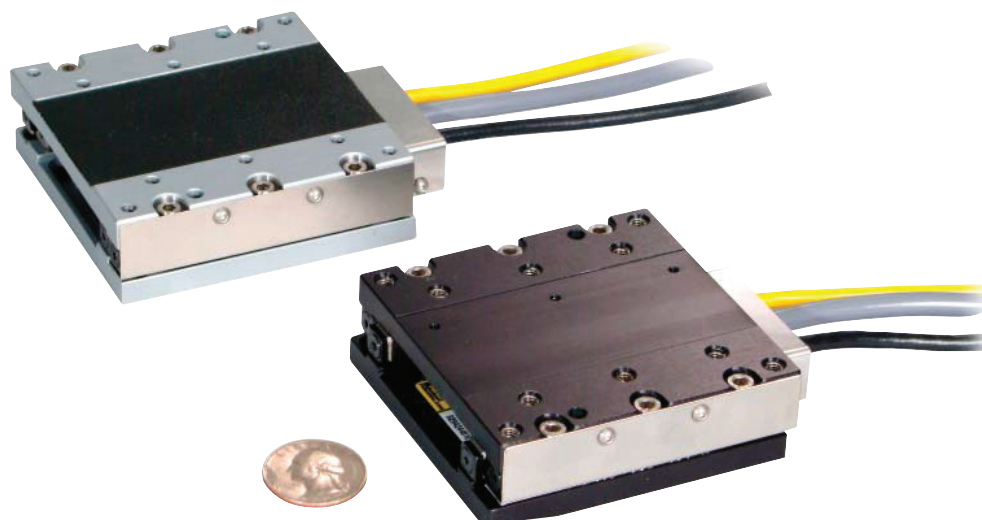




MX80L Miniature Linear Motor Stages

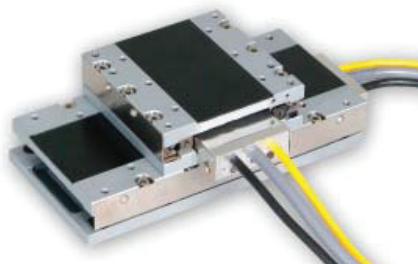
Features

- Miniature size
- 5g acceleration
- Fast settling
- Submicron precision
- High velocity (2 m/sec.)
- Multi-axis platform



Attributes:

- Low profile miniature size - (25 mm high X 80 mm wide)
- Linear servo motor drive
- Six linear encoder resolutions (0.01 μm to 5.0 μm)
- 25, 50, 100, 150 mm travels
- Cross Roller bearing (zero cage creep design)
- Precision or standard grade
- Cleanroom and low ESD options
- Fully adjustable home and limit sensors
- Dowel holes for repeatable mounting of payload
- Master reference surface to travel path
- "Plug-in" intelligent drive
- Pneumatic z-axis counterbalance
- No moving cables



Introduction

Miniaturization of fiber optics, photonics, electronics and biomedical processes has driven the need for smaller and more efficient positioners. Parker's MX80 miniature stage, the smallest linear servomotor driven positioner in the industry, is loaded with high performance features for both rapid linear translation and precise positioning of lighter loads in small work envelopes. Designed for today's 24/7 production demands, the MX80 has redefined "high-throughput automation" in the world of miniature positioners.

High Performance in a small package: While the MX80 is small in size, it is large on performance and reliability. All key components are "built-in" - residing within the body of the stage to provide a clean looking, reliable, unobstructed package. At the heart of the MX80 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.

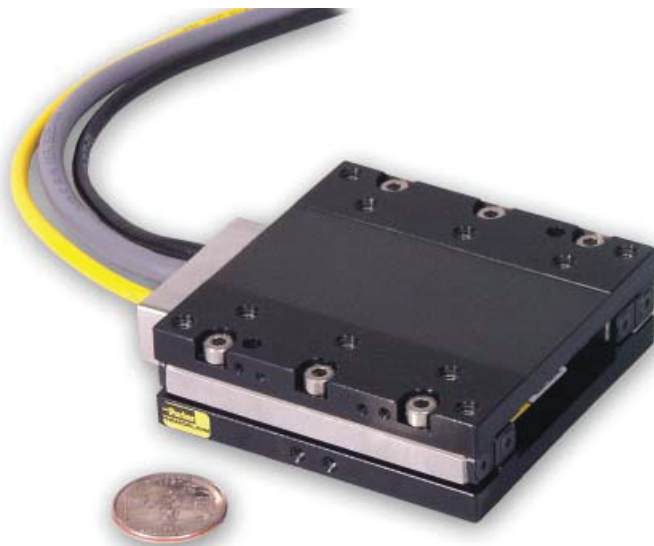
Selectable resolutions range from 10 nanometers to 5 microns. Precision ground cross roller bearing sets with a "zero cage creep" feature provide extremely smooth - precise linear translation. Digital Hall effect travel limit and home sensors are conveniently designed into the unit for easy adjustment over the entire travel of the stage. Although there are no moving cables, a meter of hi-flex cabling is included and wired directly into the units. This hi-flex cabling addresses cable flexing concerns associated with the second or third axis in multi-axis system.

MX80L Miniature Linear Motor Stages

Precision Series

Precision grade models are designed for high performance applications requiring the highest degree of positioning accuracy. They offer a steel body design with precisely ground mounting surfaces & bearing ways. They include higher resolution linear encoders, and are slope corrected, laser tested and certified for optimum precision.

- 4g acceleration
- Repeatability to $\pm 0.4 \mu\text{m}$
- Straightness $\pm 0.4 \mu\text{m}$
- Steel body construction
- Precision ground mounting and bearing surfaces
- Hard chrome protective finish



Standard Series

Standard grade units offer a lower cost alternative for applications requiring high throughput performance with less demanding positioning requirements. They are constructed of high alloy aluminum, providing a lighter weight design which can accelerate to 5 g's.

- 5g acceleration
- Repeatability to $\pm 0.8 \mu\text{m}$
- Straightness $\pm 0.8 \mu\text{m}$
- Light weight aluminum body
- Low luster black anodize finish



Specifications:

	Travel			
	25mm	50mm	100mm	150mm
Normal Load Capacity	8kg(18 lb)	8kg(18 lb)	8kg(18 lb)	8kg(18 lb)
Maximum Acceleration				
Precision Grade	4g	4g	4g	3g
Standard Grade	5g	5g	5g	4g
Maximum Velocity				
5.0µm resolution	1100 mm/sec	1500 mm/sec	2000 mm/sec	2000 mm/sec
1.0µm resolution	1100 mm/sec	1500 mm/sec	2000 mm/sec	2000 mm/sec
0.5µm resolution	1100 mm/sec	1500 mm/sec	1500 mm/sec	1500 mm/sec
0.1µm resolution	300 mm/sec	300 mm/sec	300 mm/sec	300 mm/sec
0.02µm resolution	60 mm/sec	60 mm/sec	60 mm/sec	60 mm/sec
0.01µm resolution	30 mm/sec	30 mm/sec	30 mm/sec	30 mm/sec
Peak Force	12N (2.7 lb)	12N (2.7lb)	24N (5.4 lb)	24N (5.4 lb)
Continuous Force	4N (.9 lb)	4N (.9 lb)	8N (1.8 lb)	8N (1.8 lb)
Duty Cycle	100%	100%	100%	100%
Straightness & Flatness				
Precision Grade	4 microns	4 microns	5 microns	6 microns
Standard Grade	6 microns	6 microns	10 microns	12 microns
Positional Accuracy				
Precision Grade ⁽¹⁾⁽²⁾⁽³⁾				
0.01 µm resolution	3 microns	4 microns	5 microns	5 microns
0.02 µm resolution	3 microns	4 microns	5 microns	5 microns
0.1 µm resolution	3 microns	4 microns	5 microns	5 microns
0.5 µm resolution	4 microns	5 microns	6 microns	6 microns
1.0 µm resolution	5 microns	6 microns	7 microns	7 microns
5.0 µm resolution	13 microns	14 microns	15 microns	15 microns
Standard Grade ⁽²⁾				
0.01 µm resolution	12 microns	15 microns	20 microns	20 microns
0.02 µm resolution	12 microns	15 microns	20 microns	20 microns
0.1 µm resolution	12 microns	15 microns	20 microns	20 microns
0.5 µm resolution	12 microns	15 microns	20 microns	20 microns
1.0 µm resolution	15 microns	20 microns	25 microns	25 microns
5.0 µm resolution	25 microns	30 microns	35 microns	35 microns
Bi-directional Repeatability				
Precision Grade ⁽¹⁾⁽²⁾⁽³⁾				
0.01 µm resolution		+0.4 microns		
0.02 µm resolution		+0.4 microns		
0.1 µm resolution		+0.5 microns		
0.5 µm resolution		+1.0 microns		
1.0 µm resolution		+2.0 microns		
5.0 µm resolution		±10.0 microns		
Standard Grade ⁽²⁾				
0.01 µm resolution		+0.8 microns		
0.02 µm resolution		+0.8 microns		
0.1 µm resolution		+0.8 microns		
0.5 µm resolution		+1.5 microns		
1.0 µm resolution		+2.0 microns		
5.0 µm resolution		±10.0 microns		
Unit Mass				
Precision Grade	590g	590g	1027g	1345g
Standard Grade	475g	475g	875g	1125g
Carriage Mass (unloaded)				
Precision Grade	282g	282g	509g	676g
Standard Grade	213g	213g	405g	537g

(1) Measured at the carriage center, 35mm above the mounting surface @ 20 C with no load. Unit bolted to granite surface, flat to within 1micron/300mm.

(2) Total accuracy and bi-directional repeatability over full travel (peak to peak).

(3) Precision grade with slope correction value provided. Consult factory if better accuracy is required.

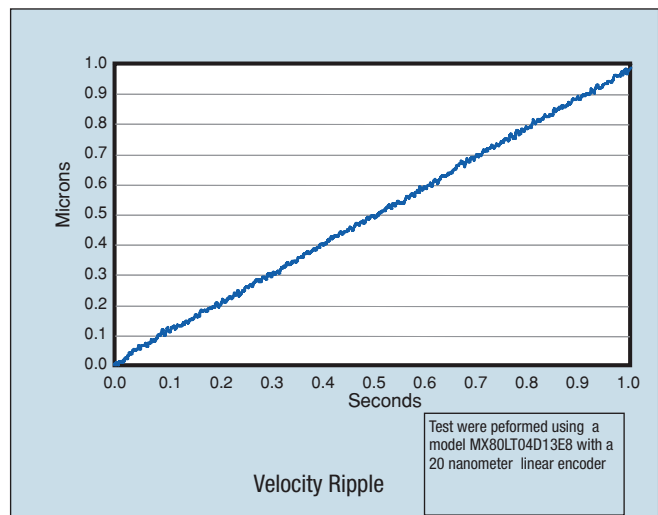
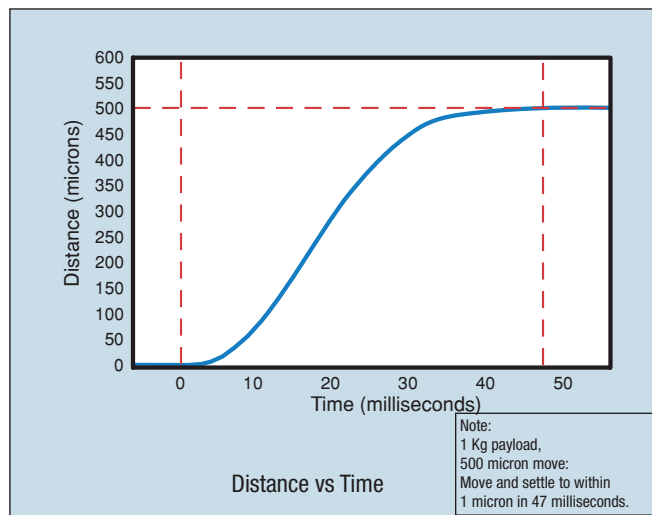
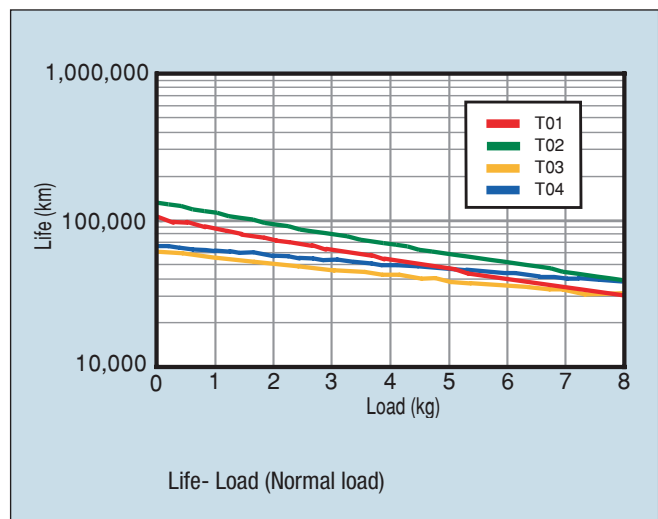
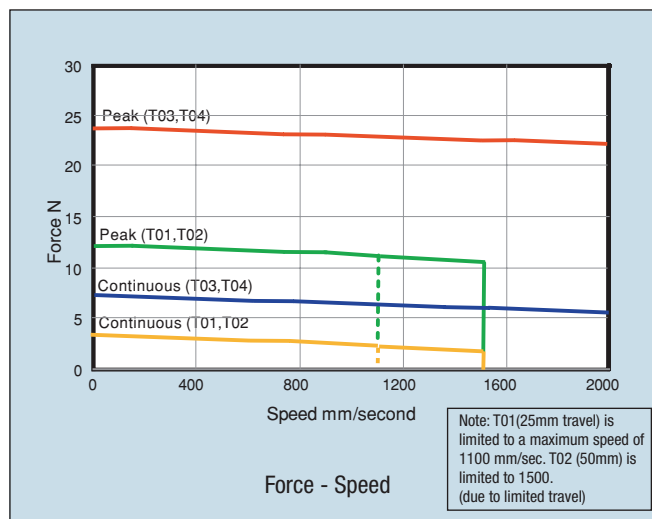
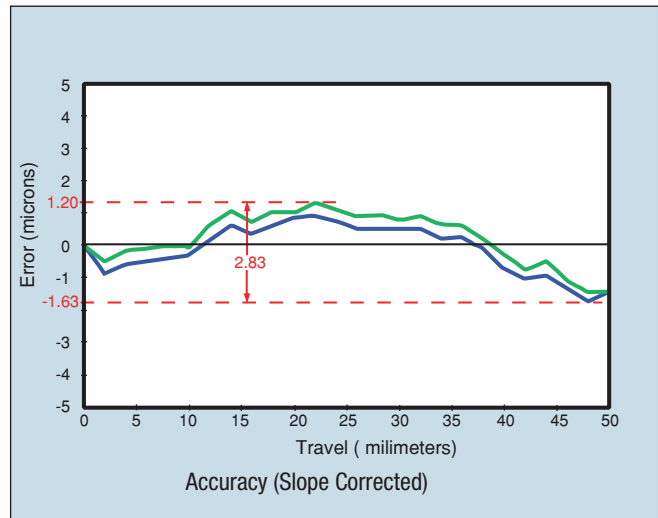
MX80L Miniature Linear Motor Stage

Specifications:

How we measure accuracy:

All published linear table accuracy and repeatability specifications vary according to testing and reporting methodology. Parker methodology includes data reporting over the entire table travel length, regardless of the start or stop position.

Testing is performed with the table unloaded and mounted to a stable granite surface, at 20° C. Accuracy and repeatability specifications are based on a peak to peak range of error, measured by a laser interferometer with the beam located 35mm above the center of the table top. The reported error totals six degrees of freedom (x,y,z, plus roll, pitch and yaw errors). Final table specifications are established from the maximum positive (+) error to the maximum negative (-) error.





CM04 to CM07



“Plug & Run” Cables Options

- High flex cables
- Plug-in compatibility with ViX drive
- CE compliant connectors and shielding
- CE compliant ferrite beads
- Color coded jackets and labeling

“User convenience” is high on the list of cable attributes found in the MX80. The high flex cabling and connectors are reliable, durable and offer easy hook-up for “plug and run” installation. The cables are connectorized at the stage for easy field replacement and connectorized at the opposite end for ease of installation with the Parker Vix servo drive.

E _

Encoder Options A non-contact linear optical encoder provides a quadrature output and offers resolution ranging from 10 nanometer to 5 micron. On the MX80L, the encoder is internal to the stage body. There is no increase to the footprint of the unit and no additional external cabling is required.

H _ L _

Home and Limit Sensors Digital Hall effect home and limit sensors are completely housed within the body of the stage. 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 50ma, and be set as N.O or N.C.



Zero Cage Creep Feature

High acceleration and smooth translation are both desired attributes in a linear-motor stage. The cross roller bearing system found in the MX80 provides extremely smooth linear translation, and with an anti-cage creep design, operates very well in high acceleration

applications. This design employs a rack and pinion feature within the bearing races to eliminate bearing creep. As a result, the MX80 performs well, even at 5g acceleration.

R2 R20



Cleanroom Option

Both Precision and Standard grade products can be prepared for cleanroom compatibility. Preparation involves material changes, element modification and cleanroom compatible lubricants. The MX80L and MX80S with the R2 option are class 10 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. The R20 option includes both - low ESD and cleanroom preparation.

Tooling Features



Innovative tooling features make mounting and alignment much quicker and easier.

- A hardened steel master reference surface is provided along the side of the stage to allow fixturing or other tooling elements to be precisely aligned with the actual travel path.
- Two dowel pin holes are provided on the carriage top and base for repeatable mounting of positioner or tooling.

R10 R20



Low ESD Coating

An optional ‘low ESD’ electroless nickel or Armoloy coating is offered for improved electrical conductivity, providing a low resistance to ground path for electric discharge.

R1

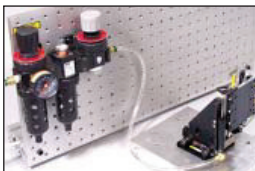
Environmental Protection Both precision and standard grade units have a hard coat protective finish. The precision units have a hard coat (Rc 78) satin chrome finish, and the standard units have a low lustre black anodized finish.

X2



Z-axis Counterbalance Option

A pneumatic Z-axis counterbalance is offered to prevent a sudden load drop if power to the motor is interrupted. A controlled vertical force is applied to the stage top to negate the effect of gravity and achieve equilibrium. A precisely regulated clean air supply of 0 to 60 psi is required for operation.



Pneumatic Accessory Package (Part Number 002-2236-01)

This accessory is offered for use with the X2 pneumatic counterbalance option. It consists of a pre-filter, a pressure regulator, a coalescing filter, and a precision regulator to precisely regulate air pressure and remove oil, water or debris down to 3 microns.

ViX Intelligent Servo & controller

A1 A20 A21 A22 A25

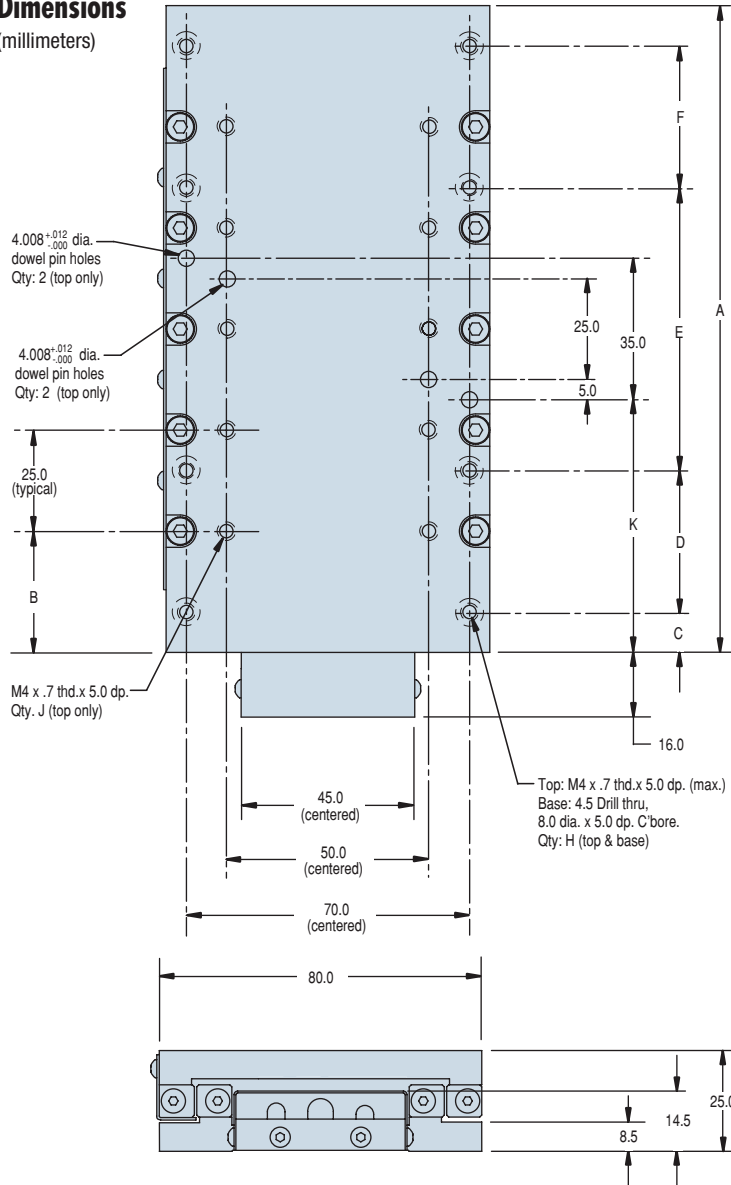
The Vix servo drives are the perfect drive solution to be paired with the MX80 family. Depending on the selected version, the Vix will be configured for force, velocity, or step/direction input command signals. In addition, a complete packaged servo drive and controller is available.”



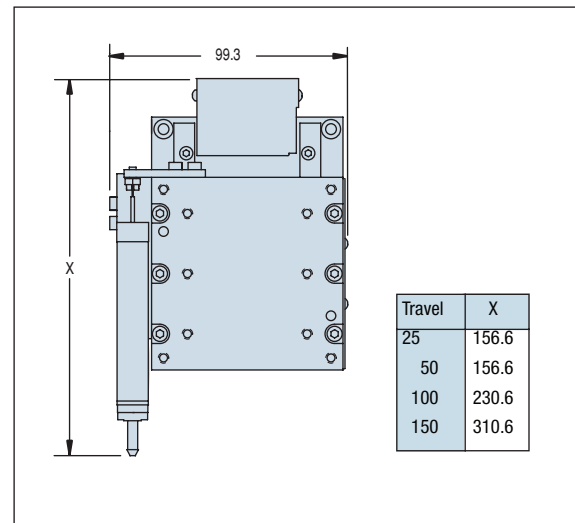
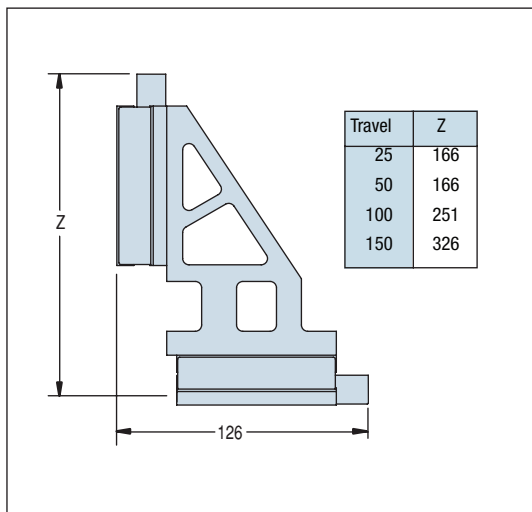
MX80L Series

Dimensions

(millimeters)



Travel	Dimensions (mm)								
	A	B	C	D	E	F	H	J	K
25	80	15	5	70	n/a	n/a	4	6	22.5
50	80	15	5	70	n/a	n/a	4	6	22.5
100	160	30	10	35	70	35	8	10	62.5
150	210	30	5	65	70	65	8	14	87.5





Order Example:

MX80L T02 M P - D11 H3 L2 CM05 Z3 E8 R1 A25 X1 S1

Model

MX80L

Travel 25 mm
50 mm
100 mm
150 mm

T01
T02
T03
T04

Mounting (metric)

M

Grade Precision
Standard

P
S

Drive Type

None - Free Travel
4 Pole(25 & 50 mm travel only)
8 Pole(100 & 150 mm travel only)

D1
D11
D13

Home Sensor

None
N.C. Current Sinking
N.O. Current Sinking

H1
H2
H3

Limit Sensor

None
N.C. Current Sinking
N.O. Current Sinking

L1
L2
L3

Cable Options

No Cables (free travel only)
1.0 meter high-flex cables w/ ViX connector
3.0 meter high-flex cables w/ ViX connector
1.0 meter high-flex cables w/ ViX connector
(no limit/home cable)
3.0 meter high-flex cables w/ ViX connector
(no limit/home cable)

CM03
CM04
CM05
CM06
CM07

X-Y Orthogonality

S1 None (no X-Y configuration)
S2 X axis unit (cables @12 o'clock)
S3 60 arc sec. - Y-axis (3 o'clock)
S4 60 arc sec. - Y-axis (9 o'clock)
S5 15 arc sec. - Y-axis (3 o'clock)
S6 15 arc sec. - Y-axis (9 o'clock)

Other Options

X1 None
X2 Z-axis Pneumatic c'balance

Digital Drive Options

A1 No drive
A20 ViX250-AH force mode
A21 ViX250-AH velocity mode
A22 ViX250-AH step/direction mode
A25 ViX 250-IH drive/controller

Environmental Options

R1 Standard finish
R2 Clean room prep.
R10 Low ESD finish
R20 Low ESD finish and clean room prep.

Digital Linear Encoder

E1 No encoder (free travel only)
E2 .01 micron resolution (10 nanometer)
E3 0.5 micron resolution
E4 0.1 micron resolution
E5 5.0 micron resolution
E8 .02 micron resolution (20 nanometer)
E9 .1 micron resolution

Z-Channel Location

Z1 No Z-Channel (free travel only)
Z3 Center Position