

### 3 Axis CNC Vertical Milling Machine

#### SPECIFICATIONS:

S. No.	DESCRIPTION OF REQUIREMENT	REQUIRED
<b>1</b>	<b>Technical Specification</b>	
<b>1.1</b>	<b>Capacity</b>	
1.1.1	Length of table	700 min
1.1.2	Width of table	400 min
1.1.3	Max load on table	300 kg
1.1.4	X travel	700 mm min
1.1.5	Y travel	400 mm min
1.1.6	Z travel	300 mm min
<b>1.2</b>	<b>Machine Spindle</b>	
1.2.1	Spindle Speed	Min 8000 Rpm
1.2.7	Main Spindle Power	7Kw or more
1.2.8	Spindle taper	ISO/BT/SK 40/50
1.3	ATC	15 min
<b>1.4</b>	<b>Accuracy</b>	
1.4.1	Positional accuracy	0.01 mm in full length
1.4.2	Repeatability	0.005 or better
<b>1.5</b>	<b>Coolant System</b>	
1.5.1	Tank capacity	Min 100 Ltr
1.5.2	High presuure filtration system	Min 20 Bar with filtration system
<b>1.6</b>	<b>Axis drive and Control</b>	
1.6.1	Digital controlled drive and motors	<b>For all Axis</b>
1.6.2	Guide way	<b>LM guide way</b>
1.6.3	Rapid Speed	<b>Min 20m/min</b>
1.6.4	Feed rate	<b>Min 6m/min</b>
<b>1.7</b>	<b>CNC Control unit Features</b>	
1.7.1	Controller	Latest version siemens 840 DSL/Fanuc / Other equivalent OEM
1.7.2	3 axes simultaneous controllable	Confirm
1.7.3	Least increment with decimal input	0.001 mm
1.7.4	Standard USB port	Confirm
1.7.5	Controller memory	Min 500 MB
1.7.6	Ethernet connectivity	Confirm
1.7.7	Display of PLC alarm and messeges	Confirm
1.7.8	Emergency stop on control panel	Confirm
1.7.9	Background editing and simulation of NC program	Confirm
1.7.10	CNC controller to take care of stored pitch error compensation.	Confirm
1.7.11	Backlash compensation for cutting traverse.	Confirm
1.7.12	Backlash compensation for rapid traverse.	Confirm
1.7.13	Friction compensation control	Confirm
1.7.14	Thermal Compensation	Confirm
1.7.15	Feed forward control	Confirm
1.7.16	Standard Cycle (canned)	Confirm

1.7.17	LCD color monitor with soft Key	Min 12"
1.7.18	Panel with inbuilt keyboard, monitor & operating knobs	Confirm
1.7.19	Feed control potentiometer	10%. Increments from 0 – 120%.
1.7.20	Spindle speed control potentiometer	10% Increments from 50 – 120%.
1.7.21	Emergency brake knob	Confirm
1.7.22	Machine hour reading	Confirm
1.7.23	Spindle load display	Confirm
1.7.24	Tool Load monitoring and Tool Life Management	Confirm
<b>2</b>	<b>Essential Accessories</b>	
2.1	Fully enclosed splash guard with slide windows	Confirm
2.2	Fully encapsulated housing with safety type window	Confirm
2.3	Leveling pads	Confirm
2.4	Door safety interlock	Confirm
2.5	Full Enclosure for safety operation	Confirm
2.6	Air conditioner for CNC Control Cabinet	Confirm
<b>3</b>	<b>Documentation</b>	
3.1	Detailed layout plan and prospect to be given	Each Documents 3 sets along with delivery
3.2	Operating and Programming instruction	
3.3	Installation and Commissioning instructions	
3.4	Quality Test records	
3.5	Circuit Diagrams	
3.6	Maintenance / repair charts	
3.7	Preventive maintenance instructions	
3.8	Lubrication chart & parameter list	
3.9	Requirement/recommendation for power supply controlled stabilizing has to be given.	
3.10	Lifting instruction mentioned in packing list.	
3.11	Detailed invoice and packing list of all items and devices and detailed prospect of machine and all other accessories enclosed in respective boxes	
<b>4</b>	<b>Installation and Commissioning</b>	
4.1	The complete installation and commissioning must be carried out by the supplier at the project (at the final destination/premises). Certificate of acceptance is to be signed by customer and supplier.	Confirm
<b>5</b>	<b>Training at final destination place</b>	
5.1	Operator training	10 days
5.2	Programming course	10 days
5.3	Maintenance course mechanical, electrical and electronic	7 days
<b>6</b>	<b>Service</b>	
6.1	The authorized Service Partners in India (Name & Address) must be certified by manufacturer and shown in the quotation	Confirm
7	Warranty	Min 12 months
8	Supplier shall undertaking of machine spares up to minimum 10 years.	Confirm
9	Prove out of all components as per tender drawings after installation of machine	Confirm
10	Manufacturer should have established after sales and service network in India	Similar machines installed in India minimum 10 Nos

**DELIVERY PERIOD INCLUDING INSTALLATION & COMMISSIONING:**

The delivery period including installation & commissioning of all of the machines at the destination mentioned in Para 1 on page no. 02 of the tender documents will be 5 months from the date of placement of Purchase Order/work contract.

**WARRANTY:**

The Entire machine inclusive of all system/accessories should be covered under warranty for a period of 24 months from the date of commissioning.

**Note:**

1. Machine shall be supplied with 3 sets of comprehensive operation and maintenance manual.
2. Breakdown calls to be attended within 48 hrs.
3. Supply to be done on Turnkey Basis. ALIMCO shall provide electrical supply point near to the place of installation.
4. Civil foundation details and drawings with specifications to be provided by the tenderer.
5. Total power consumption (in KW) to be provided by the tenderer.
6. CAD/CAM solution to be provided by the tenderer.

## 5 Axis CNC Milling Machine

### SPECIFICATIONS:

SL. NO.	DESCRIPTION OF REQUIREMENT	REQUIRED
1	<b><u>5-Axis CNC Milling Machine</u></b>	
1.1	Traverse Linear Axes-	
	in X-Axis.	Min. 700 mm
	in Y-Axis.	Min. 500 mm
	in Z-Axis.	Min. 500 mm
1.2	No. of axis to be controlled by CNC	5
1.3	Head tilting or Table tilting travel minimum	+110°/ -30° C-axis table rotation = 0° To 360°.
1.4	CNC Control = X, Y, Z movement, Table rotation & head tilting/table tilting; Simultaneous interpolation axes = 5	Confirm
2	<b><u>Field of Application</u></b>	
2.1	The Machine will be used for the following applications.	
2.1.1	Machining of single jobs and batch production.	
2.1.2	Standard machining of press tool plate, die plates, mould plates, fixtures, Precision machining jobs in:	
	- Face, shoulder and pocket milling.	
	- Drilling & Boring application	
	- Tapping.	
2.1.3	Five axis simultaneous machining of :	
	- Forming & stamping tool components	
	- Die casting Die components	
	- Injection moulding components	
	- Other free form machining components	
	- Machining of tyre moulds, Turbine blades and Aerospace Parts	
	- Measuring of parts and setting fixture with Measuring probe head with Measuring cycle (optional)	
2.2	The following Tool Holding & Cutting Tools must be able to use.	
2.2.1	<u>Tool holding</u>	
2.2.1.1	Suitable for Tool Shank BT-40/50/63/HSK-40/50/63(Drawing sketch and tool shank drawing to be attached in the quotation).	
2.2.1.2	Spindle tool adapting suitable for automatic tool change as per BT-40/50/63/HSK-40/50/63	
2.2.1.3	Solid and modular tool holders with or without internal coolant supply for automatic tool change.	
3	<b><u>Technical data</u></b>	
3.1	<u>PLATTER</u>	Rectangular/Square/ Round
3.1.1	Platter Size min	600 x 500 mm/500 SQ / Ø500 mm
3.1.2	Spindle nose to table	600 mm
3.1.3	Table weight carrying capacity	min. 250 Kg.
3.2	<u>Machine Spindle &amp; Head Stock</u>	
3.2.1	Spindle speed	Min. 8,000 rpm Opt. 12,000 rpm

3.2.2	Balanced Spindle	Confirm
3.2.3	Drive System	Gear Drive
3.2.4	Power	30 HP / 22.4 KW approx. (Vendor to specify)
3.2.5	Torque	Vendor to specify
3.2.6	Oil cooled and permanent spindle lubrication display function at CNC Control Monitor	Confirm
3.2.7	Internal coolant supply frequency-controlled Air cooling through the spindle Synchronized with bed temp preferred.	Confirm
3.2.8	Digital controlled AC Spindle Motor drive	Confirm
3.2.9	Spindle with hydraulic / pneumatic operated automatic tool changing and through spindle air blow for cleaning while tool change.	Confirm
3.2.10	Tool adapting support	SK40/50/60/ BT40/50/63
3.2.11	Power failure detection module.	Confirm
3.2.12	ATC No of tools	Minimum 30 tools
3.2.13	ATC Mechanism	Vendor to specify
3.3	<u>Coolant system</u>	
3.3.1	Tank with Waste oil separator	Confirm
3.3.2	Tank capacity	min. 250 lit.
3.3.3	Air for Dry Machining through the spindle Adjustable external coolant nozzles or Programmable Coolant Nozzle.	Confirm
3.3.4	Coolant Pressure	Internal- thru spindle Min.40 Bar External - 2.5 bar min
3.4	<u>Axis drives &amp; control</u>	
3.4.1	Digital controlled drive and motors for all axes.	Confirm
3.4.2	In-line direct drive	Confirm
3.4.3	Closed pitch ball screws, supported at both ends, pre-tensioned	Confirm
3.4.4	Rapids X/Y/Z Axis	: Min 20 m/min
3.4.5	Rapid A/B Axis	: Min 2000 deg/Min
3.4.6	Acceleration :	7 m/s <sup>2</sup>
3.4.7	X Axis motor Power and Torque	Vendor to specify
3.4.8	Y Axis motor Power and Torque	Vendor to specify
3.4.9	Z Axis motor Power and Torque	Vendor to specify
3.4.10	A Axis motor Power and Torque	Vendor to specify
3.4.11	C Axis motor Power and Torque	Vendor to specify
3.4.12	CNC Feedback type Encoder / Scale	Vendor to specify
3.4.13	Make of Scale / Encoder	Vendor to specify
3.4.14	Make of Ball Screw	Shuton / THK / Rexroth or Equivalent
3.4.15	Total connected Load KW	Vendor to specify
3.5	<u>CNC Control Unit features</u>	
3.5.1	Control	Siemens 840 DLS/Fanuc/ OEM/ or latest any other equivalent control
3.5.2	Application Hard disk	30GB or more and provision for increasing the memory.
3.5.3	RAM	Min. 1 GB for control
3.5.4	5-axes simultaneous controllable	Confirm

3.5.5	Faster data processing rate and block processing suitable for high speed milling application. (1000 blocks/sec)	Confirm
3.5.6	HSM Look Ahead Function, Min. 80 blocks	Confirm
3.5.7	Programming syntax as per DIN 66025, ISO and additional manufacturer own syntax.	Confirm
3.5.8	Least increment 0.001mm with decimal input. Spindle functions S, incl. Spindle Operation. Feed functions f, G-code & M-code	Confirm
3.5.9	Tool functions T, Tool length and cutter dia. compensation G-code, 3-D cutter compensation, Tool Load Monitoring.	Confirm
3.5.10	Interpolations Standard A] positioning B] Linear interpolation C] Helical Optional A] Involute B] Polar coordinate C] Cylindrical	Confirm
3.5.11	RS232 DNC interface	Confirm
3.5.12	I/O interface Ethernet with ISO/EIA auto-discrimination.	Confirm
3.5.13	Rigid tapping function	Confirm
3.5.14	Measuring cycles for touch probe(Optional) Standard cycles as per ISO std.	Confirm
3.5.15	USB Port for communication	Confirm
3.5.16	Part program storage Min 40 GB on Hard disk Display of PLC alarm and message	Confirm
3.5.17	Over travel control	Confirm
3.5.18	Emergency stop on control panel, remote control & tool loading device	Confirm
3.5.19	CNC controller to take care of, Stored pitch error compensation	Confirm
3.5.20	Backlash compensation for cutting traverse Backlash compensation for rapid traverse Friction compensation control	Confirm
3.5.21	Electronic Thermal Compensation Feed forward control	Confirm
3.5.22	Standard cycle (canned)	Confirm
3.5.23	Monitor	Min. 15" TFT colour
3.5.24	Swivelling Panel with in-build keyboard, monitor & operating knobs.	Confirm
3.5.25	Feed control potentiometer	10%. Increments from 0 – 150%.
3.5.26	Spindle speed control potentiometer	10% Increments from 0 – 150%.
3.5.27	Emergency brake knob	Confirm
3.5.28	Machine hour reading	Confirm
3.5.29	Spindle load display (KW)	Confirm
3.5.30	AC control for PLC and drive control cabinet, self- diagnostic function (optional)	Confirm
3.5.31	Input resolution & display.	Confirm
3.5.32	Linear axis	0.001mm or better
3.5.33	Angular axis	0.001° or better
3.6	<b><u>ACCURACY</u></b>	
3.6.1	Positioning	± 0.007 mm
3.6.2	Repeatability	± 0.005 mm
3.6.3	Run out	Max 0.003 mm run-out at Spindle Nose
4	<b><u>Accessories</u></b>	
4.1	Control Panel A/C. in-built required	Confirm

4.2	Chip conveyer.	
4.3	Fully enclosed splash guard with slide windows.	
4.4	Fully encapsulated housing with safety type window.	
4.5	Automatic Tool Magazine for min. 30 tools and Changer with safety guard. Any other equivalent Max tool weight 5 Kg. Preferably CAM Type. Max. Tool dia. 100 mm random access.	
4.6	Max. Tool Length 300 mm	
4.7	Levelling pads	
4.8	Door safety interlock	
4.9	Remote Jig Handle	
4.10	Touch probe (make Renishaw) (Optional)	
4.11	Work-piece washing gun	
4.12	PLC controlled central lubrication system	
4.13	Run hour meter	
5	<b><u>Spare parts-</u></b>	
	Spare and wear parts for two years. A detailed recommendation list must be provided with price list along with the quotation.	
	▪ Part a. Mechanical	
	▪ Part b. Electronic	
	▪ Part c. Electrical	
6	<b><u>Documentation-</u></b> Each documentation three sets in English (along with machine delivery)	
6.1	Detailed layout plan and prospect to be given	
6.2	Operating and Programming instruction	
6.3	Installation and Commissioning instructions	
6.4	Quality Test records	
6.5	Maintenance / repair charts	
6.6	Preventive maintenance instructions	
6.7	Lubrication chart & parameter list	
6.8	Requirement/recommendation for power supply controlled stabilizing has to be given	
6.9	Instruction manual for supplied coolant Concentrate and coolant maintenance.	
6.10	Detailed invoice and packing list of all items and devices and detailed prospect of machine and all other accessories enclosed in respective boxes.	
7	<b><u>Installation &amp; commissioning-</u></b> The complete installation and commissioning must be carried out by the supplier at the project (at the final destination/ premises). Certificate of acceptance is to be signed by customer and supplier.	
8	<b>Training</b> must be provided at final destination place	
8.1	Operator training 10 days	
8.2	Programming course 5 days	
8.3	Maintenance course mechanical, electrical and electronic 3 days.	
9	<b><u>Service-</u></b> The authorized Service Partner in India (Name & Address) must be certified by manufacturer and shown in the quotation	
10	<b><u>Warranty:</u></b>	Min. 2 years.
11	Supplier shall undertaking of machine spares up to minimum 10 years.	Confirm
12	Prove out of all '07' components as per tender drawings (Annexure-E) after installation of machines (04 Nos. in one & remaining 03 Nos. in second machine)	Confirm
13	Manufacturer should have established 'after sales & service' network in India.	
14	No. of similar machine installed in India- minimum 5 Nos.	

## **DELIVERY PERIOD INCLUDING INSTALLATION & COMMISSIONING:**

The delivery period including installation & commissioning of all of the machines at the destination mentioned in Para 1 on page no. 02 of the tender documents will be 5 months from the date of placement of Purchase Order/work contract.

## **WARRANTY:**

The Entire machine inclusive of all system/accessories should be covered under warranty for a period of 24 months from the date of commissioning.

## **Note:**

1. Machine shall be supplied with 3 sets of comprehensive operation and maintenance manual.
2. Breakdown calls to be attended within 48 hrs.
3. Supply to be done on Turnkey Basis. ALIMCO shall provide electrical supply point near to the place of installation.
4. Civil foundation details and drawings with specifications to be provided by the tenderer.
5. Total power consumption (in kW) to be provided by the tenderer.
6. CAD/CAM solution to be provided by the tenderer.