**Item 01:** CNC Milling Machining Center

**Technical Specification:**

A 3 Axes CNC Vertical Machining Centre with FANUC 0i Mate MD Control and with 20 Station Automatic Tool Changer.

A precision milling machine totally enclosed high visibility sliding guard.

The machine should be provided with widely placed precision LM guide ways for increased rigidity and high accuracy.

The castings are internally reinforced with heavy ribs to resist flex and damp vibrations.

**Travel**

<table>
<thead>
<tr>
<th>Axis</th>
<th>Travel (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X axis</td>
<td>600</td>
</tr>
<tr>
<td>y axis</td>
<td>450</td>
</tr>
<tr>
<td>Z axis</td>
<td>500</td>
</tr>
</tbody>
</table>

**Table**

<table>
<thead>
<tr>
<th>Table Size</th>
<th>700 x 420 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load on Table</td>
<td>350Kgs.</td>
</tr>
</tbody>
</table>

**Spindle**

<table>
<thead>
<tr>
<th>Spindle Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle</td>
<td>Direct Drive, Cartridge Type</td>
</tr>
<tr>
<td>Spindle nose to table top</td>
<td>80-580 mm</td>
</tr>
<tr>
<td>Spindle to Column</td>
<td>480 mm</td>
</tr>
<tr>
<td>Spindle nose taper</td>
<td>BT 40</td>
</tr>
<tr>
<td>Spindle motor capacity</td>
<td>7.5 Kw</td>
</tr>
<tr>
<td>Programmable spindle speed</td>
<td>100 – 8000 rpm</td>
</tr>
</tbody>
</table>

**CNC detail**

| Control System           | Fanuc 0i Mate MD |

**Feed rate**

<table>
<thead>
<tr>
<th>Feed rate Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programmable feed rate</td>
<td>0 -10000 mm/min</td>
</tr>
<tr>
<td>Rapid feed</td>
<td>30/30/20 m/min</td>
</tr>
</tbody>
</table>

**Accuracy**

<table>
<thead>
<tr>
<th>Accuracy Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning accuracy</td>
<td>0.01 mm</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.005 mm</td>
</tr>
</tbody>
</table>

**Axis**

<table>
<thead>
<tr>
<th>Axis Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axis resolution</td>
<td>0.01 mm</td>
</tr>
<tr>
<td>Axis motor</td>
<td>AC Servo motor</td>
</tr>
</tbody>
</table>

**Guide ways/ Ball screws**

<table>
<thead>
<tr>
<th>Guide Ways/Ball Screws Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slides</td>
<td>Linear motion guide ways</td>
</tr>
<tr>
<td>Ball screws X/Y/Z</td>
<td>32mm &amp; 10mm C3 Class</td>
</tr>
</tbody>
</table>

**Power source**

<table>
<thead>
<tr>
<th>Power Source Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main supply</td>
<td>415V, 3 Ph., 50 Hz</td>
</tr>
</tbody>
</table>

**Coolant/Lubrication**

<table>
<thead>
<tr>
<th>Coolant/Lubrication Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant Capacity</td>
<td>100 Ltr</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Automatic lubrication system</td>
</tr>
</tbody>
</table>

**AUTOMATIC TOOL CHANGER**

<table>
<thead>
<tr>
<th>Tool Changer Details</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool Shank</td>
<td>BT 40</td>
</tr>
<tr>
<td>No of Tool</td>
<td>20 tools</td>
</tr>
<tr>
<td>ATC Type</td>
<td>Arm Type</td>
</tr>
<tr>
<td>Maximum tool dia</td>
<td>80</td>
</tr>
<tr>
<td>Maximum tool length</td>
<td>250</td>
</tr>
</tbody>
</table>
Standard Equipment.
Back-up software disc
Installation and user manual on CD-ROM
Programming Manual on CD-ROM
Flood coolant (programmable)
One-shot lubrication for slideways
Tool mat
Machine lighting
Spanners and keys and swarf brush
Heavy duty anti-vibration pads
Maintenance Support system - An interactive multimedia based system which will guide the user through various operations of the machine such as machine commissioning, machine maintenance, basic operations of the machine
Safety
· Fully enveloping transparent High Impact chip/work guards.
· Emergency stop latching button.
· Isolator switch lockable with padlock.
· Integral electrical panel with no volt protection.
· Positive end stops on all axes.
· Low voltage control circuitry.
· Ergonomic positioning of machine controls.
· Full graphical on screen test simulation prior to machining operation.
· Absolute zero datum facility.

SUITABLE TOOLING PACKAGE TO RUN THE MACHINE
Specify the utilities required such as stabilizer, compressor etc. (IF ANY) at site for the above

CNC PART PROGRAMMING SIMULATION SOFTWARE FOR MILLING WITH COURSEWARE
(Single User License)

CNC Web-based Courseware as per the specifications :-

- Contain multiple sessions in Milling taking the students from Entry (Novice) to Intermediate through a systematic manner.
- Cover topics such as Machine Configuration, components, Machine functions, tooling systems, machining parameters, & safety procedures.
- Able to train the users on programming, operation with knowledge checks
- Adapt to the software offered below for simulation practice and exercises.
- Programming module to be offered with – Fanuc, Siemens, ISO control.

CNC PART PROGRAMMING & SIMULATION SOFTWARE FOR Milling :

Technical Specification

- Suitable Software module in accordance to the machine offered must be given.

CNC & Milling Workshop Programming and Simulation Software with Virtual Machine Operation
The Software should be an open system quality, free to be configured to any machine system structure and CNC control. CAM software should not be offered.

CNC Workshop Programming and Simulation Software should have the following features

- Realistic representations of industrial CNC machine tools for Milling Up gradation of the module upto 5 axes (X, Y, Z, A / B, C) including sub-spindle should be possible.
- The product offered must be for 3 Axes Milling with Fanuc Control, suitable to integrate to the machine offered above.
- 3D machine room simulation and 3D material removal simulation with 3D collision tests in real-time with time override selection,
- Mathematical exact measurement of the work piece generated by the simulation in sections of in the work piece
- Exact collision monitoring and collision test between all moving and fixed machine tool components,
- Calculation of 3D sections of work piece, Tool path display in 3D & 2D representations of work piece
- CNC Software should have possibilities for configuration and customization to the actual conditions of any machine tool, to tooling systems, to standard clamping systems and to the raw material,
- Providing different types of CNC programming modes for manufacturer neutral CNC programming with processing cycles and the possibility of parameter programming
- CNC-Editor with control independent user interface, Interactive programming mode , Teach-In mode, Workshop Programming mode
- Geometry editor : Contour programming, tool nose compensation, cutter radius compensation & Surface roughness calculation
- NC program analysis
- The work fixture from lathe simulation consists of spindle, chuck, jaws, collet, soft jaws, tailstock and centre sleeve.
- The work fixture from Milling simulation consists of Machine Vice, chuck, parallel blocks .
- The tool system should support different cutting tools and tools holders.
- Each individual cutting tool could be free configured on shape of cutting tip, cutting angle (rake and clearance angle).
- Each single tool could be displayed or pick out for solid modelling presentation.

COMPLETE MACHINE SIMULATION (VIRTUAL)

- Should be able to simulate the entire CNC machine - structure, movement, operation (virtual) in 3 dimension in the software.
- The software should simulate at least 5 Models of Milling from Various Machine Tool Manufacturers.
- This simulation should be identical to the actual machine being offered, allowing the student to experience the operation of the CNC machine in virtual environment

Compatibility/upgradability: Master CAM/FMS/CIM
**Item 02:  CNC WIRE CUT EDM**

**Technical Specification:**

- **X axis Travel of the table**: 300-350 mm
- **Y axis Travel of the table**: 350-400 mm
- **Maximum Work Table Area**: 415 mm x 635 mm
- **Maximum Work-piece Thickness to cut**: 500 mm
- **Maximum taper per 100 mm thickness**: ± 3°
- **Work-piece weight to handle**: 400-450 kg
- **Maximum Speed**: 80 mm²/min
- **Machining accuracy**: 0.01 mm
- **Least Input Increment**: 0.001 mm
- **Least Command Input**: ± 0.001 mm
- **Best Surface Finish**: 1.25 To 1.75 µ Ra
- **Display**: LCD monitor
- **Axis control**: 4 axis (X,Y,U & V)
- **Resolution**: 0.001 mm
- **Wire electrode**: 0.18mm to 0.12mm
- **Interpolation**: Linear and Circular
- **Programming**: Incremental
- **Least Input Increment**: 0.001 mm
- **Least Command Input**: ± 0.001 mm
- **Data input / output system**: USB, Key board and Mouse.
- **Power**: 3 Phase, 415 V, 50 Hz
- **Control System**: Computer Numerical Control
- **Guide ways**: LM Guide ways for x and y Axis
- **Total Machine Load**: 1.5 KVA
- **Dielectric fluid**: Soft Water (D.M Water) +Gel
- **Dielectric Tank Capacity**: 55 Ltrs

**Essential Features:**

- Auto centre find, auto edge find, auto shut off at wire breakage and auto stop at the end of the job.
- BMXP System Software Controller with Industrial PC with Windows 7 platform. In built Numerical Control CAD software.
- Should be capable of reading Auto CAD DXF Files. It should load AutoCAD into the system & transfer the AutoCAD DXF drawing into the system either by pen drive, CD Drive or through LAN
- It should have graphical display of the part showing the wire position.
- New programs should be entered while cutting previous program.
- Two axis DRO (STD) for quick job setting.
- 4-axes synthesizer to cut different profiles at top and bottom.

**Standard Accessories along with the machine:**

- CNC Control Unit
- Molybdenum wire: φ0.18 mm (6 kms), and φ0.15 mm (3 kms)
- Dielectric Soap Gel: (10 kgs).
- Industrial PC
- Coolant Tank
- Guide Pulleys : 3 Nos.
- Wire tightening pulleys : 1 No.
- Proximity switches: 2 Nos.
- Wire vertically setting block.- 1 No.
- 2-Axis DRO - 1 Set
- Tool kit and instruction manual
Item 03: Hydraulic Shearing machine

Technical Specification:

- Shearing length 1500
- Shearing thickness MS – 4 mm and SS-3 mm
- Motor kw 7.5

Standard Accessories:

The machine should supply complete with:

- Electrical
- Control panel
- Set of blades for MS & SS cutting
- Stroke counter
- Foot pedestal emergency stopper
- Hardened ball on table for easy movement of sheet
- Finger guard
- Right angle gauge