

 **Matsura**

High Grade Linear Motor Machine

# LX-160



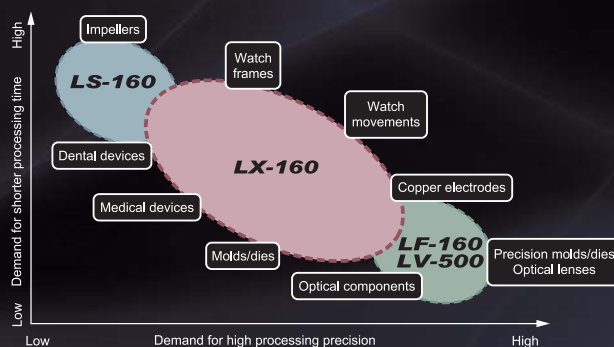
**MAXIA**  
Innovation by  Matsura

# LX-160

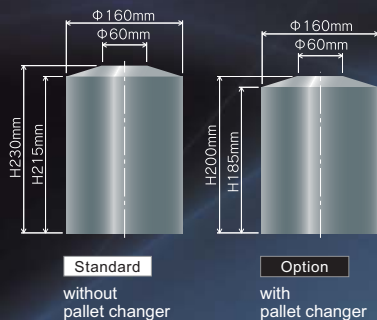
## Ultimate CNC Performance in High Speed and Accuracy State of the Art Linear Motor Technology

- The cycle time can drastically be shorted 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**.

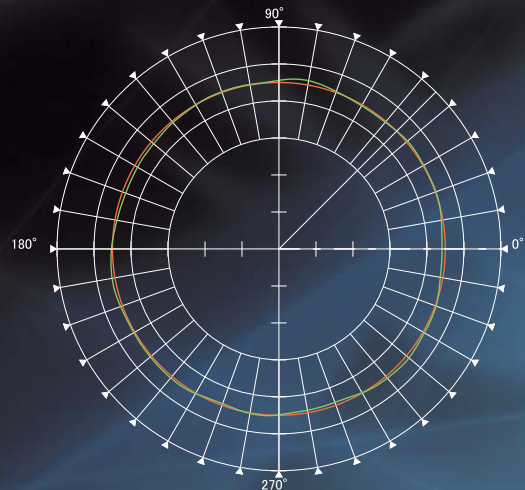
### Target Markets



### Maximum Workpiece Size \* Bullet shape



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.





Amazing measurement results prove high precision

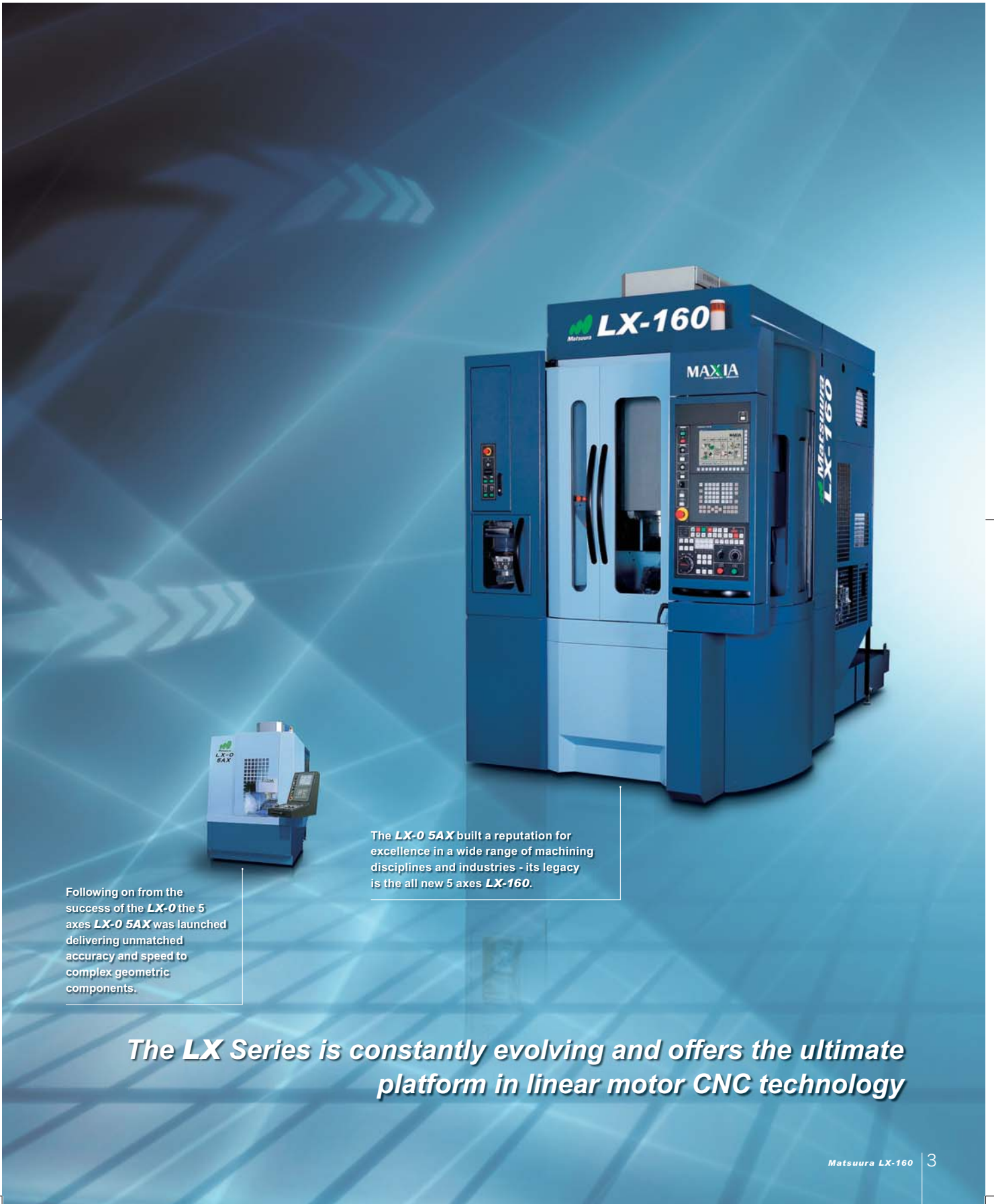
**Roundness 1μm** (actual value)



The LX Series continued to set the pace with the 3 axes LX-0 - a small footprint machine offering outstanding performance for small intricate molds and dies.

Scalable and tailored options to the customer's process 

Dedicated to the high-speed, high-accuracy market 



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

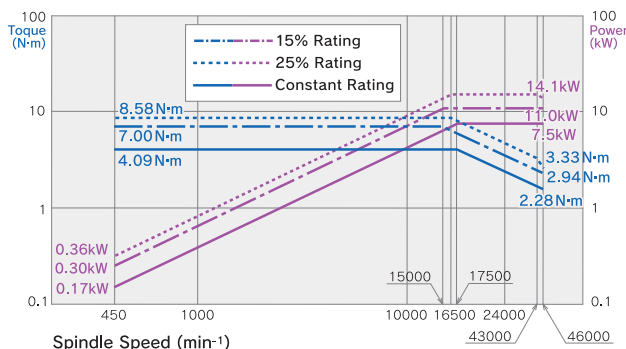
- Maximum spindle speed is 46,000min<sup>-1</sup>.
- Spindle motor output is 7.5/15 kW.
- Spindle motor torque is 8.6 N·m.
- Spindle noise level is 75 dB.

Spindle Taper BT30 Standard

Spindle Taper HSK-E40 Standard

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

### Spindle Motor Torque & Power Diagram



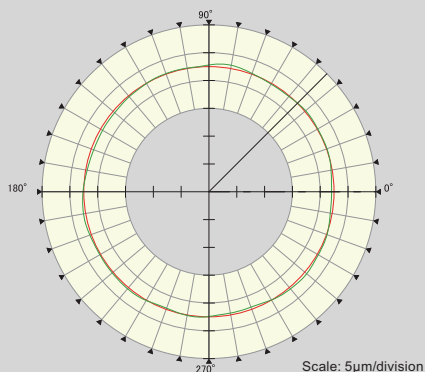
## Even faster Steel and Aluminium cutting

### Cutting Test Data

				Spindle Speed	Feed rate	Quantity	Spindle load
FACE MILL	A5052	Ø50mm (1.96) 3teeth carbide	W=40mm (1.57) D=1.5mm (0.05)	6,000 min <sup>-1</sup>	5,000mm/min (196.85)	300 cc/min	125%
	S45C	Ø63mm (2.48) 5teeth carbide	W=50mm (1.96) D=0.5mm (0.01)	1,500 min <sup>-1</sup>	700mm/min (27.55)	17.5 cc/min	170%
END MILL	A5052	Ø16mm (0.62) 2teeth carbide	W=14mm (0.55) D=3mm (0.11)	46,000 min <sup>-1</sup>	16,000mm/min (629.92)	672 cc/min	126%
	S45C	Ø16mm (0.62) 4teeth carbide	W=1mm (0.03) D=16mm (0.62)	6,000 min <sup>-1</sup>	5,000mm/min (196.85)	80 cc/min	123%
DRILL	A5052	Ø14.5mm (0.57) HSS		1,300 min <sup>-1</sup>	120mm/min (4.72)	19.8 cc/min	93%
	S45C	Ø6.8mm (0.26) HSS		900 min <sup>-1</sup>	80mm/min (3.14)	2.9 cc/min	37%
TAP	A5052	M12 × P1.75 HSS		400 min <sup>-1</sup>	700mm/min (27.55)	Solid tap function is used	143%
	S45C	M8 × P1.25 HSS		400 min <sup>-1</sup>	500mm/min (19.68)	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**  
(actual value\*)

Filter	1-15
Material	Aluminum (A5052)
Spindle speed	30,000min <sup>-1</sup>
Feed rate	5,000mm/min
Tool	Slot drill

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

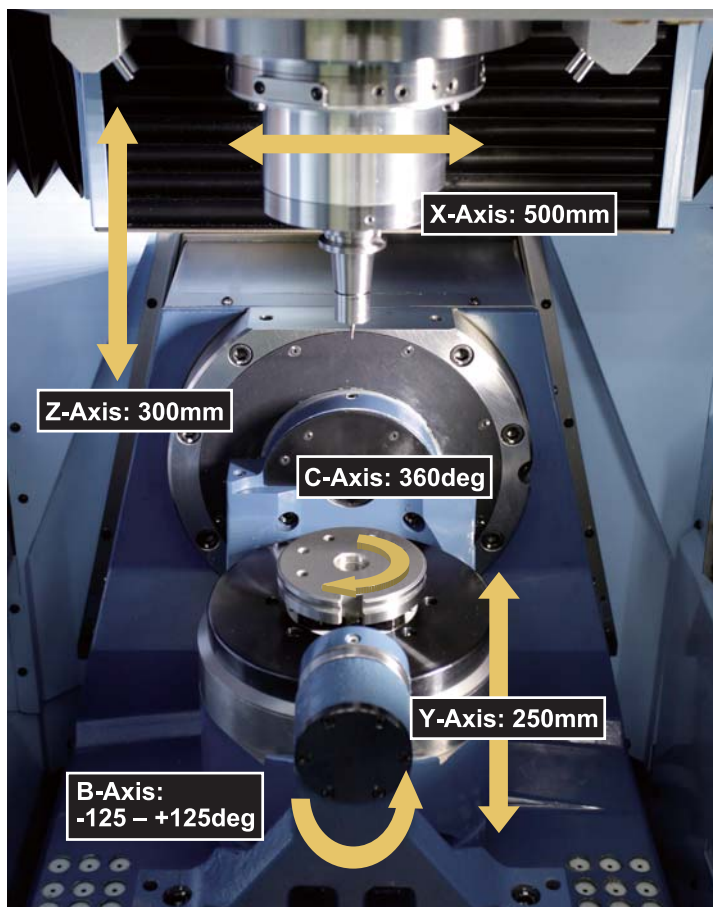


## Control Axes

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

### Rapid Traverse Rate

X-Axis 90,000mm/min	B-Axis 100min <sup>-1</sup>
Y-Axis 90,000mm/min	C-Axis 200min <sup>-1</sup>
Z-Axis 90,000mm/min	



### Liner 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.



## B / C Axis

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

### Rapid Traverse Rate

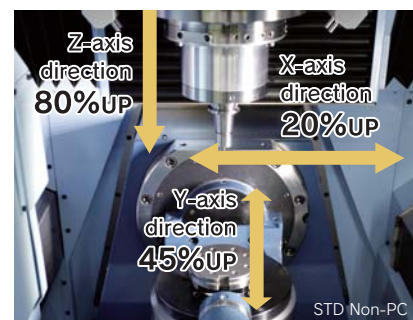
B-Axis : 100min <sup>-1</sup>
C-Axis : 200min <sup>-1</sup>

### Table Rotation Torque

B-Axis : 122N·m
C-Axis : 45N·m

### Table Breaking Torque

B-Axis : 230N·m	C-Axis : 60N·m
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## 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.

# Scalable Options Tailored to Your Process. Designed for Unmanned Production.

## Tool magazines

**Drum Magazine** Standard

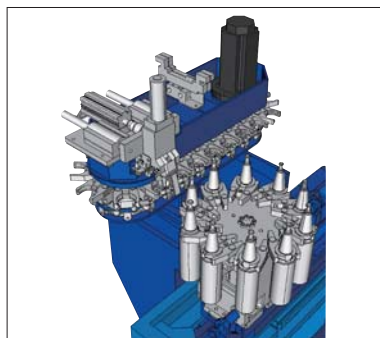


\* Even if an additional magazine unit is installed, the machine still has the standard 10-tool drum-type magazine.

**Chain Magazine** Option

• 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).

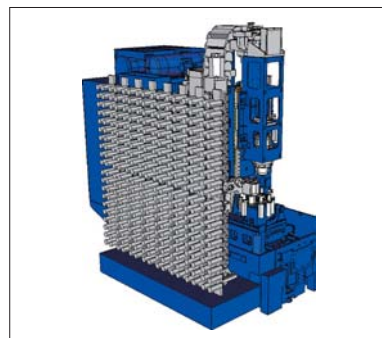
**30/50Tool Chain Magazine** Option



**Matrix Magazine** Option

• 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.

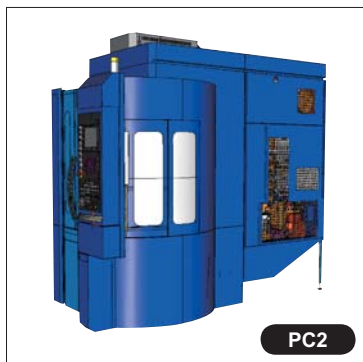
**130 – 330Tool Matrix Magazine** Option



## Pallet magazine

PC2 is integrated design for compact space.

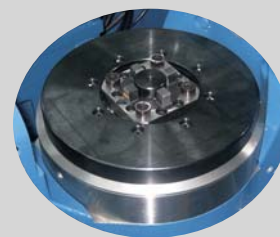
**PC2**  
**W-grip type** Option



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

**system 3R** the Pioneer

EROWA® 



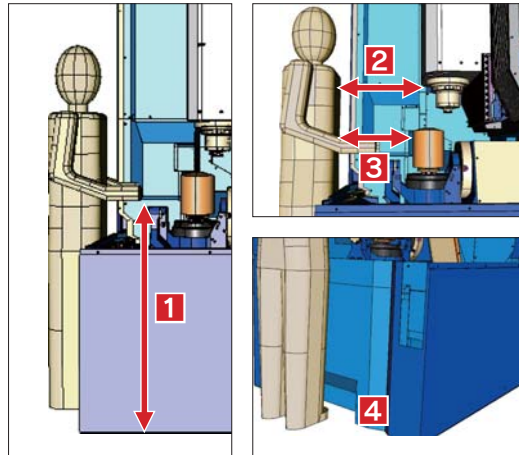
## Ergonomic Design

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.

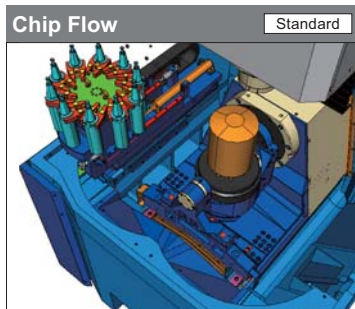
- Opening width of the operator door is 580mm, offering superb unfettered access to the machining enclosure.



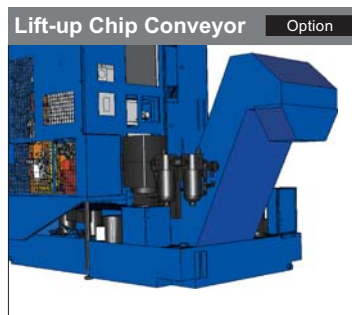
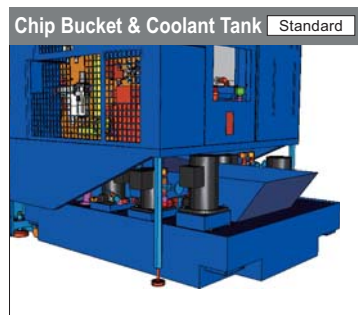
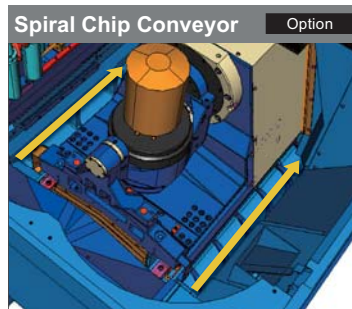
- 1** Floor – workpiece mounting surface  
900 mm (without PC)  
930 mm (with PC)
- 2** Guard front – spindle center  
550 mm
- 3** Guard front – workpiece center  
450 mm (closest approach)
- 4** Foot Cavity in Front Guard  
Ergonomically designed for easier approach and operator comfort.

## Swarf Management

- Reliable and proven chip flow management unit as standard.

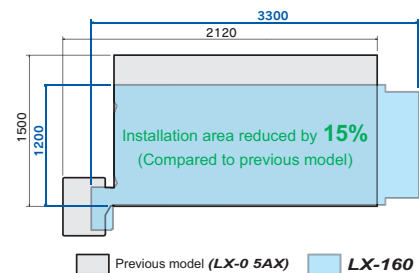


- The chip flow unit discharges directly to the rear of the machine. A chip collection & 350L coolant tank are provided as standard.



## 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

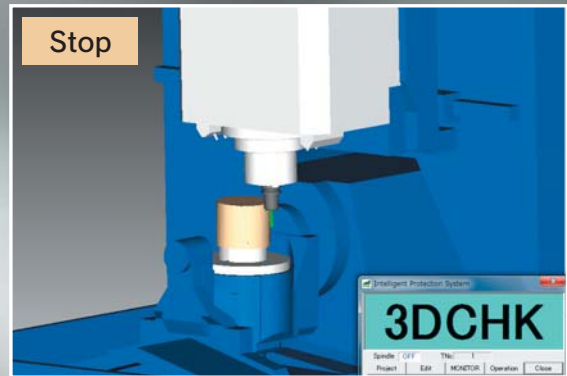
- Dynamic state of the art NC offering outstanding control, versatility and accuracy.

# Intelligent Protection System



## Ultra Safe Collision Protection

Safe Secure



Intelligent Protection System OFF

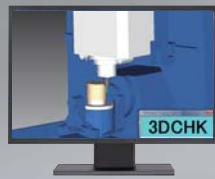
Intelligent Protection System ON

Manual / automatic operation supported  
Simultaneous 5-axis machining supported

### On-Line Link with PC

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

※Requires end user PC - consult Matsuura for full specifications.



External PC



Machining center

### 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

Software	Machine model data
Communication cable	PC communication board

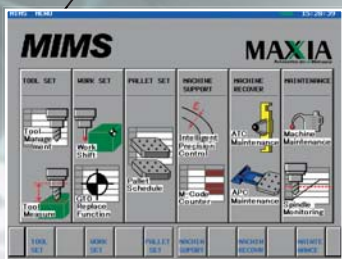
※ A high quality cable is provided to route from the NC to your PC Communication Board



# MIMS *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

## Simple

### Operability Meister

#### Fuss-Free Simple Operation

- Tool setup support
- Workpiece setup support
- Restart after machining stop

## Secure

### Reliability Meister

#### Machine Down Time Reduction

- Preventive maintenance support functions
- Machine restoration support functions

### Reliability Meister Plus Option

#### Increased Security Provided

- Electronic manual
- E-mailing function

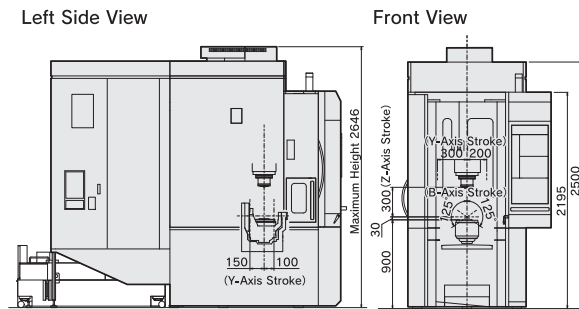
※ Reliability Meister Plus requires a PC.  
Consult Matsuura for more information.

## Standard Machine Specifications

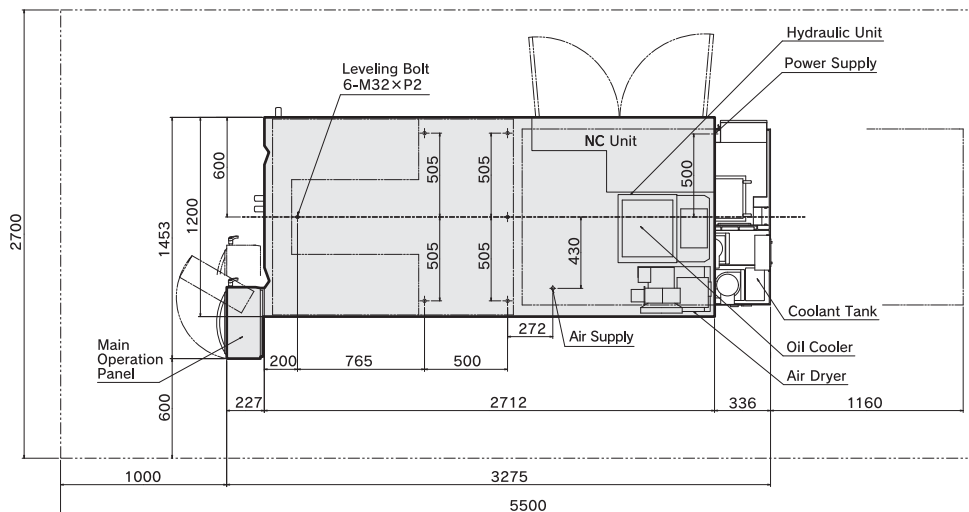
■ Movement and Range		
X-Axis Travel	mm	500
Y-Axis Travel	mm	250
Z-Axis Travel	mm	300
B-Axis Travel	deg	-125 – +125
C-Axis Travel	deg	360
From Table Surface To Spindle End	deg	30 – 330 (B-Axis 0 degree)
■ Table		
Working Surface	mm	Ø100
Loading Capacity	kg	20
Max. Work Size	mm	Ø160×H230 * Bullet shape
Height from floor surface to table surface	mm	900 (B-Axis 0 degree)
■ Spindle		
Spindle Speed Range	min <sup>-1</sup>	400 – 46,000
Spindle Taper		7 / 24 taper BT30 (Double contact type)
Spindle Motor Power	kW	7.5 / 15
Max. Spindle Motor Torque	N·m/min <sup>-1</sup>	8.68 / 16,500
■ Feed Rate		
Rapid Traverse Rate (X/Y/Z)	mm/min	90,000
Rapid Traverse Rate (B)	min <sup>-1</sup>	100
Rapid Traverse Rate (C)	min <sup>-1</sup>	200
■ Automatic Tool Changer		
Type of Tool Shank		JIS B 6339 30T
Tool Storage Capacity	pcs.	10
Max. Tool Diameter	mm	Ø46
Max. Tool Length	mm	150
Max. Tool Mass	kg	1.5
■ Power Sources * Depending on options		
Power Capacity	kVA	43
■ NC System		
Control System		<b>Matsuo L-Tech 30i</b>

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

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



### Floor Plan (10-tool Magazine and NON-PC)



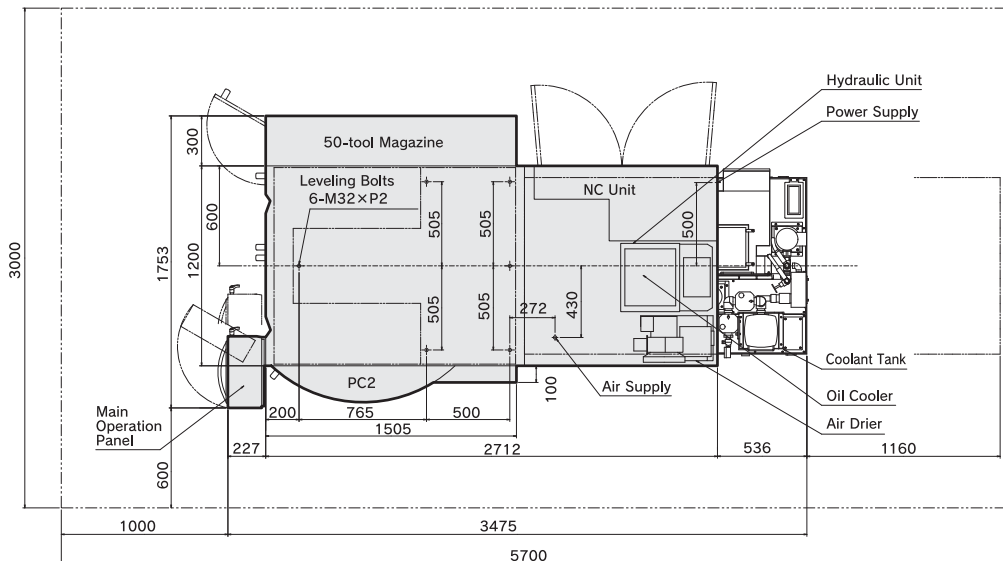
Equipment

○ : Standard ▲ : Option

<b>Spindle</b>	
46,000 min <sup>-1</sup> (BT30 Oil-Air)	○
46,000 min <sup>-1</sup> (HSK40E)	○
<b>ATC (with the inclusion of the standard 10-tool magazine)</b>	
30 tools (#30, chain type)	▲
50 tools (#30, chain type)	▲
30 / 170 / 210 / 250 / 290 / 330 tools (base for 320 tools)	▲
<b>High Accuracy Control</b>	
Scale Feedback System X/Y/Z-Axis	○
<b>APC</b>	
PC2	▲
<b>Coolant</b>	
Cutting Oil Tank	○
Vacuum Type Coolant-Thru-Spindle Type A	▲
Vacuum Type Coolant-Thru-Spindle Type B	▲
Vacuum Type Coolant-Thru-Spindle Type C 20BAR	▲
Vacuum Type Coolant-Thru-Spindle Type C 70BAR	▲
Coolant Flow Checker	▲
Mist Separator (without Fire Damper)	▲
Mist Separator (with Fire Damper)	▲
Cutting Oil Temperature Controller (with 100L Tank, separate type, small)	▲
<b>Automatic Measurement / Broken Tool Detection</b>	
Automatic Measurement / Automatic Centering (optical sensor)	▲
Broken Tool Detection / Full-Automatic Tool Length Measurement (laser sensor)	▲
Automatic Measurement (optical sensor) & Broken Tool Detection (laser sensor)	▲

<b>Swarf Management</b>	
Total Enclosure Guard	○
ATC Auto Door	○
Spiral Chip Conveyor	▲
Chip Flush System	○
Lift-up Conveyors (Scraper, Drum, Right and Left Spiral Conveyors)	▲
Air Blow For Chip / Swarf Removal	▲
Workpiece Cleaning Gun (Machine side)	▲
<b>Operation / Maintenance</b>	
AD-TAP Function	○
IPC Function	○
<b>MIMS</b>	
Intelligent Protection System	○
Auto Grease Supply to Feed Axis	○
Work Light	○
Movable Manual Pulse Generator	▲
Spindle Run Hour Meter	○
8 Sets of Extra M Function	▲
Weekly Timer	▲
Rotary Wiper	▲
Optional Block Skip 2 - 9	▲
Reliability Meister Plus Type A	▲
Reliability Meister Plus Type B	▲
<b>Safety Features</b>	
Matsura Safety Specification	○
<b>Optional Package</b>	
High-Speed, High-Precision Package	▲
5-Axis Package	▲
High-Speed, High-Precision 5-Axis Package	▲
Value Package	▲
TRUE PATH	▲

Floor Plan (50-tool Magazine with PC2) Option





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  - The photos may show optional accessories.



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