High Speed High Performance Horizontal Machining Center

DNM 750 II series
DNM 750 [L] II
DNM 750 [L] / 50 II

ver. EN 160803 SU
High Productivity Vertical Machining Center

The DNM 750 includes a spindle head cooling system which minimises thermal effects on the spindle. This enables a variety of medium to large parts to be machined to a high level of accuracy even at high speed.

In addition, the roller guideways and high strength arch structure of the column provide a highly rigid frame for stable machining conditions.
Features

1 X-axis travel and spindle torque available for various applications

DNM 750 [L] II & DNM 750 [L] / 50 II

<table>
<thead>
<tr>
<th></th>
<th>ISO #40</th>
<th>ISO #50</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-axis travel</td>
<td>1630 [2160] mm (64.2 [85] inch)</td>
<td></td>
</tr>
<tr>
<td>Spindle speed</td>
<td>8000 r/min (belt)</td>
<td>10000 r/min (belt)</td>
</tr>
<tr>
<td>Spindle torque</td>
<td>117.3 N·m (86.4 ft·lb)</td>
<td>286.4 N·m (141.1 ft·lb)</td>
</tr>
<tr>
<td>Max. tool weight</td>
<td>1500 [1800] kg (3306.9 [3968.3] lb)</td>
<td></td>
</tr>
</tbody>
</table>

2 Cooling system to minimize thermal displacement

Thermal displacement of the spindle and axes is achieved by circulating cooling oil via an oil cooler to the spindle head and ball screw nuts.

- Spindle head cooling system
- Ball screw nut cooling system

3 Eco-friendly waste oil separation system

- Improved customer environment by separating waste lubricant and coolant.
- Reduced maintenance cost by extending the life of coolant by 80%
High Productivity

Machining capacity (ISO #40)

<table>
<thead>
<tr>
<th>Face mill_Carbon steel (SM45C)</th>
<th>ø80mm Face mill (6Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machining rate</td>
<td>570 cm³/min</td>
</tr>
<tr>
<td>Spindle speed</td>
<td>1500 r/min</td>
</tr>
<tr>
<td>Feedrate</td>
<td>2970 mm/min (116.9 ipm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tap_Carbon steel (SM45C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machining rate</td>
</tr>
<tr>
<td>Spindle speed</td>
</tr>
<tr>
<td>Feedrate</td>
</tr>
</tbody>
</table>

- The results, indicated in this catalogue are provided as examples. They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

Rapid traverse

The linear motion guide ways and the high-speed servo motors enable fast axis movements, which reduce machining time and non-cutting time, resulting in enhanced productivity.

<table>
<thead>
<tr>
<th>DNM 750 II</th>
<th>DNM 750L II</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-axis</td>
<td>30 m/min 24 m/min</td>
</tr>
<tr>
<td>Y-axis</td>
<td>30 m/min 24 m/min</td>
</tr>
<tr>
<td>Z-axis</td>
<td>24 m/min 24 m/min</td>
</tr>
</tbody>
</table>

Auto tool change

Fast tool change time using a cam-type tool changer helps improve productivity.

<table>
<thead>
<tr>
<th>DNM 750 [L] II</th>
<th>DNM 750 [L] / 50 II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool change time</td>
<td>1.3 2.5</td>
</tr>
<tr>
<td>Tool change time</td>
<td>3.7 5.5</td>
</tr>
<tr>
<td>Tool storage capacity</td>
<td>30 (40/60 opt.) 24 (30 opt.)</td>
</tr>
</tbody>
</table>

Machining Accuracy

<table>
<thead>
<tr>
<th>Roughness</th>
<th>Ra 0.18 μm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball bar test</td>
<td>4.7 μm</td>
</tr>
</tbody>
</table>

- Spindle speed: 8000 r/min
- Feedrate: 1200 mm/min (47.2 ipm)
High Rigidity Body

Key machine elements such as bed and column are made of Meehanite castings which have excellent vibration absorption characteristics and are designed to minimise deformation caused by heavy duty cutting. Roller type linear guideways are used to provide a combination of rigidity for heavy duty cutting and also high speed / high precision movement of each axis for high speed machining.

Arch-shaped structure

Key machine elements such as bed and column are designed to provide optimum rigidity for high speed / heavy duty machining.

High-strength roller type linear motion guide way

- High-stiffness Ball Screw & Coupling
- Strong 45 size roller type linear guide way

Static rigidity

The high-rigid structure of DNM 750 series had raised the static rigidity up more than previous models through FEM analysis.

- FEM analysis used to design a stable body. (FEM : Finite Element Method)

Dynamic stiffness

Dynamic analysis was used in simulations of actual cutting to improve dynamic stiffness and dampen vibration during design stage.
High Speed Spindle

Spindle

ISO #40

- Max. spindle speed: 8000 r/min
- Spindle motor power: 18.5 / 15 kW
  (24.8 / 20.1 Hp)

ISO #50

- Max. spindle speed: 10000 r/min
- Spindle motor power: 26 / 22 kW
  (34.9 / 29.5 Hp)
Operators Panel

User-friendly control panel
The control panel has been consolidated into a operator-friendly and convenient layout.

PCMCIA card
The PCMCIA card is used for downloading programmes and uses a convenient slot in the CNC control panel.

Portable MPG
Application suitable for CNC machines by providing home mode, stop adjustment and Interruption signal.

USB port
A usb memory stick can be used for backup and restoring of CNC data. usb stick does not support DNC machine running.

Easy Operation Package

The Doosan easy operation package has been specially customized to provide user-friendly functions and control the magazine for tools and pallets.

Tool table
Work-piece set up table moving
ATC recovery help
Easy parameter
G-code help
M-code help
Sensor status monitor
Tool load monitor

opt.
Chip Disposal

Easy chip-removal structure

Separate chip conveyor and coolant tank provide for easy cleaning and maintenance. The completely enclosed DNM 750 series guarantees to keep the chips and coolant inside of the machining area. This provides a cleaner working area for the operator.

Coolant chiller

The coolant chiller lowers coolant temperature, helping to cool both the workpiece and tool during the machining operation. When using insoluble coolant, a coolant chiller is recommended to cool heated oil and preserve machining precision.

Internal screw conveyor

Large capacity coolant tank with chip pan and box filter

Coolant tank capacity
DNM 750 : 480L (126.8 galon)
DNM 750L : 525L (138.7 galon)

Through spindle coolant

Middle pressure : 2.0 MPa (20 bar)
High pressure : 7.0 MPa (70 bar)

DNM 750
DNM 750L

Side flushing

Chip conveyor

Scaper type
Drum filter type
Hinge type

Used lubricating oil recovery system

Improved the coolant pollution environment by separating lubricating oil with a separate oil-water separation box mounted at the coolant tank to prevent lubricating and coolant from mixing.
Optional Equipment

Various options available to meet customers’ needs and to provide efficient work and convenience.

Interface for additional equipment

Connection example of additional 1 axis interface

Connection example of fixture interface

- Rotary table size shown in example: ø320 (DNM 750)
- Hydraulic power unit may be additionally necessary according to rotary table specifications.

Fixture check list (for hydraulic / pneumatic fixtures)

- Pressure source
  - Hydraulic □ P/T □ A/B
  - Pneumatic □ P/T □ A/B

- Supply scope:
  □ Use Doosan standard unit
  24 L/min (6.3 gal/min) / 4.9 MPa (711 psi)

- Number of ports
  - □ 1 pair (2-PT 3/8" port)
  - □ 2 pair (4-PT 3/8" port)
  - □ 3 pair (6-PT 3/8" port)

- Hydraulic power unit
  (Please check the below detail specification, if you want Doosan to supply.)

- Special requirement
  ______ L/min (gal/min) at ______ MPa (psi)

Automatic tool length measurement

Automatic workpiece measurement

Minimum quantity lubrication

Oil skimmer

Misting device
External Dimensions

Top view

Step For Tool Loading PDP Box

Side view

Unit: mm (inch)

Table dimensions

/ : DN M 750

Tool shank

BT 40

CAT 40

DIN 40

BT 50

CAT 50

DIN 50
**Machine Specifications**

### Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Unit</th>
<th>DNM 750</th>
<th>DNM 750 II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Travel</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-axis</td>
<td>mm (inch)</td>
<td>1630 / 2160 (64.2 / 85.0)</td>
<td></td>
</tr>
<tr>
<td>Y-axis</td>
<td>mm (inch)</td>
<td>762 (30.0)</td>
<td></td>
</tr>
<tr>
<td>Z-axis</td>
<td>mm (inch)</td>
<td>650 (25.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Table</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance from spindle nose to table top</td>
<td>mm (inch)</td>
<td>150 - 800 (5.9 - 31.5)</td>
<td>200 - 850 (7.9 - 33.5)</td>
</tr>
<tr>
<td>Distance from spindle center to column guideway</td>
<td>mm (inch)</td>
<td>856 (33.7)</td>
<td></td>
</tr>
<tr>
<td>Table size</td>
<td>mm (inch)</td>
<td>1630 x 760 / 2160 x 760 (64.2 x 29.9 / 85.0 x 29.9)</td>
<td></td>
</tr>
<tr>
<td>Table loading capacity</td>
<td>kg (lb)</td>
<td>1500 (3306.9) / 3968.3</td>
<td></td>
</tr>
<tr>
<td>Table surface</td>
<td></td>
<td>3-SLOT</td>
<td></td>
</tr>
<tr>
<td>Max. spindle speed</td>
<td>r/min</td>
<td>8000 / 10000</td>
<td>8000 / 10000</td>
</tr>
<tr>
<td>Spindle taper</td>
<td></td>
<td>ISO #40, 7/24 TAPER</td>
<td>ISO #50, 7/24 TAPER</td>
</tr>
<tr>
<td>Max. spindle torque</td>
<td>N (lbf)</td>
<td>117.1 (26.5)</td>
<td>286.4 (63.7)</td>
</tr>
<tr>
<td>Spindle motor power</td>
<td>kW (Hp)</td>
<td>15 (20.1)</td>
<td>50 (67.1)</td>
</tr>
<tr>
<td>Rapid traverse rate (X / Y / Z)</td>
<td>m/min (ipm)</td>
<td>30 / 30 / 24 / 24 / 24</td>
<td>(1181.1 / 1181.1 / 1181.1 / 826.8 / 826.8)</td>
</tr>
<tr>
<td>Cutting feedrate</td>
<td>mm/min (ipm)</td>
<td>1-12000 (39.4 - 472441.0)</td>
<td></td>
</tr>
<tr>
<td>Type of tool shank</td>
<td></td>
<td>BT / CAT / DIN 40</td>
<td>BT / CAT / DIN 50</td>
</tr>
<tr>
<td>Tool storage capacity</td>
<td>ea</td>
<td>30 (40 / 60)</td>
<td>24 (30)</td>
</tr>
<tr>
<td>Max. tool diameter (without adjacent tools)</td>
<td>mm (inch)</td>
<td>80 / 125 (3.1 / 4.9)</td>
<td>125 (5.0)</td>
</tr>
<tr>
<td>Max. tool length</td>
<td>mm (inch)</td>
<td>300 (11.8)</td>
<td>350 (13.8)</td>
</tr>
<tr>
<td>Max. tool weight</td>
<td>kg (lbf)</td>
<td>8 (17.6)</td>
<td>15 (33.1)</td>
</tr>
<tr>
<td>Method of tool selection</td>
<td></td>
<td>MEMORY RANDOM</td>
<td></td>
</tr>
<tr>
<td>Tool change time (tool-to-tool)</td>
<td>s</td>
<td>1.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Tool change time (chip-to-chip)</td>
<td>s</td>
<td>3.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Electric power supply (Rated capacity)</td>
<td>kW</td>
<td>40</td>
<td>40 (50)</td>
</tr>
<tr>
<td>Machine height</td>
<td>mm (inch)</td>
<td>3170 (124.8)</td>
<td></td>
</tr>
<tr>
<td>Machine dimension (LxW)</td>
<td>mm (inch)</td>
<td>3850 (151.6 x 192.9 x 153.2)</td>
<td></td>
</tr>
<tr>
<td>Machine weight</td>
<td>kg (lbf)</td>
<td>13500 / 13500 (30423.3 / 33710.2)</td>
<td></td>
</tr>
</tbody>
</table>

**CNC**

- Fanuc, Siemens, Heidenhain

**Standard feature**

- Assembly & operation tools
- Screw conveyor
- Signal tower (red, yellow, green)
- Spindle head cooling system
- USB port, PCMCIA
- Work light

**Optional feature**

- Automatic power off
- Automatic tool length measurement
- Hydraulic line for fixture
- Oil skimmer
- Pneumatic line for fixture
- Rotary table
- Test bar
- Through spindle coolant

**NC Unit Specifications**

**DOOSAN-FANUC i**

- **Axes control**
  - Controlled axes 3 (X, Y, Z)
  - Simultaneously controllable axes
    - Positioning (G00) / Linear interpolation (G01) : 3 axes
    - Circular interpolation (G02, G03) : 2 axes
  - Backlash compensation
  - Follow up
  - Least command increment 0.001mm
  - Least input increment 0.001mm
  - Machine lock all axes / Z axis
  - Mirror image Reverse axis movement (setting screen and M-function)
  - Stored pitch error compensation
    - Pitch error offset compensation for each axis
  - Stored stroke check 1 Overtravel controlled by softwar
  - Absolute pulse coder

**Interpolation & Feed function**

- 2nd reference point return G30
- Circular interpolation G02, G03
- Cylindrical interpolation G07.1
- Dwell G04
- Exact stop check G09, G61 (mode)
- Feed per minute
- Feedrate override (10% increments) 0 - 200%
- Helical interpolation
- Jog override (10% increments) 0 - 200%
- Linear interpolation G01
- Manual handle feed 1 units
- Manual handle feedrate 1x1, 1x10, 1x100 (per pulse)
- Override cancel M48/M49
- Positioning G00
- Rapid traverse override F0 (fine feed), 25/50/100%
- Reference point return G27, G28, G29
- Skip function G31

**Other Features**

- Number of tool offsets 400 ea
- Tool life management 128 sets
- Tool offset memory C
- Geometry / Wear and Length / Radius offset memory
- No. of Registered programs 400 ea
- Part program storage 1280 m
- Additional work coordinate system G54.1 P1 - 48 (48 pairs)
- AICC1 : 40 block preview
- DISPLAY unit : 10.4" Color TFT LCD
- Embedded ethernet

**Features Unit DNM 750 \[ L \] II**

- **Travel**
  - X-axis mm (inch) 1630 / 2160 (64.2 / 85.0)
  - Y-axis mm (inch) 762 (30.0)
  - Z-axis mm (inch) 650 (25.6)

- **Table**
  - Distance from spindle nose to table top mm (inch) 150 - 800 (5.9 - 31.5) / 200 - 850 (7.9 - 33.5)
  - Distance from spindle center to column guideway mm (inch) 856 (33.7)
  - Table size mm (inch) 1630 x 760 / 2160 x 760 (64.2 x 29.9 / 85.0 x 29.9)
  - Table loading capacity kg (lb) 1500 (3306.9) / 3968.3

- **Spindle**
  - Max. spindle speed r/min 8000 / 10000
  - Spindle taper ISO #40, 7/24 TAPER
  - Max. spindle torque N (lbf) 117.1 (26.5) / 286.4 (63.7)
  - Spindle motor power kW (Hp) 15 (20.1) / 50 (67.1)

- **Feedrate**
  - Rapid traverse rate (X / Y / Z) m/min (ipm) 30 / 30 / 24 / 24 / 24
  - Cutting feedrate mm/min (ipm) 1-12000 (39.4 - 472441.0)
  - Type of tool shank BT / CAT / DIN 40
  - Tool storage capacity ea 30 (40 / 60) / 24 (30)
  - Max. tool diameter (without adjacent tools) mm (inch) 80 (3.1) / 125 (4.9)
  - Max. tool length mm (inch) 300 (11.8) / 350 (13.8)
  - Max. tool weight kg (lbf) 8 (17.6) / 15 (33.1)

- **ATC**
  - Method of tool selection MEMORY RANDOM
  - Tool change time (tool-to-tool) s 1.3 / 2.5
  - Tool change time (chip-to-chip) s 3.7 / 5.5

- **Electric power supply (Rated capacity) kW (Hp) 40 / 40 (50)\]\

- **Machine height** mm (inch) 3170 (124.8)

- **Machine dimension (LxW)** mm (inch) 3850 (151.6 x 192.9 x 153.2)

- **Machine weight** kg (lbf) 13500 / 13500 (30423.3 / 33710.2)

- **CNC**
  - Fanuc, Siemens, Heidenhain

**Note:** { } are optional.