



# **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**

## 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)                           | 250 (9.84)                             |
| 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>                                                        |                       |                                        |                                        |                                      | <b>*Bullet shape</b>                   |
| 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<br>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 30iB</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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Product specifications and dimensions are subject to change without prior notice. Products are subject to all applicable export control laws and regulations.

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# 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)

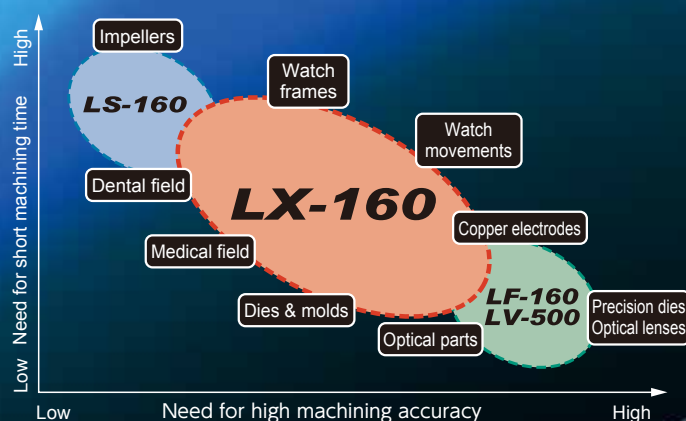
High Speed Linear Motor Machine

**LS-160** 5AX

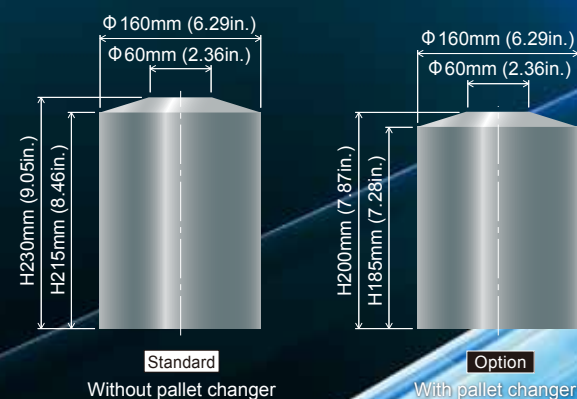
Market-specific model developed for ultra-high-speed machining such as for impellers or complicated parts for dental / medical use

□ 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.

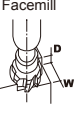
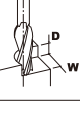




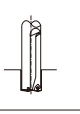
## LX-160 Basic Capabilities

### Machining test results

(inch)

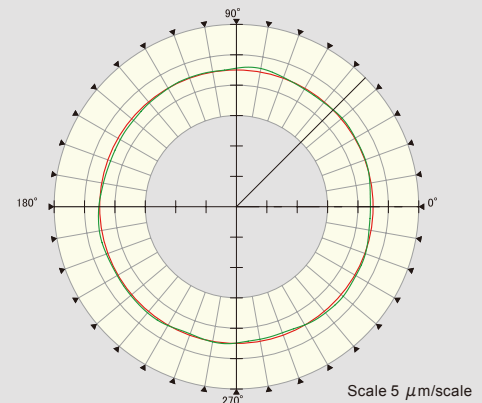
|                                                                                   |       |                         |                                 | Spindle speed            | Cutting feed rate     | Cutting capacity | Spindle load |
|-----------------------------------------------------------------------------------|-------|-------------------------|---------------------------------|--------------------------|-----------------------|------------------|--------------|
|  | A5052 | Ø50mm (1.96)<br>3-flute | W=40mm (1.57)<br>D=1.5mm (0.05) | 6,000 min <sup>-1</sup>  | 5,000mm/min (196.85)  | 300 cc/min       | 125%         |
|                                                                                   | S45C  | Ø63mm (2.48)<br>5-flute | W=50mm (1.96)<br>D=0.5mm (0.01) | 1,500 min <sup>-1</sup>  | 700mm/min (27.55)     | 17.5 cc/min      | 170%         |
|  | A5052 | Ø16mm (0.62)<br>2-flute | W=14mm (0.55)<br>D=3mm (0.11)   | 46,000 min <sup>-1</sup> | 16,000mm/min (629.92) | 672 cc/min       | 126%         |
|                                                                                   | S45C  | Ø16mm (0.62)<br>4-flute | W=1mm (0.03)<br>D=16mm (0.62)   | 6,000 min <sup>-1</sup>  | 5,000mm/min (196.85)  | 80 cc/min        | 123%         |

|                                                                                   |       |                       |  | Spindle speed           | Cutting feed rate | Cutting capacity | Spindle load |
|-----------------------------------------------------------------------------------|-------|-----------------------|--|-------------------------|-------------------|------------------|--------------|
|  | A5052 | Ø14.5mm (0.57)<br>HSS |  | 1,300 min <sup>-1</sup> | 120mm/min (4.72)  | 19.8 cc/min      | 93%          |
|                                                                                   | S45C  | Ø6.8mm (0.26)<br>HSS  |  | 900 min <sup>-1</sup>   | 80mm/min (3.14)   | 2.9 cc/min       | 37%          |
|  | A5052 | M12 × P1.75<br>HSS    |  | 400 min <sup>-1</sup>   | 700mm/min (27.55) |                  | 143%         |
|                                                                                   | S45C  | M8 × P1.25<br>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

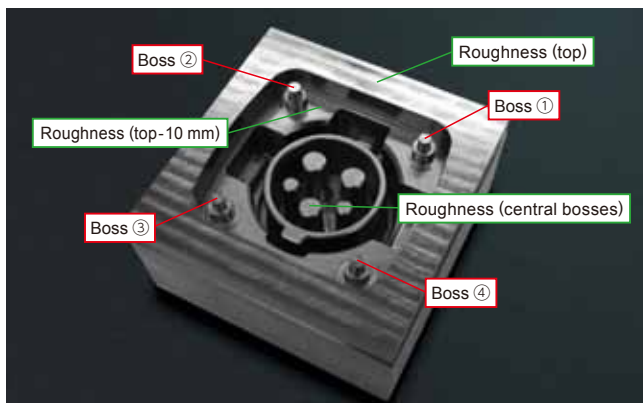


Out of roundness  
**1μm**  
\*Actual data

|               |                         |
|---------------|-------------------------|
| 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   |            |
|-----------|---------------|------------|---------------|------------|
| Reference | Distance (mm) | Error (mm) | Distance (mm) | Error (mm) |
| ①         | 26.2000       | —          | 26.6000       | —          |
| ②         | 26.2006       | 0.0006     | 26.6003       | 0.0003     |
| ③         | 26.1992       | -0.0008    | 26.6006       | 0.0006     |
| ④         | 26.1991       | -0.0009    | 26.5986       | -0.0014    |
| ⑤         | 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  |

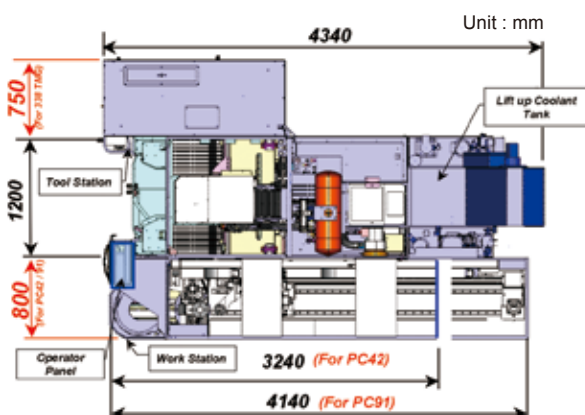
\*Above data is based on actual cases. Depending on conditions, results may differ from those listed above.

## 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.) .