

RETROFITTING & RECONDITIONING OF KWS M/C.		
ANNEXURE II		
MACHINE SPECIFICATION & DETAILS OF EXISTING MACHINE PARTS		
S.No	Description	
1	DETAILS OF THE EXISTING MACHINE AND ITS SYSTEMS	
1.1	CNC SYSTEM: HINUMERIK 2000 CNC controlling 2 axes and 1 spindle	
1.2	X-axis	
1.2.1	Siemens 3Ø permanent magnet motor 1FT5074-OAF71-1-Z Mn=14Nm,S1=3000/min,Io=13Amps	
1.2.2	AXIS DRIVE CONTROLLER : LT MODULE 25A Simodrive	
1.2.3	Pulse Sensor : 2500 PPR	
1.3	Z-axis	
1.3.1	Siemens 3Ø permanent magnet motor 1FT5074-OAF71-1-Z Mn=14Nm,S1=3000/min,Io=13Amps	
1.3.2	AXIS DRIVE CONTROLLER : LT MODULE 25A Simodrive	
1.3.3	Pulse Sensor : 2500 PPR	
1.4	Spindle Motor & Drive details	
1.4.1	Make: Siemens, Type: 1PH6167-4NF46-Z 37/55KW, 102/141Amps	
1.4.2	SPL DRIVE : LT MODULE 200A, 6SN 1123-1AA01-0FA1	
1.4.3	Pulse Sensor: SPINDLE ENCODER : 1024 PPR	
1.5	Machine in-built with tool turret mechanism	
1.6	Isolation Transformer and stabilizer of 100kVA rating each.	
1.7	Centralized lubrication system for the guide ways.	
1.8	Chip conveyor motor. Type: TEFC, frame:80, 0.75kw/1HP, 1400rpm, 1.8amps	
1.9	Hydraulic Motor. 3Ø Induction motor, TQUF 112M4ai, 3.7KW/5Hp, 415v, 8Amps, s1duty	
1.10	Specifications of the Hydraulic solenoid DC valves available in the machine: 1. DG4V 3S 2N M U1 B5 60 - 4 NOS 2. DG4V 3S 2A M U1 B5 60 - 8 NOS 3. PR CONTROL VALVE: CGR 02 B 10 - 1 NO 4. XCL 03 B 10 - 1 NO 5. DGMFN 3X A2W B2W 20 -1 NO	
1.11	The major pressure switches existing in the machine are as follows: 1. 1PT1 4/50 - 3 NOS (POLYHYDRON) Vendor to take the list of all the pressure switches as available in the machine at BHEL during their visit.	
1.12	Pumps available in the machine are as below. 1. PISTON PUMP FOR HYDRAULIC OIL CIRCULTION 2. VANE PUMP FOR OIL CHILLER CIRCULATION	
SCOPE OF SUPPLY		
S.No	Description	Vendor's Remarks / Compliance
2	Electrical & Electronics parts/accessories	

2.1	Supply of CNC Controller, able to perform all the machine functions. CNC PACKAGE: Latest version of CNC system with min 10.4" Colour display package only. CNC Makes acceptable: SIEMENS/FANUC/FAGOR The CNC system offered shall have the following features. 1. Full Alphanumeric Keyboard and Colour Display (TFT/LCD monitor) of size 10.4" or more. 2. MCP and other Operator controls having necessary Push Buttons with Indicating Lamps and Selector / Toggle Switches. 3. PLC configuration having at least 96 Inputs and 64 Outputs with necessary I/O cards. 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 turning 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 AC servo motors of suitable capacity for X and Z axes with Built-in Brake (for both motors). 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 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. Makes acceptable: SIEMENS/FANUC/FAGOR	
2.3	Supply of external encoders for X and Z axes. Encoder couplings for the mounting the encoder to be supplied. Make: Fanuc/Siemens/Fagor only acceptable, PPR: 2500	
2.4	Supply of AC digital servo amplifier modules for X and Z axes. The rating of the drive modules selected should support the selected servo motors. The type number / model of the drive module selected should be indicated in the offer and the technical leaflet should be enclosed.	
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. The type number / model of the motor selected should be indicated in the offer and the technical leaflet should be enclosed. Makes acceptable: SIEMENS/FANUC/FAGOR	

2.6	Supply of external encoder with sufficient cable length for spindle. Encoder couplings for the mounting the encoder to be supplied. Make: Fanuc/Siemens/Fagor only acceptable, PPR: 1024	
2.7	Supply of latest digital servo amplifier module for spindle. The rating of the drive module selected should support the selected servo motor. The type number / model of the drive module selected should be indicated in the offer and the technical leaflet should be enclosed.	
2.8	Necessary line filter and reactor unit for the drive modules	
2.9	Supply of motor power cable, motor signal cable, external encoder feedback cables of sufficient length with end connectors for axes and spindle.	
2.10	Supply of necessary control transformers and 24V SMPS units of sufficient rating.	
2.11	Supply of new operating pendant for mounting the new CNC system and keyboard.	
2.12	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.	
2.13	Supply of air conditioning unit for the Electrical panel and operating panel of sufficient rating. Air conditioner 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.	
2.14	Supply of Hand Held Unit along with 5 metres cable and adapter as required.	
2.15	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.	
2.16	Supply of new limit switches, pressure switches, proximity switches for the replacement of old sensors in the machine.	
2.17	Supply of voltage stabilizer of rating 100 KVA. Stabilizer shall be of NEEL, AEI, POWER AID, DELTA, Servo max, KRYGARD, Consul or any other reputed make acceptable to BHEL.	
2.18	Supply of necessary cables, single/multi core wires, glands, sleeves, ferrules etc for complete rewiring of the m/c.	
2.19	Supply of new hydraulic motor and chip conveyer motor to replace the old ones in the machine	
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 8. Adjustable wrench 200mm	
3	SCOPE OF SUPPLY - MECHANICAL ITEMS	
3.1	Supply of suitable brackets and couplings for mounting the new AC servo motors for axes and spindle.	
3.2	Supply of new Centralized lubrication system ALU-03 (CENLUB) with or equivalent with piston distributors (for all the axes,ballscrew rods), pressure switch and set of copper and nylon tubing for all guide ways.	
3.3	Supply of guideway wipers for all machine slide ways-TWO SET	
3.4	Supply of ballscrews for X and Z axis with C3 accuracy. Laser calibration report for accuracy of ball screw shall be given along with the supply. Approximate dimensions of ballscrew for X axis = 38x10Px810mm and Z axis =40x10Px2200 NOTE: Vendor to take actual dimensional drawing of ballscrew rods at BHEL works.	
3.5	Supply of high speed hydraulic cylinder model no: OSP/OSPA 150 Make: HMT or equivalent in other standard makes	
3.6	Supply of high pressure hydraulic hoses with required hydraulic end fittings -ONE SET. Vendor to take list of hoses and to supply.	
3.7	Supply of coolant circulation hose with end fittings-ONE SET	
3.8	Supply of coolant motor pump set to replace the old one in the machine.	
3.9	Supply of X and Z axis ball screw mounting bearings -ONE SET. Vendor to take the details of the bearings during dimensional drawings of ballscrews.	
3.10	Supply of chip conveyor gear box of ratio 200:1 along with motor.	
3.11	Supply of Timing belts for main spindle, encoder, X and Z axis drives. Vendor to take the details at the BHEL works.	
3.12	Supply of drive and driven pulley with required coupling for X and Z axis drive.	
3.13	Supply of inline flow switch for spindle lubrication - 2 Nos	
3.14	Vendor to design and supply new hydraulic power pack with the following accessories. 1. Pump and motor for Hydraulic system activation 2. Pump and motor for Chiller oil circulation 3. Control valves and Pressure Switches 4. Complete set of high pressure tubes/hoses 5. Suitable manifold for valves mounting. 6. Tank with suitable filters, pressure gauge, isolation valve, temp sensor. 7. Accumulator, if any as required in the design. 8. Control valves required for proper turret operation. During design stage the vendor shall consider all hydraulic actuations of the existing machine (like chuck clamp, tailstock, turret index, turret clamp, lubrication actuation). The General Assembly drawing of newly designed hydraulic power pack shall be submitted by the vendor for approval by BHEL before going for assembly/fabrication. Note: The new hydraulic pump(s), control valves of the hydraulic power pack shall be of Vickers or Rexroth makes only. Existing chiller in BHEL shall be used for Hydraulic oil cooling.	
3.15	Supply of suitable cable drag chain for X and Z axis.	
3.16	Supply of necessary seals and bearings for the servicing of turret head. Vendor to take the details of the same from machine at BHEL works.	

3.17	Supply of Maintenance Tools as mentioned below. a) Spanner set, allen key set, circlip plier - internal & external, screw driver set in suitable tool box - 2 SET a) Drilling machine tool kit (1.5mm to 10mm) – 4 set c) Pipe Wrench – 32” & 42” – 2 Nos. d) Chain Wrench – 32” & 42” – 2 Nos. e) Circlip Plier straight with leaf spring(3 sizes)-3 SET f) 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 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.	