Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
An ISO 9001 Company
CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING

ENQUIRY	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : tvenkat@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2620700023	**27.06.2007**	**28.08.2007**
Your are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

Item	**Description**	**Quantity**	**Delivery Schedule**
10	Crab Assembly with 2 x 40 Ton Hoist and Long Travel Mechanism assembly as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com)	1 No.	28.02.2008

Note:

Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site www.bhel.com under Enquiry reference "2620700023". Your offer should be based on all the above documents.

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 Manager / Capital Purchase / MM / Manufacturing

PART A.

QUALIFYING CRITERIA FOR THE SUPPLY OF CRAB ASSEMBLY WITH 2 X 40TON HOIST AND LONG TRAVEL MECHANISM ASSEMBLY

SECTION – I

The BIDDER has to compulsorily meet the following requirements to get qualified for consideration of the technical offer .

1.0	The BIDDER / VENDOR shall have a minimum of TEN Years of Continuous Experience of in the CRANES Field [Design, Manufacture & Supply]	
2.0	A Performance Certificate from a CUSTOMER with details of CONTACT PERSON, for whom Crab Assy. & Long travel mechanism / EOT CRANES of Capacity 40 Tons and above has been supplied.	

SECTION – II

The BIDDER / VENDOR is requested to provide the following information :

3.0	Number of Cranes supplied, erected & commissioned till date in the following category (Classification based on CAPACITY, SPAN and LIFT) : a) E O T Cranes b) Gantry Cranes c) Semi-Gantry Cranes	
4.0	Details of Manufacturing Facilities for Crane Structures and Components : a) Fabrication Facilities b) Machining Facilities c) Crane Assembly & Testing Facilities	
5.0	Details on AFTER-SALES-SERVICE Set-Up	
6.0	The reference List of Customers shall be accompanied with the details (Phone Number/E-Mail ID) of the CONTACT PERSON for cross reference	

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SECTION – III

The BIDDER / VENDOR has to comply with the following

7.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical & Commercial and Price Bid. The Technical Offer shall be in line with the BHEL Technical Specifications and the Guidelines or Annexures mentioned, wherever applicable.	
8.0	The Technical Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause of the specifications.	
9.0	A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer .	
10.0	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	
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	

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TECHNICAL SPECIFICATION OF CRAB ASSEMBLY WITH 2 X 40 TON HOIST & LONG TRAVEL MECHANISM ASSEMBLY

PART B : AA

The system is intended to form the drives and hoist of a crane, which will be fabricated by BHEL.

The job is to be lifted to a height of 1 – 2 Mtrs. from the floor level. The crab should be positioned at the center of the span. The long travel should have a provision to select a travel speed in the range 0.3 Mtrs/min to 3.0 Mtrs/min. The crane is expected to travel continuously for 2 hours at a predetermined speed.

For the entire period of travel, the long travel mechanism should be able to propel through uniformly, at the speed selected, the hoist should hold the job and the crab should stay put in position.

Interlocks need to be provided for the hoist mechanism & long travel mechanism such that, long travel cannot start until the job is positioned at the desired height from the floor level.

Interlocks are also required to ensure the alignment of the crane hook, with respect to the center of the span of the crane. Only after this alignment is ensured the long travel should start.

The controls, drives and motors selected should be suitable for the type of operations described above.

The crane to be fabricated by BHEL, may be an EOT or Gantry crane.

The specification enclosed, includes the crab with hoist and the LT mechanism for both type of cranes.

OFFERS FOR THE CRAB WITH HOIST AND LT MECHANISM, ARE TO BE MADE SEPARATELY FOR

I. EOT CRANE AND

II. GANTRY CRANE.

At the time of price bid opening, BHEL will indicate the type of crane.

The scope of supply is indicated below.

SCOPE OF SUPPLY FOR EOT CRANE

1. Crab assembly complete with Hoist mechanism and CT mechanism assembled on frame ---------- 1 no

2. LT mecchnism for EOT CRANE as per sketch ----- 2 nos

3. BOGIE assembly with wheels and floating shaft for EOT CRANE as per sketch ------ 4 Nos.
(drive wheels - 2 nos.and non drive wheels - 2 nos)

4. Electrical control panels and accessories for complete crane wiring - 1 set.

SCOPE OF SUPPLY FOR GANTRY CRANE

1. Crab assembly complete with Hoist mechanism and CT mechanism assembled on frame ---------- 1 no

2. BOGIE assembly with wheels and LT mechanism for Gantry crane as per sketch ---------- 4 Nos.
(drive bogie - 2 nos.and non drive bogie - 2 nos)

3. Electrical control panels and accessories for complete crane wiring - 1 set

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TECHNICAL SPECIFICATION OF CRAB ASSEMBLY WITH 2 X 40 TON HOIST & LONG TRAVEL MECHANISM ASSEMBLY

PART B : BB

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
1.	**Design, manufacture, supply, commissioning and prove-out of crab assembly and long travel mechanism.**		
2.0	**General arrangement of trolley assembly with hoist and cross travel mechanism.**	As per BHEL sketch M&S:PD:07:092	
3.0	**Long travel mechanism components (Bogie & mechanism) shall be** i) Suitable for EOT crane ii) Suitable for Gantry crane	i)As per BHEL sketch M&S:PD:07:096&98 ii)As per BHEL sketch M&S:PD:07:097	
4.0	**Hoist Lifting capacity**	2 X 40T = 80 Tons	
5.0	**Span**		
5.1	**Cross travel (between wheel centers)**	4500 mm Max	
5.2	**Long travel**	6000 mm	
5.3	**Height of lift [Effective Height of lift of both hoists]**	11,000 mm	
6.0	**DUTY CLASS**	Class II – vendor to confirm	
7.0	**SPEED**	Operating /Working speed	
7.1	Hoist	4 Mtrs/min for both hoists - vendor to confirm	
7.2	Cross Travel (CT)	3 Mtrs /min - vendor to confirm	

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S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
7.3	Long Travel (LT)	Variable speed 0.3 Mtrs/min - 3 Mtrs /min - vendor to confirm	
8.0	**HOIST ROPE DETAILS**		
8.1	Hoist - Size and number of falls of rope	Dia. 32 mm 4 Falls, For both hoist Total number of falls 4+4 = 8 falls – Vendor to confirm	
8.2	Rope construction	6x37 construction – Vendor to confirm	
8.3	Tensile strength	1960 N/ Sq mm – Vendor to confirm	
8.4	Lay	RHOL	
8.5	Core	Steel core.	
9.0	**CONTROL**	Pendant operation and Radio Remote control – Vendor to confirm	
9.1	Type of control	Master control	
9.2	Control voltage	110V AC	
9.3	Input power supply	415 ±10% Volts , 50Hz,3 phase –AC	
9.4	Duty class	Indoor Service	
10.0	Mechanism Group Classification	M4	
11.0	**DESIGN STANDARD**	1S-807 & 3177 / 1999	
12.0	**Runway Rail size**	**For information**	
12.1	Cross Travel (CT)	CR 80	
12.2	Long travel (LT)	CR 80	
13.0	**Wheel size**		
13.1	Cross Travel (CT)	Dia. 400 mm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
13.2	Long Travel (LT)	Dia. 500 mm	
14.0	**Number of wheels**		
14.1	Cross Travel (CT)	4	
14.2	Long Travel (LT)	8 (4 Bogies)	
15.0	**Wheel arrangement for long travel**		
15.1	**EOT CRANE & GANTRY CRANE**	Bogie type	
16.0	**CONTROL FEATURES**		
16.1	Control system	Frequency converter type for all motions	
16.2	Remote control	Radio remote control for all motions	
16.3	Crane operation	Through pendant control and Radio remote control with option for control selection	
17.0	**Special electrical controls**		
17.1	**Long travel**	The controls should be suitable for the crane operations as described in PART B : AA. Interlocks, as specified in PART B : AA, shall be provided.	
17.2	**Hoist**		
17.3	**Cross travel**		
18.0	**LT BOGIE & CROSS TRAVEL STRUCTURAL FABRICATON**		
18.1	Raw Material	Only steel plates, tested and certified for quality by reputed inspection authorities, shall be used.	
18.2	Welded Joints	No joint is permitted for main frames.	
18.3	Welding Electrodes	E 7018 Electrode only shall be used.	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
18.4	Splice Joints	No splice joint is allowed in cross travel frame fabrication	
19.0	Wheel Assembly	The Wheel Assembly for Cross Travel (CT) and Long Travel (LT) shall be of LIVE AXLE SYSTEM with L-type bearings as per enclosed BHEL Drawing No. **3-M-02R-0011993** for the wheel Assembly. Dimensions shall be strictly followed as per the drawing.	
20.0	Heat Treatment & NDT Examination	The Trolleys shall be Stress Relieved after welding and NDT Examination.	
21.0	Machining Operation	All mechanical mating surfaces and wheel seating areas are to be machined to the required finish and protected.	
22.0	Surface Cleaning	Trolley and bogies to be cleaned properly, after completion of all operations but prior to painting.	
23.0	Painting	The crane parts are to be painted as follows: a. One coat primer with 25m of DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint (As per IS 5 – 2004 Color ISC 592 International Orange) each with a DFT of 25m and intermittent curing of 16 hours.	
24.0	**MECHANICAL ELEMENTS**		
24.1	Gears	Gears in all the Stages shall be helical / spur in design and to be of machined and hardened.	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
24.2	Gear Box Casing	Shall be of fabricated type and stress relived by thermal heat-treatment process, prior to machining.	
24.3	Rope Drum	Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100% X-Ray for quality assurance.	
24.4	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 Wheels	
24.5	Wheels	The Wheels shall be of forged and Wheel Tread hardened to 300/350 BHN.	
24.6	Pulley Dimension	Rope pulley diameter shall be 23 times that of Rope diameter.	
25.0	**ELECTRICAL ELEMENTS**		
25.1	Operational Controls	The Crane shall be provided with the following: a. Pendant Push Button Control (Master Control) b. Radio Remote Control (Push Button Type- Model No.F24-10D)	
25.2	Control Voltage	110 VOLT A.C	
25.3	Type of Brakes	a. Hoist - Thrustor Brake b. Cross Travel - Thruster Brake c. Long Travel - Thruster Brake	
25.4	Protection	All Panels, Limit-Switches and Motors shall be IP 54 protection	
25.5	Electric Motors	All Electric Motors shall be as per IS-325 and IS-1231.	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
25.6	Electric Contactors	All Panels shall have only SIMENS Contactors and shall be suitable for AC3 Duty Class.	
25.7	Contactors Rating	The rating of all Contactors shall be at least 50% higher than the respective electric motor full load current, at the specified duty cycle.	
25.8	Electrical Design	All Electrical Elements shall be so selected, that they withstand 25% overloading of the crane, at any time of operation.	
25.9	Long Travel Motion	A Dual Drive Mechanism shall be provided for LT (Long Travel) Motion.	
25.10	Illumination	a. Four numbers of 500 Watts Halogen Lamps shall be provided under the Bridge. b. A lighting transformer - 2 KVA / 230 V AC shall be provided. c. All Electric Panels shall be provided with suitable illumination for visibility and troubleshooting.	
25.11	Controller Steps	4-Step Control shall be provided for Hoist, Long Travel, & Cross Travel	
25.12	Frequency Converter	The VVVF Drive shall be provided with suitable DBR for all motions.	
25.13	Hoist limit switches	Both rotory limit and counter weight limit shall be provided for hoist.	
25.14	Crab wiring	The CRAB wiring shall be done at site by BHEL.	
25.15	Cables	All cables, lugs etc., required for crane wiring shall be supplied by vendor	

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S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
26.0	**SELECTION OF COMPONENTS**	The make of components or Bought-Out-items shall be strictly as per the list given below.	
26.1	Hoist Hooks	HERMAN MOHTTA / HERCULES / SILPA UDYOG / SMRITI FORGINGS / KARACHIWALA	
26.2	Wire Rope	USHA MARTIN / FORT WILLIAM / RA WIRE ROPE	
26.3	Electric Motors	GEC / BHARAT BIJLEE / SIEMENS / KEC	
26.4	Radio Remote Control	Only TELECRANE make	
26.5	Thruster brake Unit	ELECTROMAG / SPEED-O-CONTROL / OMEGA	
26.6	Limit Switch Gravity type	SIEMENS / INDUSTRIAL SYNDICATE / BCH / SKC / SOC	
26.7	Contactors	Only SIEMENS make	
26.8	Over-Load-Relay	SIEMENS (THERMAL TYPE)	
26.9	HRC Fuses	ENGLISH ELECTRIC / L & T / SIEMENS	
26.10	Rotary limit switch	SIEMENS /OMEGA / SOC / INDUSTRIAL SYNDICATE	
26.11	Switch fuse unit	ENGLISH ELECTRIC / SIEMENS /GEC	
26.12	Moulded case C.B	SIEMENS / L&T	
26.13	Pneumatic Time Delay	Only BCH make	
26.14	Push - Buttons	SIEMENS /L&T/AIRON	
26.15	Connectors	Only ELMAX make	
26.16	Couplings	WMI / FENNER / ALFEX	
26.17	Bearings	SKF / NBC / ZKL	
26.18	Cables	Reputed Makes & ISI Approved	
26.19	Bridge Light Fittings	PHILIPS / GE / CROMPTON	
26.20	VVVF Drives	ABB / SIEMENS / L&T	

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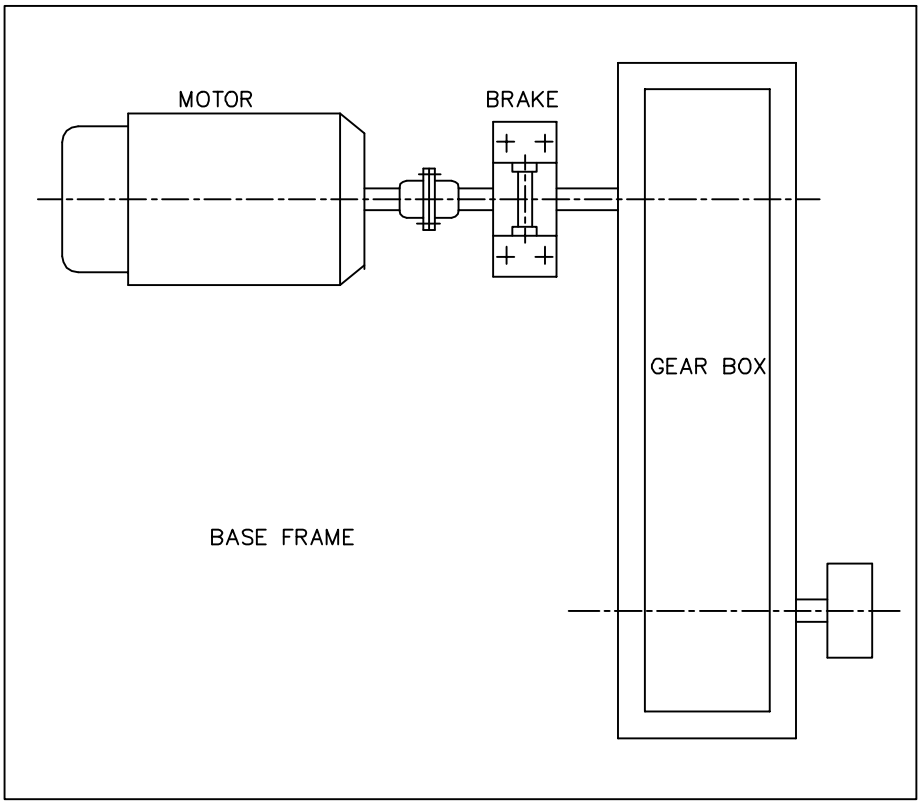
S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
27.0	**DOCUMENTS / DETAILS for APPROVAL**	The following documents and details are to be submitted for BHEL approval, prior to taking up the manufacture of the crane.	
27.1	Drawings and Documents	a. GA Drawing of Trolley assembly. c. GA Drawing of Individual mechanisms d. Drawings of End-Carriage and their connections. e. Sub-Assembly Drawing for Wheels, Hook Blocks, Gear Boxes & Hoist Drums f. Calculation for Selection of Electric Motors, Gear Reducers, Brake, Couplings, etc. g. Calculations for Crab, End – Carriage and their connections.	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
28.0	**INSPECTION**	The following will be inspected by BHEL , prior to dispatch from the Supplier's works.	
		a. Verification of Test Certificate for Raw Materials used for Bogies, Trolleys, Gear box Casings, etc. b. Random Testing on the Welds, by physical examination. c. Bogies with Wheel Assembly and Alignment checking. d. Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment. e. Free running of the all the Mechanisms f. Full / Rated Load Test g. 25% OVER-LOAD Lifting Ability Check.	
29.0	**CRANE ERECTION & COMMISSIONING**		
29.1	Mechanical Erection	Erection of the Crane will be done by BHEL, as per the guidelines furnished in the Erection Manual given by the Supplier	
29.2	Crane Commissioning	Commissioning of the Crab and LT mechanism and Performance Prove – Out for Capacity and smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
30.0	Documentation - Drawings & Details Shall supply 3 sets and on CD	a. Crab Assembly Drawing b. Total Crane Wiring Schematics c. Detailed Wiring Diagrams for Sub-Systems / Panels d. VVVF Drive's Logic Circuits e. Wheel Assembly Drawings f. Bottom Block Assembly Drawings 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.	
31.0.0	**PERFORMANCE GUARANTEE**	The Performance of the Trolley assembly, LT mechanism, electrical items and/or 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.	

L DIMENSIONS ARE IN MM



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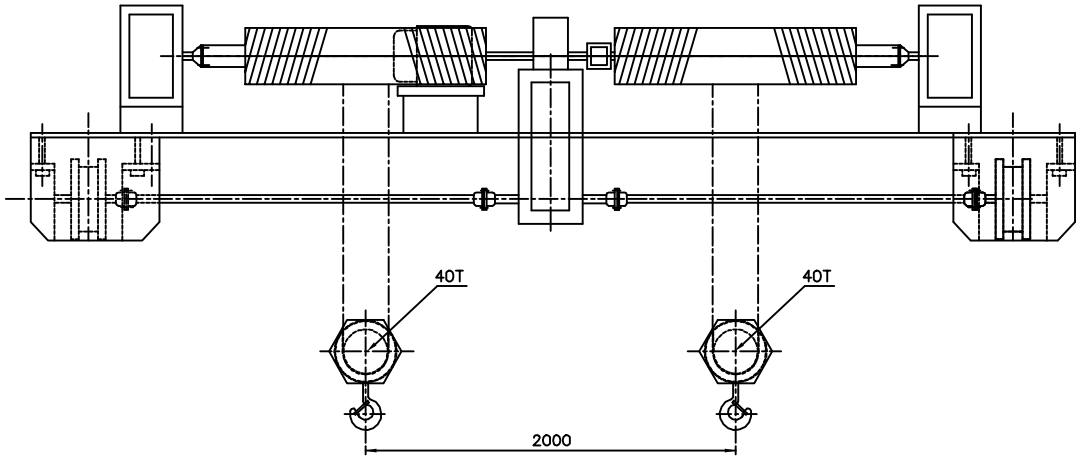
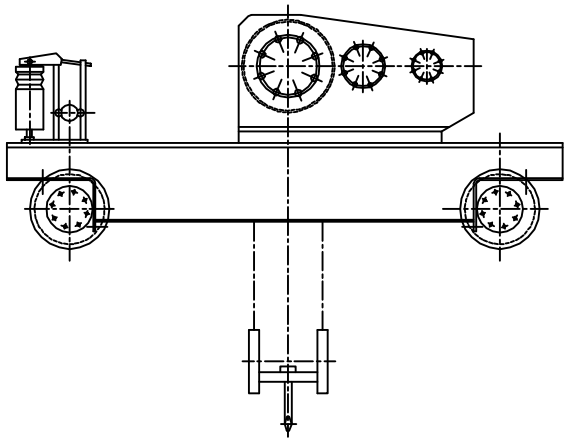
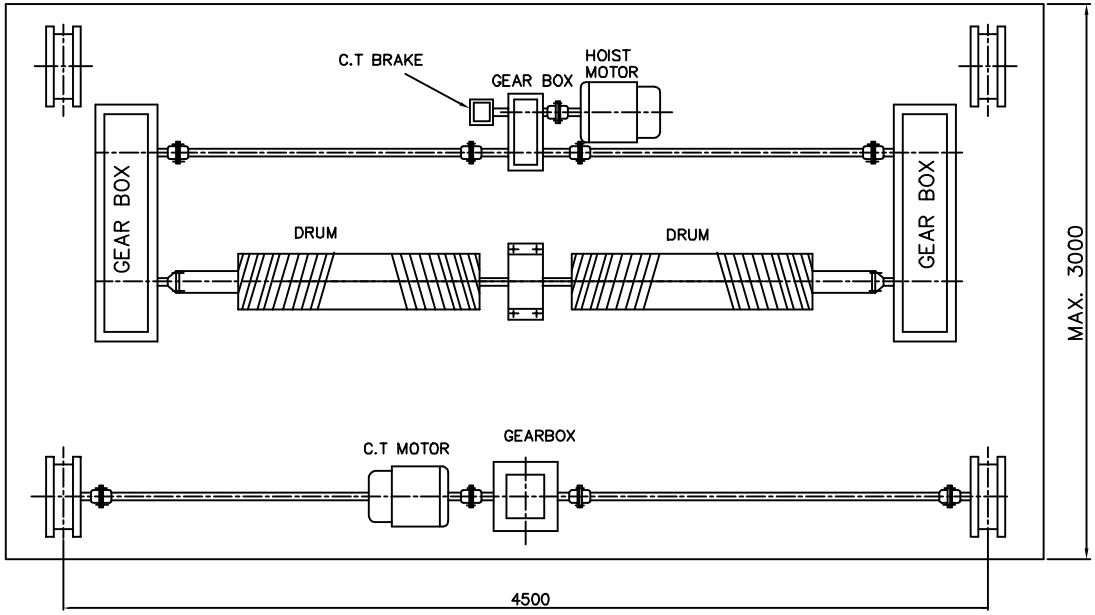
ALL DIMENSIONS ARE IN MM







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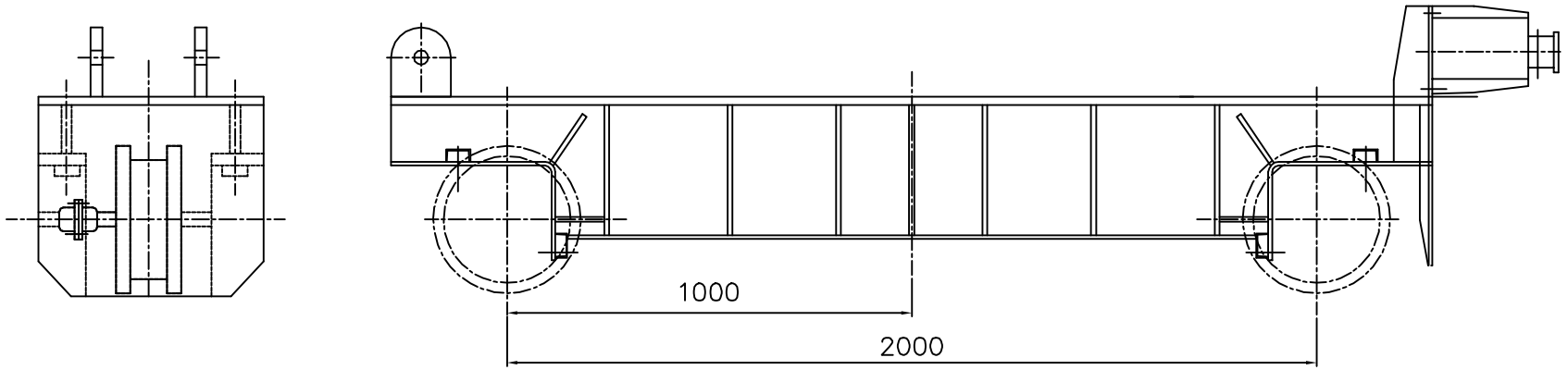

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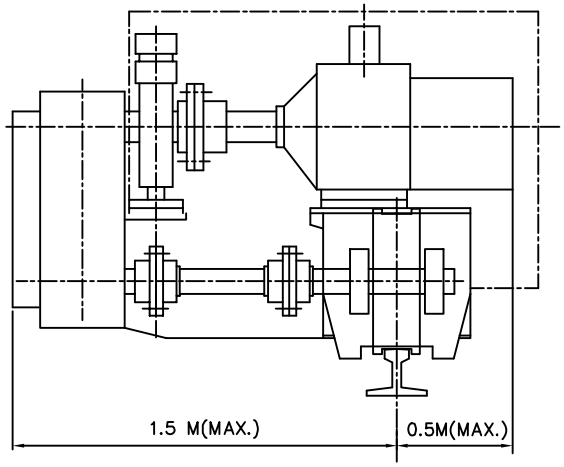
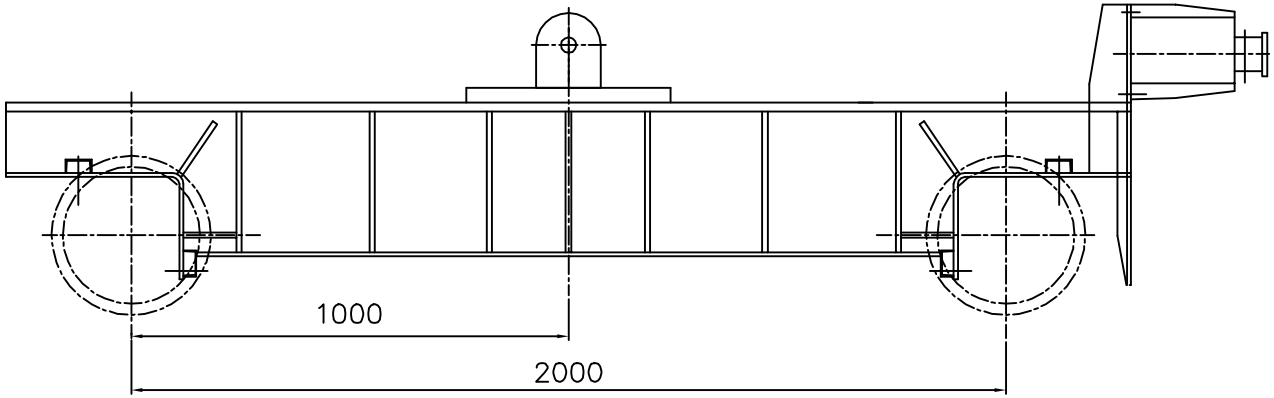
ALL DIMENSIONS ARE IN MM





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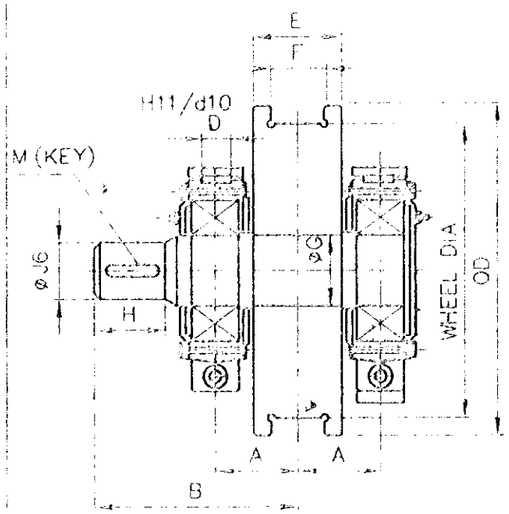
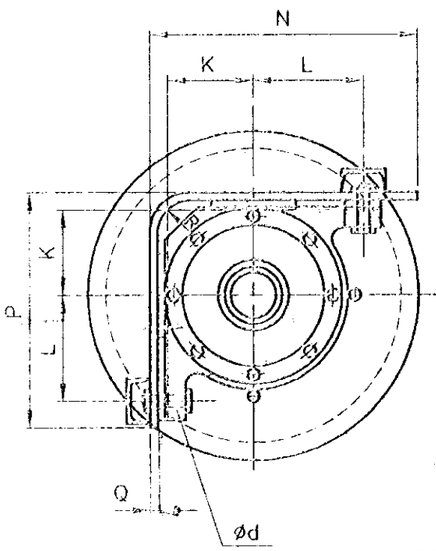
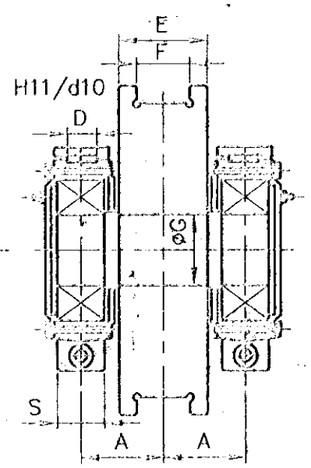
ALL DIMENSIONS ARE IN MM

SL. No.	T.O.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																			
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		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	500/550	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		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	90 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



DRIVING WHEEL ASSY





IDLE WHEEL ASSY

MATERIAL :- SHAFT - 45C8/IS:1570.
WHEEL - 55C8/IS:5517.
FORGED.
TREAD 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	
			ALTERATIONS	DCN. REF	DATE	SIGN.	INDEX
SCALE \	DRAWN	RKM					
	CHECKED	R.Ramamoorthy					
	APPROVED						
	DATE	20-10-2000					

MACHINE: CRANE WHEEL ASSY
TYPE: GENERAL
TITLE: STANDARD CRANE WHEEL ASSY
DRAWING No: 3-M-02R-11993 00
REV.
No.of Sheets: Sheet No: