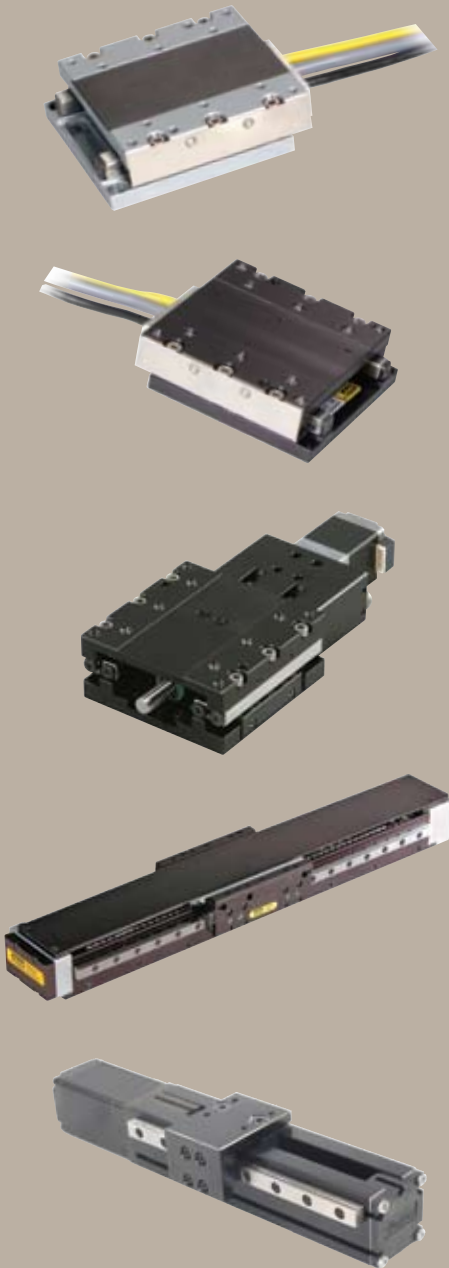


# Miniature Positioners

## linear motor and screw driven stages

Miniaturization of fiber optics, photonics, electronics and biomedical processes has driven the need for smaller and more efficient positioners. Parker offers numerous miniature stage solutions.



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## LX80L Miniature Linear Tables

### Features

- Velocity to 3 m/sec
- Acceleration to 5 g's
- Encoder resolution to 0.1 micron
- Cleanroom compatible
- Easy multi-axis mounting
- Internal cable management

Miniaturization of life sciences, electronics, photonics, and fiber optic processes has driven the need for smaller and more efficient positioners.

Parker's MX80, the smallest linear servomotor driven positioner in the industry, has redefined "high-throughput automation" in the world of miniature positioners. It is loaded with high performance features for both rapid linear translation and precise positioning of smaller loads within very small work envelopes. The LX80L picks up where the MX80 leaves off, offering longer travels than the MX80 while maintaining a very small profile. Like the MX80, it is designed to meet the rigors of today's 24/7 production demands.

### High Performance in a Small Package

Although it has a small profile, the LX80L is large on performance and reliability. All key components are "built-in," residing within the body of the table to provide a clean looking, reliable, unobstructed package. At the heart of the LX80L is an innovative non-contact linear servo motor (patent pending). This direct drive motor has been optimized for force, speed, and acceleration to deliver outstanding performance and response. A high-precision non-contact linear encoder provides submicron resolution, repeatability and accuracy with selectable resolutions ranging from 0.1 microns to 5 microns. Hall effect limit and home sensors are conveniently designed into the unit for easy adjustment over the entire travel of the table.

Precision square rail bearings provide load support and precise linear translation, while effectively countering the problematic effects of heat, high speeds, and high acceleration. Cable management is neatly packaged inside the unit so no moving cables are visible. From the end of the unit, "high-flex" cabling is provided for direct connection to the servo drive. This "high-flex" cabling alleviates cable flexing concerns associated with the second or third axis in multi-axis system.



### Single or Double Row Bearings

Precision linear bearings support the carriage, motor, and payload. Sized to provide virtually unlimited life, the bearings provide stable and accurate linear motion while maintaining



high rigidity even under combined or fluctuating loads.

Unique in the LX80L's design are single and double linear bearing rail options. The double rail design consists of two linear rails spaced apart with a total of four bearing trucks. This version offers the best load capacity, straightness/flatness, and stability. For applications requiring minimal load capacity and precision, a single rail version is offered with a single linear rail and two bearing trucks. This version reduces cost and further reduces the width to 63 mm. The single rail version is also useful when building gantry systems where stability is achieved through use of a second axis or idler rail.

### Tooling Features

Standard dowel pin locating holes facilitate repeatable mounting of a table and payloads. Two dowel holes in the LX80L base enable simple, repeatable mounting of the table into a machine.



Similarly, two dowel holes in the carriage enable simple, repeatable mounting of a fixture or payload onto the LX80L.



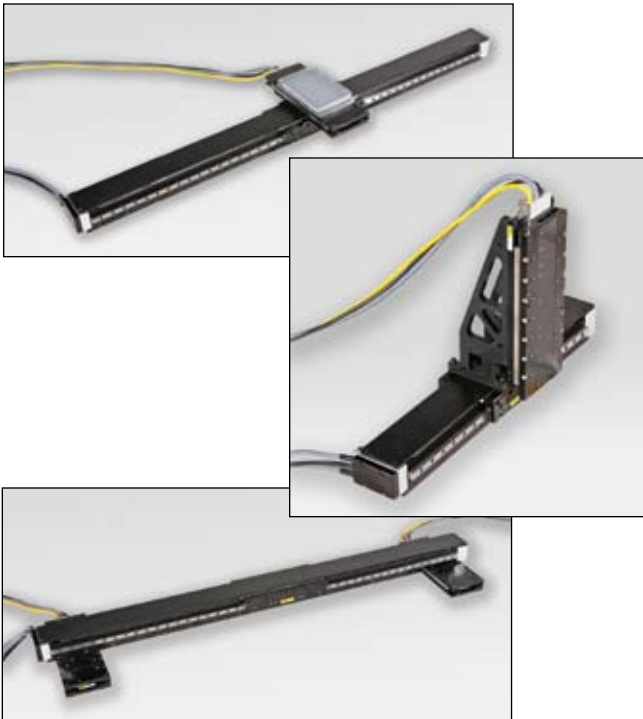
## Home and Limit Sensors

Hall effect home and limit sensors are completely housed within the body of the motor driven table. An innovative design adds functionality without sacrificing geometry. Sensor triggers can be easily adjusted over the travel. The output format is an open collector type capable of sinking up to 50 mA.

## LX80L Multi-Axis Systems

The direct mount compatibility of the LX80 and compatibility with the MX80 family enables a large variety of two and three axis systems. Possible configurations include XY systems where LX80s serve as the base axis and either an LX80 or MX80 serve as the Y axis. XZ and XYZ arrangements are possible when using MX80s as Z axes. MX80 Z-axis brackets are mount compatible with the LX80 carriage.

When optioned with Parker's ViX series drives, 2- and 3-axis systems are transformed into complete plug & run systems offering easy hookup and configuration. Intelligent ViX drives offer direct control from a PC via the RS232 interface. This solution offers a simple low cost control solution when tight coordination is not needed. For applications requiring a higher level of axis coordination, one of Parker's ACR family of controllers is an effective solution. The ACR1505 is a powerful PCI bus based motion controller capable of controlling up to 4 axes. The ACR9000 is similar but packaged as a standalone unit with RS232, USB, and Ethernet capability.



## Mounting Variations

All versions of the LX80 can be mounted flat to a surface using 4 mm cap screws. The single rail version offers an additional mounting option where the table can be edge mounted. This allows further reduction of axis width to 45 mm for applications where space is very limited.



## Idler Rail

For gantry or Cartesian configurations, an idler rail is available to provide greater system stability. Contact a Parker application engineer for detail on adding this to your system. For gantry or Cartesian configurations, an idler rail is available to provide greater system stability. Contact a Parker application engineer for detail on adding this to your system.



## Customs and Systems

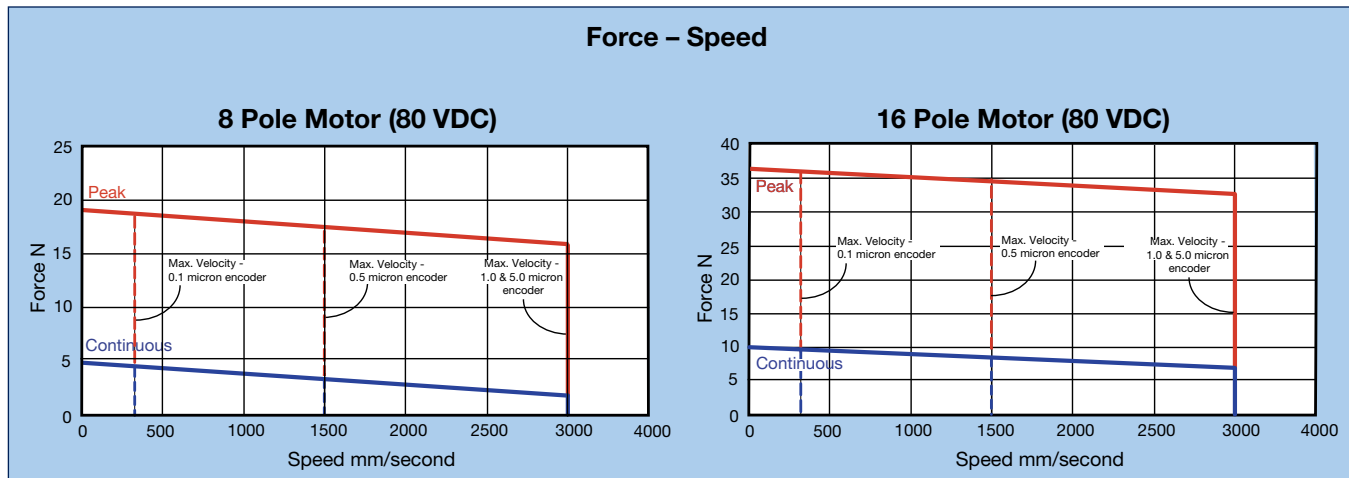
For specialized applications requiring customization, Parker design engineers can easily modify LX80L tables to suit all application specific requirements. Parker has taken the mystery, difficulty and cost out of integrating linear motor tables into high throughput precision positioning applications.

		8 Pole		16 Pole	
		Single Rail	Double Rail	Single Rail	Double Rail
<b>Normal Load Capacity</b>	kg (lb)	3 (6.5)	3 (6.5)	6 (13)	6 (13)
<b>Maximum Acceleration</b>	in/sec <sup>2</sup>	1930	1930	1930	1930
<b>Maximum Velocity</b>					
<b>Encoder Resolution:</b>					
0.1 µm	m/sec	0.3	0.3	0.3	0.3
0.5 µm		1.5	1.5	1.5	1.5
1.0 µm		3.0	3.0	3.0	3.0
5.0 µm		3.0	3.0	3.0	3.0
<b>Positional Repeatability</b>					
<b>Encoder Resolution:</b>					
0.1 µm	µm	±2.5	±1.5	±2.5	±1.5
0.5 µm		±2.5	±1.5	±2.5	±1.5
1.0 µm		±3.5	±2.5	±3.5	±2.5
5.0 µm		±10.0	±10.0	±10.0	±10.0
<b>Peak Force – Max</b>	N (lb)	19 (4.3)	19 (4.3)	36 (8.1)	36 (8.1)
<b>Continuous Force – Max</b>	N (lb)	4.7 (1.0)	4.7 (1.0)	10 (2.2)	10 (2.2)
<b>Moment Load – Max</b>	Nm	0.75	1.5	0.75	3.0
<b>Carriage Weight</b>	g	287	388	476	648

**Travel Dependent Specifications**

		Single Rail				Double Rail						
Travel – mm		Positional Accuracy*– Encoder Resolution (µm)		Straightness & Flatness* µm	Weight –kg		Positional Accuracy*– Encoder Resolution (µm)		Straightness & Flatness* µm	Weight –kg		
Code	8 Pole	16 Pole	0.1; 0.5; 1.0		10.0	8 Pole	16 pole	0.1; 0.5; 1.0		10.0	8 Pole	16 pole
<b>T02</b>	150	80	12	22	13	1.590	1.854	8	18	9	1.396	1.586
<b>T04</b>	250	180	16	26	18	1.944	2.207	12	22	14	1.714	1.905
<b>T06</b>	350	280	20	30	23	2.300	2.563	16	26	19	2.035	2.225
<b>T08</b>	450	380	24	34	28	2.652	2.915	20	30	24	2.352	2.543
<b>T010</b>	550	480	27	37	33	3.006	3.269	23	33	29	2.671	2.861
<b>T014</b>	750	680	33	43	41	3.713	3.976	29	39	37	3.308	3.498

\* Accuracy stated is at 20 degrees C, utilizing slope correction factor provided.





### Simple Configuration Digital Drive Options

All digital drives ordered in the LX80L part number configuration come set up with a motor file including electrical parameters to set continuous and peak currents, current loop compensation values, and default gain settings. Users will have the ability to override these parameters for special application requirements.

Tuning is easy and intuitive for users and is available via a variety of methods. The motor and loading information must be known by the drive to determine the baseline tuning gains. These are simple parameter entries the user can complete with the help of standard Parker supplied front-end software tools. Seamless integration of drives and controls ensures performance matched functionality of the completed motion system.

### ViX Intelligent Servo Drives/Controllers

The ViX servo and microstepping drives are the perfect drive solution to be paired with the MX80 family. These drives use advanced field oriented digital control technology to enhance dynamic performance and improve efficiency. In addition to servo and microstepping versions, the ViX family is offered with different levels of control.



#### ViX Servo Drive

**Order Codes: A20 A21 A22**

#### ViX Servo Drive/Controller

**Order Codes: A25**

### ACR1505 “Acroloop” Motion Controller PCI/PC Bus Operation

The ACR1505 is Parker’s PCI Bus performance leader. The ACR1505 is a half-slot PCI card capable of operating four axes of servo or stepper motion control with four encoder inputs at up to 30 MHz (post-quadrature).



### XL-PSU Power Supply Module Accessory

The Parker XL-PSU power supply offers a convenient way of powering a ViX series servo drive.



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*For complete details on drive product features and specifications, please refer to the “Drives & Electronics” section of this catalog.*

**Cleanroom Option**

**Order Codes: CM03 CM04 CM05**

LX80L tables can be prepared for cleanroom compatibility. Preparation involves material changes, element modification and cleanroom compatible lubricants. The LX80L with this option is class 100 cleanroom compatible. When applying an XY or XYZ combination in a cleanroom environment, moving wires need to be considered – please consult a Parker application engineer.



**Encoder Options**

**Order Codes: E2 E3 E4 E5 E7**

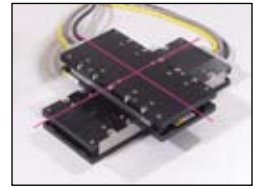
A non-contact linear optical encoder provides a quadrature output and offers resolution ranging from 0.1 micron to 5 micron . On the LX80L, the encoder is internal to the table body. There is no increase to the footprint of the unit and no additional external cabling is required.



**Orthogonality**

**Order Codes: S2 S3 S4 S5 S6**

In any multi-axis positioning system, the perpendicular alignment of the axes must be clearly specified. “Degree of orthogonality” defines the perpendicular alignment of axis one to another. The LX80L is offered with two choices for orthogonality. As standard, perpendicularity is held to within 60 arc seconds. For more exacting applications, the LX80L can be optioned for 15 arc seconds orthogonality.



**Z-Axis Bracket Accessories**

Lightweight aluminum Z-brackets are available for easy construction of vertical axis combinations. These include brackets for mounting both the MX80L and MX80S tables as verticals. Contact Factory for ordering information.





## Cable Management

### “Plug & Play” Cable Options

**Order Codes: CM03 CM04 CM05**

“User friendly” and “robust” were the goals of the cabling design. All cables are high-flex for durability and are fully shielded. The cables are labeled for quick identification and have connectors at critical locations to simplify use. The drive end terminations are ViX series servo drive compatible and have CE compliant connectors including a ferrite bead to improve EMI immunity.



### Internal Cable Management Accessories

The LX80’s pre-engineered internal cable management offers several benefits. It preserves the LX80’s narrow footprint by not requiring additional space for cable management. It allows the table to be mounted in any orientation without a need to re-engineer the cable management. The innovative design is field serviceable and can be maintained without a trip back to the factory. It is designed for and fully tested to last over 20 million cycles. And best of all, it is already done for you!



Internal cable management

### Multi-Axis Cable Management Accessories

When building multi-axis systems, flexible cable management for the moving axes should be considered. Parker offers pre-engineered cable management for MX80s and LX80s used as the Y-axis. Contact Parker when putting multi-axis systems together to take advantage of these pre-engineered solutions.



Multi-axis cable management

### Cable Options Accessories

From the end of the LX80L, high-flex extension cables are included for connection to the servo drive and control. They are offered in 1 m and 3m lengths and are connectorized at both ends for easy installation or removal. The servo drive end is connectorized for Parker’s ViX series servo drives.



Convenient connectors for ViX drives

The extension cables egress from the table at a right angle to minimize the overall length of the system. In the standard configuration the cable egress to the left; however, the design is flexible and allows them to egress to the right if desired.



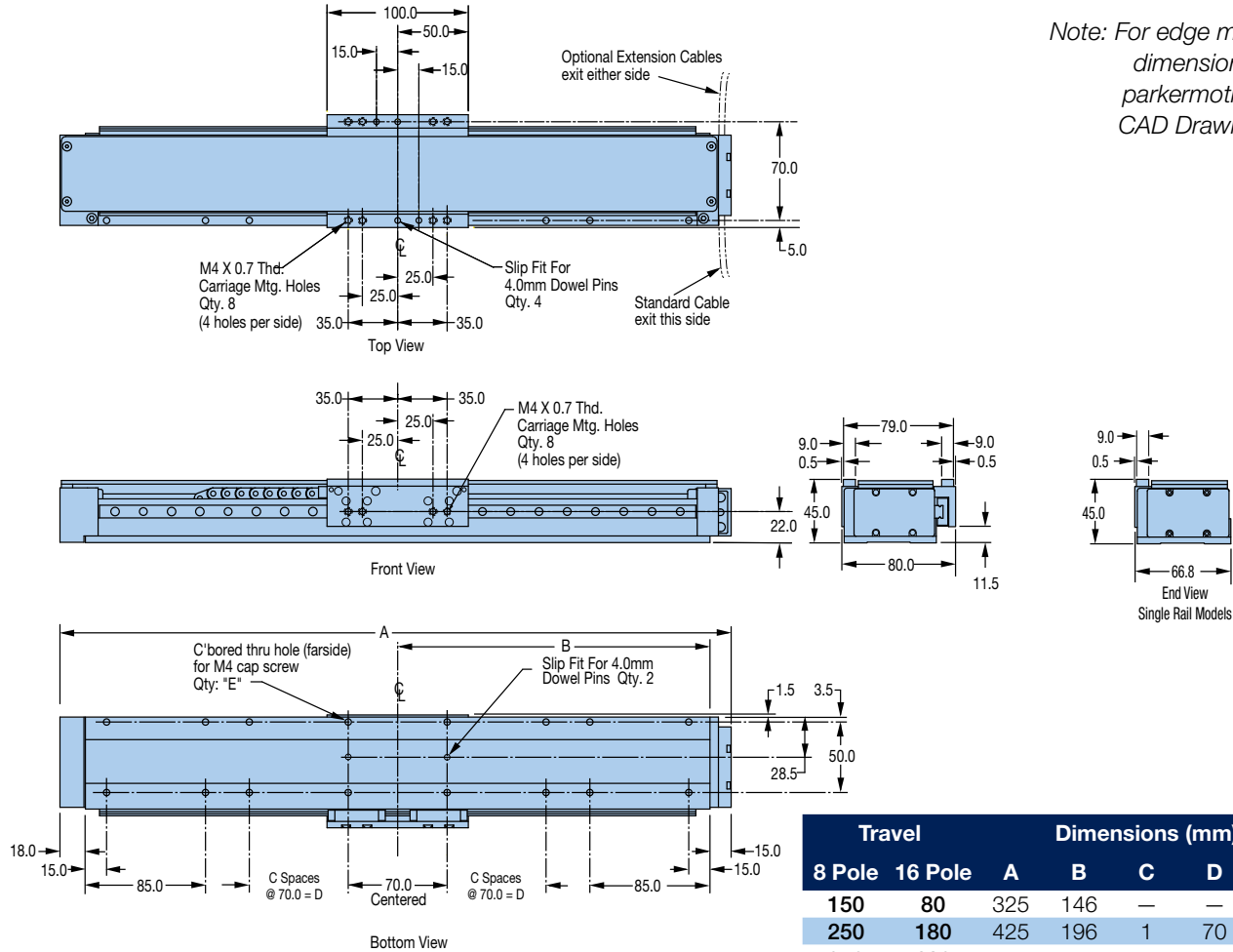
Right or left hand cable egress

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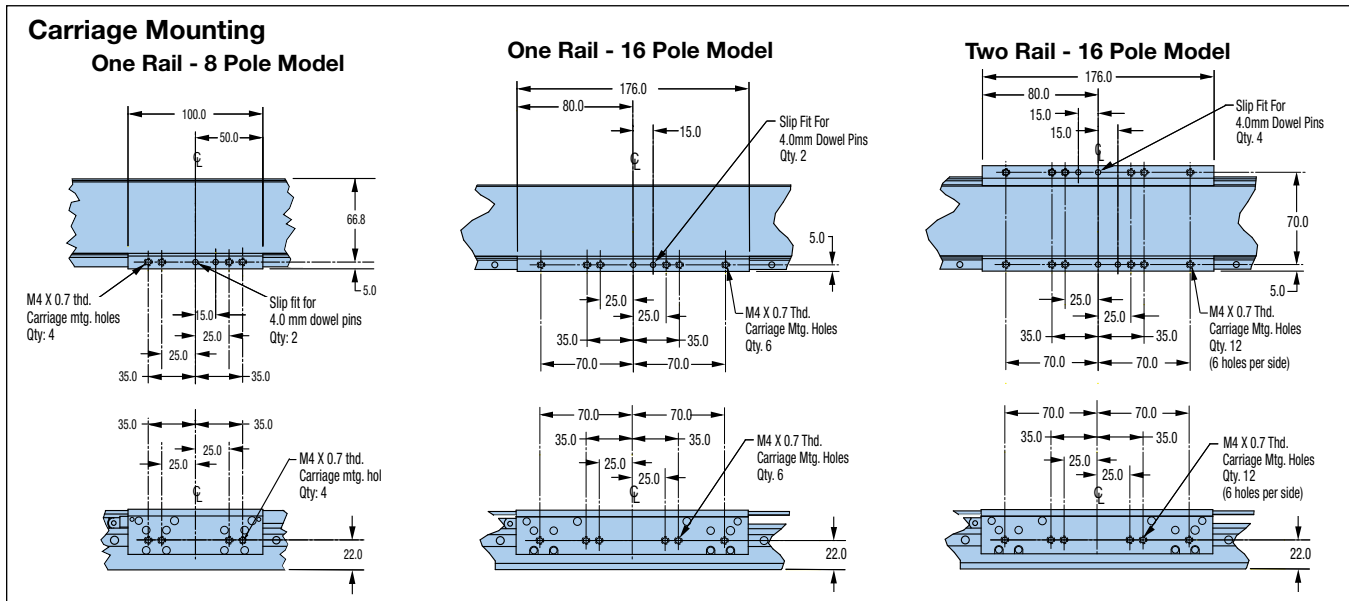
Two Rail (8 Pole model shown)

Dimensions (mm)

Note: For edge mounting dimensions go to parkermotion.com CAD Drawing Files



Travel		Dimensions (mm)				
8 Pole	16 Pole	A	B	C	D	E
150	80	325	146	—	—	6
250	180	425	196	1	70	8
350	280	525	246	1	70	8
450	380	625	296	2	140	10
550	480	725	356	3	210	12
750	680	925	396	4	280	14







Fill in an order code from each of the numbered fields to create a complete model order code.

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

**Order Example:** LX80L T04 M P D D13 CM05 Z1 E3 R1 A25 X1 S1

- |   |               |                |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|---|---------------|----------------|----------------|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| <p>① <b>Series</b><br/>LX80L</p> <p>② <b>Travel – mm</b></p> <table border="0"> <tr> <td></td> <td><b>8 Pole</b></td> <td><b>16 Pole</b></td> </tr> <tr> <td>T02</td> <td>150</td> <td>80</td> </tr> <tr> <td>T04</td> <td>250</td> <td>180</td> </tr> <tr> <td>T06</td> <td>350</td> <td>280</td> </tr> <tr> <td>T08</td> <td>450</td> <td>380</td> </tr> <tr> <td>T10</td> <td>550</td> <td>480</td> </tr> <tr> <td>T14</td> <td>750</td> <td>680</td> </tr> </table> <p>③ <b>Mounting</b><br/>M Metric</p> <p>④ <b>Grade</b><br/>P Precision</p> <p>⑤ <b>Bearing Type</b><br/>S Single Row<br/>D Double Row</p> <p>⑥ <b>Drive Type</b><br/>D3 None – 8 pole carriage<br/>D7 None – 16 pole carriage<br/>D13 8 pole linear motor*<br/>D17 16 pole linear motor*<br/><small>*Includes home or limit switches</small></p> <p>⑦ <b>Cable Options</b><br/>CM03 Standard Finish (black anodized)<br/>CM04 High-flex Cables w/ViX connector, 1 meter<br/>CM05 High-flex Cables w/ViX connector, 3 meter</p> |               | <b>8 Pole</b>  | <b>16 Pole</b> | T02 | 150 | 80 | T04 | 250 | 180 | T06 | 350 | 280 | T08 | 450 | 380 | T10 | 550 | 480 | T14 | 750 | 680 | <p>⑧ <b>Z Channel Location</b><br/>Z1 None<br/>Z2 Positive End Position</p> <p>⑨ <b>Digital Linear Encoder</b><br/>E1 No encoder (free travel only)<br/>E2 1.0 µm Resolution<br/>E3 0.5 µm Resolution<br/>E4 0.1 µm Resolution<br/>E5 5.0 µm Resolution<br/>E7 Sine Output</p> <p>⑩ <b>Environmental</b><br/>R1 Standard Finish (black anodized)<br/>R2 Cleanroom Prep</p> <p>⑪ <b>Digital Drive</b><br/>A1 No Drive<br/>A20 ViX250-AH (torque mode)<br/>A21 ViX250-AH (velocity mode)<br/>A22 ViX250-AH (step/direction mode)<br/>A25 ViX250-IH Drive/Controller</p> <p>⑫ <b>Required Designator</b><br/>X1</p> <p>⑬ <b>Axis Designator</b><br/>S1 None (single-axis)<br/>S2 X-axis base unit (cables @ 12 o'clock)<br/>S3 Y-axis 60 arc-sec (cables @ 3 o'clock)<br/>S4 Y-axis 60 arc-sec (cables @ 9 o'clock)<br/>S5 Y-axis 15 arc-sec (cables @ 3 o'clock)<br/>S6 Y-axis 15 arc-sec (cables @ 9 o'clock)</p> |
|   | <b>8 Pole</b> | <b>16 Pole</b> |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| T02   | 150           | 80             |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| T04   | 250           | 180            |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| T06   | 350           | 280            |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| T08   | 450           | 380            |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| T10   | 550           | 480            |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| T14   | 750           | 680            |                |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |

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