

SCOPE OF WORK FOR THE ENQUIRY NO.2071242E

Supply, Installation, Erection & Commissioning of Regenerative Variable Frequency Drives, Induction motors & Panels in Retrofitting of BHEL Ranipet's 10T EOT Crane

SL	1. SCOPE OF WORK	QTY
1.1	Supply, Installation, erection & Commissioning of Regenerative Variable Frequency AC Drives, three phase Squirrel Cage Induction Motors, Panels, Cables, etc in S4 10T Electrical Overhead Traveling Crane of BHEL Ranipet and to replace the existing systems which are operated by Slip Ring motors with Resistance controls	1 Package

SL	2.DETAILS OF THE CRANE	ALREADY AVAILABLE	VENDOR'S COMMENTS
2.1	S4 EOT Crane is an Indoor Double Girder Electrical Overhead Traveling Crane. It is located in F1 Bay of BHEL Ranipet	Vendor to note	
2.2	Crane Capacity is 10 T	Vendor to note	
2.3	Span is 28.5 meters	Vendor to note	
2.4	Crane is operated by 5 step Master controller and 2 step Remote Controller	Vendor to note	
2.5	All motions of crane are being operated by Slip Ring Motors controlled by Rotor Resistances	Vendor to note	
2.6	Make of the crane - Southern Structurals Ltd (SSL), Madras. Crane was commissioned in 1982	Vendor to note	
2.7	Already Existing Main Hoist Motor -One number of 280S frame size, 6 pole 37KW slip ring motor 40% CDF 150 s/h	Vendor to note	
2.8	Already Existing Long Travel motors - Two numbers of 200L frame size, 6 pole, 13KW slip ring motor – 40% CDF 150 s/h	Vendor to note	
2.9	Already Existing Cross Travel motor- One number of 132M frame size, 6 pole, 2.4KW slip ring motor – 40% CDF 150 s/h	Vendor to note	
2.10	Crane Height of lift - 8.6 meters	Vendor to note	
2.11	Number of falls for Hoist steel wire rope - 4 falls. Steel Wire rope size 16mm. Construction 6 x 36	Vendor to note	

2.12	Hoist Speed - 12 meters/min, LT speed - 80 meters/min, CT speed - 40 meters/min	Vendor to note	
2.13	Hoist Gearbox - Horizontal- triple stage with gear ratio 44.9:1	Vendor to note	
2.14	CT Gearbox - Vertical- Double stage with gear ratio - 17.65:1	Vendor to note	
2.15	LT Gearbox - Vertical - Double stage with gear ratio - 17.7:1	Vendor to note	
2.16	Crane platform 1075 mm width approx.	Vendor to note	
2.17	Crane control circuit voltage - 110V AC	Vendor to note	
2.18	Brakes- DCEM brakes for Hoist, LT and CT are already available in crane	Vendor to note	
2.19	Limit Switches- Crane has Limit switches for LT and CT. Crane has Gravity and Rotary Limit Switches for Hoist.	Vendor to note	

SL	3.Required AC Squirrel cage Induction Motor	Specification Required	Qty	Vendor's Offered Spec with motor ratings & make	Deviations
3.1	Hoist Motor	280S 6 pole 50Hz 3 phase Squirrel Cage AC Induction Motor. Foot mounted. S4.40% CDF & 150 starts / hour. TEFC Motor. Insulation class F. Utilization class B. Terminal Box on top of motor. Motor Rating shall be chosen by Vendor in accordance with frame size, previous motor rating and load. Motors shall be of reputed make	1		
3.2	Long Travel motors	200L 6 pole 50Hz 3 phase Squirrel Cage AC Induction Motor. Foot mounted. S4.40% CDF & 150 starts / hour. TEFC Motor. Insulation class F. Utilization class B. Terminal Box on top of motor. Motor Rating shall be chosen by Vendor in accordance with frame size, previous motor rating and load. Motors shall be of reputed make	2		

3.3	Cross Travel Motor	132M 6 pole 50Hz 3 phase Squirrel Cage AC Induction Motor. Foot mounted. S4.40% CDF & 150 starts / hour. TEFC Motor. Insulation class F. Utilization class B. Terminal Box on top of motor. Motor Rating shall be chosen by Vendor in accordance with frame size, previous motor rating and load. Motors shall be of reputed make	1		
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SL	4.Required Variable Frequency AC Drives	Specification Required	Qty	Vendor's Offered drive's make, spec and model no	Deviations
4.1	Hoist VFD	Regenerative Variable Frequency AC Drive of 400V class and above with no Dynamic Braking Resistors. Heavy Duty Rating of the Drive shall be equal to or more than the Motor Rating. Make shall be ABB, Siemens or Yaskawa only	1		
4.2	Long Travel VFD	Regenerative Variable Frequency AC Drive of 400V class and above with no Dynamic Braking Resistors. Heavy Duty Rating of the Drive shall be equal to or more than the Motor Rating. Make shall be ABB, Siemens or Yaskawa only	1		
4.3	Cross Travel VFD	Regenerative Variable Frequency AC Drive of 400V class and above with no Dynamic Braking Resistors. Heavy Duty Rating of the Drive shall be equal to or more than the Motor Rating. Make shall be ABB, Siemens or Yaskawa only	1		

SL	5.VFD auxiliaries	Specification Required	Qty	Vendor's Acceptance	Deviations
5.1	Line Reactors	To be provided at input and output of the drive if there are no inbuilt input and output filters in the drive	NA		
5.2	Mains cable fuses	Fuses for short-circuit protection of the mains cable and to protect the adjoining equipment of the drive in case of a short-circuit with operating time of the fuse of 0.1 seconds shall be provided	NA		

5.3	Dynamic Braking Resistor units	Strictly no DBR. Only Regenerative AC Drive shall be provided.	NA		
5.4	Regenerative Units	Each AC Drive shall be a standalone Regenerative AC drive. Additional Regenerative Units or converters to an individual AC drive or to a series of drives will not be acceptable.	NA		
5.5	Programming of drive	Shall be through Basic Operator Panel	NA		
5.6	Analog or Digital Control	Digital Control preferred. (Input from Crane Master controller and remote controller)	NA		
5.7	Make and model of Drive	ABB ACS 800-11/U11 , Siemens Sinamics PM250 or Yaskawa U1000 series	NA		

SL	6.Required Auxiliaries	Specification Required	Qty	Vendor's Offered Spec with make	Deviations
6.1	Panels	Suitable IP55 panels with exhaust fan for cooling.	NA		
6.2	Control circuit Voltage	110V	NA		
6.3	Control Circuit Wiring	Engineering of Control Circuit wiring is in Vendor's scope	NA		
6.4	Switchgears like Contactors, relays, MCBs, MCCBs	Reputed Switchgears alone shall be provided and shall conform to IS standards	NA		
6.5	Lighting inside panel	Adequate lighting inside panels shall be provided.	NA		
6.6	Control panel wiring and Drive, switchgears spacing	All Drives, MCBs and switchgears shall be adequately spaced from each other. Panels shall be neatly wired. Positioning shall be proper with DIN rails. Panels shall be easily maintainable.	NA		
6.7	Power cables	All additional Power cables are in Vendor's scope. Reputed cables of IS make shall be provided	NA		
6.8	Control Cables	All control cables are in Vendor's scope	NA		
6.9	All Power and control cable wiring	Any festoon wiring is in the scope of Vendor. All power and control circuit wiring and proving out of the crane is in Vendor's scope	NA		

SL	7.Interfacing	Acceptance by Vendor	Deviations
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7.1	All new motors and drives shall be interfaced to BHEL's S4 10T EOT crane		
7.2	Interfacing of panels with BHEL's S4 10T EOT Crane is in Vendor's scope		
7.3	All wirings from/to all accessories, motors, VFDs, drives, panels etc are in Vendor's scope		
7.4	Programming of VFD is in Vendor's scope		
7.5	Interfacing of Crane's brakes with VFD is in Vendor's scope		
7.6	Input shall be 5 step Master Controller and 2 step Remote controller. Master Controller and remote controller is already existing in the crane. Wiring from Master Controllers to control panels is in Vendors's scope. Interfacing of already existing Remote Receiver with Control panel is in Vendor's scope		

SL	8.General Conditions	Acceptance by Vendor	Deviations
8.1	Proving out of the crane for all motions is in Vendor's scope		
8.2	All interfacing of drives, motors, panels is in Vendor's scope		
8.3	Removing old panels motors, resistance boxes etc from the crane is in Vendor's scope. All removed items shall be handed over to BHEL		
8.4	Installing Motors is in Vendor's scope		
8.5	BHEL will provide uninterrupted 3 phase power supply		
8.6	All welding and cutting consumable will be provided by BHEL		
8.7	Hoisting of Motors, VFDs, Panels, Cables, etc is in Vendor's scope		
8.8	Chain hoist for hoisting will be provided by BHEL		
8.9	All skilled manpower for installation, erection etc is in Vendor's scope		
8.10	All wiring is in Vendor's scope		
8.11	Motor couplings if needed to be changed will be provided by BHEL. However removal of old couplings and fixing of new couplings is in the scope of Vendor.		
8.12	Master Controllers if needed to be changed will be provided by BHEL. However wiring to and from Master controllers is in Vendor's scope		

8.13	It is the responsibility of the Vendor to collect the details of the crane from BHEL for smooth erection & installation . Vendor can visit BHEL on any working day for the same, if necessary.		
8.14	Inspection of panels, inspection of panel wiring, inspection of switchgears spacing in panels, etc shall be performed by BHEL at supplier's works prior to despatch		
8.15	Training on VFD maintenance & programming shall be imparted to all Cranes' electrical maintenance personnel at either BHEL's works / Vendor's works.		
8.16	Guarantee period shall be 12 months from the date of commissioning. Guarantee period shall be for all motors, drives & panels.		
8.17	Shut down time of the crane shall be 15 days for installation & commissioning.		

SL	9. Documents Required	Acceptance by Vendor	Deviations
9.1	Modified Crane Control and power circuit drawing shall be provided for approval. Crane panel wiring shall be started only after electrical drawing approval from BHEL		
9.2	List of electrical items like Switch gears, relays, contactors etc		
9.3	VFD manuals		
9.4	Operation & Maintenance manuals		