A dedicated 400mm square Pallet Horizontal – from Matsuura

Legendary Matsuura Productivity – Rapid Return on Investment

Responding to our global customer base for a dedicated 4 axis 400mm square multi-pallet horizontal, Matsuura are proud to release the all new **H.Plus-400** into our family of renowned **H.Plus** Series machines. Conceived & developed utilising our many decades of experience creating world beating horizontal machining technology, the all new **H.Plus-400** has inherited all of the attributes of its siblings & predecessors: unerring accuracy, proven reliability, unrivalled productivity, tailorable suite of options and assured unmanned running.

**Expandable as your business grows**

Vast array of proven cost effective tool, pallet and automation options – tailored to your current and future production requirements.

**Ergonomically designed to maximise output**

With an operator, or integrated into an unmanned production environment, the **H.Plus-400** is designed & built around ease of use to minimise all non-productive time & to optimise spindle utilisation. New NC features include; Touch Screen, email functionality, on-screen manuals & enhanced **MIMS** software.

**MAXIA Spindle as Standard**

Matsuura – the pioneers of leading spindle technology are rightly proud of our **MAXIA** spindle technology supplied as standard with the **H.Plus-400**. Matsuura **MAXIA** spindles offer superb operation and reliability – from aluminium machining to hard to cut steels & exotic materials.

**High Speed Drives, High Accuracy Precision – Maximum Productivity**

Rapid traverse rates of 60m/min on X / Y / Z axes, delivering rapid operation & minimising non-productive non cutting time. The B axis is equipped with a proven DD (Direct Drive) motor, with Matsuura’s revolutionary DCS (Direct Clamping System) and ADC (Automatic Acceleration / Deceleration System) supplied as standard, massively reducing non-productive indexing & positioning time.

**Compact design smallest in its class**

With shop floor real estate at a premium the world over, only 8.6m² of floor-space is required for the standard **H.Plus-400** machine – the smallest in its class of true 400mm square pallet horizontals.
Advanced Capability – Traditional Matsuura Quality

Legendary **H.Plus** Series Rigidity

Inheriting all of the traditional design and build knowledge from our world renowned **H.Plus** Series horizontals, the **H.Plus-400** is an exceptionally rigid machining platform – as you would naturally expect from Matsuura.

<table>
<thead>
<tr>
<th>Maximum workpiece size</th>
<th>D630×H900 mm (24.80×H35.43 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loading capacity</td>
<td>400 kg (880 lb.)</td>
</tr>
<tr>
<td>Travel (X/Y/Z)</td>
<td>560 / 640 / 640 mm (22.04 / 25.19 / 25.19 in.)</td>
</tr>
<tr>
<td>Feedrate (X/Y/Z)</td>
<td>60 / 60 / 60 m/min (2.36 / 2.36 / 2.36 ipm)</td>
</tr>
</tbody>
</table>

**Axis configuration**

- **X:** 560 mm (22.04 in.)
  - 60 m/min (2.36 ipm)
- **Y:** 640 mm (25.19 in.)
  - 60 m/min (2.36 ipm)
- **Z:** 640 mm (25.19 in.)
  - 60 m/min (2.36 ipm)

**Maximum workpiece size**

The operator door to the cavernous machining enclosure offers 640mm access with the pallet center only 500mm away.

<table>
<thead>
<tr>
<th>From the operator door to the pallet center</th>
<th>500 mm (19.68 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator door opening width</td>
<td>640 mm (25.19 in.)</td>
</tr>
<tr>
<td>From the floor to the pallet top surface</td>
<td>1,050 mm (41.33 in.)</td>
</tr>
</tbody>
</table>
Tool Stations Expandable for Maximised Unmanned Running

60-tool ATC as standard

A proven & reliable 60 tool station ATC magazine (drum type) is the standard for the new **H.Plus-400. MIMS** functionality assures rapid & smooth tool set-up.

<table>
<thead>
<tr>
<th>Tool change time (tool-to-tool)</th>
<th>6 kg (13.2 lb.) or less</th>
<th>0.9 sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 kg (13.2 lb.) and more</td>
<td>1.4 sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indexing time from the tool change position</th>
<th>Longest (T1→T31)</th>
<th>10.7 sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shortest (1pot)</td>
<td>7.1 sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tool selection method</th>
<th>Fixed address system</th>
</tr>
</thead>
</table>

ATC Options: Matrix Magazines for maximum unmanned production

<table>
<thead>
<tr>
<th>High capacity type</th>
<th>A maximum of 330 tools can be stored.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High speed type</td>
<td>A maximum of 294 tools can be stored.</td>
</tr>
<tr>
<td></td>
<td>By optimizing the tool rack arrangement, the next tool waiting time can be shortened by up to 34%, compared with existing models.</td>
</tr>
</tbody>
</table>

Maximum tool weight: 10 kg, maximum tool length: 350 mm

*Common to the drum magazine and Matrix magazine*
Two types of pallet systems available

Floor pallet system (PC6) or tower pallet system (PC12) available as an option

Floor pallet system (PC6)

Tower pallet system (PC12)

Thermal displacement compensation

The thermal displacement compensation function monitors the temperature of major machine components, such as the spindle, ball screws, bed or column, automatically calculates the amount of compensation, and feeds it back to the NC controller. In addition, an environmental thermal displacement compensation function is newly employed to compensate deformation of the machine that may be induced by room temperature changes.

Pressure supply system for fixtures

Pressure supply ports for fixtures through the pallet are available as an option.

* A pressure supply source, solenoid valves, pressure switches, gap sensors, joints and hoses must be prepared by the customer.

<table>
<thead>
<tr>
<th></th>
<th>Number of ports</th>
<th>Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work station side</td>
<td>8 ports</td>
<td>Max. 19.6</td>
</tr>
</tbody>
</table>

Stable machining accuracy is obtained by combining three kinds of thermal displacement compensation: spindle, environment, and feed axes (X/Y/Z).

* The X/Y/Z thermal displacement compensation function can be used on the machine with no scale feedback specification.
The BT40 MAXIA Spindle is renowned for its enduring and unerring performance when cutting everything from aerospace aluminium, to hardened steels to exotic materials. Matsuura’s own Thermal Displacement Compensation Function assures repeatability in cut time and again over long production runs.

Fabricated in a dedicated clean room to ensure that spindle runout at the mouth is reduced to less than 1 micron. Grease lubrication (automatic greasing type) is employed for minimal maintenance, low-air consumption, and environmental protection. Thermal displacement, vibration and noise are reduced to the minimum and contribute to high precision machining.

**Cutting test results (BT40 15,000min⁻¹)**

<table>
<thead>
<tr>
<th>Part material</th>
<th>Tool size</th>
<th>Cutting with Cutting depth</th>
<th>Spindle speed</th>
<th>Cutting feed rate</th>
<th>Cutting capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face mill</td>
<td>A5052</td>
<td>Ø80mm (3.14) 3 blades</td>
<td>W=70mm (2.75) D=55mm (0.19)</td>
<td>5,500 min⁻¹</td>
<td>8,000 mm/min (314.96)</td>
</tr>
<tr>
<td></td>
<td>S45C</td>
<td>Ø80mm (3.14) 5 blades</td>
<td>W=70mm (2.75) D=35mm (0.11)</td>
<td>1,120 min⁻¹</td>
<td>2,800 mm/min (110.23)</td>
</tr>
<tr>
<td>End mill</td>
<td>A5052</td>
<td>Ø25mm (0.98) 2 blades</td>
<td>W=22mm (0.86) D=6mm (0.23)</td>
<td>15,000 min⁻¹</td>
<td>11,000 mm/min (433.07)</td>
</tr>
<tr>
<td></td>
<td>S45C</td>
<td>Ø20mm (0.78) 4 blades</td>
<td>W=3mm (0.11) D=25mm (1.37)</td>
<td>5,500 min⁻¹</td>
<td>5,500 mm/min (216.53)</td>
</tr>
</tbody>
</table>

**Cutting feed rates**

- **Spindle speed**: 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000
- **Cutting capacity**: 673 cc/min

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* The above data is based on actual cases. Depending on conditions, actual results may differ.
Rotary indexing table with a DD motor

A non-contact, high-speed, high-acceleration, high precision DD motor (100 min⁻¹) is used for driving the 4th axis. This motor ensures low noise, superb unerring performance & trouble-free operation, and is virtually maintenance free.

ADC (Automatic Acc. & Dec. Control)
Automatic acceleration/deceleration control function

The B-/Z-axis acceleration/deceleration can be automatically tuned during ATC operation according to the moment of inertia applied to the workpiece. Indexing time can be reduced by up to 40%.

DCS (Dynamic Clamp System)

The key to shorter indexing times is the table clamping/unclamping time. Matsuura’s DCS function is the world’s first revolutionary clamping system. The load level applied to the DD motor is monitored, and the table is clamped only when the load level has exceeded the setting value. The table remains unclamped even during machining as long as the load level is within the preset load range.

- Within the preset load range ⇒ Machining with the table unclamped (M21 and M22 skipped for light machining)
- Load range exceeding the setting value ⇒ Machining with the table clamped (M21 and M22 not skipped for heavy machining)

<table>
<thead>
<tr>
<th>Light machining</th>
<th>B-axis positioning at the 90-deg. position</th>
<th>M21 (B-axis clamping)</th>
<th>Machining</th>
<th>M22 (B-axis unclamping)</th>
<th>B-axis positioning at the 0-deg. position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional (without DCS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCS used</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

- M21 B-axis clamping
- M22 B-axis unclamping
- Skip
**MIMS** with New Features for Safety and Security of Machining

**Matsuurra Intelligent Meister System**

Digitized Meister knowledge, skills and ingenuity
Matsuurra's unique interface to maximize rapid operation and usability

<table>
<thead>
<tr>
<th>Environment</th>
<th>Eco Meister</th>
<th>Thermal Meister</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power saving</td>
<td>Power cut-off function</td>
<td>Spindle thermal displacement compensation</td>
</tr>
<tr>
<td></td>
<td>Energy-saving devices installed</td>
<td>XYZ thermal displacement compensation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Simple</th>
<th>Accuracy</th>
<th>Operability Meister</th>
<th>Secure</th>
<th>Reliability Meister</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stable accuracy</td>
<td>Fuss-free simple operation</td>
<td></td>
<td>Machine downtime reduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tool setup support</td>
<td></td>
<td>Preventive maintenance support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workpiece setup support</td>
<td></td>
<td>Failure cause analysis</td>
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<td></td>
<td></td>
<td>Electronic manuals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E-mail function</td>
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</tbody>
</table>

**E-mail function**

At the occurrence of an alarm during operation, an e-mail message to notify the alarm can automatically be sent to the registered e-mail addresses. The operating status or machining progress status notification is also possible.

E-mail server

- Alarm occurrence
- Machining start/end
- Tool breakage/tool life expiry
- Tool life pre-notice

A maximum of 10 e-mail addresses can be set for each notification item.

**Electronic manuals**

Electronic manuals can be viewed on the main operation panel. Search features and bookmarks ensure quick access to the information you are looking for.

15-inch touch panel screen adopted

The machine is equipped with a new operating system that features a 15-inch touch panel. Icons required for operation, setup and maintenance are displayed on the screen. Screen display can be switched by single-tapping, and can be customized as needed.

To send e-mails, an e-mail server is necessary.
Standard Machine Specifications

**Movement and Ranges**
- X-axis stroke (column right/left) mm (in.) 560 (22.04)
- Y-axis stroke (head up/down) mm (in.) 640 (25.19)
- Z-axis stroke (pallet back/forth) mm (in.) 640 (25.19)
- B-axis rotation angle (rotation on the Y axis) deg 360

**Table (Pallet)**
- Working surface (X \( \times \) Y) mm (in.) 400 \( \times \) 400 (15.74 \( \times \) 15.74)
- Loading capacity kg (lb.) 400 (880)
- Max. part size mm (in.) \( \Phi \) 80 \( \times \) H 900 (\( \Phi \) 3.14 \( \times \) H 35.43)

**Spindle**
- Spindle speed mm/min (ipm) 6000 / 60000 / 60000
- Type of spindle taper 7/24 taper #40 (BT dual contact type)
- Spindle bearing inner diameter mm (in.) \( \Phi \) 80 (3.14)
- Spindle motor output kW AC 15 / 22 (low-speed coil: cont. / 15 min)
- Max. spindle torque N·m 150 / 1400min

**Feed Rate**
- Rapid traverse rate X / Y / Z mm/min (ipm) 6000 / 60000 / 60000

**Automatic Tool Changer**
- Type of tool shank JIS B 6339 tool shank 40T
- Pull stud JIS B 6339 pull stud 40P
- Tool storage capacity tools 60 (drum type)
- Max. tool diameter mm (in.) 80 (3.14)
- Max. tool length mm (in.) 350 (13.77)
- Max. tool mass kg (lb.) 10 (22) (Total tool weight: 300 kg (660) or less, max. eccentric load: 50 kg (110) or less)
- Method of tool selection Fixed address system
- Tool change arm W-grip type

**Automatic Pallet Changer**
- No. of pallets 2

**Power Sources**
- Electrical power supply KVA 37 (Depends on the optional features)
- Power supply voltage V AC 200 / 220 ± 10%
- Power supply frequency Hz 50 / 60 ± 1
- Compressed air supply MPa 0.54 - 0.93

**Tank Capacity**
- Hydraulic oil tank L 10
- Coolant tank L 530
- Oil cooler tank capacity L 10 (Total capacity: 15)

**Machine Size**
- Machine weight kg (lb.) 10,200 (22,440)

**NC System**
- Control system Matsuura G-Tech 31i

**Standard Accessories**
- 01. Total splash guard with top side cover
- 02. ATC magazine guard
- 03. ATC auto door
- 04. Pallet magazine safety guard
- 05. Pallet loading station
- 06. Safety guard for loading station (with interlock)
- 07. Synchronized tapping function
- 08. AD-TAP function
- 09. IPC function
- 10. Spindle oil cooler
- 11. Spindle automatic grease supply unit
- 12. Auto grease supply unit for feed axes
- 13. Swarf back disposal
- 14. Coolant unit
- 15. Chip flow
- 16. Feed axis collision prevention (software OT)
- 17. Spindle overload protection
- 18. M-code counter (9 kinds)
- 19. Work light
- 20. Standard mechanical tools & tool box
- 21. Machine color paint
- 22. MIMS (Matsuura Intelligent Meister System) Thermal Meister included
- 23. Leveling bolts and plates (not for foundation)
- 24. Software tool for memory card program operation & editing CD-ROM
- 25. Spindle two-year warranty

**Floor Plan (Unit : mm (in.))**

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List of Fittings

- **Spindle**
  - 15,000 min⁻¹ (BT40, auto grease lubrication)
  - 20,000 min⁻¹ (BT40, auto grease lubrication)
  - 15,000 min⁻¹ (HSK-A63, auto grease lubrication)
  - 20,000 min⁻¹ (HSK-A63, auto grease lubrication)

- **ATC (drum magazine)**
  - 60 tools (#40, fixed address)
  - 61 tools (#40, memory random)
  - 60 tools (HSK-A63, fixed address)
  - 61 tools (HSK-A63, memory random)

- **ATC (Matrix magazine)**
  - 120/160/200/240/280/330 tools (#40, high capacity type, 330-tool base)
  - 164/204/244/294 tools (#40, high speed type, 294-tool base)
  - 164/204/244/294 tools (HSK-A63, high speed type, 294-tool base)

- **Coolant tank unit**
  - Scale feedback X-/Y-/Z-axis (Heidenhain)

- **Coolant**
  - Matsuura rotary table, built-in DD motor type (max. 100 min⁻¹)
  - Vacuum type through-spindle coolant C (7 MPa)
  - Vacuum type through-spindle coolant B (7 MPa)
  - Mist separator (without through-spindle coolant)
  - Mist separator retro damper
  - Ceiling shower coolant
  - Ceiling shower coolant retrofitting
  - Mist separator (with fire damper)
  - Mist separator retrofitting
  - Coolant temperature controller with 100-liter tank (separately installed, small size)
  - Coolant temperature controller with 200-liter tank (separately installed, large size)

- **Chip Removal**
  - Total splash guard
  - ATC auto door
  - Spiral chip conveyor
  - 2 MPa external nozzle (with through-spindle coolant)
  - 7 MPa external nozzle (with through-spindle coolant)
  - Lift-up conveyor (scrapers, drum, spiral, water-based)
  - Chip bucket
  - Air blow for chip removal
  - Part washing gun (on the machine side)
  - Part washing gun (on the machine side) with no pump
  - Part washing gun (on the APC side)
  - Operation/Maintenance Support

  - **AD-TAP function**
  - 3-color signal light (red, yellow, green from top)
  - Rotary wiper (air driven)
  - Rotary wiper (electrically driven)
  - Rotary wiper (electrically driven) retrofitting
  - 100 VAC socket 3 A
  - Optional block skip addition 2 to 9
  - Removable manual pulse generator
  - DCS (Dynamic Clamp System) (to be combined with DD type rotary indexing)
  - Pre-machining tool check function
  - Pressure supply system for fixtures

- **Safety Devices**
  - Matsuura safety specification
  - Automatic fire extinguisher

- **List of Fittings**

**Outline (Unit : mm (in.))**

**Pallet Surface (Unit : mm (in.))**
This product is subject to all applicable export control laws and regulations.