

# 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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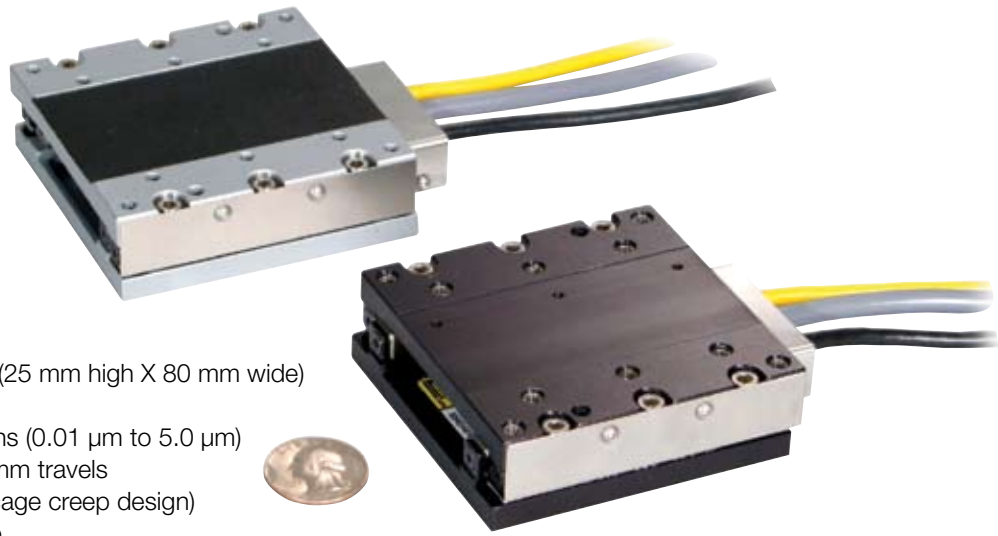
## MX80L Linear Servo Motor Driven Stages

### Features

- Miniature size
- 5 g 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  $\mu\text{m}$  to 5.0  $\mu\text{m}$ )
- 25, 50, 100, 150 and 200 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



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.

**Cross Roller Bearings**  
provide high stiffness and extremely smooth linear translation. A rack and pinion anti-cage creep design within the bearing races prevents cage creep even at 5g acceleration, or with cantilevered loads.

**Linear Servo Motor**  
features a patent pending ironcore design that provides high thrust density for linear acceleration to 5g's and velocities to 2 meters/second. The non-contact design offers long life and clean operation.

**Optical Linear Encoders**  
are available in six standard resolutions (10 nm, 20 nm, 0.1  $\mu\text{m}$ , 0.5  $\mu\text{m}$ , 1.0  $\mu\text{m}$ , 5.0 mm) and is fully integrated within the body of the stage. The non-contact design offers long life and clean operation.

**Master Reference Surface**  
is a feature unique to the MX80 that enables customers to align their process to the actual travel path within microns.

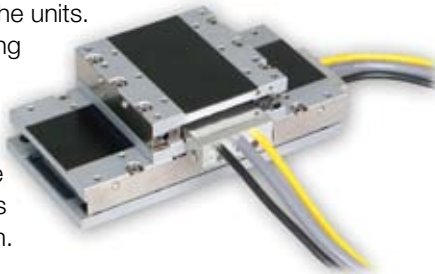
**Home/Limit Sensors**  
are magnetic sensors completely housed within the body of the stage, and fully adjustable over the entire travel range.



## 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 high-flex cabling is included and wired directly into the units. This high-flex cabling addresses cable flexing concerns associated with the second or third axis in multi-axis system.



## 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.



## 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.



Miniature Positioners

## MX80LP Precision Series



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

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.

## MX80LS Standard Series



- 5 g acceleration
- Repeatability to  $\pm 0.8 \mu\text{m}$
- Straightness  $6 \mu$
- Steel body construction
- Light weight aluminum body
- Low luster black anodize finish

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.



		MX80LP Precision Grade				MX80LS Standard Grade				
Travel (mm)		25	50	100	150	25	50	100	150	200
<b>Normal Load Capacity</b>	kg (lb)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)
<b>Maximum Acceleration</b>	in/sec <sup>2</sup>	1544	1544	1544	1158	1930	1930	1930	1544	1175
<b>Maximum Velocity</b>										
5.0 µm		1100	1500	2000	2000	1100	1500	2000	2000	2000
1.0 µm		1100	1500	2000	2000	1100	1500	2000	2000	2000
0.5 µm	mm/sec <sup>2</sup>	1100	1500	1500	1500	1100	1500	1500	1500	1500
0.1 µm		300	300	300	300	300	300	300	300	300
0.02 µm		60	60	60	60	60	60	60	60	60
0.01 µm		30	30	30	30	30	30	30	30	30
<b>Peak Force</b>	N (lb)	12 (2.7)	12 (2.7)	24 (5.4)	24 (5.4)	12 (2.7)	12 (2.7)	24 (5.4)	24 (5.4)	24 (5.4)
<b>Continuous Force</b>	N (lb)	4 (0.9)	4 (0.9)	8 (1.8)	8 (1.8)	4 (0.9)	4 (0.9)	8 (1.8)	8 (1.8)	8 (1.8)
<b>Duty Cycle</b>	%	100	100	100	100	100	100	100	100	100
<b>Straightness &amp; Flatness</b>	µm	4	4	5	6	6	6	10	12	14
<b>Positional Accuracy*</b>										
5.0 µm		13	14	15	15	25	30	35	35	35
1.0 µm		5	6	7	7	15	20	25	25	25
0.5 µm	µm	4	5	6	6	12	15	20	20	20
0.1 µm		3	4	5	5	12	15	20	20	20
0.02 µm		3	4	5	5	12	15	20	20	20
0.01 µm		3	4	5	5	12	15	20	20	20
<b>Bi-directional Repeatability*</b>										
5.0 µm		±10.0	±10.0	±10.0	±10.0	±10.0	±10.0	±10.0	±10.0	±10.0
1.0 µm		±2.0	±2.0	±2.0	±2.0	±2.0	±2.0	±2.0	±2.0	±2.0
0.5 µm	µm	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
0.1 µm		±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.7
0.02 µm		±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.5
0.01 µm		±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.5
<b>Unit Mass</b>	g	590	590	1027	1345	475	475	875	1125	1370
<b>Carriage Mass (unloaded)</b>	g	282	282	509	676	213	213	405	537	695

\* Notes:

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

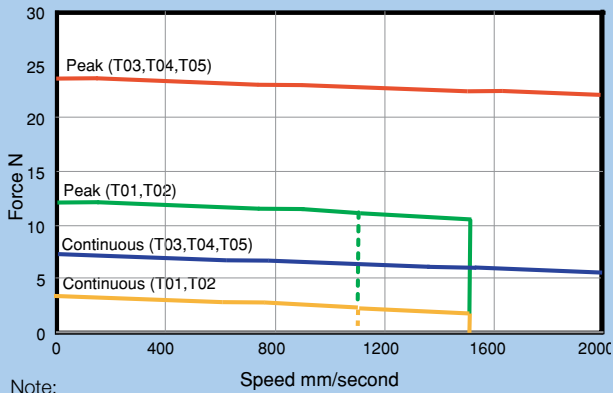
(2) Total accuracy and bi-directional repeatability over full travel (peak to peak).

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

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

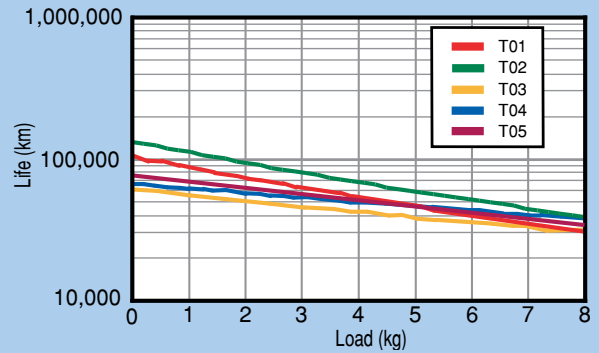


**Force - Speed**

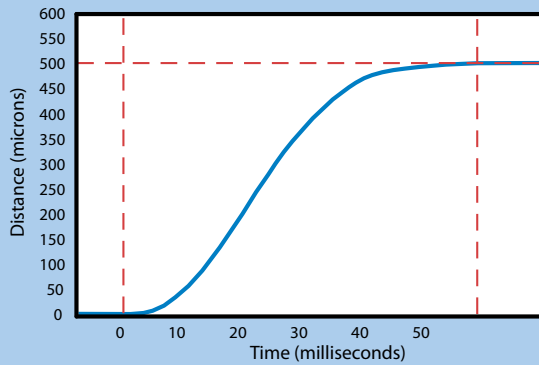


Note:  
T01 (25 mm travel) is limited to a maximum speed of 1100 mm/sec.  
T02 (50 mm) is limited to 1500 (due to limited travel).

**Life - Load (Normal Load)**

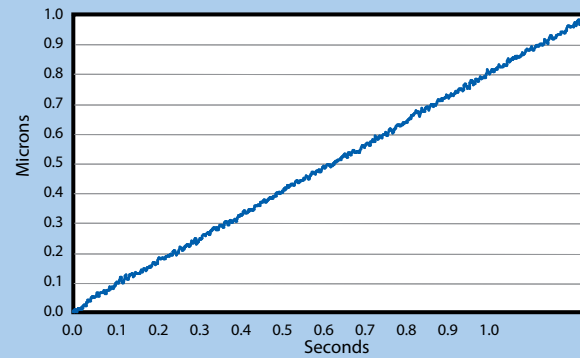


**Distance vs Time**



Note: 1 Kg payload, 500 micron move:  
Move and settle to within 1 micron in 47 milliseconds.

**Velocity Ripple**



Note: Test were performed using a model MX80LT04D13E8 with a 20 nanometer linear encoder

Miniature Positioners

### Simple Configuration Digital Drive Options

All digital drives ordered in the MX80 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 & Microstepping 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**

### XL-PSU Power Supply Module Accessory

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



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

### “Plug & Play” Cable Options

**Order Codes: CM04 CM05 CM06 CM07**

“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.



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

### Encoder Options

**Order Codes: E2 E3 E4 E8 E9**

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.

### Home and Limit Sensor Options

**Order Codes: H1 H2 H3 L1 L2 L3**

Magnetic 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 50 mA, and be set as N.O. or N.C.





## Cleanroom Option

**Order Codes: R2 R20**

Both precision and standard grade products can be prepared for cleanroom compatibility. Preparation involves material changes, element modification and cleanroom compatible lubricants. MX80L and MX80S stages with this 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.



## Low ESD Coating Option

**Order Codes: R10 R20**

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



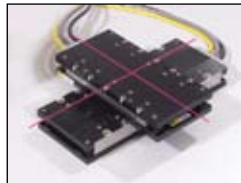
## Environmental Protection Option

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 luster black anodized finish.

## System Orthogonality Option

**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 MX80 offers two choices for orthogonality. As standard, perpendicularity is held to within 60 arc seconds. For more exacting applications the MX80 can be optioned for 15 arc seconds orthogonality.



## Z-axis Counterbalance Option

**Order Codes: X2**

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. (See Pneumatic Accessory Package)



## Pneumatic Accessory Package

This accessory is offered for use with the 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.



**Part Number: 002-2236-01**

## Z-Axis Bracket Accessory

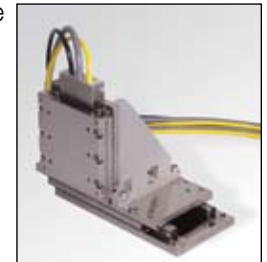
Lightweight aluminum Z-brackets are available for easy construction of vertical axis combinations.

**Standard Model Part Numbers:**

**25 & 50 mm: 002-2238-01**  
**100 & 150 mm: 002-2240-01**

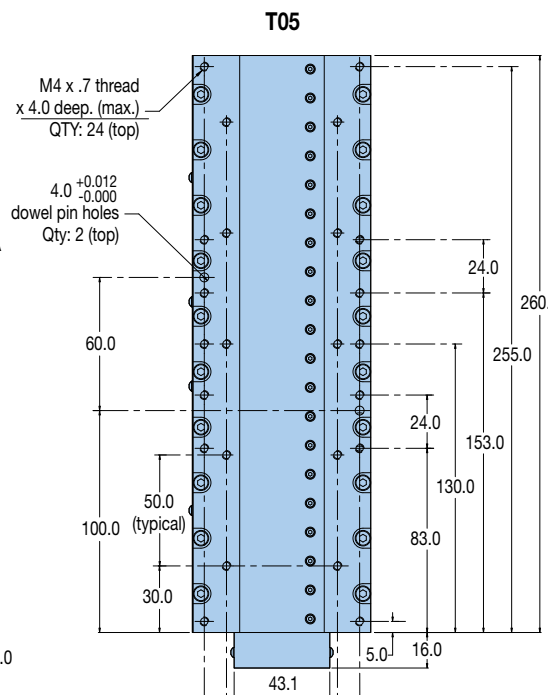
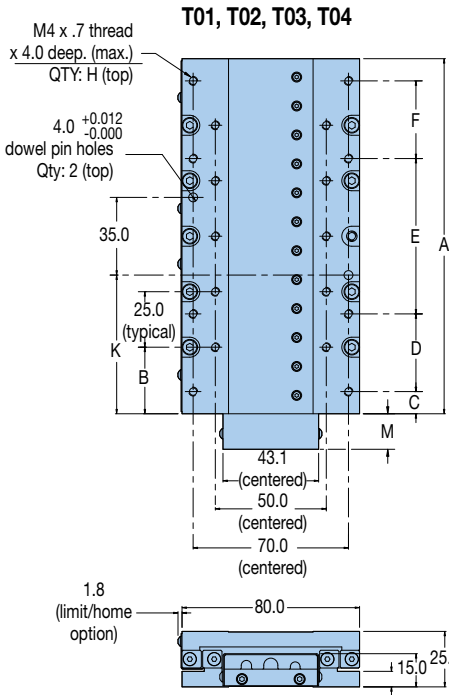
**Low ESD Model Part Numbers:**

**5 & 50 mm: 002-2239-01**  
**100 & 150 mm: 002-2241-01**



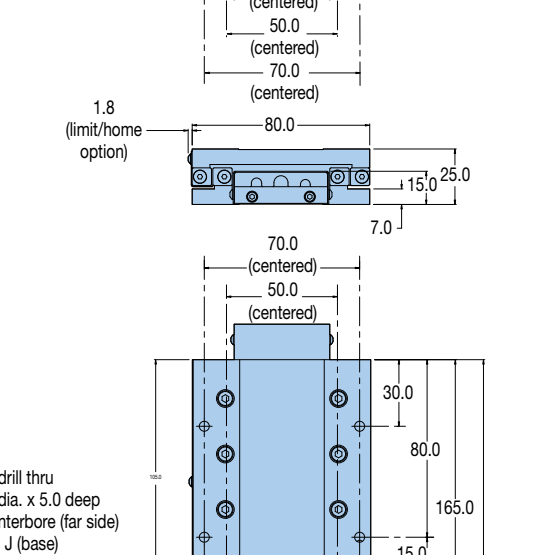
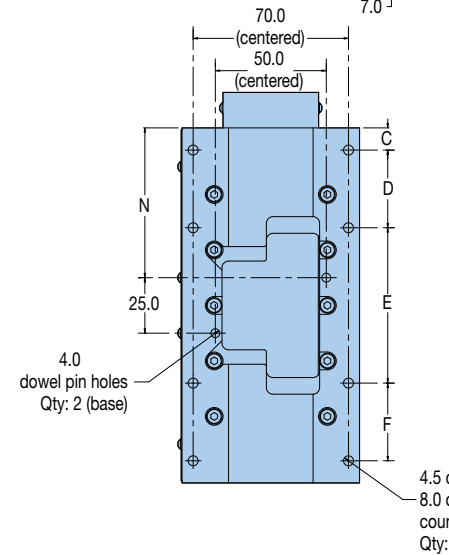
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**Dimensions (mm)**



**Z-axis**

Travel	Dim Z
25	166
50	166
100	251
150	326
200	-



**Pneumatic Vertical Axis Counter Balance**

Travel	Dim X
25	156.6
50	156.6
100	230.6
150	310.6
200	-

Dimensions (mm)										
Travel	A	B	C	D	E	F	H	J	K	N
25	80	15	5	70	-	-	10	4	22.5	27.5
50	80	15	5	70	-	-	10	4	22.5	27.5
100	160	30	10	35	70	35	18	8	62.5	67.5
150	210	30	5	65	70	65	22	8	87.5	92.5





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 ⑭

**Order Example:** MX80L T02 M P -D11 H3 L2 CM05 Z3 E8 R1 A25 X1 S1

- ① **Series**  
MX80L
- ② **Travel – mm**  
T01 25  
T02 50  
T03 100  
T04 150  
T05 200
- ③ **Mounting**  
M Metric
- ④ **Grade**  
S Standard  
P Precision (not available with T05 Travel option)
- ⑤ **Drive Type**  
D1 Free Travel (No Motor)  
D11 4 Pole (25 & 50 mm travel only)  
D13 8 Pole (100, 150 & 200 mm travel only)
- ⑥ **Home Sensor**  
H1 None-Free Travel (only)  
H2 N.C. Current Sinking  
H3 N.O. Current Sinking
- ⑦ **Limit Sensor**  
L1 None-Free Travel (only)  
L2 N.C. Current Sinking  
L3 N.O. Current Sinking
- ⑧ **Cable Options**  
CM03 No Cables – Free Travel  
CM04 High-Flex Cables w/ViX Connector (1 meter)  
CM05 High-Flex Cables w/ViX Connector (3 meter)  
CM06 High-Flex Cables w/ViX Connector, no limit/home cable (1 meter)  
CM07 High-Flex Cables w/ViX Connector, no limit/home cable (3 meter)
- ⑨ **Z Channel Location**  
Z1 None  
Z3 Center Position
- ⑩ **Digital Linear Encoder Option**  
E1 None  
E2 1.0 µm Resolution  
E3 0.5 µm Resolution  
E4 0.1 µm Resolution  
E8 0.02 µm Resolution (20 nanometer)  
E9 0.01 µm Resolution (10 nanometer)
- ⑪ **Environmental**  
R1 Standard Finish (black anodized)  
R2 Cleanroom Prep  
R10 Low ESD Finish  
R20 Low ESD Finish & Cleanroom Prep
- ⑫ **Digital Drive**  
A1 No Drive  
A20 ViX250-AH (force mode)  
A21 ViX250-AH (velocity mode)  
A22 ViX250-AH (step/direction mode)  
A25 ViX250-IH Drive/Controller
- ⑬ **Other Options**  
X1 None  
X2 Z-axis Pneumatic Counter Balance\*  
\* Not available with T05 Travel.
- ⑭ **Axis Designator**  
S1 None (single-axis)  
S2 X-axis base unit (cables @ 12 o'clock)  
S3 Y-axis 60 arc-sec (cables @ 3 o'clock)  
S4 Y-axis 60 arc-sec (cables @ 9 o'clock)  
S5 Y-axis 15 arc-sec (cables @ 3 o'clock)  
S6 Y-axis 15 arc-sec (cables @ 9 o'clock)

Miniature Positioners

## MX80S Ballscrew and Leadscrew Driven Stages

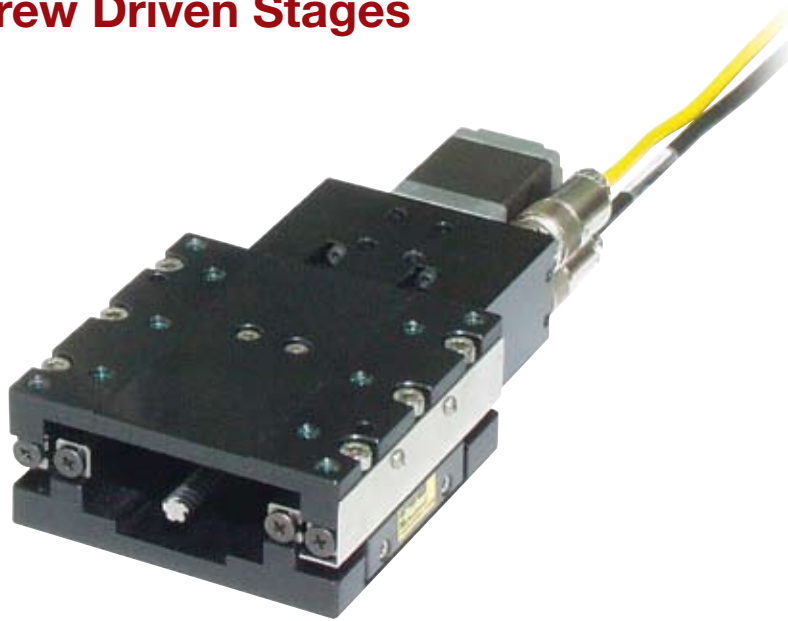
### Features

- Miniature Size - Low Profile (35 mm high X 80 mm wide)
- Normal or cleanroom environments
- 25, 50, 100, 150 mm travels
- Multi-axis platform
- Ballscrew or leadscrew drive options

### Attributes

- Low profile miniature size
- Up to 123 N axial thrust
- 2g acceleration
- Cross roller bearing (zero cage creep option)
- Stepper or servo motor drive
- Digital limit/home system
- Optional linear encoder
- Cleanroom prep. option
- Low ESD option for electrically sensitive applications

The MX80S miniature positioner is the screw driven member of Parker's MX80 family. Like its counterparts, the MX80L linear motor driven stage and MX80M manual stage, the MX80S is designed for applications requiring reliable linear positioning in space restricted applications. It is the complementary product that bridges the product spectrum between the high dynamic linear motor performance of the MX80L, and the manual precision of the MX80M. The MX80S can be supplied with a high-efficiency leadscrew drive capable of reaching 200 mm per second velocity, or a precision ground ballscrew drive offering axial thrust to 123 N.



The leadscrew drive employs a PTFE coated leadscrew with a preloaded nut to produce extremely smooth linear translation. A choice of three leads provides improved opportunity for matching desired velocity/resolution requirements.



*Leadscrew drive*



*Ballscrew drive*

The 2.0 mm lead ballscrew stage offers high performance 24/7 operation with a thrust load capacity of 123 N (28 lb) and velocity to 100 mm/second at 100% duty cycle.

**Cross Roller Bearings**  
provide high stiffness and extremely smooth linear translation. A rack and pinion anti-cage creep design within the bearing races prevents cage creep even at 5 g acceleration, or with cantilevered loads.

**Master Reference Surface**  
is a feature unique to the MX80 that enables customers to align their process to the actual travel path within microns.

**Ballscrew or leadscrew drive**  
The 2.0 mm lead ballscrew driven stage offers high performance 24/7 operation with a thrust load capacity of 123 N (28 lb.) and velocity to 100 mm/second at 100% duty cycle. Leadscrew driven stages are available with 1 mm, 2 mm, or 10 mm leads. The PTFE coated leadscrew provides extremely smooth linear translation at velocities up to 200 mm/second.

**Home/Limit Sensors**  
are magnetic sensors completely housed within the body of the stage, and fully adjustable over the entire travel range.



		MX80S Leadscrew Drive				MX80S Ballscrew Drive			
Travel (mm)		25	50	100	150	25	50	100	150
Normal Load Capacity	kg (lb)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)	8 (18)
Thrust Load Capacity	N (lb)	44 (10)	44 (10)	44 (10)	44 (10)	123 (28)	123 (28)	123 (28)	123 (28)
<b>Maximum Velocity</b>									
1.0 mm lead	mm/sec	20	20	20	20	—	—	—	—
2.0 mm lead		40	40	40	40	100	100	100	100
10.0 mm lead		200	200	200	200	—	—	—	—
Breakaway Torque	Nm	0.021	0.021	0.021	0.021	0.050	0.050	0.050	0.050
<b>Running Torque</b>									
1.0 mm lead	Nm	0.028	0.028	0.035	0.035	—	—	—	—
2.0 mm lead		0.028	0.028	0.035	0.035	0.085	0.085	0.085	0.085
10.0 mm lead		0.021	0.021	0.021	0.028	—	—	—	—
Duty Cycle	%	50	50	50	50	100	100	100	100
Straightness & Flatness*	μm	8	12	16	20	8	12	16	20
<b>Positional Accuracy*</b>									
1.0 mm lead	μm	30	45	75	100	—	—	—	—
2.0 mm lead		30	45	75	100	10	15	18	20
10.0 mm lead		35	50	80	105	—	—	—	—
<b>Bi-directional Repeatability*</b>									
1.0 mm lead	μm	±5.0	±5.0	±5.0	±5.0	—	—	—	—
2.0 mm lead		±5.0	±5.0	±5.0	±5.0	±1.5	±1.5	±1.5	±1.5
10.0 mm lead		±10.0	±10.0	±10.0	±10.0	—	—	—	—
<b>Inertia (without motor &amp; coupling)</b>									
1.0 mm lead	10 <sup>-7</sup> kg-m <sup>2</sup>	1.47	1.47	2.42	3.06	—	—	—	—
2.0 mm lead		1.62	1.62	2.68	3.42	4.19	4.19	6.08	7.68
10.0 mm lead		6.34	6.34	11.30	14.90	—	—	—	—
Screw Speed (max)	rps	20	20	20	20	50	50	50	50
<b>Leadscrew Efficiency</b>									
1.0 mm lead	%	40	40	40	40	—	—	—	—
2.0 mm lead		59	59	59	59	90	90	90	90
10.0 mm lead		78	78	78	78	—	—	—	—
Screw Diameter	mm	6.35	6.35	6.35	6.35	8.00	8.00	8.00	8.00
Bearing Coefficient of Friction		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
<b>Unit Mass</b>									
Table only	g	597	597	1003	1268	694	694	1114	1392
With 2-stack stepper		748	748	1154	1419	845	845	1265	1513
Carriage Mass (unloaded)	g	194	194	353	471	291	291	464	595

\* Notes:

(1) Measured at the carriage center, 35 mm above the mounting surface @ 20 C with no load. Unit bolted to granite surface, flat to within 1 micron/300 mm.  
 (2) Total accuracy and bi-directional repeatability over full travel (peak to peak).

(1) Measured at the carriage center, 35 mm above the mounting surface @ 20 C with no load. Unit bolted to granite surface, flat to within 1 micron/300 mm.  
 (2) Total accuracy and bi-directional repeatability over full travel (peak to peak).  
 (3) Repeatability valid with M21 servo motor.

Miniature Positioners

### Simple Configuration Digital Drive Options

All digital drives ordered in the MX80 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 & Microstepping 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: A10 A11 A12**

#### ViX Servo Drive/Controller

**Order Codes: A15**

#### ViX Microstep Drive/Controller

**Order Codes: A62**

### E-AC and E-DC Microstepping Drive

**Order Codes: A31**

### XL-PSU Power Supply Module Accessory

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



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

### “Plug & Play” Cable Options

**Order Codes: CM02 CM03 CM04 CM05 CM06 CM07 CM08 CM09 CM10 CM11 CM12 CM13 CM15 CM17**

“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.



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

### Encoder Options

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

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.

### Home and Limit Sensor Options

**Order Codes: H2L2 H2L3 H3L2 H3L3**

Magnetic 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 50 mA, and be set as N.O. or N.C.



## Cleanroom Option

**Order Codes: R2 R20**

Both precision and standard grade products can be prepared for cleanroom compatibility. Preparation involves material changes, element modification and cleanroom compatible lubricants. MX80L and MX80S stages with this 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.



## Z-Axis Bracket Accessory

Lightweight aluminum Z-brackets are available for easy construction of vertical axis combinations.

**Standard Model Part Numbers:**

**25 & 50 mm: 002-2238-01**  
**100 & 150 mm: 002-2240-01**

**Low ESD Model Part Numbers:**

**5 & 50 mm: 002-2239-01**  
**100 & 150 mm: 002-2241-01**



## Low ESD Coating Option

**Order Codes: R10 R20**

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.



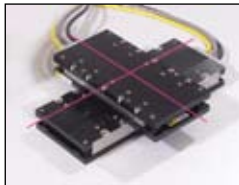
## Environmental Protection Option

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 luster black anodized finish.

## System Orthogonality Option

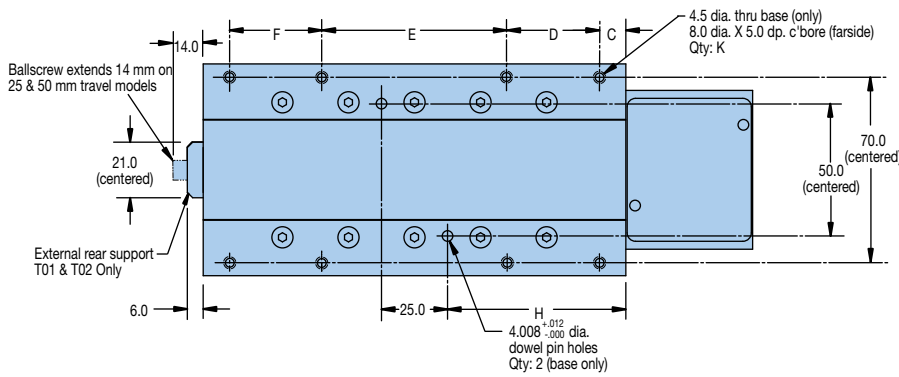
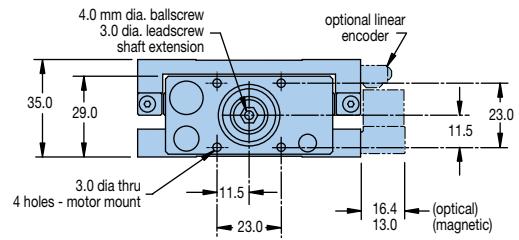
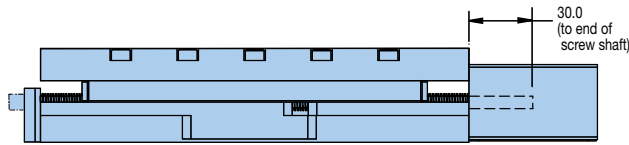
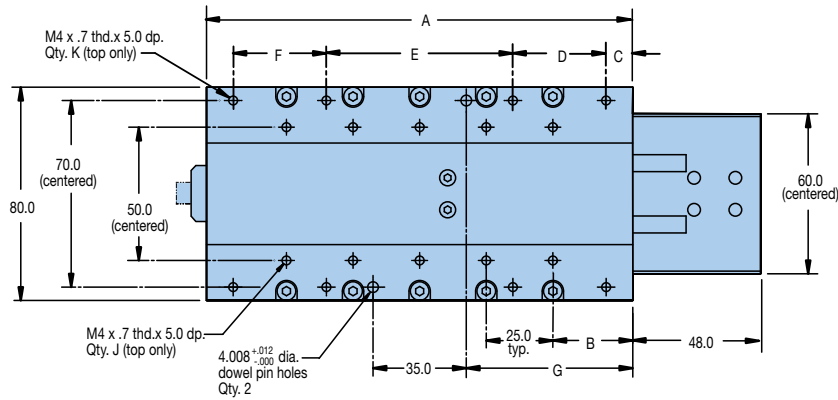
**Order Codes: S2 S3 S4 S5 S6**

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 MX80s offer two choices for orthogonality. As standard, perpendicularity is held to within 60 arc seconds. For more exacting applications the MX80 can be optioned for 15 arc seconds orthogonality.



Miniature Positioners

Dimensions (mm)



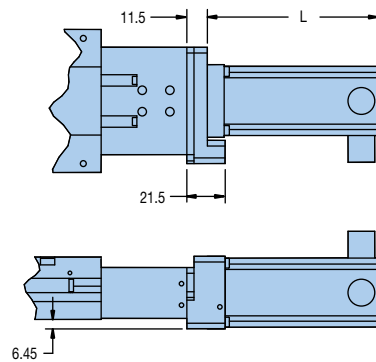
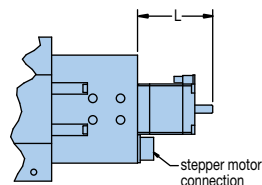
Dimensions (mm)

Travel	A	B	C	D	E	F	G	H	J	K
25	80	15	5	70	—	—	22.5	27.5	6	4
50	80	15	5	70	—	—	22.5	27.5	6	4
100	160	30	10	35	70	35	62.5	67.5	10	8
150	210	30	5	65	70	65	87.5	92.5	14	8

Mounting

Servo Motor

Stepper Motor



Model	# Stack	NEMA	Dimension L (mm)
Stepper	1		42.0
	2	11	50.0
	3		61.5
Servo	1	16	83.6





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 ⑭ ⑮

**Order Example:** MX80S T04 M P K - D1 M1 H3L3 CM12 E1 Z1 R1 A11 X1 S1

① **Series**  
MX80S

- ② **Travel – mm**  
T01 25  
T02 50  
T03 100  
T04 150

- ③ **Mounting**  
M Metric

- ④ **Grade**  
S Standard  
P Precision\*

\* Must order E3 or E4 Digital Option to meet catalog specification.

- ⑤ **Bearing Type**  
J Standard Cross Roller  
K ACS Cross Roller

- ⑥ **Drive Type**  
D1 1 mm Leadscrew <sup>(1)</sup>  
D2 2 mm Leadscrew <sup>(1)</sup>  
D3 10 mm Leadscrew <sup>(1,3)</sup>  
D6 2 mm Ballscrew <sup>(2,3)</sup>  
(1) Standard grade only (2) Precision grade only  
(3) Not available with 1- or 2-stack stepper motor.

- ⑦ **Motor**  
M0 No motor, flange, coupling  
M1 NEMA 16 flange, no motor, coupling  
M14 Stepper, 1 stack, NEMA 11  
M15 Stepper, 2 stack, NEMA 11  
M16 Stepper, 3 stack, NEMA 11  
M21 Servo, 1 stack, NEMA 16

- ⑧ **Home/Limit Switch\***  
H1L1 None  
H2L2 N.C. Home/N.C. Limit  
H2L3 N.C. Home/N.O. Limit  
H3L2 N.O. Home/N.C. Limit  
H3L3 N.O. Home/N.O. Limit  
\*NC = Normally Closed; NO = Normally Open

- ⑨ **Cable Options (High-flex)**  
CM01 None  
CM02 Limits (only) w/Flying Leads (1 meter)  
CM03 Limits (only) w/Flying Leads (3 meter)  
CM04 Limits (only) w/ViX Connector (1 meter)  
CM05 Limits (only) w/ViX Connector (3 meter)  
CM06 Stepper Motor & Limits w/ViX Connector (1 meter)  
CM07 Stepper Motor & Limits w/ViX Connector (3 meter)  
CM08 Stepper Motor (no Limits) w/ViX Connector (1 meter)  
CM09 Stepper Motor (no Limits) w/ViX Connector (3 meter)  
CM10 Stepper Motor (E Drive) & Limits (1 meter)  
CM11 Stepper Motor (E Drive) & Limits (3 meter)  
CM12 Stepper Motor (E Drive) no Limits (1 meter)  
CM13 Stepper Motor (E Drive) no Limits (3 meter)  
CM15 Servo Motor, Encoder & Limits w/ViX Connector (3 m)  
CM17 Servo Motor, Encoder (no Limits) w/ViX Connector (3 m)

- ⑩ **Digital Option**  
E1 None  
E2 1.0 µm Resolution  
E3 0.5 µm Resolution  
E4 0.1 µm Resolution  
E5 5.0 µm Resolution  
E7 Sine Output

- ⑪ **Z Channel Location**  
Z1 None  
Z3 Center Position

- ⑫ **Environmental**  
R1 Standard Finish (black anodized)  
R2 Cleanroom Prep  
R10 Low ESD Finish  
R20 Low ESD Finish & Cleanroom Prep

- ⑬ **Digital Drive**  
A1 No Drive  
A10 ViX250-AE Servo (torque mode)  
A11 ViX250-AE Servo (velocity mode)  
A12 ViX250-AE Servo (step/direction mode)  
A15 ViX250-IE Servo Drive/Controller  
A31 E-DC Stepper Drive  
A62 ViX250-IM Stepper Drive/Controller

- ⑭ **Axis Designator**  
S1 None (single-axis)  
S2 X-axis base unit (cables @ 12 o'clock)  
S3 Y-axis 60 arc-sec (cables @ 3 o'clock)  
S4 Y-axis 60 arc-sec (cables @ 9 o'clock)  
S5 Y-axis 15 arc-sec (cables @ 3 o'clock)  
S6 Y-axis 15 arc-sec (cables @ 9 o'clock)

- ⑮ **Required Designator**  
X1

Miniature Positioners

## **MX80M Free Travel and Micrometer Driven Stages**

### **Features**

- Precision cross roller bearings
- Optional cleanroom prep.
- Optional low ESD coating
- Dowel holes in top & base
- Interchangeable mounting with motorized MX80 models
- Positive position lock

The MX80M stages are offered as free travel or micrometer driven units with 25 mm or 50 mm travel. They include innovative tooling features to make mounting and precision alignment 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. Dowel pin holes are provided on the carriage top for repeatable mounting or tooling. Also available are custom features such as a steel body design, vacuum prepped units, and anti cage creep bearings for high-dynamic applications up to 150 mm travel.



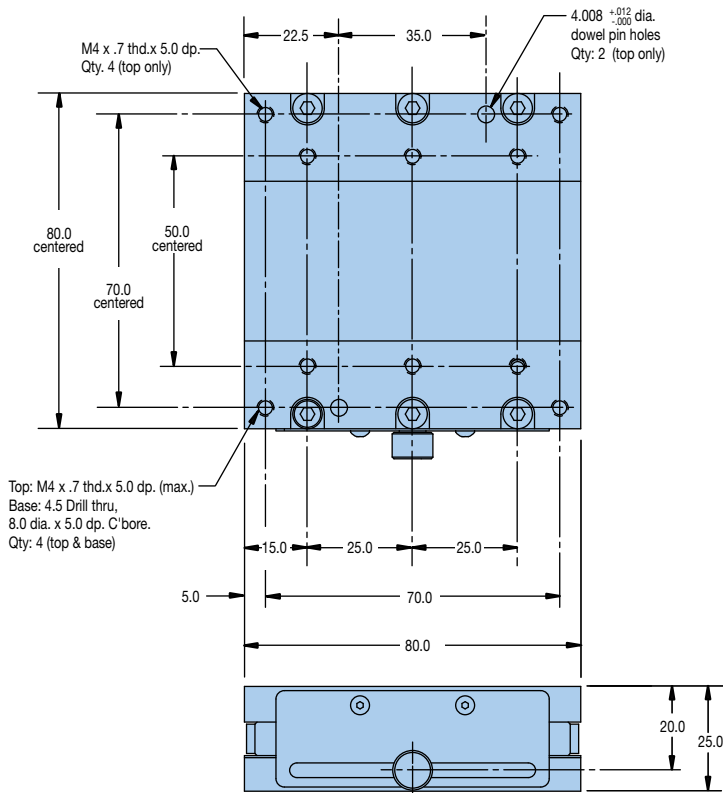


		MX80M Free Travel		MX80LM Micrometer Driven	
Travel (mm)		25	50	25	50
<b>Normal Load Capacity</b>	kg (lb)	20 (44)	20 (44)	20 (44)	20 (44)
<b>Axial Force <sup>(1)</sup></b>					
$F_a$	kg	—	—	4.5	4.5
$F_b$		—	—	0.6	1.0
<b>Straight Line Accuracy (per 25 mm travel)</b>	$\mu\text{m}$	2	2	2	2
<b>Micrometer Resolution</b>					
0.001 in		—	—	Yes	Yes
0.01 mm		—	—	Yes	Yes
<b>Digital Micrometer</b>					
0.00005 in		—	—	Yes	Yes
0.001 mm		—	—	Yes	Yes

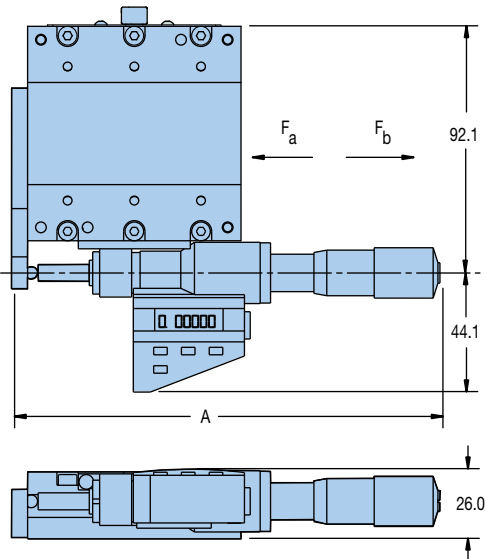
<sup>(1)</sup>  $F_a$  (force acting against micrometer)  
 $F_b$  (force acting against spring)

**Free Travel (with position lock)**

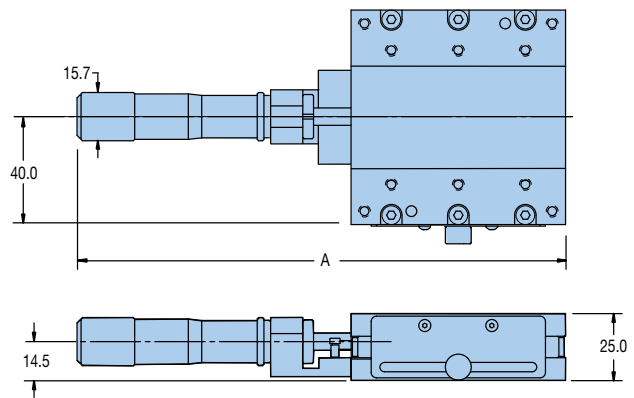
Dimensions (mm)



**Digital Micrometer (side drive shown)**



**Standard Micrometer (center drive shown)**



Drive Orientation	Travel	Dimension A (mm)
Center	25	225.6
	50	273.5
Side	25	160.6
	50	209.5

Drive Orientation	Travel	Dimension A (mm)
Center	25	182.2
	50	231.4
Side	25	117.2
	50	167.4



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	
<b>Order Example:</b>	MX80M	T02	M	-	S	C2	D22	R1	X4	S1
<b>① Series</b>	MX80M									
<b>② Travel – mm</b>	T01	25								
	T02	50								
<b>③ Mounting</b>	M	Metric								
<b>④ Grade</b>	S	Standard								
<b>⑤ Style</b>	C1	Free Travel								
	C2	Center Drive								
	C3	Side Drive								
<b>⑥ Drive Type</b>						D1	None			
						D20	Metric Micrometer			
						D21	English Micrometer			
						D22	Digital Micrometer			
<b>⑦ Environmental</b>						R1	Standard Finish (black anodized)			
						R2	Cleanroom Prep			
						R10	Low ESD Finish			
						R20	Low ESD Finish & Cleanroom Prep			
<b>⑧ Lock Options</b>						X1	No Lock			
						X4	With Lock			
<b>⑨ Axis Designator</b>						S1	None (single-axis)			
						S2	X-axis base unit (micrometer @ 12 o'clock)			
						S3	Y-axis 60 arc-sec (micrometer @ 3 o'clock)			
						S4	Y-axis 60 arc-sec (micrometer @ 9 o'clock)			
						S5	Y-axis 15 arc-sec (micrometer @ 3 o'clock)			
						S6	Y-axis 15 arc-sec (micrometer @ 9 o'clock)			

Miniature Positioners