Ultimate CNC Performance in High Speed and Accuracy
State of the Art Linear Motor Technology

- The cycle time can drastically be shortened thanks to 65% reduction in tool change time and optimal location of the tilting rotation center which is moved closer to the machining point.
- Optimised rigidity assures a stable machining platform.
- Matsuura’s proven software: *Intelligent Protection System* collision avoidance and next generation operating software *MIMS*.

### Target Markets

- *Input*
- *Watch*
- *Medical devices*
- *Makings*
- *Optical components*
- *Copper electrodes*
- *LX-160*
- *LS-160*

### Maximum Workpiece Size

* Bullet shape

- Standard without pallet changer
- Option with pallet changer

**Roundness 1μm** (actual value)

Expanding the boundaries of technology is at the heart of Matsuura. The era of ultra high speed and accuracy linear motor CNC machining began with the Matsuura LX-1.
Following on from the success of the LX-0, the 5 axes LX-0 5AX was launched, delivering unmatched accuracy and speed to complex geometric components.

The LX-0 5AX built a reputation for excellence in a wide range of machining disciplines and industries—its legacy is the all new 5 axes LX-160.

The LX Series is constantly evolving and offers the ultimate platform in linear motor CNC technology.
Dedicated to the high-speed, high-accuracy market — with a focus on small workpiece processing and linear motor drive technology

**Matsuura Hi-Tech Spindle**

- Maximum spindle speed is 46,000 min⁻¹.
- Spindle motor output is 7.5/15 kW.
- Spindle motor torque is 8.6 N·m.
- Spindle noise level is 75 dB.

Motor torque has been increased 20% & the low noise LX spindle is further reduced in volume by 10%.

**Spindle Motor Torque & Power Diagram**

Even faster Steel and Aluminium cutting

<table>
<thead>
<tr>
<th>Cutting Test Data (inch)</th>
<th>Spindle Speed</th>
<th>Feed rate</th>
<th>Quantity</th>
<th>Spindle load</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACE MILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A5052 Ø50mm (1.96) 3 teeth carbide</td>
<td>W=40mm (1.57) D=1.5mm (0.05)</td>
<td>6,000 min⁻¹</td>
<td>5,000mm/min (196.85)</td>
<td>300 c/min</td>
</tr>
<tr>
<td>S45C Ø3mm (0.12) 6 teeth carbide</td>
<td>W=50mm (1.96) D=0.5mm (0.01)</td>
<td>1,500 min⁻¹</td>
<td>700mm/min (27.55)</td>
<td>17.5 c/min</td>
</tr>
<tr>
<td>END MILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A5052 Ø16mm (0.62) 2 teeth carbide</td>
<td>W=14mm (0.55) D=1.1mm (0.04)</td>
<td>46,000 min⁻¹</td>
<td>16,000mm/min (629.92)</td>
<td>672 c/min</td>
</tr>
<tr>
<td>S45C Ø16mm (0.62) 4 teeth carbide</td>
<td>W=11mm (0.43) D=1.6mm (0.06)</td>
<td>6,000 min⁻¹</td>
<td>5,000mm/min (196.85)</td>
<td>80 c/min</td>
</tr>
</tbody>
</table>

| DRILL | | | | |
| A5052 Ø14.5mm (0.57) HSS | 1,300 min⁻¹ | 120mm/min (4.72) | 19.8 c/min | 93% |
| S45C Ø6.8mm (0.26) HSS | 900 min⁻¹ | 80mm/min (3.15) | 2.9 c/min | 37% |

| TAP | | | | |
| A5052 M12 × P1.75 HSS | 400 min⁻¹ | 700mm/min (27.55) | Solid tap function is used | 143% |
| S45C M8 × P1.25 HSS | 500 min⁻¹ | 500mm/min (19.69) | Solid tap function is used | 119% |

Note: The data above is from examples of actual results. Depending on conditions, there may be cases where results equivalent to those of the catalog data may not be able to be obtained.

**Measurement results proving the high precision**

**Roundness 1μm**

*The actual value is not intended to guarantee the performance.*
Control Axes

- All axes are driven by linear motors to achieve high speed and rapid acceleration/deceleration.

Rapid Traverse Rate

<table>
<thead>
<tr>
<th>Axis</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Axis</td>
<td>90,000mm/min</td>
</tr>
<tr>
<td>Y-Axis</td>
<td>90,000mm/min</td>
</tr>
<tr>
<td>Z-Axis</td>
<td>90,000mm/min</td>
</tr>
<tr>
<td>B-Axis</td>
<td>100min⁻¹</td>
</tr>
<tr>
<td>C-Axis</td>
<td>200min⁻¹</td>
</tr>
</tbody>
</table>

B / C Axis

- The B and C axes are also driven by DD motors.

<table>
<thead>
<tr>
<th>Axis</th>
<th>Rate</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-Axis</td>
<td>100min⁻¹</td>
<td>B-Axis : 122N·m</td>
</tr>
<tr>
<td>C-Axis</td>
<td>200min⁻¹</td>
<td>C-Axis : 45N·m</td>
</tr>
</tbody>
</table>

Table Breaking Torque

<table>
<thead>
<tr>
<th>Axis</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-Axis</td>
<td>230N·m</td>
</tr>
<tr>
<td>C-Axis</td>
<td>60N·m</td>
</tr>
</tbody>
</table>

High-rigidity Design

- Optimum rigidity is assured on all Matsuura products via FEM and our established track record for excellence in engineering.
- High rigidity, linear motors and exceptional spindle speeds identify the **LX-160** as a unique solution for high precision high gain machining.

**Linear Motor Drive**

- Direct drives enable high speed, high accuracy processing.
- With the exception of the guide surface there are no two parts that create friction, vastly reducing mechanical wear and tear. Minimised component design assures reliability.
- High gain characteristics of linear motors enables positive loop gain of more than 10 times that of conventional motors, guaranteeing high accuracy.
Scalable Options Tailored to Your Process.
Designed for Unmanned Production.

Chain Magazine
- The standard 10-tool magazine can be extended to a 30-tool magazine with the addition of a 20-tool chain-type magazine (10 + 20 = 30), and 50 with the addition of a 40-tool magazine (10 + 40 = 50).

Matrix Magazine
- Using the matrix-type magazine, the number of tools can also be increased — by a minimum of 120 tools up to a maximum of 320 tools, in increments of 40 tools on each column. Therefore, up to 330 (= 10 + 320) tools can be set at a time.

Pallet magazine
- PC2 is integrated design for compact space.

PC2
- W-grip type

Pallet is Matsuura made.
Pallet clamping device can be selected from “system 3R” and “EROWA”.

system 3R the Pioneer
EROWA®
Ergonomic Design

The front guard is designed with comfort in mind, providing a space for the operators’ feet allowing close positioning to the machine.

- The NC can be slid and revolved for maximum operator comfort and control.

Easy access maintenance at the rear of the machine.

- Opening width of the operator door is 580mm, offering superb unfettered access to the machining enclosure.

Swarf Management

- Reliable and proven chip flow management unit as standard.

- The chip flow unit discharges directly to the rear of the machine. A chip collection & 350L coolant tank are provided as standard.

Installation Area

- The machine footprint is 15% smaller than that of our previous model (LX-0 5AX), yet offers a larger workpiece envelope.

NC System

Matsuura L-Tech 30i

- Dynamic state of the art NC offering outstanding control, versatility and accuracy.
Ultra Safe Collision Protection

On-Line Link with PC

Intelligent Protection System simulates your programmed component alerting the user to any interference or collision before any actual machining.

Collision Avoidance during Setup

Tool length compensation data is linked with the Intelligent Protection System. As NC data changes, PC compensation data is automatically updated.

Collision Avoidance during Automatic Operation

Collision check can be activated during simulation. The collision check function renders the part in real time on screen.

Standard Accessories

<table>
<thead>
<tr>
<th>Software</th>
<th>Machine model data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication cable</td>
<td>PC communication board</td>
</tr>
</tbody>
</table>

A high-quality cable is provided to route from the NC to your PC Communication Board.
Matsuura Intelligent Meister System

Meister's knowledge, skills, and ideas combined

- **Environment**
  - Eco Meister
  - Power Saving
    - Power cut-off function
    - Energy-saving devices installed

- **Accuracy**
  - Thermal Meister
    - Stable Accuracy
      - Spindle thermal displacement compensation

- **Operability Meister**
  - Fuss-Free Simple Operation
    - Tool setup support
    - Workpiece setup support
    - Restart after machining stop

- **Reliability Meister**
  - Machine Down Time Reduction
    - Preventive maintenance support functions
    - Machine restoration support functions
  - Reliability Meister Plus
    - Increased Security Provided
      - Electronic manual
      - E-mailing function

*Reliability Meister Plus requires a PC. Consult Matsuura for more information.*
**Standard Machine Specifications**

### Movement and Range

<table>
<thead>
<tr>
<th>Axis</th>
<th>Travel/RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Axis</td>
<td>mm 500</td>
</tr>
<tr>
<td>Y-Axis</td>
<td>mm 250</td>
</tr>
<tr>
<td>Z-Axis</td>
<td>mm 300</td>
</tr>
<tr>
<td>B-Axis</td>
<td>deg -125 +125</td>
</tr>
<tr>
<td>C-Axis</td>
<td>deg 360</td>
</tr>
<tr>
<td>From Table Surface To Spindle End</td>
<td>deg 30 – 330 (B-Axis 0 degrees)</td>
</tr>
</tbody>
</table>

### Table

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Surface mm</td>
<td>Ø100</td>
</tr>
<tr>
<td>Loading Capacity kg</td>
<td>20</td>
</tr>
<tr>
<td>Max. Work Size mm</td>
<td>Ø160×H230 * Bullet shape</td>
</tr>
<tr>
<td>Height from floor surface to surface mm</td>
<td>900 (B-Axis 0 degrees)</td>
</tr>
</tbody>
</table>

### Spindle

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle Speed Range min^-1</td>
<td>400 – 46,000</td>
</tr>
<tr>
<td>Spindle Taper</td>
<td>7 / 24 taper BT30 (Double contact type)</td>
</tr>
<tr>
<td>Spindle Motor Power kW</td>
<td>7.5 / 15</td>
</tr>
<tr>
<td>Max. Spindle Motor Torque N·m/min^-1</td>
<td>8.68 / 16,500</td>
</tr>
</tbody>
</table>

### Feed Rate

| Rapid Traverse Rate XY/Z mm/min | 90,000          |
| Rapid Traverse Rate B mm/min   | 100             |
| Rapid Traverse Rate C mm/min   | 200             |

### Automatic Tool Changer

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Tool Shank</td>
<td>JIS B 6339 30T</td>
</tr>
<tr>
<td>Tool Storage Capacity pcs.</td>
<td>10</td>
</tr>
<tr>
<td>Max. Tool Diameter mm</td>
<td>Ø46</td>
</tr>
<tr>
<td>Max. Tool Length mm</td>
<td>150</td>
</tr>
<tr>
<td>Max. Tool Mass kg</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Power Sources

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Capacity kVA</td>
<td>43</td>
</tr>
</tbody>
</table>

### NC System

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control System</td>
<td>Metasura LX-160</td>
</tr>
</tbody>
</table>

### Standard Accessories

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. Total Splash Guard</td>
<td></td>
</tr>
<tr>
<td>02. ATC Magazine Guard</td>
<td></td>
</tr>
<tr>
<td>03. ATC Auto Door</td>
<td></td>
</tr>
<tr>
<td>04. Spindle Oil Cooler</td>
<td></td>
</tr>
<tr>
<td>05. Auto Grease Supply Unit</td>
<td></td>
</tr>
<tr>
<td>06. Air Dryer</td>
<td></td>
</tr>
<tr>
<td>07. Synchronized Tapping</td>
<td></td>
</tr>
<tr>
<td>08. AD-TAP Function</td>
<td></td>
</tr>
<tr>
<td>09. IPC Function</td>
<td></td>
</tr>
<tr>
<td>10. Scale Feedback for the X/Y/Z/B/C-Axis</td>
<td></td>
</tr>
<tr>
<td>11. Coolant Unit</td>
<td></td>
</tr>
<tr>
<td>12. Chip Flow</td>
<td></td>
</tr>
<tr>
<td>13. Linear Motor Cooler</td>
<td></td>
</tr>
<tr>
<td>14. Spindle Overload Protection</td>
<td></td>
</tr>
<tr>
<td>15. 9 Sorts of M-code Counters</td>
<td></td>
</tr>
<tr>
<td>16. Work Light</td>
<td></td>
</tr>
<tr>
<td>17. Standard Mechanical Tool and Tool Box</td>
<td></td>
</tr>
<tr>
<td>18. Machine Color Paint</td>
<td></td>
</tr>
<tr>
<td>19. MIMS</td>
<td></td>
</tr>
<tr>
<td>20. Intelligent Protection System</td>
<td></td>
</tr>
<tr>
<td>21. Spindle Run Hour Meter</td>
<td></td>
</tr>
<tr>
<td>22. Leveling Pads and Bolts</td>
<td></td>
</tr>
<tr>
<td>23. Automatic Operation Run Hour Meter</td>
<td></td>
</tr>
<tr>
<td>24. PC Tool for Memory Card Program Operation and Editing</td>
<td></td>
</tr>
</tbody>
</table>

### Outline (10-tool Magazine and NON-PC)

- **Floor Plan (10-tool Magazine and NON-PC)**
- **Left Side View**
- **Front View**
- **Hydraulic Unit**
- **Power Supply**
- **Coolant Tank**
- **Oil Cooler**
- **Air Dryer**
- **Air Supply**
- **NC Unit**
- **Main Operation Panel**
- **Levelling Bolt M32×P2**
- **10,000**
- **3270**
- **1650**
- **Hydraulic Unit**
- **Power Supply**
- **Coolant Tank**
- **Oil Cooler**
- **Air Dryer**
- **Air Supply**
- **NC Unit**
- **Main Operation Panel**
- **Levelling Bolt M32×P2**
- **10,000**
- **3270**
- **1650**
### Equipment

**Spindle**
- 46,000 min\(^{-1}\) (BT30 Oil-Air) [Standard]
- 46,000 min\(^{-1}\) (HSK40E) [Option]

**ATC** (with the inclusion of the standard 10-tool magazine)
- 30 tools (HSK63, chain type) [Option]
- 50 tools (HSK63, chain type) [Option]
- 30 / 170 / 210 / 250 / 290 / 330 tools (base for 320 tools) [Option]

**High Accuracy Control**
- Scale Feedback System XYZ-Axis [Option]
- APC

**Coolant**
- Cutting Oil Tank [Option]
- Vacuum Type Coolant-Thru-Spindle Type A [Option]
- Vacuum Type Coolant-Thru-Spindle Type B [Option]
- Vacuum Type Coolant-Thru-Spindle Type C 20BAR [Option]
- Vacuum Type Coolant-Thru-Spindle Type C 70BAR [Option]
- Coolant Flow Checker [Option]
- Mist Separator (without Fire Damp) [Option]
- Mist Separator (with Fire Damp) [Option]
- Cutting Oil Temperature Controller (with 100L Tank, separate type, small) [Option]

**Automatic Measurement / Broken Tool Detection**
- Automatic Measurement / Automatic Centering (optical sensor) [Option]
- Broken Tool Detection / Full-Automatic Tool Length Measurement (laser sensor) [Option]
- Automatic Measurement (optical sensor) & Broken Tool Detection (laser sensor) [Option]

**Swarf Management**
- Total Enclosure Guard [Option]
- ATC Auto Door [Option]
- Spiral Chip Conveyor [Option]
- Chip Flush System [Option]
- Lift-up Conveyors (Scraper, Drum, Right and Left Spiral Conveyors) [Option]
- Air Blow For Chip / Swarf Removal [Option]
- Workpiece Cleaning Gun (Machine side) [Option]

**Operation / Maintenance**
- AD-TAP Function [Option]
- IPC Function [Option]
- MIMS
- Intelligent Protection System [Option]
- Auto Grease Supply to Feed Axis [Option]
- Work Light [Option]
- Movable Manual Pulse Generator [Option]
- Spindle Run Hour Meter [Option]
- 8 Sets of Extra M Function [Option]
- Weekly Timer [Option]
- Rotary Wiper [Option]
- Optional Block Skip 2 - 9 [Option]
- Reliability Meister Plus Type A [Option]
- Reliability Meister Plus Type B [Option]

**Safety Features**
- Matsuura Safety Specification [Option]

**Optional Package**
- High-Speed, High-Precision Package [Option]
- 5-Axis Package [Option]
- High-Speed, High-Precision 5-Axis Package [Option]
- Value Package [Option]

**TRUE PATH**

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**Floor Plan (50-tool Magazine with PC2)**

![Floor Plan](image-url)
MATSUURA MACHINERY CORPORATION
1-1 Urushihara-cho Fukui City 910-8530, Japan
TEL : +81-776-56-8106    FAX : +81-776-56-8151

MATSUURA EUROPE GmbH
Otto-Von Gueriche-Ring 10a 65205 Wiesbaden-Nordenstadt, Germany
TEL : +49-6122-7803-80    FAX : +49-6122-7803-33
E-MAIL : info@matsuura.de
URL : http://www.matsuura.de/

MATSUURA MACHINERY PLC
Beaumont Center Whitwick Business Park, Coalville Leicestershire LE67 4NH, England
TEL : +44-1530-511-400    FAX : +44-1530-511-440
E-MAIL : sales@matsuura.co.uk
URL : http://www.matsuura.co.uk

MATSUURA MACHINERY GmbH
Otto-Von Gueriche-Ring 10a 65205 Wiesbaden-Nordenstadt, Germany
TEL : +49-6122-7803-80    FAX : +49-6122-7803-33
E-MAIL : info@matsuura.de
URL : http://www.matsuura.de/

ELLIOTT MATSUURA CANADA INC.
2120 Buckingham Road Oakville Ontario L6H 5X2, Canada
TEL : +1-905-829-2211    FAX : +1-905-829-5600
E-MAIL : sales@elliotmachinery.com
URL : http://www.elliotmachinery.com/

MMTS CORPORATION
65 Union Avenue Suite2, Sudbury Massachusetts 01776, U.S.A.

• Product specifications and dimensions are subject to change without prior notice.
• The photos may show optional accessories.

Products are subject to all applicable export control laws and regulations.