



# Linear Motor Series



High Grade Linear Motor Machine

**LX-160**



High Precision Linear Motor Machine

**LF-160**



High Speed Linear Motor Machine

**LS-160**



High Precision Linear Motor Machine

**LV-500**

# Overwhelming strength in machining speed and accuracy

## Distinctive linear motor machine series

High Grade Linear Motor Machine

### LX-160 5AX

All axes linear motor drive (X/Y/Z) + direct drive motor drive (4th/5th)  
Flagship model with both high speed and high accuracy in an even higher dimension

□ Spindle: 46,000 min<sup>-1</sup> (BT30 or HSK-E40)

High Precision Linear Motor Machine

### LF-160 5AX

### LV-500 3AX

Market-specific model developed for ultra-precision machining for dies & molds or optical parts. Spindle with ultimately minimized dynamic runout and high-resolution scale (resolution: 0.01 μm). Extraordinary geometric accuracy and surface finish available

□ Spindle: 46,000 min<sup>-1</sup> (BT30 or HSK-E40)

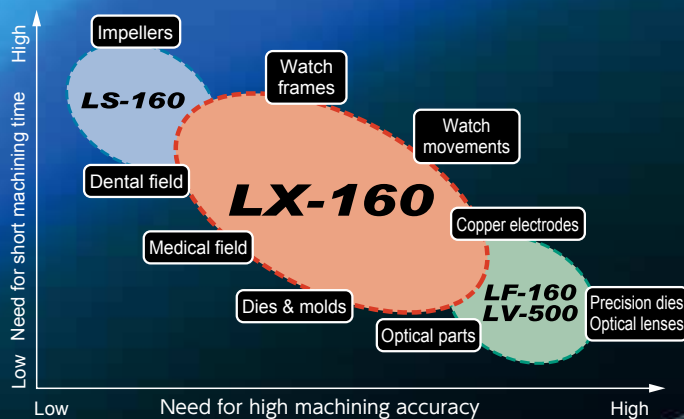
High Speed Linear Motor Machine

### LS-160 5AX

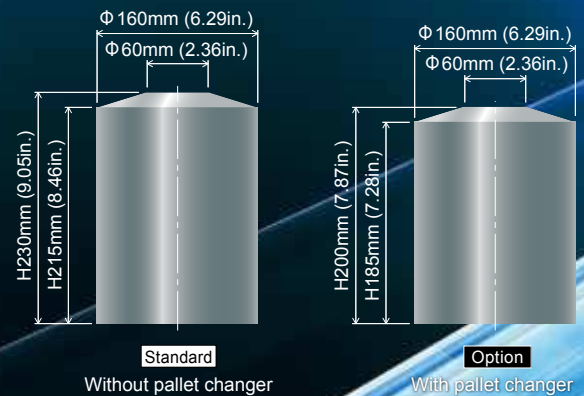
Market-specific model developed for ultra-high-speed machining such as for impellers or complicated parts for dental / medical use

□ Spindle: 40,000 min<sup>-1</sup> (HSK-E40)

#### ■ Target markets



#### ■ Maximum part size \* Bullet shape (excluding the LV-500)



## ATC/APC options for extended unmanned operation

\*Refer to "Specifications" on the backside for applicable models.

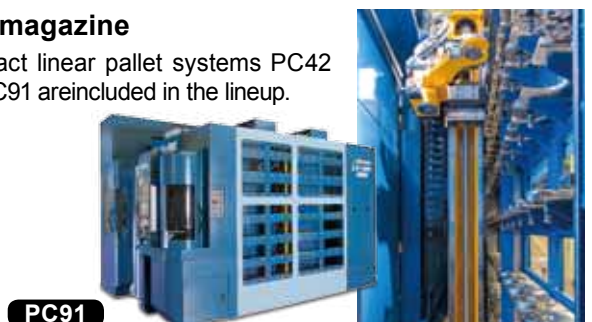
### ATC magazine

Matsuura's lineup offers chain type magazines extendable to 30 or 50 tools and matrix magazines that hold a maximum of 338 tools.



### APC magazine

Compact linear pallet systems PC42 and PC91 are included in the lineup.

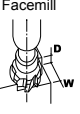
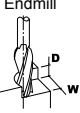
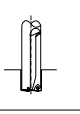
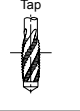


PC91

## LX-160 Basic Capabilities

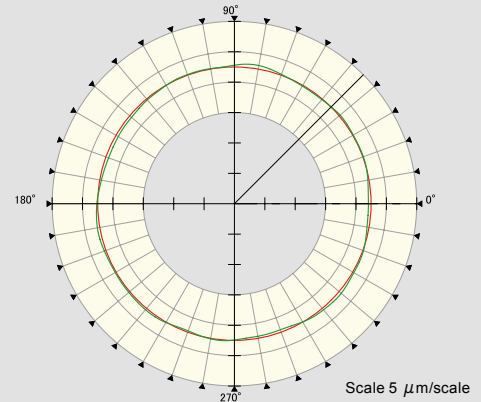
### Machining test results

(inch)

				Spindle speed	Cutting feed rate	Cutting capacity	Spindle load
	A5052	Ø50mm (1.96) 3-flute	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) 5-flute	W=50mm (1.96) D=0.5mm (0.01)	1,500 min <sup>-1</sup>	700mm/min (27.55)	17.5 cc/min	170%
	A5052	Ø16mm (0.62) 2-flute	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) 4-flute	W=1mm (0.03) D=16mm (0.62)	6,000 min <sup>-1</sup>	5,000mm/min (196.85)	80 cc/min	123%
	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%
	A5052	M12 × P1.75 HSS		400 min <sup>-1</sup>	700mm/min (27.55)		143%
	S45C	M8 × P1.25 HSS		400 min <sup>-1</sup>	500mm/min (19.68)		119%

\*Above data is based on actual cases. Depending on conditions, results may differ from those listed above.

### Amazing measurement results that prove ultra high accuracy

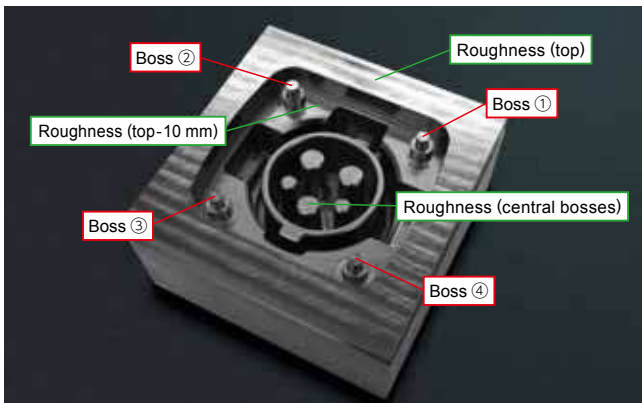


Out of roundness  
**1μm**  
\*Actual data

Filter	1-15
Material	Aluminum A5052
Spindle speed	30,000min <sup>-1</sup>
Feed rate	5,000mm/min
Tool	2-flute endmill

\*Note that measurement results are recorded values and not guaranteed values.

### LF-160 Machining case example [EV connector]



#### ■ Boss positioning accuracy

	X direction		Y direction	
	Distance (mm)	Error (mm)	Distance (mm)	Error (mm)
Reference	26.2000	—	26.6000	—
①	26.2006	0.0006	26.6003	0.0003
②	26.1992	-0.0008	26.6006	0.0006
③	26.1991	-0.0009	26.5986	-0.0014
④	26.2005	0.0005	26.5993	-0.0007

#### ■ Surface roughness

	Ra (μm)	Rz (μm)
Surface roughness	0.2066	1.1837
Top Z-10mm	0.1400	0.9822
Boss	0.1720	0.9692

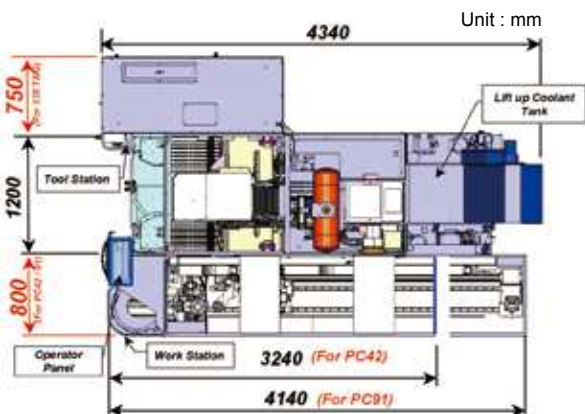
\*Above data is based on actual cases. Depending on conditions, results may differ from those listed above.

### LS-160 Machining case example [Impeller]



An impeller used for car engine turbocharger. Specialized for simultaneous 5-axis machining.

Diameter	Blade (pcs)	Machining time
φ 80mm (φ 3.14in.)	6	9 min 34 sec
φ 44mm (φ 1.73in.)	6	1 min 50 sec



### Slim & compact design by completely eliminating wasted space

An ATC unit with a 338-tool matrix magazine measures up to only 750mm (29.52in.) in width. The APC unit is so compact & slim that even the largest PC91 can be installed in a space of 800mm (31.49in.) x 4140mm (162.99in.).



## Main Specifications

		<b>LX-160</b>	<b>LF-160</b>	<b>LS-160</b>	<b>LV-500</b>
<b>■ Movement and Ranges</b>					
X-axis stroke	mm (in.)	500 (19.68)	500 (19.68)	500 (19.68)	500 (19.68)
Y-axis stroke	mm (in.)	250 (9.84)	250 (9.84)	250 (9.84)	350 (13.77)
Z-axis stroke	mm (in.)	300 (11.81)	300 (11.81)	300 (11.81)	300 (11.81)
B-axis rotation angle	deg	-125 ~ +125	-125 ~ +125	-125 ~ +125	—
C-axis rotation angle	deg	360	360	360	—
Table top to spindle nose	deg	30 ~ 330 (B-axis 0-deg. position)	30 ~ 330 (B-axis 0-deg. position)	30 ~ 330 (B-axis 0-deg. position)	150 ~ 450 (B-axis 0-deg. position)
<b>■ Table</b> <span style="float: right;">*Bullet shape</span>					
Working surface	mm (in.)	Ø100 (Ø3.97)	Ø100 (Ø3.97)	Ø100 (Ø3.97)	540×350 (21.25×13.77)
Loading capacity	kg (lb.)	20 (44)	20 (44)	20 (44)	100 (220)
Maximum workpiece size	mm (in.)	Ø160× H230 (Ø6.29× H9.05)*	Ø160× H230 (Ø6.29× H9.05)*	Ø160× H230 (Ø6.29× H9.05)*	—
Working surface configuration T-slot size (width x number x pitch)	mm (in.)	—	—	—	18 (H8) ×3×100 (11/16×3×4)
Table working surface from floor	mm (in.)	900 (35.43) (B-axis 0-deg. position)	900 (35.43) (B-axis 0-deg. position)	900 (35.43) (B-axis 0-deg. position)	780 (30.70)
<b>■ Spindle</b>					
Spindle speed	min <sup>-1</sup>	400 ~ 46,000	400 ~ 46,000	400 ~ 40,000	400 ~ 46,000
Spindle nose		7/24 taper BT30 (BT dual contact type)	7/24 taper BT30 (BT dual contact type)	HSK-E40	7/24 taper BT30 (BT dual contact type)
Spindle motor output (cont./15%)	kW	7.5 / 15	7.5 / 15	12 / 22.5	7.5 / 15
Maximum spindle torque	N·m/min <sup>-1</sup>	8.68 / 15,000	8.68 / 15,000	9 / 24,000	8.68 / 15,000
<b>■ Feed Rate</b>					
Rapid traverse rate (X / Y / Z)	mm/min (ipm)	90,000 (3543.3)	90,000 (3543.3)	90,000 (3543.3)	90,000 (3543.3)
Rapid traverse rate (B)	min <sup>-1</sup>	100	100	100	—
Rapid traverse rate (C)	min <sup>-1</sup>	200	200	200	—
<b>■ Automatic Tool Changer</b>					
Tool shank		JIS B 6339 tool shank 30T	JIS B 6339 tool shank 30T	HSK-E40 Tool shank	JIS B 6339 tool shank 30T
Pull stud		JIS B 6339 pull stud 30P	JIS B 6339 pull stud 30P	—	JIS B 6339 pull stud 30P
Tool storage capacity	tools	10	10	10	10
Maximum tool diameter	mm (in.)	Ø46 (Ø1.81)	Ø46 (Ø1.81)	Ø46 (Ø1.81)	Ø46 (Ø1.81)
Maximum tool length	mm (in.)	150 (5.9)	150 (5.9)	150 (5.9)	150 (5.9)
Maximum tool mass	kg (lb.)	1.5 (3.7)	1.5 (3.7)	1.5 (3.7)	1.5 (3.7)
<b>■ Power Sources</b> * Depends on the options provided					
Electric power capacity	kVA	43	43	43	35
<b>■ NC System</b>					
Control system		<b>Matsura L-Tech 30i</b>	<b>Matsura L-Tech 30i</b>	<b>Matsura L-Tech 840Dsl</b>	<b>Matsura L-Tech 30i</b>

## ■ APC & ATC Specifications

		<b>LX-160</b>	<b>LF-160</b>	<b>LS-160</b>	<b>LV-500</b>
APC	Standard	Without pallet changer	Without pallet changer	Without pallet changer	—
	Option	PC2 / PC42 / PC91	PC2 / PC42 / PC91	PC2	—
ATC	Standard	10 (drum magazine)	10 (drum magazine)	10 (drum magazine)	10 (drum magazine)
	Option	30 / 50 (chain magazine)	30 / 50 (chain magazine)	30 / 50 (chain magazine)	30 / 50 (chain magazine)
	Option	338 tools (matrix magazine)	338 tools (matrix magazine)	—	338 tools (matrix magazine)



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