

# CNC VERTICAL TURNING CENTER

Model : VL-4000ATC-Caxis

## SPECIFICATION

March,16,2015

## 1. Specification of machine

### 1-1 Machining Capacity

- |   |                        |
|---|------------------------|
| 1) Max. turning diameter, & Max. swing  | $\phi 5,000$ mm        |
| 2) Distance between tool holder end and table surface<br>(Standard tool holder length 240 mm) | Max height : 2, 500 mm |
| 3) Minimum Boring diameter (Ram passage diameter)   | $\phi 450$ mm          |
| 4) Max. load on table   | Max 40,000 kgs         |

### 1-2 Table

- |  |   |
|--|---|
| 1) Table diameter                                | $\phi 4,000$ mm   |
| 2) Table speed                                   | 0.1 ~ 80 min <sup>-1</sup><br>Low speed: 0.1 – 8.8 – 26.6 min <sup>-1</sup><br>High speed: 0.3 – 26.6 – 80 min <sup>-1</sup>                                  |
| 3) Method of table speed change                  | 2-shift gear change & A.C spindle motor regulation  |
| 4) Max. table torque (at 8.8 min <sup>-1</sup> ) | 108,000 N-m   |
| 5) Type of table support                         | Outer periphery : Thrust roller bearing<br>Bearing diameter; $\phi 2,500$ mm<br>Center : Double row cylindrical roller bearings<br>Diameter; 540 mm (NN3072K) |
| 6) Method of lubrication                         | Automatic forced lubrication  |
| 7) Table chucks                                  | Manual 4-jaw chucks   |

### 1-3 C-axis feed (Table indexing)

- |                     |                 |
|---------------------|-----------------|
| 1) Feed speed       | 0 ~ 180 deg/min |
| 2) Rapid feed speed | 180 deg/min     |

- |                          |                                     |
|--------------------------|-------------------------------------|
| 3) Minimum command       | 0.001 deg                           |
| 4) Method of table clamp | Hydraulic- Automatic (M function)   |
| 5) Table clamping force  | 3,000 N-m                           |
| 6) Positioning           | Rotary scale<br>(Maker :HEIDENHAIN) |

#### 1-4 Ram spindle head

- |  |   |
|--|---|
| 1) Type  | Square ram type   |
| 2) Ram size  | 300 X 300 mm  |
| 3) X1-axis stroke (Horizontal)                     | For table center : -2,500 ~ +2,900 mm   |
| 4) Z1-axis stroke (Vertical)                       | 1,800 mm  |
| 5) Spindle nose diameter                           | Φ128.570 mm   |
| 6) Spindle nose taper                              | ISO No50  |
| 7) Spindle speed                                   | 10 ~ 2,500 min <sup>-1</sup><br>Low speed: 10 – 156 – 625 min <sup>-1</sup><br>High speed: 30 – 625 – 2,500 min <sup>-1</sup> |
| 8) No of spindle speed                             | 2 step gear change & A.C spindle motor regulation<br>(S4 digit command)   |
| 9) Spindle maximum torque (156 min <sup>-1</sup> ) | 1,346 N-m   |
| 10) Method of main tool clamp                      | Clamp : Conned disk spring<br>(Clamping force : 2,400 kg)<br>Unclamp : Hydraulic cylinder                                     |
| 11) Method of sub tool clamp                       | Clamp : Hydraulic cylinder<br>(Clamp force 2,400 kg)<br>Unclamp : Hydraulic cylinder  |
| 12) Pull stud bolt                                 | Main tool : MAS407 P50T-2   |

- |   |  |
|---|--|
| 13) Bite holder & attachment clamping force                   | 4,800 Kg   |
| Main tool clamp 2,400Kg + Sub tool clamp : 2,400kg = 4,800 kg |  |
| 14) Bite holder positioning                                   | Curvic coupling  |
| 15) Ram balance system  | Hydraulic counter balance<br>( Hydraulic Cylinder)               |
| 16) Spindle orientation system                                | magnetic censer  |
| 17) X,Z-axes cutting feed speed                               | 1~3,000 mm/min   |
| 18) X-axis raped feed speed                                   | 10,000 mm/min  |
| 19) Z-axis raped feed speed                                   | 10,000 mm/min  |
| 20) Method of slide way lubrication                           | Automatic forced lubrication                                     |
| 21) X,Z-axes positioning system                               | Closed loop control system<br>(Maker :HEIDENHAIN, Optical scale) |

#### 1-6 Cross-rails

- |                                    |                                    |
|------------------------------------|------------------------------------|
| 1) Vertical travel                 | 1,680 mm                           |
| 2) Feed Speed                      | 500 mm/min                         |
| 3) Positioning                     | 280 mm pitch X 6 position          |
| 4) Positioning command             | CNC control axis                   |
| 5) Drive system                    | Ball screw (Tandem control system) |
| 6) Method of slide way lubrication | enforced - lubrication             |
| 7) Cross rail balance system       | Hydraulic counter balance          |
| 8) Cross rail clamp system         | Hydraulic – Automatic              |

**1-7 Milling ATC device ( For Left head)**

|                                     |                                       |
|-------------------------------------|---------------------------------------|
| 1) No. of ATC device                | 1 set                                 |
| 2) Number of tool stored            | 60 pcs                                |
| 3) Max. length of milling tool      | 400 mm                                |
| 4) Max. weight of milling tool      | 25 Kgs                                |
| 5) Milling tool shank               | MAS403 BT50                           |
| 6) Pull stud bolt for milling shank | MAS407 P50T-2                         |
| 7) Tool selection method            | random                                |
| 8) Magazine drive method            | A.C servo motor<br>A.C 4.0 KW X 1 set |
| 9) Tool change system               | Direct change                         |

**1-8 Turning ATC device (For Right head)**

|                               |  |
|-------------------------------|--|
| 1) Number of tool stored      | 12 pcs   |
| 2) Max. length of tool holder | 400 mm   |
| 3) Max. weight of tool holder | 50 kgs/holder                                      |
| 4) Tool selection method      | random   |
| 5) Magazine drive method      | A.C Servo motor drive<br>(Maker: FANUC, α22/3000i) |
| 6) Tool change system         | Direct change                                      |

**1-9 Coolant device**

|                         |  |
|-------------------------|--|
| 1) Reserve capacity     | 1,000 L  |
| 2) Pump output capacity | 30 L/min   |
| 3) Pump output pressure | 0.5 Mpa  |
| 4) Discharging nozzle   | Turning; Both side of tool holder<br>Milling; Oil hole adapter |
| 5) Cleaning method      | Magnet & element   |

**1-11 Chip conveyor**

|                         |                          |
|-------------------------|--------------------------|
| 1) Conveyor type        | Hinge belt               |
| 2) Width of conveyor    | 290 mm                   |
| 3) Conveyor speed       | 3.4 M/min                |
| 4) Chip bucket capacity | 1,000W x 1,000L x 1,000H |

## 2. Electrical specifications

### 2-1 Power source

|                        |   |
|------------------------|---|
| 1) Voltage             | A.C 220V±10%                                |
| 2) Frequency           | 60Hz ±1Hz                                   |
| 3) Capacity            | 300 KVA                                     |
| 4) Noise               | 85 dB                                       |
| 5) Ambient temperature | Max.40 deg, Celsius<br>Min. -0 deg, Celsius |
| 6) Temperature change  | ± 3 ° /8H                                   |
| 7) Relative humidity   | Max.90 %<br>(Normal 70 %)                   |

### 2-2 Accessories

|   |        |
|---|--------|
| 1) Control panel (with air condition)       | 1 set  |
| 2) Operation switch box                     | 1 set  |
| 3) Operation box for manual pulse generator | 1 set  |
| 4) CNC device (Fanuc system 18i or 32i)     | 1 set  |
| 5) Operation box for ATC device             | 2 sets |
| 6) Operation box for Chip conveyor          | 1 set  |

### 2-3 Motor

|                        |           |       |
|------------------------|-----------|-------|
| 1) For table drive     | AC 100 kw | 1 set |
| 2) Fan motor for above | AC 90 w   | 1 set |
| 3) For X-axis feed     | AC 9.0 kw | 1 set |

(FANUC model  $\alpha$ 40/3000i)

|  |                                   |         |    |        |
|--|-----------------------------------|---------|----|--------|
| 4) For Z-axis feed                           | AC                                | 9.0     | kw | 1set   |
|  | (FANUC model $\alpha$ 40/3000iB)  |         |    |        |
| 5) For Cross rail elevation                  | AC                                | 14.0    | kw | 2 sets |
|  | (FANUC model $\alpha$ 50/3000is)  |         |    |        |
| 6) For C-axis feed                           | AC                                | 14.0    | kw | 1 set  |
|  | (FANUC model $\alpha$ 50/3000is ) |         |    |        |
| 7) For hydraulic unit                        | AC                                | 22.0    | kw | 1 set  |
| 8) For fan for above                         | AC                                | 50      | w  | 1 set  |
| 9) For lubrications of X and Zaxes slide way | AC                                | 64      | w  | 2 sets |
| 10) For chip conveyor                        | AC                                | 0.75    | kw | 1 set  |
| 11) For lubrications of cross rail           | AC                                | 64      | w  | 1 set  |
| 12) For coolant pump                         | AC                                | 3.0     | kw | 1 set  |
| 13) For table lubrication unit               | AC                                | 0.75    | kw | 2 sets |
| 14) Oil controller for table lubrication     | AC                                | 1.5     | kw | 1 set  |
| 15) For ATC drive                            | AC                                | 4.0     | kw | 2 sets |
| 16) For Ram spindle head                     | AC                                | 18.5/22 | kw | 1 set  |



### 3. Accessories

#### 3-1 Standard accessories

|  |       |
|--|-------|
| 1) Foundation metal fittings                             | 1 set |
| Anchor bolts   |       |
| Leveling blocks  |       |
| Pad plates   |       |
| 2) Maintenance tools                                     | 1 set |
| 3) Electrical equipment and secondary wiring             | 1 set |
| 4) Hydraulic unit and secondary piping                   | 1 set |
| 5) Steel protection cover (X axis both slide way)        | 1 set |
| 6) Cover for column                                      | 1 set |
| Upper side : Below cover                                 |       |
| Under side : Steel cover                                 |       |
| 7) Machine light ( Halogen light at ram head saddle)     | 1 set |
| 8) Operation situation indication lamp (3 steps)         | 1 set |
| Red: Alarm   |       |
| Yellow: Stopping during automatic operation(M00,M02,M30) |       |
| Green: Automatic operation running                       |       |
| 9) Manual 4-jaw chucks                                   | 1 set |
| 10) Stand type operation switch box                      | 1 set |
| 11) Table lubrication unit & piping                      | 1 set |
| 12) CNC device for FANUC 18i or32i                       | 1 set |
| 13) Air condition for control panel                      | 1 set |
| 14) Oil controller for table lubrication                 | 1 set |
| 15) Platform   | 1 set |

|  |        |
|--|--------|
| 16) Turning ATC device (For right head)        | 1 set  |
| 17) Milling ATC device (For left head)         | 1 set  |
| 18) Tool holders(total)                        | 10 pcs |
| 19) Oil pan & chip grade                       | 1 set  |
| 20) Chip conveyor & chip bucket                | 1 set  |
| 21) Coolant device                             | 1 set  |
| 22) Closed-loop control system (X,Z,& C-axes ) | 1 set  |
| 23) Dummy cover (Curvic coupling cover)        | 1 set  |
| 24) Angle attachment                           | 1 set  |

#### 4, Guaranteed accuracy

(As per Jis Standard)

| Item                   | Accuracy Guaranteed |
|------------------------|---------------------|
| Positioning Accuracy   | X: 0.01/500         |
|                        | Z: 0.01/500         |
|                        | C: 15 second        |
| Repeatability Accuracy | X: $\pm 0.008$      |
|                        | Z: $\pm 0.008$      |
|                        | C: 10 second        |

※ Other accuracies are as per the JIS test-standard enclosed herewith.

※ Environmental Conditions at 20°C

#### 5 Scope of customer's manufacturing

The following items are to borne by the customer.

1) Foundation works

up to cement - grouting for anchor bolts

2) Primary electrical works

up to connection of terminals in the control panel

3) Crane and operator for assembly of machine

4) Wire rope, power source, air source and etc. for assembly of machine

5) Oil and grease for operation of machine

6) Test piece and tools

7) Air source

Pressure : 5 kg/cm<sup>2</sup>

Capacity : 200 L/min

Type of air : dry

**6 Guarantee period**

After acceptance test, any defect, faults, and break-down that occur within one year and attributable to our responsibility shall be corrected by replacing parts

**7 Documents to be submitted**

The following manual are submitted.

|   |        |
|---|--------|
| 1) Instruction manual                         | 3 sets |
| 2) Test record                                | 3 sets |
| 3) CNC device instruction manual              | 3 sets |
| Maintenance manual                            | 3 sets |
| Connection manual                             | 3 sets |
| 4) Spindle motor instruction manual           | 3 sets |
| 5) A.C servo motor, instruction               | 3 sets |
| 6) Electric circuit diagram                   | 3 sets |
| 7) Hydraulic & lubrication instruction manual | 3 sets |