

RETROFITTING & RECONDITIONING OF VA50 VERTICAL MACHINING CENTER.		
ANNEXURE-II		
SPECIFICATION & SCOPE OF SUPPLY		
S.No	Description	
Section A: Details of existing machine		
1	CNC SYSTEM: SIEMENS Make SINUMERIK 840C with 3-axis, one spindle, APC (Automatic pallet changer)	
1.1	X axis: MOTOR ; INDRAMAT MAKE ; 3 ϕ ~ permaenent magnet motor ; MAC 112C-0-KD-2-C-130-B-0 Drive: Servo module INDRAMAT, Type:TDM1.2-50-300-w1-000	
1.2	Y axis: MOTOR ; INDRAMAT MAKE ; 3 ϕ ~ permaenent magnet motor ; MAC 112C-0-KD-4-C-130-B-0 Natrual Condition : mdn - 28.0 Nm ; Idn - 31.0 A ; Surface cooled : mdn - 44.0 Nm ; Idn - 49.0 A ; Tacho - 3.0v / 1000 min-1 ; N=1500 min/1 Drive: Servo module INDRAMAT, Type:TDM1.2-50-300-w1-000	
1.3	Z axis: MOTOR ; INDRAMAT MAKE ; 3 ϕ ~ permaenent magnet motor(Brake motor) ; MAC 112C-0-KD-2-C-130-B-2 ; Natrual Condition : mdn - 28.0 Nm ; Idn - 31.0 A ; Surface cooled : mdn - 44.0 Nm ; Idn - 49.0 A ; Tacho - 3.0v / 1000 min-1 ; N=1500 min/1, Brake : 40Nm DC 24v +-10% Drive: Servo module INDRAMAT, Type:TDM1.2-50-300-w1-000	
1.4	Spindle AC motor: 3 ϕ ~ spindle motor ; 2AD-132B-B050-B2-BS01-D2N1(10 KW) ; Base speed =1500 rpm - max speed = 7500 rpm Spindle drive: TYPE: KDA 3.2-100-3-A00-W1, CHOKE (L) GLD 13	
1.5	Machine inbuilt with Automatic Pallet changer	
1.6	Hydraulic motor details: 3 ϕ ~ induction motor ; Make : NGEF ; 2.0 HP ; 1.5KW ; 3.4 A ; 1400 rpm ; Mount 90LZ ; B class insulation : S1 Duty	
1.7	Spindle head lubrication 3 ϕ ~ motor : 0.18 KW ; 1440 rpm	
1.8	Lubrication power pack 3 ϕ ~ motor : 0.18 KW ; 1440 rpm	
1.9	Chip conveyor 3 ϕ ~ motor : 0.75 KW ; 1400 rpm	
1.10	Coolant 3 ϕ ~ motor : Make : Bharat Bijilee Limited ; Frame : 100L 415v Δ 50Hz 2.2KW/3HP ; I=5A ; 1430 rpm ; Duty : S1	
1.11	Voltage Stabilizer Details: NEEL Servo Controlled Voltage Stabilizer: Input: Min. to Max-310V-480V ; Output: 415V ; Rating: 45 KW ; Current: 63A	
1.12	Specifications of the major Hydraulic solenoid DC valves available in the machine: 1) DG4V-3S-2N-M-U1-D5-60 (1 No's) 2) DG4V-3S-2A-M-U1-D5-60 (1 No's) 3) DG4V-3S-6C-M-U1-D5-60 (2 No's) 4) DG4V-3S-2C-M-U1-D5-60 (1 No's) 5) DGMFN 3Y A2W B2W - 1 No Note: All are "vickers" make.	

1.13	Major pressure switches existing in the machine are as follows: Type: IPS (industrial pressure switch) - 2 No's; Make : Indfos	
1.14	Major pump available in the machine is as below: PYB 10RS Y31 C11 IN154	
2	Section B: SCOPE OF SUPPLY	
S.No	Description	Vendor's Remarks / Compliance
2.1	Supply of CNC Controller, capable of performing all the machine functions and controlling 3 axis and a spindle. The CNC system should have the provision for 4 th axis (for rotary table axis) CNC PACKAGE: Latest version of CNC system with min 10.4" Colour display package only. CNC Makes acceptable: SIEMENS/FANUC The CNC system offered shall have the following features. 1. Alphanumeric Keyboard and Colour Display of size 10.4" or more. 2. MCP and Operator controls having necessary Push Buttons with Indicating Lamps and Selector / Toggle Switches. 3. PLC configuration having at least 144 Inputs and 96 Outputs. 4. Graphic Machining Simulation of tool paths in part programs. 5. Minimum 3MB user memory along with MIN 1 GB flash card facility for program storage. 6. Manual measurement and automatic storage of tool offsets in tool offset memory. 7. All milling / drilling operations and to cater all existing machine features. 8. CNC data can be transferred quickly and easily using USB / Compact Flash (CF) card / Ethernet interfaces Note: 1. The CNC system being offered shall be available in the market for next 10 years and spares/service support shall be available for the next 15 years. 2. All features available in the old CNC system of the machine shall be made available in the new CNC being offered. 3. Service support shall be available in India. Details of the service centre facility available in India to be provided.	
2.2	Supply of 3 numbers of A.C.servo motors with inbuilt high resolution encoders of suitable capacity for all three axis. (X,Y,Z). Torque and speed to match with the parameters of the existing A.C. servo motor mentioned above and suitable to be interfaced with the CNC system offered. Mechanical interfacing arrangement and coupling required to match the new motor with the existing mechanical drive system should be included in the offer. The type number / model of the motor selected should be indicated in the offer and the technical leaflet should be enclosed. Note: Z axis Motor is brake inbuilt Make: Fanuc/Siemens only acceptable	
2.3	Supply of AC digital servo amplifier modules for all the three axis of suitable capacity for the proposed individual servo motors. The type number of the module should be provided.	
2.4	Supply of external encoders for X,Y and Z axes. Encoder couplings for the mounting the encoder to be supplied. Make: Fanuc/Siemens only acceptable, PPR: 2500 min.	

2.5	Supply of AC spindle motor of suitable capacity to replace the old spindle motor. The parameters of the offered motor to match with the existing servo motor and suitable to be interfaced with the CNC system offered. Mechanical interfacing arrangement and coupling required to match the new motor with the existing mechanical drive system should be included in the offer. The type number / model of the motor selected should be indicated in the offer and the technical leaflet should be enclosed. Make: Fanuc/Siemens only acceptable	
2.6	Supply of latest digital servo amplifier module for spindle. The rating of the drive module selected should support the selected servo motor. The type / model of the drive module selected should be indicated in the offer.	
2.7	Supply of external encoder with sufficient cable length for spindle. Encoder couplings for the mounting the encoder to be supplied. Make: Fanuc/Siemens only acceptable, PPR: 1024 min.	
2.8	Supply of motor power cable, motor signal cable, external encoder feedback cables of sufficient length with end connectors for axes and spindle.	
2.9	Supply of necessary line filter and reactor unit for the drive modules	
2.10	Supply of control transformers and 24V SMPS of necessary rating.	
2.11	Supply of necessary cables, single/multi core wires, glands, sleeves, ferrules etc for complete rewiring of the m/c.	
2.12	Supply of new operating pendant for mounting the new CNC system and keyboard.	
2.13	Supply of new Electrical panel for mounting the drives, power supply units and other switchgears. The panel should have the following features. 1. The panel shall be metal enclosed, indoor, floor mounting and free-standing type of Rittal make (or any other make acceptable to BHEL). The panel shall be free from flaws, dents and undulations. 2. All mating surfaces shall be provided with neoprene gaskets. Panel shall be provided with three point locking arrangement. Hardware used shall be chrome/ nickel - plated. The anti-vibration pad shall be of hard rubber. 3. Degree of protection of panel enclosure: IP 55 4. Removable cable entry shall be provided. 5. The bottom surface of the control panel should be free and no components should be mounted on it. 6. All transformers shall be provided with acrylic cover over the terminals.	
2.14	Supply of air conditioning unit for the Electrical panel and operating panel of sufficient rating. i. M/s Advance Cooling System pvt Ltd ii. M/s Werner Finley pvt Ltd iii. M/s Rittal or any other reputed make acceptable to BHEL.	
2.15	Supply of Hand Held Unit along with 5 metres cable and adapter as required.	
2.16	Supply of suitable ratings of MCB, MPCB, contactors, relays, fuses, 3ph digital energy meter (with data logging feature) and other control elements for replacing the old switchgears in the machine.	
2.17	Supply of new limit switches, pressure switches, proximity switches for the replacement of old sensors in the machine.	
2.18	Supply of voltage stabilizer of rating 50 kVA or higher.	
2.19	Supply of new induction motors to replace the all the old ones.	

2.20	Supply of machine lamp, spindle area LED spot light, panel lamp and 24V hand lamp for the machine. 24V AC handlamp provision shall be provided in the panel.	
2.21	Supply of tools for maintenance of the machine. 1. Clamp meter (AC/DC 0-600A) - 1 no 2. Electrical maintenance safety gloves (Class 00) - 3 sets 3. Electrical maintenance socket set 4. Spanner set+allen key set+screw driver set with tool box - 1 SET. 5. Three leg mechanical puller - 6 Inch - 1 No 6. Three leg mechanical puller - 12 inch - 1 No 7. Heat gun - Bosch make: Working temperature 300 - 500 °C - 1 Set	
2.22	Supply of pallet change motors.	
3	SCOPE OF SUPPLY - MECHANICAL ITEMS	
3.1	Design and supply of suitable brackets and coupling for mounting the new AC servomotors for all axes and spindle motor.	
3.2	Supply of new Centralized lubrication system ALU-05 (CENLUB) or equivalent with piston distributors and set of copper and nylon tubing for all guide ways.	
3.3	Supply of motor pump set for head stock lubrication system as available in the machine.	
3.4	Supply of coolant circulation pump RDRN 100 Make: Rotodel or equivalent in any other standard makes.	
3.5	Supply of chip conveyor gear box ratio 300:1 along with motor.	
3.6	Supply of complete set of Hyd. solenoid valves to replace the old ones. The new solenoid valves shall be of Rexroth / Vickers make only.	
3.7	Supply of pressure switches as given or equivalent to the existing ones in the machine. Any modification required for mounting the pressure switches to be carried out by the vendor. Any other pressure switch existing in the machine not included in the list above to be studied by the supplier during their visit to BHEL and to be included in the offer.	
3.8	Supply of suitable oil filter/strainer for the hydraulic system.	
3.9	Supply of ball screw rod and nut for X and Z axis. Vendor to take dimensional drawings of the ball screw rod at BHEL works.	
3.10	Supply of X,Y and Z axis ball screw end support bearings.	
3.11	Supply of new Hydraulic oil chiller unit for the machine of CAPACITY: 4500 K/CAL Chiller unit shall be of following makes. i. M/s Advance Cooling System pvt ltd ii. M/s Werner Finley pvt ltd iii. M/s Rittal or any other reputed make acceptable to BHEL.	
3.12	Supply of guideway wipers for X,Y and Z axis-TWO SET	
3.13	Supply of high pressure hydraulic hoses -ONE SET. Vendor to take list of hoses at BHEL and to supply.	
3.14	Supply of coolant circulation hose-ONE SET	
3.15	Supply of coolant pump and motor to replace the old one in the machine. (Two immersible pumps are available in the existing machine)	
3.16	Supply of complete set of hydraulic fittings one to one equivalent to the existing machine hydraulic fitting. Supplier to take list the of fitting at the time of BHEL visit.	
3.17	Supply of new pumps and coupling for the hydraulic system as given above or equivalent to the existing pumps. The new pumps shall be of Vickers or Rexroth makes only.	
3.18	Supply of new rollers for pallet changing mechanism and sliding door. Vendor to take the actual size and details of the same at BHEL works.	
3.19	Design and supply of telescopic covers for X,Y axis. Design and supply of lamino bellows cover for Z axis to replace the old one.	
3.20	Supply of seal kit pallet open /close door cylinder to replace the old one.	

3.21	Supply of coolant union model no: 1109 021 188 make: Deublin or any other make equivalent to existing model.	
3.22	Supply of oil level inspection glases for the machines.	
3.23	Supply of Maintenance Tools of Taparia make or any other reputed make acceptable to BHEL. 1. Spanner set+allen key set+screw driver set with tool box - 2 SET. 2. Circlip Plier straight with leaf spring(3 sizes)-3 SET 3. Circlip Plier bend with leaf spring(3 sizes)-3 SET	
4	Important point to be noted by the vendor: 1. Any material not specified in the scope of supply but required for successful commissioning of the supplied electrical and mechanical materials is in the scope of the contractor. 2. Vendors (except OEM of the machine) MUST visit HPBP BHEL, Tiruchirappalli, study the existing machine and assess the work content before submission of quotation. Only such offers shall be considered for technical evaluation.	