BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Boiler Auxillaries Plant
Indira Gandhi Industrial Complex, Ranipet - 632406 , INDIA

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BAP:RANIPET

LETTER / FAX ENQUIRY

To : M/S

ENQUIRY NO. : 8861135E

ENQUIRY DATE : 02/12/2016

DUE DATE : 23/12/2016

FAX TO :

Dear Sir(s),

SUB : REQUIREMENT OF RECONDITIONING & RETROFIT OF INNSE LATHE

REF : 8861135E DT : 02/12/2016

Please Submit your lowest quotation on FIRM PRICE basis.

Sln	Mcd	Description	Qty	Unit	Lot no.	Lot Qty	Dly Dt
001	IM9107705501	RECONDITIONING & RETROFIT OF INNSE LATHE WITH ELECTRICAL & MECHANICAL SCOPE OF WORK ENCLOSED	1.000	ST	001	1.000	20/01/2017

REMARKS: 1.) KINDLY FILL THE COMMERCIAL TERMS & CONDITIONS SHEET AND SEND IT ALONG WITH YOUR OFFER WITHOUT FAIL. 2.) KINDLY QUOTE ON TWO PART BID BASIS (TECHNICAL + PRICE BID).

REGARDS

MANAGER / PURCHASE

Boiler Auxiliaries Plant,

Bharat Heavy Electricals Limited,

Ranipet - 632406, Tamilnadu, INDIA.

Scope for "Mechanical Reconditioning of Innse CNC Heavy Duty Lathe "

1.0	**APPLICATION:**
1.1	The machine is used to produce curvature machining of hemi-sphere jobs
2.0	**SCOPE OF WORK & SUPPLY:**
2.1	At present, profile machining, which is done on hemisphere job by the machine, having surface finish problem. The surface finish problem means line marks formation on the surface during machining.
2.2	To eliminate the problem, it is planned to do reconditioning on X&Z-axis mechanical assembly and replacing main spindle bearings.
2.3	It will be done by dismantling Z-axis and X-axis mechanical drive assembly and replace the worn-out parts with new one, which will be provided by BHEL BAP. Before starting the work, the existing geometrical accuracy will be measured by Laser calibration method.
2.4	After completing retrofit and reconditioning, another Laser calibration need to be done to obtain the required geometrical accuracy.
2.5	The main spindle bearings,which will be provided by BHEL, will be replaced along with other reconditioning work.
2.6	After completing the retrofit and reconditioning, the present repeatability & reconditioning accuracy in Z&X-axis are need to be retained/improved. And spindle run-out must be within tolorance.
3.0	**REQUIRED TECHNICAL SPECIFICATIONS:**
3.1	Run-out on spindle must be within 0.02 mm
4.0	**Details of works to be performed.**
4.1	A preliminary geometrical accuracy checking test need to be conducted with the help of Laser calibration method by the supplier.
4.2	Condition of the main spindle bearings must be analyzed.
4.3	All the inspecting, dismantling, replacing and assembly works are to be done by supplier.
4.4	All the worn-out parts are replaced from the X & Z-axis mechanical elements with new items, which will be provided by BHEL BAP, by the supplier.
4.5	Another Laser calibration test will be conducted for achiving the required geometrical accuracy in repeatablity & repositioning by the supplier.
4.6	Those new repeatability and repositioning accuracy will be discussed and accepted by BHEL BAP, if meeting the specified tolerance limit.
4.7	The spindle bearing dismantling and assembly works are to be done by the supplier. Then the spindle run-out will be checked and proved.
4.8	After completing the retrofit and reconditioning, the previous repeatability & reconditioning accuracy in Z&X-axis are need to be retained/improved by the supplier and the same will be checked by BHEL BAP.
4.9	Then a trial hemisphere job need to be loaded and machined by the supplier. Necessary assistance will be provided for loading and machining of the job.

22/11/16

EI/MMO-forms

5.0	**Material collection & delivery**
5.1	All the reconditioning works shall be carried out and need to prove the performance in BHEL BAP.
5.2	All the required spares and bearings will be provided by BHEL BAP.
5.3	All the works shall be carried out and proved the performance of X-axis and z-axis within **23 Days** from the date of start of work.
6.0	**General Instructions:**
6.1	Necessary tools will be arranged by the supplier.
7.0	**INSTALLATION & PROVE OUT AT BHEL WORKS**
7.1	The final repeatability and positional accuracy of X & Z axis will be maintained / improved
7.2	Run-out on spindle must be within 0.02 mm
8.0	**PERFORMANCE GUARANTEE:**
8.1	The Performance of the retrofit work on X-axis and Z-axis with new replaced parts shall be guaranteed for a minimum period of 12 months from the date of prove out at BHEL Works.

EI/MMO-Fans

Supply, Installation and Commissioning of the following in Retrofit of INNSE Lather

SNo.	1. SCOPE OF WORK	Qty
1.1	Supply, installation and commissioning (Retrofit) INNSE machine CNC system with Siemens 840D SL, with suitable drives ,servo motors, absolute linear scales and accessories suitable to replace the existing Siemens 840C CNC system. Presently the system is working with AC Motors and AC Analog Drives. **The existing system details are given in the table annexure-1 and table-1.**	1 Package

SNo	2. REQUIRED CNC SYSTEMS	Qty	Acceptance by vendor	Details Required	Deviations/ Details
2.1	Complete package of CNC system (system as explained in point 1.1) to support axes X & Z, Spindle with a monitor of display screen size not less than 10"	1SET	Yes/No	Submit full details	
2.2	Motors and its Drives for all the axes (X, Z, Spindle) compatible with the new system to be supplied. The drives shall be digitally interfaced.		Yes/No	Submit full details	
2.3	New absolute linear scales for the axes X, Z and external encoder for spindle, compatible with the drives and the system. The scales and encoder shall be of Heidenhain make only		Yes/No	Submit full details	
2.4	CNC tuning, parameter adjustments and PLC programs are supplier's scope.		Yes/No	Submit full details	

SNo	3. REQUIRED MOTORS	Qty	Acceptance by vendor	Details Required	Deviations/ Details
3.1	AC Servo Motor without Brake for Z axis	1No	Yes/No	Submit full details	
3.2	AC Servo Motor without Brake for X- axis	1 No	Yes/No	Submit full details	
3.3	The above items shall be of SIEMENS make only		Yes/No	Submit full details	
3.4	The details like rating, make, load characteristics etc of the motors to be supplied along with technical offer		Yes/No	Submit full details	

SNo	4. REQUIRED DRIVES	Qty	Acceptance by vendor	Details Required	Deviations/ Details
4.1	Suitable AC Servo Drive for point no 3.1,3.2,3.3	1No	Yes/No	Submit full details	

4.2	The existing spindle motor shall be retained in the machine. The new suitable servo drive has be supplied by supplier for the existing spindle motor. The details of spindle motor available in Annexure I	1No	Yes/No	Submit full details	
4.3	The Drive power supply and Drives shall be connected through common DC BUS.	1 No	Yes/No	Submit full details	
4.4	The above items shall be of SIEMENS make only		Yes/No	Submit full details	
4.5	The details like rating, make, load characteristics etc of the drives to be supplied along with technical offer		Yes/No	Submit full details	

SNo	4. REQUIRED MEASURING SYSTEMS	Qty	Acceptance by vendor	Details Required	Deviations/ Details
5.1	Linear absolute Scales for Z Axis. The length of scale shall be 3440 mm.	1No	Yes/No	Submit full details	
5.2	Linear absolute Scales for X - Axis. The length of scale shall be 840 mm.	1 No	Yes/No	Submit full details	
5.3	External encoder for spindle	1 No	Yes/No	Submit full details	
5.4	The Scales are to be retrofitted by removing the existing linear scales and also to be interfaced to the new CNC system		Yes/No	Submit full details	
5.5	The Scales shall be fully covered to protect from chips and other mechanical damages		Yes/No	Submit full details	
5.6	The above items shall be of HeidenHain make only		Yes/No	Submit full details	
5.7	The Scales shall be of Optical type only		Yes/No	Submit full details	

SNo	5. REQUIRED AUXILIARIES	Qty	Acceptance by vendor	Details Required	Deviations/ Details
6.1	New control panel with a reputed make panel AC shall be supplied.		Yes/No	Submit full details	
6.2	All supplied necessary Contactors, control elements and all other switch gears shall be of reputed make.		Yes/No	Submit full details	
6.3	The Panel shall be wired neatly and the positioning should be proper with DIN rails and easy maintainability.		Yes/No	Submit full details	
6.4	All interfacing cables and connectors shall be supplied and it must be of reputed make.		Yes/No	Submit full details	

6.5	New swilling type operator panel shall be designed for the CNC system and it must be accessible to the operator meeting all operational requirements.		Yes/No	Submit full details	
6.6	Mini BHG of the respective CNC system shall be provided with sufficient cable length meeting the operational requirements of the machine.		Yes/No	Submit full details	
6.7	Supply and installation of Two submersible pumps with float switches for coolant and lubrication oil recovery and it shall be interfaced with PLC. The capacity of pumps shall be 200LPM or more.	2 Set	Yes/No	Submit full details	

SNo	6. INTERFACE	Acceptance by vendor	Deviations/ Details
7.1	All the new motors and drives of the axes are to be interfaced to new CNC system.	Yes/No	
7.2	The mechanical mountings, Couplings, fixtures, brackets and alignment are supplier's scope.	Yes/No	
7.3	All wirings from / to the accessories, motors, encoders/Scales, drives and panels are the suppliers scope	Yes/No	
7.4	Re-programming the PLC/CNC to meet all the machine requirements is supplier scope.	Yes/No	
7.5	Interface of all accessories to be done	Yes/No	
7.6	Temporarily removed existing machine parts for retrofit to be re-installed	Yes/No	
7.7	Reputed make wires/cables/conduits shall be used with proper rating to interface the drive, motor etc. If BHEL finds that the wires/cables/conduits are not a reputed make and under rated the same shall be disqualified by BHEL.	Yes/No	
7.8	New external linear scales and encoders to be interfaced to the new CNC system. The necessary cables, connectors, mounting brackets and protective covers are under supplier's scope.	Yes/No	
7.9	Special provision has to be made with G-Code for protection of tool digging in the event of sudden power failure by retraction of X- Axis. (Auto Tool Retrieval system for X and Z axis)	Yes/No	
7.10	Vacuum pump is available for holding job in spindle while finishing operation. Operation of this pump shall be interfaced through operator panel.	Yes/No	
7.11	Interfacing of existing turret with new CNC system has to be done in the machine	Yes/No	
7.12	All safety interlocks existing in the machine shall be interfaced to PLC like panel temperature, Over travel etc.	Yes/No	

S.No	7. GENERAL CONDITIONS	Acceptance by vendor	Deviations/ Details
8.1	Existing accuracy & Features of the machine shall be proved after retrofit.	Yes/No	
8.2	Maintaining Positioning accuracies, repeatability's and entering error compensations in the CNC are the scope of suppliers.	Yes/No	
8.3	Minor help like drilling/welding/material handling can be extended by BHEL on request.	Yes/No	
8.4	BHEL Provides interrupted Power supply of 3 Phase 3 Wire 415V+/-10%, 50HZ +/-3Hz without neutral.	Yes/No	
8.5	All the interfacing between drives, motors and CNC are in supplier's scope.	Yes/No	
8.6	The guarantee period will be 12 months after successful commissioning.	Yes/No	
8.7	The shut down period will be 30 days for installation & commissioning.	Yes/No	
8.8	Removing Existing system, panel, etc. from the machine is supplier's scope.	Yes/No	
8.9	Training has to be given for operators and electrical maintenance persons on respective CNC system at vendor/OEM works. Expenses for boarding and lodging of BHEL personnel during training shall be born by BHEL	Yes/No	
8.10	It is the responsibility of the vendor to collect details of the machine from BHEL, Ranipet. Vendor may visit BHEL, Ranipet for the same, if necessary.	Yes/No	

SNo	8. DOCUMENTS REQUIRED	Qty	Acceptance by vendor
9.1	Manuals and Drawings in all respect to meet all the maintenance activities and to recover the machine in case of failures. The Manuals and Drawings shall be given in the form of CD also.	3 Set	Yes/No
9.2	CNC and PLC Backups in CD format		Yes/No
9.3	PLC program in CD readable format		Yes/No
9.4	CNC & Operation manuals	3 Set	Yes/No
9.5	Manuals shall be in English only		Yes/No

No	9. ANNEXURE-1 Existing systems (All these parts of existing system removed from the machine shall be handed over to M&S dept of BHEL BAP, Ranipet)	
10.1	Siemens 840C CNC system	6FC5110-0DB02-0AA2 6FC5114-0AA01-1AA0 6FC5114-0AA02-0AA0 6FC5111-0BA01-0AA0 6FC5110-0CB01-0AA0 6FC5112-0DA01-0AA1 6FC5110-0BB01-0AA2
10.2	SPINDLE(Table) MOTOR	Make: SIEMENS; Model: 1PH7224-2NF00-0CA0 (100KW,1500RPM, 4500RPM max)
10.3	Axis Motors X	Make: SIEMENS, Model: 1FT5 076-0AF71-1-Z (rated torque-16.5Nm, rated .speed 3000RPM,).
10.4	Axis Motors Z	Make: SIEMENS, Model: 1FT5 106-0AF71-1-Z (rated torque-28Nm, rated .speed 3000RPM).
10.5	Power supply (ER module) for X, Z	6SN1145-1BA02-0CA2
10.6	Power supply (ER module) for SPINDLE	6SN1145-1BB00-0FA0
10.7	Spindle drive	LT Module: 6SN1123-1AA00-0KA0(400A LT Module control card: 6SN1121-0BA11-0AA0 Braking module : 6SN1113-1AB01-0BA0
10.8	Axes drives	LT Module: 6SN1123-1AA00-0DA0 (80A)– X-AXIS LT Module : 6SN1123-1AA00-0EA0 (160A) – Z-AXIS LT Module control cards : 6SN1118-0AA11-0AA1 – (FOR X,Z AXIS) MAGNETIZING MODULE : 6SN1112-1AC01-0AA0 Braking module : 6SN1113-1AB01-0BA0
10.9	External Encoders for SPINDLE.	ROD 426 1024 03S12-03 (Heidenhain make)
10.10	Linear scale of X-AXIS	LS 106 ,Heidenhain make, length of scale 840mm(ID NO – 295 709-19)
10.11	Linear scale of Z-AXIS	LB 301 ,Heidenhain make, length of scale 3440mm(ID NO – 284668-03)
10.12	AUTO retrieval system for X and Z-Axis .