**Computer Aided Manufacturing(CAM) Lab**

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**CNC VERTICAL MACHINING CENTER**

**Make** : BRIDGEPORT (HARDINGE)

**Model** : GX 600

**Control system** : Fanuc 0i MD

Specifications:

|  |  |  |
| --- | --- | --- |
| Travels: X,Y,Z | | 600x540x540mm |
| Working Surface | | 750mm x 540mm |
| Control Type | | Fanuc *i*-Series GX |
| Spindle Taper | | No. 40 |
| Spindle power | | 15kw |
| Spindle Speed | | 8,000 rpm |
| Tool Changer capacity | | 20 |
| Accuracy | Positioning | 0.01mm |
| Repeatability | 0.005mm |
| Feed rates max. | Cutting | 12m/min |
| Rapid &Jog | 30m/min |

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**CNC VERTICAL MACHINING CENTRE**

Make : BFW

Model : CHANDRA+

Control System : Fanuc OiMF +

Specifications:

|  |  |  |
| --- | --- | --- |
| Travel: X,Y,Z | | 800 x 350 x 380 mm |
| Working Surface | | 1060 x 315 mm |
| Spindle Power | | 5.5 kW |
| Spindle Speed | | 60 - 6000 rpm |
| Tool Changer Capacity | | 20 |
| Accuracy | Positioning | ± 0.010 mm |
| Repeatability | ± 0.005 mm |
| Feed Rates  Max. | Cutting | 1-5000 mm/min. |
| Rapid& Jog (X,Y) | 10,000 mm/min. |
| Rapid & Jog (Z) | 5000 mm/min. |



**CNC LATHE MACHINE**

Make : HMT-PRAGA

Model : PTC- 200

Control system : FANUC Oi-Mate

SPECIFICATIONS:

|  |  |  |
| --- | --- | --- |
| Swing diameter over Bed | | ø250mm |
| Max.Turning Diameter | | ø200mm |
| Max.Turning Length with Chuck | | 200mm |
| Max.Turning Length without Chuck | | 300mm |
| Spindle Speed | | 100 – 4000rpm |
| No. of Tools | | 8 |
| Turning Tool Size | | 20x20mm |
| Type of Bed | | Inclined 30˚ to vertical |
| Traverse | X-axis | 110mm |
| Z-axis | 300mm |
| Feed Rates | | 1 – 5000mm/min |
| Rapid Feed Rates | X-Axis | 18m/min |
| Z-axis | 30m/min |
| Positional | X-Axis | ±0.003mm |
| Z-axis | ±0.004mm |
| Repeatability | X-Axis | ±0.003mm |
| Z-axis | ±0.004mm |

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**CNC TURNING CENTER –TRAINER**

**Make**: MTAB Engineers Pvt. Ltd

**Model**: **XLTURN**

**Specifications:**

|  |  |
| --- | --- |
| X- Axis Travel | 80 mm |
| Z- Axis Travel | 180 mm |
| Chuck Size | 100 mm |
| Maximum Turning Diameter | 32 mm |
| Maximum Turning Length | 120 mm |
| Distance between Centers from Spindle Face | 210 mm |
| Spindle Nose Taper | A2-3 / MT3 |
| Spindle Speed Range | 150 - 3000 RPM |
| Spindle Motor Capacity | 1 HP |
| Number of Stations | 8 |
| Control | Fanuc |
| Main Supply | Single phase, 110V/230 V, 50/60 Hz |



**HIGH SPEED MICROMACHINING CENTER**

Make: MicroMach, India

Model: PMC080

Specifications:

|  |  |  |
| --- | --- | --- |
| Stage Travel | X-axis | 100 mm |
| Y-axis | 100 mm |
| Z-axis | 100 mm |
| Mode of Operation | | CNC |
| Accuracy | | ± 2µm for stage |
| Resolution | | 0.15 µm |
| Load Capacity | | 15 kg on stage |
| Max. Spindle Speed | | 80,000 RPM |
| Travel Speed | | 0.01 – 20 mm/sec |
| Max. Torque | | 11.9 N-cm |
| Support | | Granite |



**LATHE CUTTING FORCE DYNAMOMETER**

Make: NK Instruments

Specifications:

|  |  |
| --- | --- |
| 3 Component Piezoelectric Based Cutting Force Measurement System( Fz, Fx, & Fy) | |
| Cutting force Dynamometer Size | 109 x 80x 35 mm |
| Range: Fx , Fy & Fz direction | ± 4 kN, |
| Sensitivity | Fx: 3.7 pC/N, Fy: 7.8 pC/N, Fz – 7.8 pC/N. |
|  |  |
| Cable: | Connecting cable for 3-component sensors with V3 neg. connector - 3xBNC pos- 3 to 5 meter length |
| Multi-Channel Charge Amplifier | Industrial type Charge Amplifier, 3 channel , BNC, Range 15PC to 1,00,000 PC, Voltage Output:+/-10 V, Max Current Output+/- 5 mA, Output Impedance: 10 ohm |
| Data Acquisition System | Data Acquisition Hardware supporting 4 Channel Simultaneous Sampling, Input Range: ±1.25,±2.5,±5,±10 V, Sample Rate: 50.0/100 kS/s per Channel, Input BNC neg. Resolution: 24-Bit Anti-aliasing Filter, Interface: USB 2.0 |
| Data Acquisition Software Data Acquisition & Analysis Software | Customized Standalone configuration based on Channel selection. Graphics Functions Measured data represented on one or more graphs Display as y(t), Display of numeric values Cursor function, Zoom function, Data Export with storing facility. Display of average value of data Min, Max value of data. |



**CNC MILLING, LATHE & DRILLING TOOL DYNAMOMETERS**

Make: EMI Technologies

Specifications:

|  |  |
| --- | --- |
| **Drilling Tool Dynamometer** (2 Forces – Thrust & Torque) With Signal conditioner for XY axis. | |
| Sensor- | Strain gauge based two axis force sensor |
| Accuracy(Approx.) | ± 1 of full scale |
| Linearity(Approx.) | ± 1 of full scale |
| Excitation Voltage (Approx.) | 10V DC MAX |
| Display Type | Independent for each axis. |
| Range | 500 kg force in Thrust 20.0kgm force in Torque |
| USB data acquisition system  (2 Channel) | Resolution: 12-bit ADC, No of samples: 10K samples per sec. No of channels:8(single ended),4(differential ended) |
| **Lathe Tool Dynamometer** with Signal Conditioner for XYZ | |
| Accuracy(Approx.) | ± 1 of full scale |
| Linearity(Approx.) | ± 1 of full scale |
| Excitation Voltage (Approx.) | 10V DC MAX |
| Display Type | Independent for each axis. |
| Range | 500 kg force in three direction |
| USB data acquisition system  (3 Channel) | Resolution:12 bit ADC, No of samples: 10K samples per sec. No of channels:8(single ended),4(differential ended) |
| **Milling Tool Dynamometer** With Signal conditioner for XYZ axis. | |
| Sensor Size(Top) | 300mm X 300mm |
| Sensor | Stain gauge based three axis force sensor |
| Accuracy(Approx | ± 1 of full scale |
| Linearity(Approx) | :-:- ± 1 of full scale |
| Excitation Voltage (Approx) | 10V DC MAX |
| Display Type | Independent for each axis |
| Range | 500 kg force in three direction |
| USB data acquisition system  (3 Channel) | Resolution:12 bit ADC, No of samples: 10K samples per sec. No of channels:8(single ended),4(differential ended) |

Fig. 7 Test piece on the dynamometer (Kistler 9255B) 
                

**TOOL VIBRATION MEASUREMENT DEVICE**

**Make**: PCB Piezotronics

**Model**:356B21&482C05

**Specifications:**

|  |  |
| --- | --- |
| Platinum Stock Products: Triaxial ICP® ACCELEROMETER | |
| Sensitivity | (±10%)10 mV/g (1.02 mV/(m/s²)) |
| Measurement Range | ±500 g pk (±4905 m/s² pk) |
| Electrical Connector | 8-36 4-Pin |
| Frequency Range (±5 %) (y or z axis) | 2 to 10000 Hz |
| Frequency Range (±5 %) (x axis) | 2 to 70 00 Hz |
| Resonant Frequency | ≥55 kHz |
| Broadband Resolution (1) | 0.004 g rms **(0.04 m/s² rms)** |
| Platinum Stock Products; 4-channel, line-powered, ICP® sensor signal conditioner | |
| Channels | 4 |
| Sensor Input Type(s) | ICP® |
| Output Range (Maximum) | ±10 V |
| Low Frequency Response (-5 %) | <0.1 Hz |
| High Frequency Response (-5 %) | >1000 kHz |
| Phase Response (at 1 kHz) | ±1 ° |
| Cross Talk (maximum) | -72 dB |
| Fault/Bias Monitor/Meter (LED) | Open/Short/Overload |

