

Annexure-A

RETROFITTING OF STC 25 CNC SLANT BED LATHE PLAN NO. 2-437, BLOCK-3

Brief About Machine:

CNC Slant Bed Lathe (Model STC 25) from M/s. HMT, INDIA with following Broad Specifications is to be retrofitted with Sinumerik 828D or latest/FANUC 0i CNC controller along with AC servomotors and AC servo drives ,AC spindle motor & AC spindle drive and measuring systems. All existing features and functions of the machine need to be retained as such.

Broad Specifications of the machine:

• CNC Slant Bed Lathe (STC 25)	HMT, India
• Type of Bed	Inclined 20° to vertical
• Swing over Carriage wings	430 mm
• Swing between centers	360 mm
• Distance between centers	1000 mm
• Maximum Turning diameter of chucking job	400 mm
• Maximum turning length	1000 mm
• Maximum boring length	300 mm
• Spindle nose	A 2-6"
• Hole through spindle	53 mm
• Spindle socket taper	Metric 60
• Spindle speed range	RPM (40-4000)
• Total speed range	1 : 100
• Total constant power range	1 : 12.5
• Selection of speeds (Range selection-Hydraulic)	By tape or MDI
• Type of spindle drive	DC Motor through SCR
• Feed range (Longitudinal and Cross)	mm/min (1-5000)
• Rapid traverse rate (Longitudinal and Cross)	m/min 10
• Thread cutting pitch	mm/rev 0.001-400 subject to max. Feed rate
• Cross slide stroke	300 mm
• Tailstock spindle diameter	300 mm

• Tailstock spindle stroke	110 mm
• Tailstock spindle taper	110mm
• No. of tools	12 (6 Internal & 6 External) 12 (any combination for VDI option)
• Turret indexing positions (Random or sequential)	12
• Turret indexing accuracy	± 3 arc seconds
• Turret tool shank size	25mm X 25mm
• Turret actuation	Hydraulic
• Max. shank diameter or drilling And boring tools on turret	50 mm 40 mm (VDI shank)
• Indexing time:	
• 30° Indexing	3 seconds
• 180° Indexing	5 seconds
• Power of spindle drive motor (std.)	15 Kw continuous
• Power of hydraulic motor	1.5 Kw
• Power of coolant pump motor	0.375 Kw
• Positioning accuracies of slides As per NMTBA method	±0.015/300
• Repeatability of slides As per NMTBA method	±0.005
• Programming resolution	0.001 mm\
• Feedback resolution	0.001 mm
• CNC Controller	HMT Hinumerik 3100 T
• Main spindle drive	6RA2625-6GV57
• Main Spindle Motor	Siemens DC motor 1GG5134-0WY40-6HU7-Z, 20.0Kw
• Axes drive	6RB2030-2EG00
• Feed motors	Siemens 1HU3078-0AC01, M ₀ =14 Nm, 1.8 Kw, 2000 rpm for Z Axis, TACHO 1HU1052, 20mV/min Siemens 1HU3074-0AC01-Z, M ₀ =7 Nm, 1.8 Kw, 2000 rpm for X Axis with brake: EBD 2M, 24VDC, 23W
• Milling Spindle Motor	Siemens 1FT5076-0AF01-Z, M ₀ = 20 Nm, 4.4 Kw, 3000 RPM, Impulse Generator: ROD320B, 2500ppr
• Milling Spindle Drive	Siemens 6SC6101-2A-Z; Z=A70+G10
• Measuring system for X Axis	Heidenhain Encoder ROD 426, 2500 ppr (Mounted on motor shaft)
• Measuring system for Z Axis	Heidenhain Encoder ROD 426 E, 2500 ppr (Mounted on lead screw)

- Measuring system for Chuck/Spindle Siemens Encoder 6FX2001-2CB02, 1024 ppr (For spindle positioning)
- Power Supply: 415V +/-10%, 50 Hz +/- 3%, 3 Phase, with neutral and earth, 50KVA

(A)	SCOPE OF SUPPLY					
SL. NO	DESCRIPTION		QTY	ACCEPTED (YES/NO)	DEVIATION	REMARKS
(1)	<u>MATERIAL SUPPLY & WORK:</u>					
1.1	<u>CNC SYSTEM</u> : SIEMENS 828D or latest / FANUC 0i comprising of the following features:		1 No.			Vendor to provide details & comply
(a)	Turning, Milling & threading operations					Vendor to comply
(b)	Oriented Spindle stop					Vendor to comply
(c)	USB ports, RS232 or Ethernet port for data transfer. (Note: USB port is must for data transfer.)					Vendor to comply
(d)	Measuring systems, lead screw, Backlash & Friction compensation, Bi-directional pitch error compensation facility					Vendor to comply
(e)	Graphic simulation- Single sided 2D view, dynamic					Vendor to comply
(f)	PLC in Ladder diagram / STL format should be provided. Ladder program should be viewable on the monitor of CNC. Status of various signal should be indicated in ladder diagram					Vendor to comply
(g)	CNC user memory for program and data should be 2MB or more.					Vendor to comply
(h)	Features through USER/ Pre-defined keys: 1. Single block 2. Block Search 3. DRY run 4. Optional Stop	5. Programmable keys 6. Rapid Feed On/OFF				Vendor to comply
(i)	Blue Print programming/ Integrated operation Guidance for NC program-less machining.					Vendor to comply
1.1.1	Machine Operator panel for Mode selection, Feed override, Spindle override, Cycle START/STOP, Spindle START/STOP along with full QWERTY keyboard.		1 Set			Vendor to comply
1.1.2	Electronic Hand wheel & Handwheel interface (if required) on operator panel for X & Z axis with axes handwheel selector switch.		2 Nos.			Vendor to comply
1.1.3	CF card for data transfer.		3 Nos.			Vendor to comply
1.1.4	Transcend make CF card reader. Interface cables for connecting CF card with PC and CNC system with PC through Ethernet & RS232 port.		3 Nos.			Vendor to comply
1.1.5	Input/ Output board for 72 inputs & 48 outputs or more.		2 Nos.			Vendor to comply
1.1.6	All Softwares along with communication cables for data back-up & restoration.		2 Set			Vendor to comply

1.1.7	Vendor should provide program conversion software for automatic conversion of existing programs of the machine ensuring conversion of all basic codes (G,M,F,S,T,H codes etc.), coordinate values, text instructions, subprogram call, block structure and tool nos. of NC program. In case, conversion of any special function/feature/cycle/offset nos. is not possible with supplied software, necessary manual correction of existing programs (200 Nos.) shall be carried out by vendor for acceptance by BHEL. The software shall be installed on BHEL PC (Windows 7 onwards). Testing of software shall be done by converting 5 existing programs using supplied software and checking of converted programs for their correctness & suitability to new system. Sample programs are enclosed for reference (Refer Annexure- A/PROG).	1 Set			Vendor to comply
(1.2)	AC SERVO MOTORS :				
1.2.1	SIEMENS/FANUC AC servo motor with holding brakes of suitable rating for X axis with rated Torque (M_n) of 7 Nm or more and maximum speed of 2000 RPM or more. Existing motor details are as under: Siemens 1HU3074-0AC01-Z, $M_o=7$ Nm, 1.8 Kw, 2000 rpm Note: X Axis motor is with brake: EBD 2M, 24VDC, 23W	1 No.			Vendor to provide details and comply
1.2.2	SIEMENS/FANUC AC servo motor for Z axis with rated Torque (M_n) of 14 Nm or more and maximum speed of 2000 RPM or more. Existing motor details are as under: Siemens 1HU3078-0AC01, $M_o=14$ Nm, 1.8 Kw, 2000 rpm.	1 No.			Vendor to provide details and comply
1.2.3	Suitable SIEMENS/FANUC AC Main Spindle Motor (Forced Air cooled) with 20 KW or more rated Power and maximum speed of 3900 RPM or more in constant power zone. Size constraints for the motor have to be accounted for considering the available space in the machine. Existing motor details are as under: Siemens DC motor 1GG5134-0WY40-6HU7-Z V(42-380) 1/min (50-1900) & V (380) 1/min (3500-5000reg.) Excitation V (310) A (1.65) IP23 Kw 20.0	1 No.			Vendor to provide details and comply
1.2.4	Suitable SIEMENS/FANUC milling spindle Motor with 4.3 KW or more rated Power and maximum speed of 3000 RPM or more. Size constraints for the motor have to be accounted for considering the available space in the machine (The motor will be mounted behind the tools turret station.) Existing motor details are as under: Siemens 1FT5076-0AF01-Z, $M_o=20$ Nm, 4.4 Kw, 3000 RPM, Impulse Generator: ROD320B, 2500ppr	1 No.			Vendor to provide details and comply
1.2.5	Supply of intermediate flanges, couplings and any other parts required for mounting of the Axes AC Servo motors (2 Nos.), Main Spindle motor (1 No.) and Milling spindle motor (1No.).	1Set			Vendor to comply

(1.3)	AC SERVO DRIVES & SPINDLE DRIVES :			
1.3.1	SIEMENS/FANUC make AC Servo drive for Feed motors' control with input voltage of 415VAC (+/- 10%), 3 phase 3 wire system.	1 set		Vendor to provide details and comply
1.3.2	SIEMENS/FANUC make AC Servo drive for Main Spindle motor control with input voltage of 415VAC (+/- 10%), 3 phase 3 wire system.	1 set		Vendor to provide details and comply
1.3.3	SIEMENS/FANUC make AC Servo drive for milling spindle motor control with input voltage of 415VAC (+/- 10%), 3 phase 3 wire system.	1 set.		Vendor to provide details and comply
1.3.4	AC Line Filter with appropriate rating. Maximum ratings of motors offered to be taken into account for calculating the ratings of the Modules.	1 set		Vendor to provide details and comply
1.3.5	Encoder cables of suitable length for all AC Servo motors, Main Spindle motor & milling spindle motor.	01 Set		Vendor to provide details and comply
1.3.6	Power cables of suitable length for all AC Servo motors, Main Spindle motors and milling spindle motor. Please note that Z axis motor is without holding brake & X axis motor is having holding brake.	01 Set		Vendor to provide details and comply
1.3.7	Input supply of 415VAC is available on the machine & if installed system & Drives require any other rated supply then suitable rated supply transformer to be supplied by the vendor.	01 No.		Vendor to provide details and comply
1.3.8	Shield terminal plates and earthing schematic for all the modules.	01 Set		Vendor to comply
1.3.9	Pre-assembled cables to connect a laptop with the drives for commissioning and diagnosis purposes.	01 Set		Vendor to comply
(1.4)	MEASURING SYSTEM :			
1.4.1	The existing X-axis encoder has to be replaced with a suitable encoder (1 V _{SS} output) of Heidenhain make with +/- 5 micron accuracy grade. Ensuring same or better accuracy parameters after completion of work shall be in vendor's scope. The existing encoder is : Heidenhain Encoder ROD 426, 2500 PPR (Mounted on motor shaft)	01 No.		Vendor to provide details and comply
1.4.2	The existing Z-axis encoder has to be replaced with a suitable encoder (1 V _{SS} output) of Heidenhain make with +/- 5 micron accuracy grade. Ensuring same or better accuracy parameters after completion of work shall be in vendor's scope. The existing encoder is: Heidenhain Encoder ROD 426 E, 2500 PPR (Mounted on lead screw)	01 No.		Vendor to provide details and comply
1.4.3	The existing Position Encoder for turret tool positioning has to be replaced with suitable encoder and interfaced with CNC control for 12-Position (binary coded) Tool Turret. The existing encoder is: • <u>BALLUFF make BWG1-12-07-00-P-R-0-5 mounted behind turret tool station.</u>	01 No.		Vendor to provide details and comply
1.4.4	Pre-assembled Position feedback cables from measuring system to CNC system including encoder adapter cables (if any) - Length: 10 meters or above with suitable connectors.	01 Set		Vendor to provide details and comply
1.4.5	Couplings, Mounting brackets, mounting plates etc. for mounting of position feedback encoders and other items required for ensuring accuracy and repeatability of the feed axes will be in vendor's scope.	01 Set		Vendor to comply

(1.5)	<u>ELECTRICAL FEATURES :</u>			
1.5.1	The existing space for operator Panel will be retained for CNC controller and it should look aesthetic with modifications whichever required & with the following features: a) Fitted with suitable air flow mechanism. b) 220 VAC/ 5 Amp 3-pin service socket and switch.	01 Set		Vendor to comply
1.5.2	The existing electrical cabinets are to be replaced with RITTAL make cabinets. The cabinets should not have rear opening and the cabinet should be equipped with suitable side mounted air-conditioner of reputed make. NOTE: One additional set of keys for Electrical cabinet & Operator Panel locks should be provided.	01 set		Vendor to provide details and comply
1.5.3	L&T/Siemens/ABB/ Schneider Electric make MCCB of suitable rating as per new schematic with rotary handle kit for switching ON the power supply of panel & machine. It should be mounted on the outer left side of the panel.	01 Set		Vendor to comply
1.5.4	Suitable Semiconductor, HRC fuses, fuse bases of GE/ SIEMENS/ BUSSMAN or reputed make for overload protection.	02 Set		Vendor to comply
1.5.5	The complete LV switchgear (reputed make) of the machine including overloads, relays, contactors, MCBs etc. is to be supplied & interfaced by the vendor as per new electrical schematic. Vendor must interface each induction motor (<i>installed on machine</i>) with MPCB for single phase and overload protection.	01Set		Vendor to comply
1.5.6	Electrical Cabinet to be equipped with: a) Door limit switch operated panel lights with ON/ OFF switch b) Combination of 5A/15A, 3-pin service socket and switch inside the electrical cabinet.	01 Set		Vendor to comply
1.5.7	Additional Keys, Push-buttons, Indicator lamps / lamp holder & Selector switches required on the operator panel for operation of the machine to be provided by the vendor.	01 Set		Vendor to comply
1.5.8	Axes emergency By-pass push button should be provided on operator panel.	01 No.		Vendor to comply
1.5.9	All existing Proximity Switches, Limit switches, Pressure Switches, Flow Switches are to be replaced with digital variants for pressure/ flow switches & Limit switches of reputed make.	01 Set		Vendor to provide details and comply
1.5.10	DC Regulated Power Supply 24V DC, 20 Amps or more of Siemens/Phoenix/Allen Bradley for CNC system & Input/ Outputs.	02 No.		Vendor to provide details and comply
1.5.11	DC Regulated Power Supply 24V DC, 10 Amps or more of Siemens/Phoenix/Allen Bradley for machine elements.	02 Nos.		Vendor to provide details and comply
1.5.12	Sealed machine light of reputed make for machine illumination (220VAC/24VDC) to be installed.	02 Nos.		Vendor to comply
1.5.13	Wires & Conduits preferably of LAPP/IGUS or reputed make for rewiring of the entire machine including Control, Signal & Power cables, switchgears cables, and field elements cables etc. Note: The vendor to note that the entire machine has to be rewired. 3-phase 415VAC Input Power Supply to the machine will be provided by BHEL.	01 Set		Vendor to comply
1.5.14	Terminal boxes, screwed terminal blocks, bus bars, transformers etc. as required as per the new electrical scheme should be provided of reputed makes viz. Wago, Phoenix contact etc.	01 Set		Vendor to comply
1.5.15	All existing operational features of the machine should be retained in the new electrical schematic of the machine.			Vendor to comply

1.5.16	Oil, chip & dust-proof Metallic/ PVC Cable drag chains and end covers/ brackets of reputed make. <u>Note: One additional drag chain (for X axis & Z-axis) to be supplied complete with end-covers and brackets.</u>	02 Set			Vendor to comply
1.5.17	Reputed make hose pipes, DIN rails, cable ducts, insulated lugs, printed ferrules, and other material required for the wiring & tagging of machine field elements and panel shall be supplied by the vendor.	01 Set			Vendor to comply
1.5.18	Party shall supply all clamps, fixtures and fasteners required to complete the retrofitting work.	01 Set			Vendor to comply
1.5.19	8 Nos. X 8 Channel Relay boards preferably Phoenix contact make or reputed make should be provided for driving the PLC outputs to the machine. All PLC outputs to be routed to the machine through these Relay boards.	01 Set			Vendor to comply
1.5.20	Any other material not mentioned above but found necessary to complete the retrofitting work, shall be in party's scope of supply.	01 Set			Vendor to comply
(1.6) SCOPE OF WORK :					
1.6.1	Dismantling of old electrical panel including dismantling/removal of all drives(X,Z, Main Spindle & Milling spindle) , switch gears ,CNC, PLC, along with old cabling and wirings, cable trays etc.. Dismantling of axes feed motors, main spindle motor, milling spindle motor, all encoders and field elements required.				Vendor to comply
1.6.2	Dismantling of old CNC controller on operator Control panel and Installation of new CNC controller.				Vendor to comply
1.6.3	Installation of New electrical cabinet(s) with required new cable trays , rails etc.				Vendor to comply
1.6.4	Mounting and installation of All feed motors (X, Z), Main Spindle motor, Milling spindle motor, all encoders. Design, Modification / re-engineering, manufacturing of pulley, flanges and encoder couplings etc. for feed motors, position feedbacks as per requirement.				Vendor to comply
1.6.5	Cabling and wiring of CNC, PLC, Drive system, control panels and field devices. Entire Cabling including Position Feedback of the machine is to be replaced with the new cabling. Laying and routing of new conduits, cables from electrical cabinet to machine and CNC operator panel through new conduits. Refurbishment and rewiring of all the terminal boards, Junction Boxes as per requirement. Routing of the new cables through drag chain. The cables passing through the drag chain shall be inside the conduits of reputed make.				Vendor to comply
1.6.6	Interfacing of new CNC controller.				Vendor to comply
1.6.7	Interfacing of the existing turret tool station, tailstock, coolant unit, Main hydraulic unit, chip conveyer with the new electrical schematic.				Vendor to comply
1.6.8	Installation, Interfacing & commissioning of the CNC, PLC, Position feedback devices, Main spindle drive, Milling spindle drive, Feed drives, Machine lights, Field elements & all air conditioners .				Vendor to comply
1.6.9	Existing machine functions have to be retained in the new PLC Program. In case the vendor perceives that more Inputs/Outputs are required for completion for the work as per their designed and conceived electrical scheme, the same should be included in the scope of supply.				Vendor to comply

1.6.10	Prove-out of all existing main functions (axis & spindle) including M19, auxiliary functions (Turret indexing & positioning, Coolant system, Hydraulics, Lubrication, Chip conveyer etc.). Demonstration of Turret Tool carrier with T- codes/Manual Index as in existing system.				Vendor to comply
1.6.11	Prove-out of DNC function for program transfer.				Vendor to comply
1.6.12	Any work for successful completion of retrofitting will be in the scope of work.				Vendor to comply
(2)	<u>COMMISSIONING :</u>				
2.1	Party shall undertake commissioning of the supplied components at HEEP BHEL, Haridwar. All material required for commissioning of the system with the machine shall be supplied by the party free of cost and obligation. All commissioning materials shall be supplied by party for successful running of the machine.				Vendor to comply
2.2	New PLC program should incorporate all the drive signals, all possible alarms, suitable interlocking and their display on CNC screen with remedial actions related to the alarms and messages.				Vendor to comply
2.3	Existing machine logic and technological processes have to be retained.				Vendor to comply
(3)	<u>ACCEPTANCE :</u>				
3.1	Final Acceptance shall be at HEEP, BHEL, Haridwar after: a) Upon completion of the scope of supply at BHEL Haridwar. b) Final acceptance shall include clearance of all pending issues related to the work contract. c) Successful Commissioning & Demonstration of various cycles and control functions as envisaged in the technical scope. Party shall demonstrate operation of all parts of the system supplied along with all the features as specified above. d) Successful machining of 5 nos. of components as provided by BHEL with turning, threading, drilling & milling operations. The blank raw material, tooling, fixtures & programs for machining of the jobs will be provided by BHEL. (Vendor to note that the machining time of each component is approximately 2 hours.) e) After settlement of all pending issues related to work and supply, a certificate for Completion of works in all respect shall be released within 15 days by Production and Maintenance personnel of BHEL which will be the referred document for Final Acceptance and final payment to the vendor. f) Vendor to demonstrate program conversion of 05 nos. of programs as per clause 1.1.7.				Vendor to comply
(4)	<u>DELIVERY (IF DELIVERY PERIOD IS NOT OFFERED/ ACCEPTABLE, OFFER WILL BE REJECTED)</u>				
4.1	1) Material: 6 months from the date of release of the Work order. 2) Work: 45 Days from date of release of the machine for work. The delivery period of work for the purpose of LD as per Clause 11 shall be considered from the date of start of work to the date of start of the machine after carrying out the work and start of the work on the first prove-out component. Vendor to note that early delivery shall be acceptable. Vendor should take BHEL approval before invoking this clause.				Vendor to comply

(5)	<u>DOCUMENTATION :</u>			
	<i>Following documents shall be supplied by the vendor:</i>			
5.1	CNC system manuals in hard & soft copy comprising of Installation & Start-up guide, Connecting conditions, Configuration guide, Diagnostics guide, Commissioning guide.	03 Set		Vendor to comply
5.2	Programming Manuals	03 Set		Vendor to comply
5.3	Technical and Service manuals of the AC servomotors, main spindle motor & milling Spindle motors in hard copy.	03 Set		Vendor to comply
5.4	Commissioning and service manuals of the AC servo drive, Main Spindle & Milling Spindle drives	03 Set		Vendor to comply
5.5	Commissioning and service manuals of the PLC	03 Set		Vendor to comply
5.6	PLC program hard copy with comments in English & cross-reference list	03 Set		Vendor to comply
5.7	PLC program on CD/DVD in installable & printable formats.	03 Set		Vendor to comply
5.8	New electrical schematic and wiring diagram of the machine in hard copy as well as in soft copy.	03 Set		Vendor to comply
5.9	Instructions for data back-up & restoration for CNC & PLC.	03 Set		Vendor to comply
5.10	Instructions for data back-up & restoration for Feed drives	03 Set		Vendor to comply
5.11	All documentation, ghost backup / Image of CNC system, Main Spindle, milling Spindle & Feed Drive parameters & back-up on CD/DVD	03 Set		Vendor to comply
5.12	List & Service catalogues of all bought-out items.	03 Set		Vendor to comply
5.13	Drawings of all mechanical modifications, mountings, flanges & couplings.	03 Set		Vendor to comply
5.14	Additional required Softwares for machine maintenance on CD/DVD in installable format.	03 Set		Vendor to comply
5.15	Complete list of bill of materials	03 Set		Vendor to comply
(6)	<u>SPARES: (To be quoted compulsorily)</u>			
6.1	Active Line Module /IR module with Line filter and HF commutating choke of appropriate rating of the highest rating used on the machine.	01 Set		Vendor to comply
6.2	Drive modules for X, Z axis, main spindle, Milling Spindle drive. (each type used on machine)	01 No.		Vendor to comply
6.3	X-axis motor (same as used on the machine)	01 No.		Vendor to comply
6.4	Z axis motor (same as used on the machine)	01 No.		Vendor to comply
6.5	Complete CNC control (Same as used on the machine)	01 No.		Vendor to comply
6.6	Indicating lamps used on the machine of each type	10 No.		Vendor to comply
6.7	Relays, Contactors, Push buttons, Selector switches of each type	10 No.		Vendor to comply
6.8	Position encoder for turret (same as used on the machine)	01 No.		Vendor to comply
6.9	Encoders for X & Z axes of each type same as used on the machine.	01 No.		Vendor to comply

(7)	<u>WARRANTY :</u>				
7.1	Party shall stand warranty for all the supplied material and work executed for a period of one year from the date of final acceptance (Ref.: Clause No. 3) of the machine at BHEL, Haridwar.				Vendor to comply
(8)	<u>TRAINING :</u>				
8.1	Party shall impart training to BHEL staff, for operation, programming & maintenance of the system supplied by them during installation & commissioning.				Vendor to comply
8.2	Vendor to arrange one week training each for: <ul style="list-style-type: none"> • 1 person for Maintenance & commissioning of CNC system at CNC System manufacturer's works. • 1 person for Programming & 2 persons for Operations of CNC system at CNC System manufacturer's work s. • Expenses for Boarding & Lodging of BHEL personnel during training shall be borne by BHEL. 				Vendor to comply
(9)	<u>VENDOR'S OBLIGATION :</u>				
9.1	The vendor shall bring all tools, tackles and testing equipment with them for successful commissioning of the machine & supplied system.				Vendor to comply
(10)	<u>QUALIFYING CONDITIONS :</u>				
10.1	The average annual turnover during the last three years ending 31 st March 2015 should be at least Rs 16.37 Lakhs . Audited balance sheets for the last three years should be submitted, however unaudited balance sheet for the year 2014-15 may be considered.				Vendor to comply
10.2	The Vendor must have successfully retrofitted CNC machines with Siemens/Fanuc CNC system during last 7 years ending last day of the month prior to which applications are invited and should be either of the following: <p style="text-align: center;">a). 3 nos. of CNC machines retrofitted with Siemens/Fanuc CNC system with project costing not less than Rs 21.83 Lakh OR</p> <p style="text-align: center;">b). 2 nos. of CNC machines retrofitted with Siemens/Fanuc CNC system with project costing not less than Rs 27.29 Lakh OR</p> <p style="text-align: center;">c). 1 no. of CNC machines retrofitted with Siemens/Fanuc CNC system with project costing not less than Rs 43.66 Lakh</p>				Vendor to comply

10.3	The above retrofitted machines should be running satisfactorily for at least 6 months prior to 31 st MAY 2015. 6 months period will be calculated on the basis of commissioning certificates provided. Vendor to provide P.O. / W.O copies and commissioning/ performance certificates for satisfactory operation of the above retrofitted systems along with name, address & contact details of their customer. BHEL reserves the right to verify the information provided. Vendor is advised to attach only the relevant certificates and not attach papers irrelevant against this clause				Vendor to comply
(11)	<u>LATE DELIVERY PENALTY (LD) CLAUSE :</u>				
11.1.	LD @ ½% per week subject to a max.of 10% of the material value (including spare parts) shall be applicable for delay in deliveries. <i>The time period from invitation date for Pre dispatch inspection from vendor to the date of arrival of Pre Dispatch Team to vendor's works and any other reasons attributed to BHEL will not be accounted for in delivery period. This period will be excluded for the purpose of calculating LD. Vendor should intimate regarding PDI 7 days in advance only.</i>				Vendor to comply
11.2.	Late delivery penalty @ 2% per week subject to a max. Of 10% of the Commissioning Charges shall be applicable for delay beyond scheduled commissioning date as per clause 4.1 (2) for reasons attributed to the party.				Vendor to comply
(12)	<u>PRE-DISPATCH INSPECTION:</u>				
12.1	Pre-dispatch inspection of all the items covered under <u>Scope of Supply at PARA (1) & spare parts at PARA (6)</u> shall be carried out by BHEL persons at party's works.				Vendor to comply
12.2	Supplier shall invite BHEL for carrying out pre despatch inspection with 7 days prior notice.				Vendor to comply
12.3	Deputed BHEL persons shall do pre-dispatch acceptance of material under scope of supply at PARA (1) at vendor's works and give despatch clearance.				Vendor to comply
12.4	Expenses of Boarding and lodging of BHEL personnel during PDI shall be borne by BHEL.				Vendor to comply
(13)	<u>SUBMISSION OF BILL OF MATERIAL (BOM) :</u>				
13.1	Before inviting BHEL for Pre-dispatch inspection, vendor shall submit to BHEL the Bill of Material (BOM) and proposed electrical drawing/ schematic for scrutiny and approval.				Vendor to comply
(14)	<u>EARNEST MONEY DEPOSIT (EMD) :</u>				
14.1	Vendors have to deposit the EMD. EMD may be deposited in cash / through pay order / through Demand draft in favor of A.O. CASH HECP, BHEL, Haridwar . The rate of EMD will be as below: <ul style="list-style-type: none"> • Work costing upto Rs. 2 Lakhs : Nil • Work costing more than Rs. 2 Lakhs & upto 5 Lakhs : Rs. 10,000/- • Work costing more than Rs. 5 Lakhs & upto 10 Lakhs : Rs.20,000/- • Work costing more than Rs. 10 Lakhs & upto 20 Lakhs : Rs.40,000/- 				Vendor to comply

	<ul style="list-style-type: none"> • Work costing more than Rs. 20 Lakhs & upto 30 Lakhs : Rs. 60,000/- • Work costing more than Rs. 30 Lakhs & upto 50 Lakhs : Rs. 1,00,000/- • Work costing more than Rs. 50 Lakhs & upto 100 Lakhs : Rs. 1,50,000/- • Work costing more than Rs. 100 Lakhs : Rs. 2,00,000/- 				
14.2	EMD shall be converted to security deposit if the work is awarded.				Vendor to comply
14.3	EMD of unsuccessful bidders shall be refunded back normally within fifteen days of acceptance of award of work by the successful bidder.				Vendor to comply
14.4	EMD shall not carry any interest.				Vendor to comply
14.5	<p><u>EMD by bidder will be forfeited as per tender document, if:</u></p> <ul style="list-style-type: none"> • After opening the tender, the tenderer revokes his tender within the validity period or increases his earlier quoted rates. • The tenderer does not commence the work within the period as per LOI/contract. 				Vendor to comply
14.6	Offers without EMD will be rejected and will not be considered for evaluation. However valid NSIC/EM-II certificate may be considered subject to receipt of notarised copy / copy attested by gazetted officer & verification.				Information to Vendor
(15)	<u>SECURITY DEPOSIT (SD) :</u>				
15.1	Successful vendor shall deposit security. The rate of security deposit will be as below:				Vendor to comply
	For work Up to Rs. 10 Lakhs : <u>10% of work order value</u>				
	<ul style="list-style-type: none"> • Above Rs. 10 Lakhs upto Rs. 50 Lakhs : <u>Rs. 1 Lakh + 7.5% amount exceeding Rs. 10 Lakhs</u> • Above Rs. 50 Lakhs: <u>Rs. 4 Lakhs + 5% amount exceeding Rs. 50 Lakhs</u> 				
15.2	The security deposit should be submitted before the start of work in the following forms:				Vendor to comply
	i) Cash (As permissible under the Income Tax Act)				
	ii) Pay Order, Demand Draft in favour of BHEL HEEP, Hardwar.				
	iii) Local cheques of Scheduled Banks, subject to realization.				
	iv) Bank Guarantee from Scheduled Banks/Public Financial Institution as defined in the companies Act. The Bank guarantee format should have the approval of BHEL.				
15.3	Security Deposit shall not carry any interest.				Vendor to comply
15.4	EMD of successful tenderer can be converted and adjusted against the Security Deposit.				Vendor to comply
15.5	100% of the Security Deposit amount shall be refunded to the vendor after final acceptance of work. SD shall be released after the submission of Performance Bank Guarantee (PBG) by the vendor.				Vendor to comply

(16)	Performance Bank Guarantee (PBG) :				
16.1	Vendor shall be required to submit a performance bank guarantee (PBG) for 10% of the total work order value which shall be valid for a period of 12 months from the date of final acceptance of the machine.				Vendor to comply
16.2	The PBG shall be submitted on a non-judicial stamp paper of value not less than Rs.100/- issued by any one of the nationalised banks.				Vendor to comply
(17)	PAYMENT TERMS : (Note: No advance payment shall be made to the vendor.)				
17.1	Part payment will be made after completion of following milestones				Vendor to comply
17.1.1	Payment of 80% of material cost along with 100% of all taxes & duties (Excise duty, CST/VAT as applicable) shall be payable after inspection & acceptance of material at HEPP, BHEL, Haridwar. Vendor to ensure that all relevant documents are submitted.				Vendor to comply
17.1.2	Final payment of balance 20% of material cost, 100% of commissioning charges including service taxes as applicable amount will be made after Final acceptance of the machine (As per Clause 3). The payment shall be made subject to submission of PBG as per "Para 16".				Vendor to comply
17.2	All the payments shall be made through e-payment after submission of following documents along with first bill.				Vendor to comply
17.2.1	E-payment form duly filled (Form will be provided by BHEL)				Vendor to comply
17.2.2	Income tax exemption letter(if applicable)				Vendor to comply
17.3	Excise duty & CST/VAT will be paid on material cost and service tax will be paid on commissioning charges at actual. Related original documents to be submitted for availing MODVAT credit by BHEL.				Vendor to comply
17.4	Timely submission of CENVATABLE invoices along with necessary documents to enable availment of CENVAT (Excise duty, Service Tax & VAT) credit by BHEL. <u>Note: Wherever CENVAT credit cannot be availed within given time limit due to delay in submission of invoices or for any other reasons attributed to vendor, loss of such CENVAT credit will be recovered from such vendor.</u>				Vendor to comply
(18)	Risk Purchase Clause : In case of delays in supplies / defective supplies or non-fulfilment of any other terms & conditions given in the work order the purchaser may cancel the work order in full or part thereof and may also make the purchase of the material / service from elsewhere / alternative source at the risk and cost of supplier. Vendor does not agree to above clause, their offer is liable to be rejected. In case any vendor accepts risk purchase clause initially and subsequently declines to honour the term in the eventuality of RISK PURCHASE, they may be banned for business with BHEL.				Vendor to comply
(19)	GENERAL CONDITIONS :				
19.1	A point wise compliance statement shall be submitted by the party with reference to the above scope of supply against each clause/ sub-clause with relevant details & comments. Non-compliance to any of the clauses & quoting inadequate quantity can lead to dis-qualification of the offer.				Vendor to comply

19.2	The Vendor is advised to inspect the machine & collect sample existing machining programs (compatible with existing Siemens 3T system) to ascertain all the relevant details required for successful completion of the work.				Vendor to comply
19.3	The proposed electrical schematic & Bill Of Material (BOM) for the machine shall be provided by the vendor prior to pre dispatch inspection.				Vendor to comply
19.4	Complete specifications such as part no./Model/Type, power, torque, Rated and maximum RPMs, Rated and maximum currents of the motor and drive controllers shall be stated in the offer by the party. Ordering brochure/catalogue should be attached.				Vendor to comply
19.5	Vendor must compulsorily quote the quantity exactly as per the Scope of supply. No reduction in quantity as per the above Scope of supply is permissible.				Vendor to comply
19.6	Vendor must quote the Spare parts separately along with the offer otherwise the offer will be rejected.				Vendor to comply
19.7	The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com				Vendor to comply
19.8	The award of works will be made on basis of the total of Material cost, Spare Parts cost, Commissioning charges and all taxes, duties as applicable (Cost to BHEL).				Information to vendor
19.9	The Vendor should submit their best price at this stage itself and they will not be allowed to revise the price. Any revision / discount given by the vendor subsequently will be ignored.				Information to vendor
19.10	Check List as per Annexure 'D' must be enclosed with techno-commercial bid.				Vendor to comply
19.11	The risk of delay/loss in transmission by post/courier rest with the bidder.				Vendor to comply
19.12	Conditional tender is likely to be rejected.				Vendor to comply
19.13	BHEL reserves the right to reject the lowest or any tender or accept any tender in full or in part without assigning any reasons whatsoever.				Vendor to comply
19.14	If any information/documents submitted by the contractor are found false/fake at any stage, the tender will be cancelled and earnest money deposited shall be forfeited debarring from the future participation in tenders.				Vendor to comply
19.15	In case more than one contractor quotes equal L-1 rates, lottery shall be drawn among L-1 parties to decide one L-1 party.				Vendor to comply
(20)	<u>BHEL'S OBLIGATION:</u>				
20.1	Existing electrical schematic of the machine shall be provided by BHEL to the vendor.				Vendor to comply
20.2	Crane facility and lifting tackles like slings, rope, D-Shackles shall be provided.				Vendor to comply
20.3	Any machining facility required for rectification/fitting of supplied material, subject to the extent available in BHEL, shall be provided.				Vendor to comply

20.4	Any civil work required for the erection of panel shall be done by BHEL.				Vendor to comply
20.5	Consumables like lubricants, kerosene oil, cotton waste etc. will be supplied free of cost by BHEL during execution of works inside BHEL premises. Contractor should make his own arrangements for all types of hand tools including pneumatic/electrical drill machines, grinders, scraping tools along with the general purpose measuring instruments, straight edges etc.				Vendor to comply
(21)	<u>OFFER:</u> <u>The offer should be submitted in two parts and in following manner:</u>				
21.1	<u>Techno-commercial Bid :</u>				
21.1.1	The envelop shall contain the Techno-commercial Bid (ANNEXURE 'A') with technical details and commercial terms & conditions along with relevant documents like copies of ESI, PF code, PAN No., Service Tax Regn. No., TIN No., CST No., Experience Certificates, Audited Balance Sheet of last 3 years, P.O copies & Commissioning/ Performance certificates (against Pre-qualifying conditions) , Tender fees, EMD and Check List as per ANNEXURE 'C'.				Vendor to comply
21.1.2	Envelop shall be super scribed with " Techno-Commercial Bid ", Name of work & NIT No.				Vendor to comply
21.1.3	Point-wise compliance of this scope of supply and work is to be given by vendors while submitting their techno-commercial offer.				Vendor to comply
21.1.4	The vendor must note that no prices are to be quoted/ mentioned in the techno-commercial offer. Vendor must include un-priced Price bid.				Vendor to comply
22.2	<u>Price Bid:</u>				
22.2.1	The second envelope shall contain only the price bid with separate price for material, spares, work & applicable taxes & duties on price bid Format as per ANNEXURE 'B' .				Vendor to comply
22.2.2	Any other information in the price bid shall not be considered and the quotation is likely to be rejected. Price bid document shall be signed by the bidder at the bottom of the page.				Vendor to comply
22.2.3	The envelope shall be sealed and super scribed with "Price Bid", Name of work & NIT No.				Vendor to comply
22.2.4	Price bids of techno commercially accepted vendors shall be opened.				Vendor to comply
22.2.5	Vendor should submit their best price at this stage itself and they will not be allowed to revise the price. Any revision/ discount given by the vendor subsequently will be ignored.				Information to Vendor
22.2.6	Both the above two envelopes shall be kept in another sealed cover. The cover shall be super-scribed with "Quotation for (name of work), NIT No. & due date and shall be submitted in the Tender Box kept in the				Vendor to comply

	<u>Tender room of Purchase department at the 4th floor of the Main Administrative Building of BHEL,HEEP,HARIDWAR</u> and it should also contain the Bidder's address.				
22.2.7	In case the date of tender opening happens to be a BHEL declared holiday, tenders shall be opened on the next working day.				Vendor to comply
(23)	<u>Commercial Terms:</u>				
23.1	Prices shall be quoted on "Firm Price" basis only. The prices should be on F.O.R BHEL, HEEP, Haridwar basis inclusive of Packing & Forwarding, transit insurance & Transportation charges. Applicable % of ED & Sales Tax, Installation/ Commissioning Charges & Service Tax should be clearly indicated in attached Price bid format as per " Annexure B "				Vendor to comply
23.2	Validity of offer shall be for a minimum period of 120 days from the date of Tender Opening.				Vendor to comply
23.3	Freight & transit insurance charges from Despatching station to BHEL, Haridwar shall be borne by the party.				Vendor to comply
23.4	The material will be dispatched to Central Plant Stores, HEEP, BHEL, Haridwar with instructions to forward the same to Dy. Manager (WEX/CNC-TUM), HEEP, BHEL, Haridwar-249403				Vendor to comply
(24)	<u>PACKING:</u>				
24.1	Supplier shall arrange for adequate protection and packing of the consignment so as to avoid loss and damage during transit and also take appropriate measures to prevent metal parts from rusting and corrosion during transit. Handling instructions shall be clearly printed /painted on the packages. Each package should carry a detailed packing slip. Supplier shall be responsible for any loss/damage during transit due to defective/inadequate packing				Vendor to comply

'ANNEXURE-A/PROG'

<u>PROGRAM No. : 1</u>		
%0161	N190 G01 X30 F5 M08	N490 G01 X44 F1
(PROVED PROG)	N200 Z-66 B2 F0.15	N500 Z-80.745
(PROG NO NEW: 0161/ OLD NO: 3406)	N210 X38	N510 X32 F0.1 M08
(MACHINE STC-25/1000 3T-4B)	N220 X32	N520 X36 Z-80 F2 M09
(CONTROL SINUMERIK 3T)	N230 G01 Z-80.6 F0.15	N530 G00 X250 M05
(PROG NO 140/ST-47013-003/21/MP-6/STC)	N240 X42	N540 Z250 M00
(PISTON SLEEVE VAR 3)	N250 G00 X250 M09	(CHK COLLER WIDTH 8.3 EDTL 04)
(DRG NO ST-47013-003)	N260 Z250 M5	N550 G00 Z-75
(4TH SETTING OF FINISHING)	N280 T0303 (PDJNR)	N560 X44
(USE HYD MANDRIL)	N290 G00 Z-94.145	N570 G96 S100 M04
(USE TAIL STOCK)	N300 X38	N580 G01 Z-81.05
(SET Z0 ON FACE)	N310 M00	N590 X32 F0.1 M08
	(CHK Z GAP EDTL 03)	N600 X34 Z-79 F4 M09
N10 G54	N320 G00 X45 Z-100	N601 G00 X250 M5
N21 M26	N330 M00	N602 M00
N20 G95 G71	(CHK 5X GAP EDTL 03)	N604 X44
N30 G92 S1200	N340 G00 X46	N605 G96 S100 M04
N40 T0404 (PCLNL)	N350 Z-90	N606 G01 X39.5 F1
N50 G00 Z5	N360 G96 S100 M04	N610 Z-92 F0.15 M08
N60 X50	N370 G01 Z-89.045 F1 M8	N620 G0 X250 M09
N70 X32 M00	N380 X30 F0.1	N630 Z300 M05
(CHK 5Z GAP EDTL 02)	N390 X40 Z-90.4 F1 M09	N640 M00
N80 G96 S100 M04	N400 G00 X250 M5	(CHK COLLER WIDTH 7.995)
N90 G01 Z2 F4	N410 Z300	N650 T0606 (SPL GRV TL)
N100 G01 X31.5 F4 M08	N420 T0404 (PDJNL)	N660 G00 Z-76.05
N110 Z-66 B1 F0.15	N430 G00 Z-75.6	N661 X34 M46
N120 X42	N440 X34	N670 M00
N130 G0 X250 M09	N450 M00	(CHK 5Z GAP EDTL 06)
N140 Z250 M5	(CHK 5Z GAP EDTL 04)	N680 X42
N150 M00	N460 X42	N681 M46
(CHECK DIA.31.5 MM EDIT X OFFSET IN 02)	N470 M00	N690 M00
N160 G00 Z2	(CHK 5X GAP EDTL 04)	(CHK 5X GAP EDTL 06) (CHECK COLLER
N170 X50	N480 G96 S100 M04	WIDTH AS 8 MM EDIT Z OFFSET IN 12)
N180 G96 S100 M04		

N700 G96 S100 M04	N1020 X13 F0.08 M08	N1344 M46
N710 G01 Z-79.85 F6	N1030 X35 F0.1	N1350 L4701
N720 X32 F0.1	N1040 G00 X50 M09	N1360 G00 X250
N730 G02 X32 Z-81.05 I.8 K-.6 F0.05	N1050 M05	N1370 M05
N740 G02 X34.4 Z-81.05 I.6 K.8	N1060 M33	N1380 M33
N750 G01 Z-78 F2 M09	N1070 M29	N1390 M29
N760 G00 X250	N1080 G04 X2	N1400 M25
N761 M47	N1090 M25	N1410 M5
N770 G00 Z250	N1100 M05	N1420 G04 X2
N780 M05	N1110 M19 S180	N1430 M19 S180
N790 M25	N1120 G04 X1	N1440 G04 X2
N800 M19 S0	N1130 M28	N1450 M28
N810 G0 X260	N1140 M32	N1460 G04 X2
N820 M28	N1150 G95 M03 S450	N1480 M32
N830 G04 X1	N1160 G00 Z-24	N1490 G04 X2
N840 T0909	N1170 X35	N1500 L4701
(TWIST DRILL DIA.12 MM IN RADIAL DRIVEN TOOL HOLDER)	N1180 G01 X32 F.M08	N1510 G00 X250 M5
N850 M32	N1190 X28 F.05	N1520 Z250
N860 G04 X1	N1200 X13 F.08	N1530 M33
N870 G0 Z-76.05	N1210 X35 F0.1 M09	N1540 M29
N880 X34 M00	N1220 G0 X250	N1541 M47
(CHECK 5Z GAP EDIT Z OFFSET IN 08)	N1230 M05	N1550 M30
N890 X42 M00	N1240 M33	%SP
(CHECK 5X GAP EDIT X OFFSET IN 08)	N1250 M29	L4700
N900 X50	N1260 M25	(SP FOR 0161)
N910 G00 Z-104	N1270 M05	N10 G00 Z-26
N920 G95 M03 S450	N1280 G04 X1	N15 G00 X35
N930 Z-111.95 F2	N1290 M19 S0	N20 M03 S400
N940 G00 X40	N1300 G4 X1	N25 G01 X28 F.06 M08
N950 G01 X34 F.05 M08	N1310 M28	N30 Z-61 F.1
N960 X15 F.08	N1320 T1111	N35 X32 F.3
N970 X42 F0.1 M09	(SLOT DRILL DIA.15 MM)	N40 G00 Z-27
N980 X50 F6	N1330 M32	N45 G01 X26 F.05
N990 G00 Z-24	N1340 G04 X2	N50 Z-61 F.1
N1000 G01 X32 F3	N1341 G00 Z-76.05	N55 X32 F.3
N1010 X28 F.05	N1342 X36 M00	N60 G00 Z-27
	N1343 G00 X42 M00	

<p>N65 G01 X24 F.05 N70 Z-61 F.1 N75 X32 N80 G00 N85 G01 X22 N90 Z-61 N95 X32 N100 G00 Z-27 N105 G01 X20 F.05 N110 Z-61 F.1 N115 X32 N120 G00 Z-27 N125 G01 X18 N130 G01 Z-61 N135 X32 N140 G00 Z-27 N145 G01 X16 N150 N155 X32 N160 G00 Z-26 N165 G01 X11.6 N170 Z-61 N175 X35 F.3 M09 N180 G00 X50 N185 M17 N190 M02 %</p>	<p><u>PROGRAM No. : 2</u> %0331 (PROVED PROG) (PROG NO - NEW: 0331/ OLD NO: 3443) (CONTROL SLEEVE FOR TMC DRILL DIA 3MM) (PROG N 144/ST-47012-002/21/MP-3/STC) (DRG N ST-47012-002 REV 00) (BLANK AS PER FINISH JOB) (MAX CLAMPING 30MM ON MANDRIL) (SET Z0 ON FACE) N10 G54 G71 N20 G95 G90 N30 G92 S600 N40 M25 N51 R20 0 R21 180 R22 0 R23 1 R24 2 N50 G04 X2 N60 T1111 (CENTRE DRILL) M05 N70 G00 Z6.125 N75 X35 /N80 M00 N90 (CHK 5Z GAP EDTL 11) N100 X40 /N110 M00 N120 (CHK 5X GAP EDTL 11) N121 Z2.9 N130 R20 0 R21 180 R22 0 R23 1 R24 2 N140 M25 N150 G04 X2 N160 M19 S R20 N170 G04 X2 N180 M28 N190 G04 X2 N200 M32 N210 G04 X2 N220 G95 S600 M03 N230 G01 X35 F4 N240 X28 F0.04 M08</p>	<p>N250 X35 F4 M09 N260 G00 X200 N270 M05 N300 G04 X2 N310 M29 N315 R20 R21 N318 R22 R23 N320 @01 330 R22 R24 N322 @00-160 N330 X250 N332 G04 X2 N334 M29 N338 G04 N339 Z100 N340 T0909 (TMC DRILL DIA 3) N350 G00 Z6.625 N360 X35 /N361 M00 N370 (CHK 5Z GAP EDTL 11) N390 X40 /N400 M00 N410 (CHK 5X GAP EDTL 11) N411 Z2.9 N414 R20 180 R21 180 R22 0 R23 1 R24 2 N415 M25 N420 G04 X2 N425 M19 S R20 N440 G04 X2 N450 M28 N460 G04 X2 N470 M32 N480 G04 X2 N490 G95 S600 M03 N500 G01 X35 F4 N510 X23 F0.04 M8 N520 X35 F4 N531 G00 X200</p>
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<p>N530 M05 N540 M29 N550 R20 R21 N560 R22 R23 N570 @01 590 R22 R24 N580 @00-425 N590 G00 X250 M09 N610 G04 X2 N620 M29 N630 G04 X2 N640 Z300 M05 T00 N650 M30</p>	<p>_N90 G1 X95 Z0 F4 N100 X-2 F.1 N110 X86 Z2 F6 N120 X-105 F0.2 N130 X90 Z-80 F6 M9 N140 G0 X250 M5 N150 Z200 N160 T0404 (TWIST DRILL DIA.30 MM) N170 G00 Z5 N180 X0 /N185 M00 (CHK 5Z GAP EDIT Z OFFSET IN 04) N200 G95 S250 M03 N210 G01 Z.5 F2 M08 N220 R01 2 R02-168 R03 6 R04 30 R13 .1 N230 L9801 N240 T0606 (TWIST DRILL DIA.43 MM) N250 G00 Z5 N260 X0 /N265 M00 (CHK 5Z GAP EDIT Z OFFSET IN 06) N280 G95 S100 M03 N290 G01 Z3 M08 N300 R01 2 R02-168 R03 6 R04 43 R13 .1 N310 L9801 N320 T0808 (RH BORING BAR DIA.32 INSERT TPMPR) N330 G00 Z5 M5 N340 X76 /N345 M00 (CHK 5X Z GAP EDIT Z OFFSET IN 08) N360 G96 S100 M03 N370 G01 X45 Z2 F4 M08 N380 Z-162 F0.15</p>	<p>N390 X42 Z2 F6 N400 X47.5 N410 Z-162 F0.15 N420 X42 Z5 F6 N421 G0 X275 M9 N422 M5 /N423 M0 N424 X55 M08 N425 G96 S100 M3 N430 G1 X49.4 F2 N440 Z-162 F0.15 N450 X44 Z2 F6 M09 N460 G00 X250 M05 N470 Z300 N480 T1010 (INT.GROOVING TOOL R1) (B.BAR NO.:R6300-0717 INSERT NO.:R2128-0664) N490 G00 Z5 N500 X76 /N505 M00 (CHK 5Z AND X GAP EDIT X AND Z OFFSETS IN 10) N520 G95 S150 M04 N530 G01 X48 Z3 F4 M08 N540 R01 4 R02 49 R03 53 R04 0.05 N550 L7029 N560 G00 Z5 M09 N570 X250 M05 N580 Z250 N585 M00 N590 T0101 (PCLNL 2525 INSERT CNMG 120404) N600 G00 Z5 M08 N610 G96 S100 M04 N620 X83 Z2</p>
<p><u>PROGRAM No. : 3</u> %0911 (PROVED PROG) (PROG NO NEW: 0911/ OLD NO: 5071) (MACHINE: STC-25/1000/TMC) (CONTROL: SINUMERIK 3T/4B) (COMPONENT: BUSH/500 MW: 1ST SETTING) (DRG.NO.4-11202-02034 REV 00) (BLANK: O.D-90 MM: LENGTH-165MM) (CLAMPING: IN 3 JAW CHUCK: USE SHOFT JAW:CLAMPING LENGTH 40 MM) (SET Z0 ON FACE CONSIDERING 1 MM ALLOWN.) (STORE ZERO OFFSET VALUE IN OFFSET NO:1) N10 G90 G95 G71 N20 G92 S1000 N30 G54 N40 G04 X4 M25 N50 T0101 (PCLNL 2525 INSERT: CNMG 120404) N60 G00 Z2 N70 X100 M8 N80 G96 S100 M04</p>		



N630 G01 Z-100 F0.2
N640 X88 Z2 F6
N650 X77.8 Z1
N660 X80.8 Z-4.49 F0.2
N670 Z-100
N680 X90 Z-50 F6 M09
N690 G00 X250 M05
N700 Z250
N710 T0202
(EXT.GROOVING TOOL R1:TOOL NO.:R2150-1638)
N720 G00 Z5
N730 X78
/N735 M0
(CHK 5Z GAP EDIT Z OFFSET IN 02)
N750 X90.8
N760 Z-5
/N770 M0 (CHK 5X GAP EDIT X OFFSET IN 02)
N780 Z4 M8
N790 R01 10 R02 81 R03 77 R04 0.05
N800 L6009
N810 G00 X100 Z-50 M09
N820 X250 M05
N830 Z250 T00
N840 M30
%SP
L9800
(SP FOR 0911)
R05 0 R04
R06 3.464
R05 /R06
R07 0 R01
R08 0 R02
R07 -R08
R07 R05
R09 0 R07

R10 0 R01
R11 1 R12 0
R10 -R09
R14 .009
G0 Z4 R01
X0 M08
@00 120
N100 G1 Z2 R10 F2
R10 -R09
N120 G1 Z R10 F R14
Z2 R01 F3
R12 R11
R14 0
@01 110 R12 R03
@00-100
N110 G0 X250 M09
Z250 M05
M17
L6000
(SP FOR 0911)
N1 G90
N2 G0 X2 R02
N3 G96 S20 M04
N4 G91 G1 Z -R01 F6
N5 G90 G1 X R03 F R04
N6 X2 R02 F1
N7 M17
L7000
(SP FOR 0911)
N1 G90
N2 G00 X-2 R02
N3 G96 S15 M04
N4 G91 G1 Z -R01 F6
N5 G90 G1 X R03 F R04
N6 X-2 R02 F1
N7 M17
M02

PROGRAM No.: 4

%2311
(PROVED PROVED)
(PROG. NO. 2311)
(COMPONENT:COUPLING BOLT)
(DRG. NO. 2-74009-01002 REV NO 00)
(PRODUCT:GT V94.2 150 MW)
(SETTING:IST)
(MACHINE:STC 25/1000)
(BLANK DIA 70 LENGTH 265 WITH C/HOLE)
(MAX. CLAMPING 15MM,T/LENGTH 245MM)
(SET Z0 ON FACE CONSIDERING 1MM
ALLOW.ON FACE)
(AFTER IST SETTING IST JOB TO BE
CHECKED BY QC)
N0010 G54 G95
N0020 G92 S1000
N0030 M25
N0040 G04 X4
N0050 T0202 (PCLNL)
N0060 G00 Z2
N0070 X80
N0080 G96 S100 M04
N0090 G01 Z0 F6
N0100 X25 F0.15 M08
N0110 X64 Z2 F6
N0120 Z-240 F0.25
N0130 X72
N0140 Z2 F6
N0150 X62
N0160 Z-240 F0.25
N0170 X72
N0180 Z2 F6
N0190 X61
N0200 Z-240 F.25
N0210 X72



N0220 Z2 F6 M09	N0550 R24 0 R25 0 R29 21 L95 F0.1 M08	N0910 Z-47
N0230 G00 X250	N0560 G00 X250 M09	N0920 M05
N0240 M05	N0570 M05	N0930 M00 (CHK.DIA 36.5 ED TL 04)
N0250 M00 (CHK.DIA 61 ED TL 02)	N0580 M00 (CHK. OVER ALL FINISH DIM.)	N0940 G00 X45
N0260 G00 X70	N0590 T0404 (MVJCL, INSERT-R0.4 LOCATION	N0950 G96 S100 M04
N0270 G96 S100 M04	NO.3)	N0960 G01 X43.7 F6
N0280 G01 X60 F6	N0600 G00 Z5	N0970 Z-46
N0290 Z-240 F.15 M08	N0610 X35	N0980 X36.67 Z-49.514 F0.1 M08
N0300 X66	N0620 M00	N0990 G02 X35.5 Z-50.928 I1.414 K-
N0310 Z2 F6 M09	N0630 G00 X51.7	1.414
N0320 G00 X250	N0640 Z-20	N1000 G01 Z-59
N0330 M05	N0650 M00	N1010 G02 X39.5 Z-61 I2 K0
N0340 M00 (CHK. FIINSH DIA 60 MM)	N0660 G40	N1020 G01 X44
N0350 G00 X70	N0670 G00 X50	N1030 Z2 F6 M09
N0360 G96 S100 M04	N0680 Z-40	N1040 G00 X250 M05
N0370 G01 X65 Z2 F4	N0690 G96 S100 M04	N1050 M00 (CHK.FINISH DIA 35.5MM EDTL04)
N0380 G04 X4	N0700 G01 X45.7 F6	N1060 G00 Z-190.668
N0390 R20 22 R21 31.7 R22 1 R24 2 R25 0 R26	N0710 X46.7 Z-46.5 F4 M08	N1070 X65
2 R27 40 R29 31	N0720 X40.67 Z-49.514 F.1	N1080 G96 S100 M04
N0400 L95 F.25 M08	N0730 G02 X39.5 Z-50.928 I1.414 K-1.414	N1090 G01 X45.7 F6
N0410 G00 X250 M09	N0740 G01 Z-59	N1100 X41.7 Z-194.132 F0.10 M08
N0420 M05	N0750 G02 X43.5 Z-61 I2 K0	N1110 Z-199
N0430 M00 (CHK.DIA 45.7,47.7 AND LEN 197.55	N0760 G01 X44	N1120 X62
EDTL02)	N0770 Z-47 F6	N1130 M09 (ALL EDEGES TO BE ROUND OFF
N0440 G00 X50	N0780 X38.67 Z-49.514 F0.15	TO 0.2MM MANNUALY)
N0450 G96 S100 M04	N0790 G02 X37.5 Z-50.928 I1.414 K-1.414	N1140 G00 Z2
N0460 G04 X4	N0800 G01 Z-59	N1150 X250
N0470 R24 1 R25 0 R26 1 R29 21 L95 F0.2 M08	N0810 G02 X41.5 Z-61 I2 K0	N1160 M05
N0480 R24 .5 R25 0 L95	N0820 G01 X43.7	N1170 M00
N0490 G00 X250 M09	N0830 Z-47 F6	N1180 T0808 (PARTING TOOL W=3MM)
N0500 M05	N0840 X42.7	N1190 G00 Z5
N0510 M00 (CHECK DIA 42.7,44.7 AND LENGTH	N0850 X37.67 Z-49.514 F0.1	N1200 X35
61.5,198.55 ED TL 02 IN X)	N0860 G02 X36.5 Z-50.928 I1.414 K-1.414	N1210 M00 (CHK.5MM GAP IN Z ED TL 08/09)
N0520 G00 X45	N0870 G01 Z-59	N1220 G00 X53.7
N0530 G96 S120 M04	N0880 G02 X40.5 Z-61 I2 K0	N1230 Z-100.
N0540 G04 X4	N0890 G01 X44	N1240 M00 (CHK. 5MM GAP IN X ED TL 08)
	N0900 G00 X250 M09	N1250 G00 X64



N1260 Z-238.6 N1270 G96 S100 M04 N1280 G01 X50 F0.05 M08 N1290 X62 F0.5 N1300 G00 X250 M09 N1310 Z250 N1320 M05 N1330 M00 N1340 T0606 (EXT.TH.TOOL) N1350 G00 Z0 N1360 X43 N1370 M00 (CHK. Z GAP ED TL 06) N1380 G00 X51.7 N1390 Z-25 N1400 M00 (CHK. 5MM GAP IN X ED TL 06) N1410 G00 Z-51 N1420 G95 S530 M04 N1430 G04 X4 M08 N1440 G01 X44 F6 N1450 R20 4.5 R21 41.7 R22-48 R23 1 R24- 2.825 R25 0 R26 4 R27 3 N1460 R28 28 R29 30 R31 41.7 R32 0 N1470 L97 N1480 G00 X250 M09 N1490 M05 N1500 M00 (CHK.TH.IF TIGHT ED TL 06 IN X) N1510 G00 X50 N1520 G95 S530 M04 N1530 G01 X44 Z-51 F6 M08 N1540 R28 4 R23 1 L97 N1550 G00 X250 M09 N1560 M05 N1570 M00 N1580 M30 %SP L2200 (SP FOR 2311)	N10 G01 X41.7 Z-4 F0.1 N20 Z-61 N30 X42 N40 X43.7 Z-64.17 N50 Z-198.8 N60 X62 N70 M17 N80 M02 M02 % <hr/> PROGRAM No. : 5 %6111 (PROVED PROGRAMME) (PROG.NO.6111) (COMPONENT: DISC) (DRG.NO. 4-73400-02008,REV.00) (SETTING:1ST) (PRODUCT:G.T. 150 MW,V94.2) (M/C:STC 25 CNC LATHE) (CONTROL:SINUMERIK 3T) (LAYOUTNO.:2-437 BAYIII,BLIII) (WORK CENTRE:2744,EQUIPMENT CODE:171) (ROUGH BLANK OD-110,BORE-25,LENGTH 90 MM) (CLAMPING LENGTH 15 MM,USE 3 JAW CHUCK) (SET Z0 ON FACE CONSIDERING 0.5MM ALLOW) N0010 G90 G96 N0020 G71 M25 N0030 G54 N0040 G92 S200 N0050 T0202(PCLNL 25*25,INSERT CNMG 120408,TYPE 3,R 0.8) N0060 G00 X150 Z5 N0070 G95 S160 M04 N0080 R01 120 R02 2 R03 22 R04 1	R05 2 R06 0.15 L37 M08 N0082 G00 X250 M09 N0084 Z300 M05 N0085 M00 N0086 G95 S160 M4 N0090 R01 109 R02 2 R03-32.5 L36 M8 N0091 G00 X250 M09 N0092 Z300 M05 N0093 M00 (CHK. DIA 109 EDTL 02) N0095 R01 108 L36 N0098 R01 107 L36 N0100 R01 106 L36 N0110 G00 X250 M09 N0120 Z300 M05 N0130 M00 (CHK.DIA 106 EDTL 02) N0140 G95 S160 M04 N0150 R01 105 L36 M08 N0160 G00 X250 M09 N0170 Z300 M05 N0180 M00 (CHANGE TOOL) N0190 T0404 (BORING BAR DIA 16 WITH CNMG INSERT) N0200 G00 Z5 N0210 X80 N0220 M00 (C(CHK.5Z GAP EDTL 04) N0230 G95 S150 M04 N0240 R01 25.6 R03-43 R04-1 R05 1 R06 0.1 L36 M08 N0242 R01 26.6 L36 N0244 R01 27.6 L36 N0246 R01 28.6 L36 N0250 R01 29.6 L36 N0260 G00 X300 M05 N0270 Z300 M09 N0280 M00 (CHK.DIA 29.6 EDTL 04) N0290 G95 S150 M04 N0300 R01 30.6 L36 M08
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N0301 G00 X300 M05
 N0302 Z200 M9
 N0303 M00
 N0304 T1010
 N0305 G00 Z5
 N0306 X95
 N0307 M00
 N0309 G95 S150 M04
 N0310 R01 26 R02-.5 R03 87.5 M8 L37
 N0312 R02-1 L37
 N0314 R02-1.5 L37
 N0320 R02-2 L37
 N0325 R02-2.5 L37
 N0330 R02-3 L37
 N0335 R02-3.5 L37
 N0340 R02-4 L37
 N0345 R02-4.5 L37
 N0350 R02-5 L37
 N0355 R02-5.4 L37
 N0360 R01 88 R02 2 R03-5.4 R04-1
 L36
 N0361 G00 X300 M5
 N0362 Z250 M9
 N0363 M00
 N0364 G95 S150 M4
 N0370 R01 88.5 L36 M8
 N0380 G00 X300 M05
 N0390 Z300 M09
 N0400 M00 (CHK.DIA 88 AND DIST. 5MM EDTL
 04)
 N0410 G95 S150 M04
 N0420 R01 88.92 R03-5.5 L36 M08
 N0430 G00 Z2
 N0440 R01 26 R02-5.5 R03 88.92 R04-1 L37
 N0450 G00 Z10 M09
 N0460 X300 M05
 N0470 Z300

N0480 M00
 (CHANGE PARTING TOOL W=3MM)
 N0490 T0606 (LH.TOOL OFFSET)
 N0500 G00 Z5
 N0510 X95
 N0520 M00 (CHK.5MM Z GAP EDTL 06/07)
 N0530 G00 X115.00
 N0540 Z-15
 N0550 M00 (CHK.5MM X GAP EDTL 06/07)
 N0560 G95 S90 M04
 N0570 T0607 (RH.TOOL OFFSET)
 N0580 G00 X120 (PARTING OFF)
 N0590 Z-12.5
 N0600 G01 X107 F5
 N0610 X26 F.04 M08
 N0620 Z-2 F6
 N0630 G00 X250 M09
 N0640 Z300
 N0650 M00
 N0660 M30
 %SP
 L3600
 (GEN.SUB PROGRAMME FOR ONE TURNING CUT)
 N05 G0 G90 Z R02
 N10 X R01
 N15 G1 Z R03 F R06
 N20 G91 X R04 Z R05 F10
 N25 G0 G90 Z R02
 N30 M17
 L3700
 (GEN.SUB PROGRAMME FOR ONE FACING CUT)
 N05 G0 G90 X R01
 N10 Z R02
 N15 G1 X R03 F R06
 N20 G91 X R04 Z R05 F10
 N25 G0 G90 X R01
 N30 M17
 M02

PROGRAM No.: 6

%9611
 (PROVED PROGRAMME)
 (PROG NO 9611)
 (COMPONENT: END TIE ROD LEFT)
 (PRODUCT : DEFENCE - SRGM)
 (DRG. NO: 1-576-08-21000 REV00)
 (1ST SETTING)
 (MACHINE : STC-25 / SINUMERIK-3T /
 LAYOUT NO. 2-432)
 (EQUIP CODE:171 / WORK CENTRE:2744)
 (BLANK SIZE DIA 30 LENGTH 100 MM)
 (CLAMPING: USE 3 JAW CHUCK,CLAMPING
 LENT 15MM T/LENT 82MM)
 (SET G54 Z0 ON FACE CONSIDERING .5MM
 ALLOWANCE)
 N5 G54 G90
 N10 G92 S2000
 N15 M26
 N20 T0202 (PDJNL 2525 INS DNMG 150608
 B=.8 A=3)
 N25 G00 X250
 N30 Z5
 N35 G96 S100 M04
 N40 X35
 N45 G01 Z0 F6
 N50 X-2 F0.15 M08
 N55 X30 Z2 F6
 N56 Z-74 F0.15
 N57 X34
 N58 Z2 F6
 N60 R20 2 R21 10.781 R22 0.5 R24 1 R25
 0.2 R26 1.5 R27 42 R29 31
 N65 F0.20 L95
 N70 R24 0.5 R25 0.1 R27 42 R29 21
 F0.15 L95



N75 X40 Z2 F6 M09
N80 G0 X250
N85 Z250 M05
N90 M00
(CHECK DIA 14.78 EDTL 02)
N95 G00 Z2 M08
N100 X30
N105 G96 S100 M04
N110 G01 X25 Z1 F6
N112 G01 X9.78 Z.5 F6
N113 X13.781 Z-1.5 F0.15
N114 Z-48 X14.06
N115 X29 Z-80.109
N116 X34
N120 X40 Z2 F6 M09
N125 G00 X250 M05
N130 Z250
N135 M00
(CHECK DIA 13.78 EDTL 02 AND TOOL CHANGE)
N140 T0606 (EXT TH TOOL P=1.5 FOR LH
THREAD)
N145 G00 Z-5
N150 X23.78
N155 M00
(CHECK 5X GAP EDTL 04)
N160 G00 Z6.5
N165 X7
N170 M00
(CHECK 5Z GAP EDTL 04)
N175 G00 X18 M08
N180 Z1.5
N185 G95 S800 M04
N190 R20 1.5 R21 13.781 R22 1.5 R23 1 R24-
0.812 R25 0.1 R26 1.5
N195 R27 0 R28 10 R29 30 R31 13.781 R32-45
L97
N200 G00 X250 M09

N205 Z250 M05
N210 M00
(CHECK THREAD IF TIGHT EDTL 04)
N215 G00 Z1.5
N220 X30
N225 G95 S800 M04
N230 G01 X18 F10 M08
N235 R23 1 R28 2 L97
N240 G00 X250 M09
N245 Z250 M05
N250 M00
(CHECK THREAD)
(1ST SETTING CHECK BY Q.C)
N255 M30
%SP
L0200(SP FOR 9611)
N5 G01 X13.781 Z-1
N10 G01 Z-48
N15 X29 Z-80.109
N20 M17



ANNEXURE 'B'

PRICE BID FORMAT

Name of Work :

NIT No. & Date :

Bidder's Offer No. & Date :

Sl. No.	Description of item	Unit	Qty	Basic Rate (In Rs.)	Excise Duty (In %)	VAT/CST (In %) (VAT with FORM-17 or CST with C-FORM)	Service Tax (In %)	Total Value (In Rs.)	
1	Material	Set	01	Rs.	%	%		Rs.	
2	Spares	Set	01	Rs.	%	%		Rs.	
3	Installation & Commissioning	Set	01	Rs.			%	Rs.	
4	TOTAL COST (in Figures)								Rs.
5	TOTAL COST (in Words) :								
	TOTAL COST								

Note: Bidder may please note that all relevant columns should be duly filled up and in case any column is left blank it will be considered as inclusive in the prices quoted. All pages to be duly signed and stamped by authorised signatory.

Sign & Seal

Annexure 'C'
CHECK LIST FOR TENDER

NIT No. : _____

Bidder shall ensure that following documents / particulars have been enclosed with tender. This check list shall be enclosed with Techno-commercial Bid.

S. No.	Particulars	YES/NO	REMARKS
1.	Sealed Techno-commercial Bid with Un-priced price bid as per Annexure 'B' of NIT		
2.	Sealed Price Bid as per Annexure 'B' of NIT		
3.	Compliance to all the points of the Annexure 'A' of NIT		
4.	Audited balance sheets for the last three years should be submitted i.e., 2014-15, 2013-14, 2012-13 required as per Clause 10.1 of Annexure 'A' of NIT		
5.	P.O. copies and Commissioning/ Performance certificates required as per Clause 10.3 of Annexure 'A' of NIT		
6.	Name, address & contact details of their customer required as per Clause 10.3 of Annexure 'A' of NIT		
7.	Tender Fee enclosed		
8.	Earnest Money Deposit (EMD) required as per Clause 14 of Annexure 'A' of NIT		
9.	Complete specifications such as Part no. / Model / Type of Drive and Servo motors, power, torque, Rated and max. RPMs, Rated and max. Currents of servo motors. Ordering brochure/catalogue should be attached required as per Clause 19.4 of Annexure 'A' of NIT		

Sign & Seal