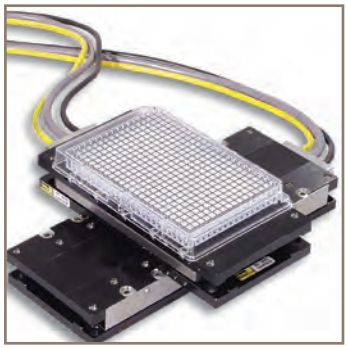

aerospace
climate control
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fluid & gas handling
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pneumatics
process control
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MX - Miniature Positioners

Miniature Precision Axis

北京润诚时代科技有限公司

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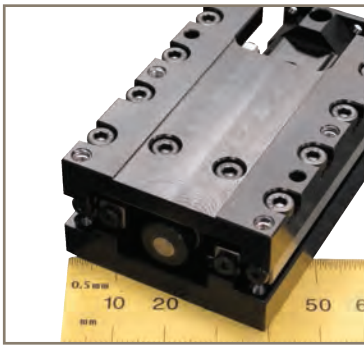

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Miniature Positioners - MX Series

Overview

Description

Life science applications are a good example of how miniaturization has driven the need for smaller and more efficient positioners. Parker's MX series miniature positioner, the smallest positioner in the industry, is loaded with high-performance features for both rapid travel and precise positioning of lighter loads in small work envelopes.

Designed for today's 24/7 production demands, the MX series has redefined "high-throughput automation" in the world of miniature positioners

Typical areas of application

- Fiber optics
- Photonics
- Electronics and biomedical processes

Features

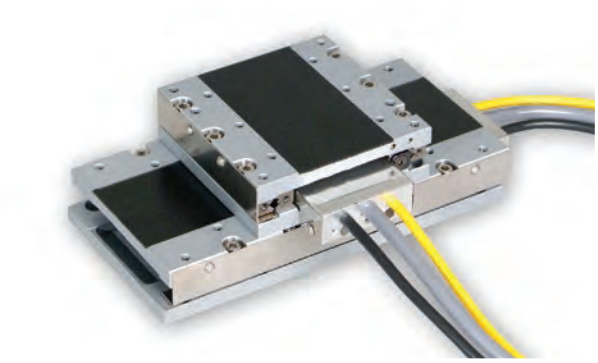
- Low profile miniature size
- Different technologies available:
  - Ballscrew and leadscrew driven stages: MX45S, MX80S
  - Linear servo motor driven stages: MX80L
  - Free travel and micrometer driven stages: MX80M
- Cross roller bearing (zero cage creep option)
- Optional encoder
- Optional digital limit/home sensors
- Optional cleanroom and low ESD preparation
- Multi-axis platform

Technical Characteristics - Overview

	Type: Miniature Positioners			
	MX45S	**MX80S**	**MX80L**	**MX80M**
Technology	screw driven		linear motor driven	manual driven
Frame size height/width [mm]	25x45 mm	35x80 mm	25x80 mm	25x80 mm
Travel [mm]	5, 15, 25	25, 50, 100, 150	25, 50, 100, 150, 200	25, 50
Max. Speed [mm/s]	20...2000			
Nominal Load [kg]	7	8	8	20
Repeatability [µm]	±1... ±8	±1.5... ±10	±0.4... ±10	-

High performance in a small package

While the MX series 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 MX series is an innovative non-contact linear servo motor (patent pending). This MX series has been optimized for force, speed, and acceleration, to deliver outstanding performance and response.
A high-precision non-contact encoder provides submicrometer resolution, repeatability and accuracy. 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 systems.



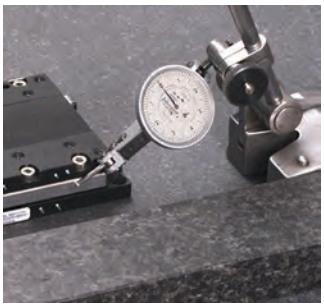
Zero cage creep feature

High acceleration and smooth travel are both key features of the MX Series stage. The cross roller bearing system found in the MX series provides extremely smooth linear travel, 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 MX series performs well, even at 49 m/s² 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.



MX45S - Ballscrew and Leadscrew Driven Stages

Description

Designed with anti-cage creep crossed roller bearings, the MX45S allows users to position up to 7 kg of normal load on the stage's three standard travel lengths (5, 15 & 25 mm).
The MX45S can be supplied with a high efficiency leadscrew or a high precision ground ballscrew, both of which are capable of producing 40 N of thrust and reaching linear velocities of 20 and 30 mm/s respectively.

The leadscrew drive employs a PTFE-coated screw with a preloaded nut to deliver extremely smooth and quiet linear motion. A choice of two leads allows the user to match the desired mix of velocity and resolution in order to best match the application's requirements.

Leadscrew drive

The ballscrew drive is available in a 1 mm lead offering the user 3 µm bi-directional repeatability and 24/7 operation (100 % duty cycle).

Ballscrew drive

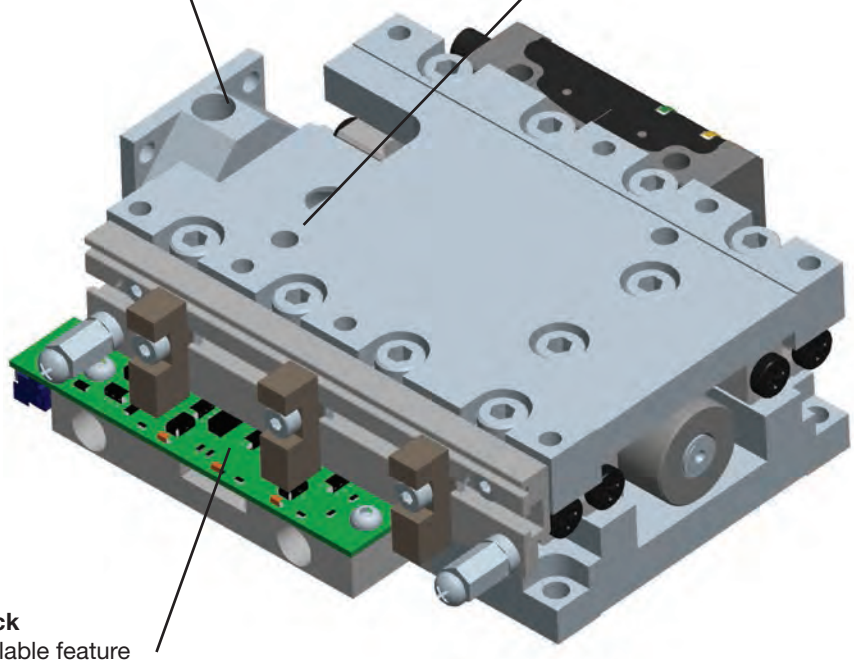
Features

- **Ultra compact profile (35 mm high x 80 mm wide)**
- **Travels: 5, 15 and 25 mm**
- **Ballscrew or leadscrew drive options**
- **Anti-cage creep crossed roller bearings**
- **Axial thrust: up to 40 N**
- **Max velocity: 30 mm/s**
- **Stepper motor driven**
- **Digital limit/home sensor pack (option)**
- **Rotary or linear encoders (option)**
- **Multi-axis platforms**
- **Ideal for normal or cleanroom environments**

Product Design

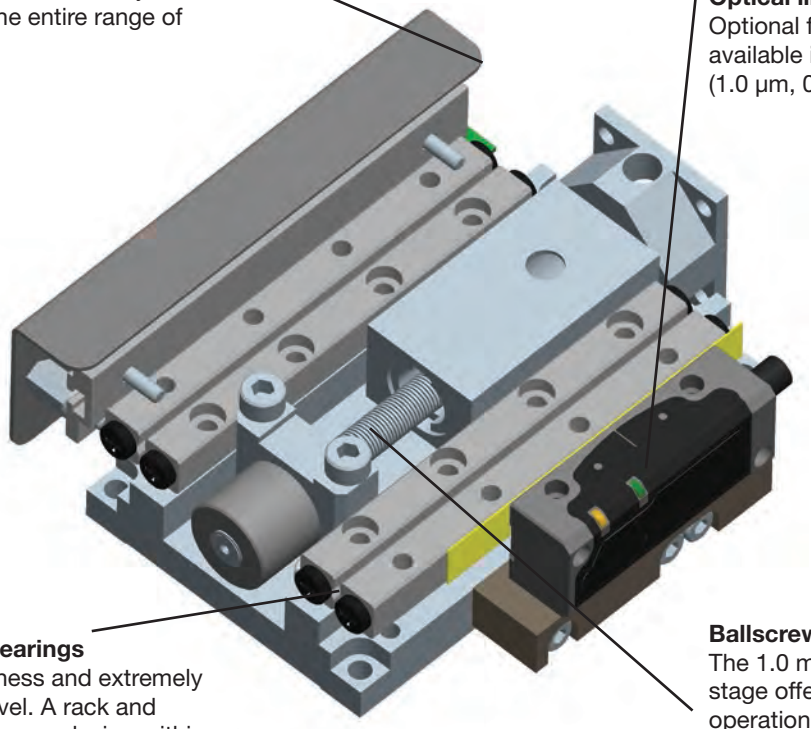
Motor mount
NEMA 8 stepper motor mounts directly to stage housing

Dowel pin holes
Ensure precise repeatable mounting



Home/limit sensor pack
This optional field installable feature consists of three NPN or PNP switches, each of which is fully adjustable over the entire range of travel

Optical linear encoders
Optional field installed feature is available in three standard resolutions (1.0 µm, 0.1 µm and sine output)



Crossed roller bearings
provide high stiffness and extremely smooth linear travel. A rack and pinion anti-cage creep design within the bearing races prevents cage creep even at high acceleration, or with cantilevered loads

Ballscrew or leadscrew drive
The 1.0 mm lead ballscrew driven stage offers high performance 24/7 operation with a thrust load capacity of 40 N and velocity to 30 mm/s. The leadscrew driven stages are available with 0.5 or 1.0 mm leads. The PTFE coated leadscrew provides extremely smooth linear travel at velocities of 20 mm/s

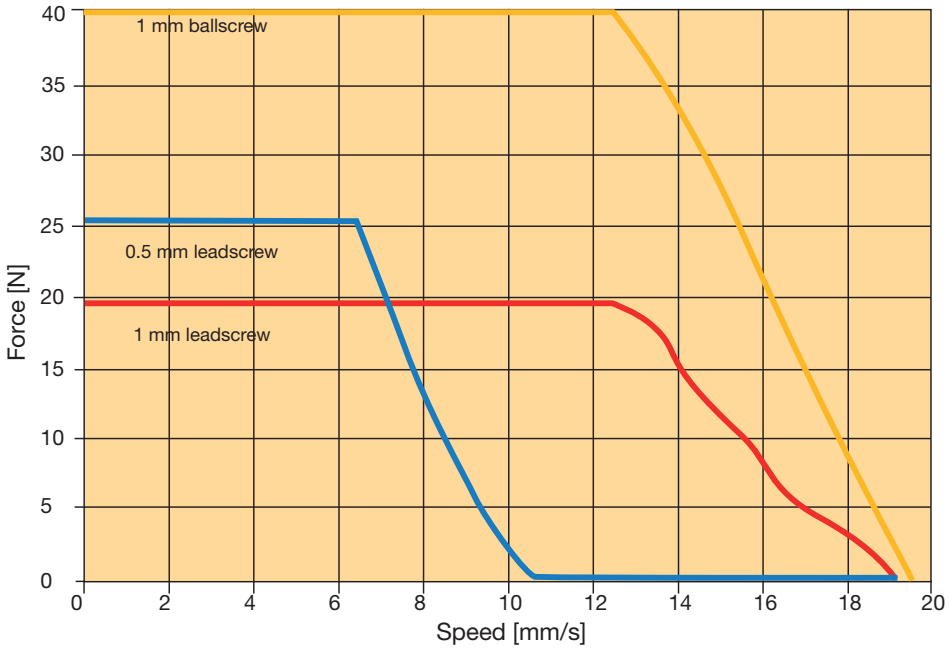
Technical Characteristics

		Unit	MX45S Leadscrew Drive (Standard)			MX45S Ballscrew Drive (Precision)		
			T01	T02	T03	T01	T02	T03
Travel (1)		[mm]	5	15	25	5	15	25
Nominal load		[kg]	5	5	7	5	5	7
Thrust Load		[N]	40			40		
Maximum velocity (2)	0.5 mm lead	[mm/s]	10			-		
	1.0 mm lead		20			30		
Acceleration/deceleration		[m/s²]	20			20		
Running torque		[Nm]	0.011			0.011		
Duty cycle		[%]	50			100		
Straightness & flatness (3)		[µm]	3	5	8	3	5	8
Positional accuracy (4)	with 2000 count rotary encoder	[µm]	10	18	30	8	12	15
	with 1 or 0.1 µm linear encoder		6	10	12	6	10	12
Bidirectional repeatability (4), (5)	with 2000 count rotary encoder	[µm]	±8			±3		
	with 1 µm linear encoder		±4			±2		
	with 0.1 µm linear encoder		±2			±1		
Input inertia (without motor)	0.5 mm lead	[10^{-8}kgm²]	2.37	2.76	3.14	-	-	-
	1.0 mm lead		2.58	2.96	3.35	1.41	1.6	1.79
Screw speed (max)		[min^{-1}]	1200			1800		
Screw diameter		[mm]	4.7			4.0		
Screw efficiency	0.5 mm lead	[%]	30			-		
	1.0 mm lead		47			90		
Bearing friction coefficient		-	0.003			0.003		
Unit weight	Stage only	[kg]	0.177	0.200	0.238	0.182	0.205	0.243
	Carriage Only		0.070	0.082	0.100	0.073	0.084	0.104
Additional mass of motors&options	NEMA 8 stepper (6)	[kg]	0.095			0.095		
	Linear encoder option (7)		0.016			0.016		
	Limit option sensor board (7)		0.005			0.005		

Notes:
(1) Travel is in the direction of the motor mount only.
(2) See speed/force curve for performance with Parker motor.
(3) Measured at the carriage center, 35 mm above the mounting surface @20 °C with no load. Unit bolted to granite surface, flat within 1 µm/300 mm.
(4) Total accuracy and bi-directional repeatability over full travel (peak to peak) (with 0.5 or 1 mm leadscrew).
(5) Repeatability valid with NEMA 8 stepper motor and encoder noted.
(6) Includes rotary encoder (part of base)
(7) Part of base

Diagram: Force - Speed

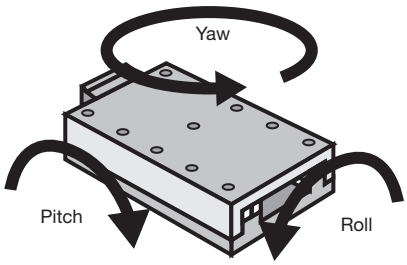
MX45S with Parker NEMA 8 stepper motor



Performance Loading

Performance loading with 2540 km life time

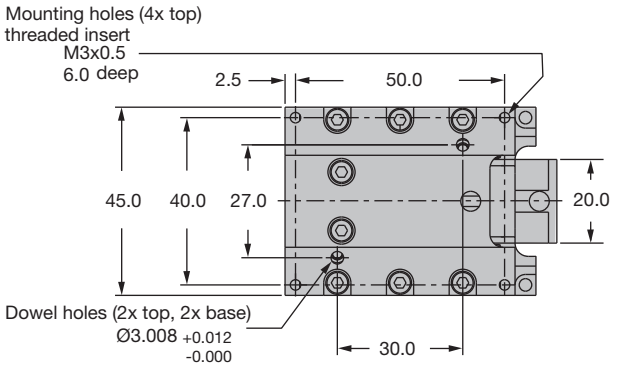
	Unit	
Normal load capacity		
5 mm travel	[kg]	5.0
15 mm travel		5.0
25 mm travel		7.0
Pitch & yaw moment loading		
25 mm lever arm	[kg]	1.0
50 mm lever arm		0.6
75 mm lever arm		0.5
100 mm lever arm		0.4
Roll moment loading		
25 mm lever arm	[kg]	2.0
50 mm lever arm		1.2
75 mm lever arm		0.9
100 mm lever arm		0.7



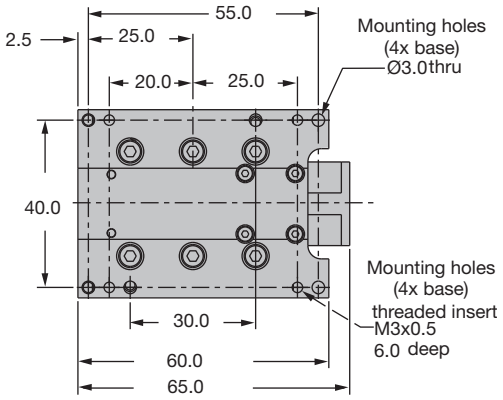
Dimensions

Dimensions [mm]

T01 - 5 mm travel

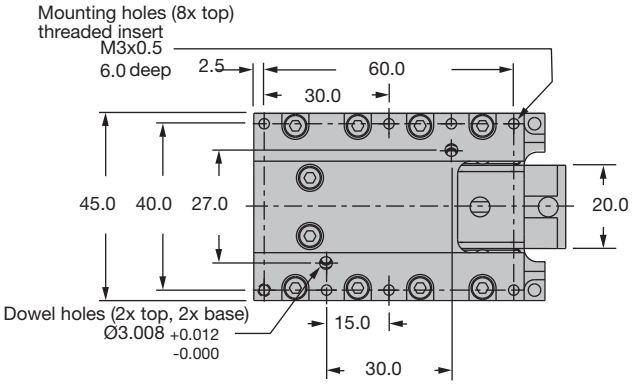


Top view

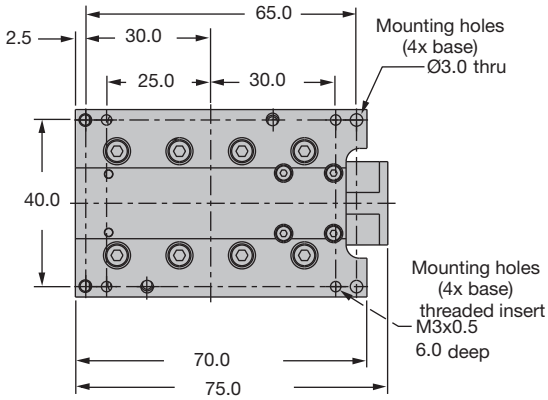


Bottom view

T02 - 15 mm travel

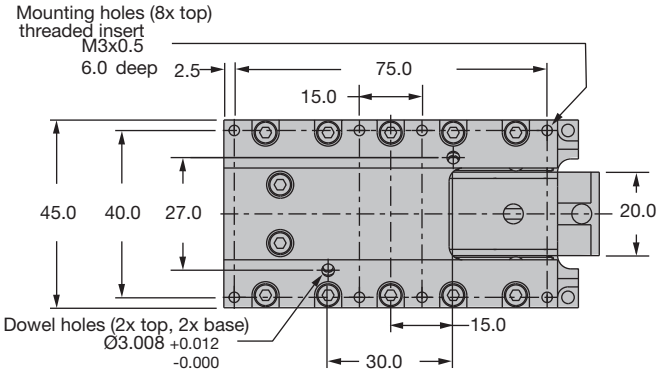


Top view

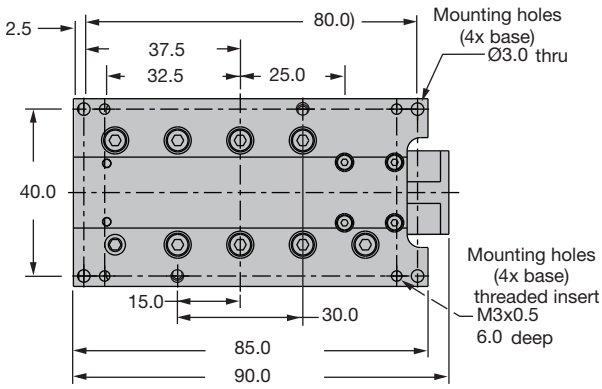


Bottom view

T03 - 25 mm travel



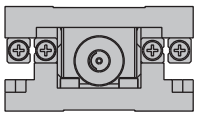
Top view



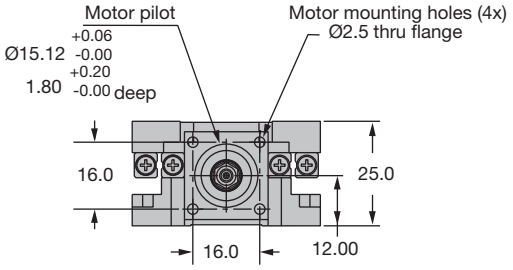
Bottom view

Note: For T01, T02 and T03, the carriage is shown at end of travel, available stroke towards motor mount only.

T01, T02, T03



Bearing end view

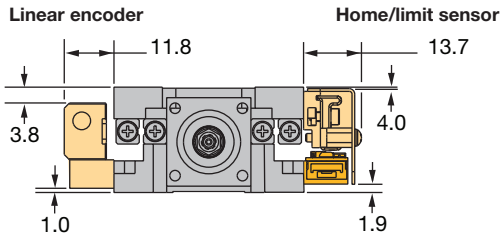


Motor side end view

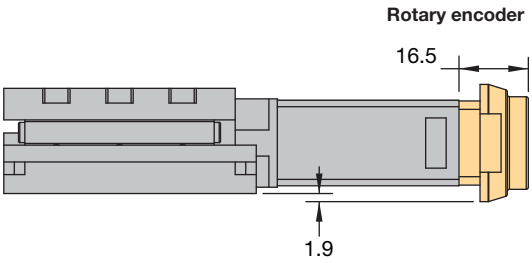
MX45S with option:

Dimensions [mm]

Encoder and home/limit sensor pack



Motor end view



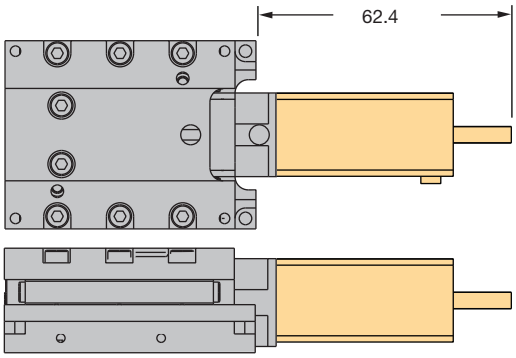
Side view

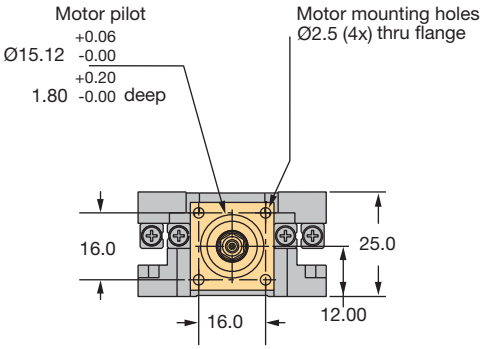
MX45S with option:

Dimensions [mm]

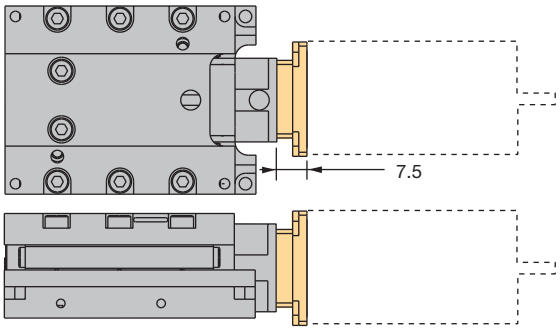
Motor mounting

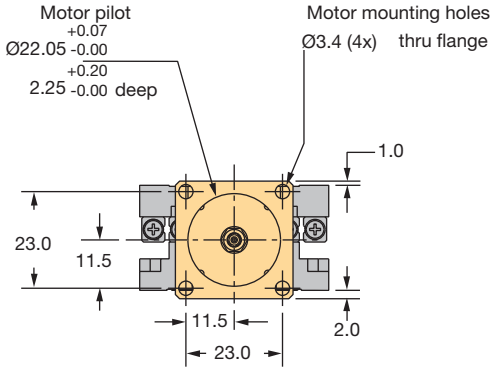
NEMA 8 motor mount





NEMA 11 motor mount





MX80S - Ballscrew and Leadscrew Driven Stages

Description

The MX80S miniature positioner is the screw driven member of Parker s MX80 series. 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 a complementary product that is the link 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/s 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 travel. A choice of three leads provides improved opportunity for matching desired velocity/ resolution requirements.
The 2.0 mm lead ballscrew driven stage offers high performance 24/7 operation with a thrust load capacity of 123 N and velocity to 100 mm/s at 100 % duty cycle.

Leadscrew drive

Ballscrew drive

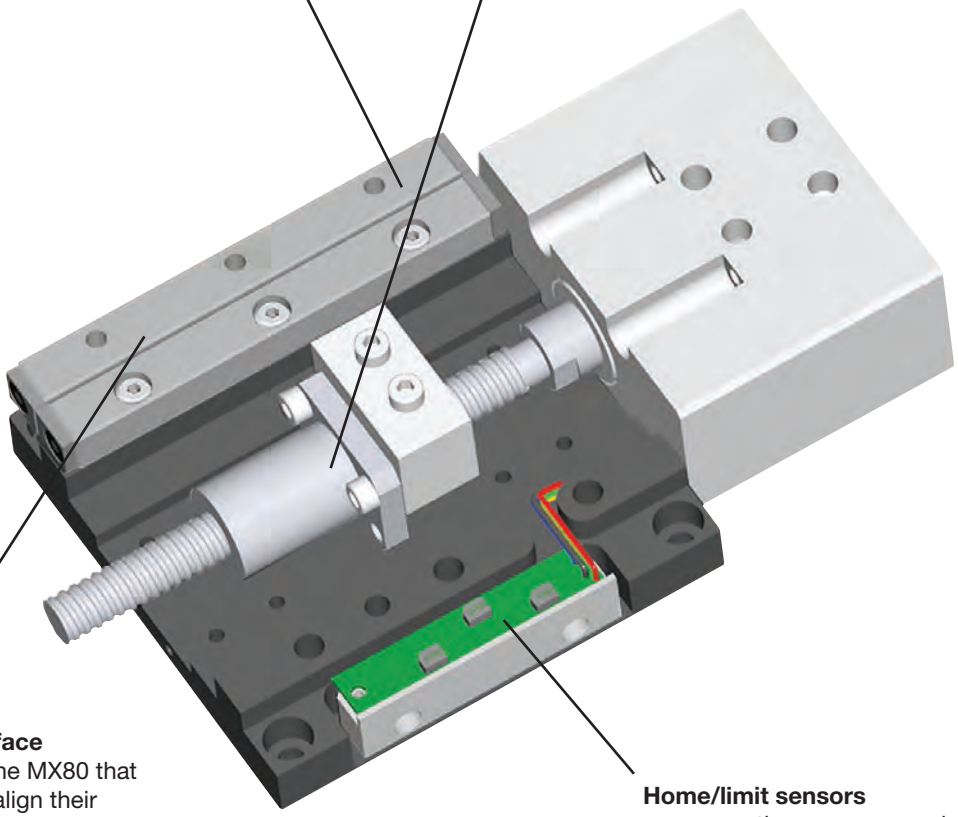
Features

- **Low profile miniature size (35 mm high x 80 mm wide)**
- **Travels: 25, 50, 100, 150 mm**
- **Multi-axis platform**
- **Ballscrew or leadscrew drive**
- **Axial thrust: up to 123 N**
- **Acceleration: 20 m/s²**
- **Cross roller bearing (zero cage creep option)**
- **Stepper or servo motor driven**
- **Digital limit/home system (option)**
- **Linear encoder (option)**
- **Cleanroom preparation (option)**
- **Low ESD option for electrically sensitive applications (option)**

Product Design

Cross roller bearings
provide high stiffness and extremely smooth linear travel. A rack and pinion anti-cage creep design within the bearing races prevents cage creep even at high acceleration, or with cantilevered loads.

Ballscrew drive 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 and velocity to 100 mm/s at 100 % duty cycle. Leadscrew driven stages are available with 1, 2 or 10 mm leads. The PTFE coated leadscrew provides extremely smooth linear travel at velocities up to 200 mm/s.



Master reference surface
is a feature unique to the MX80 that enables customers to align their process to the actual travel path within micrometer.

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

Technical Characteristics

		Unit	MX80S Leadscrew Drive (Standard)				MX80S Ballscrew Drive (Precision)			
			T01	T02	T03	T04	T01	T02	T03	T04
Travel		[mm]	25	50	100	150	25	50	100	150
Nominal load		[kg]	8	8	8	8	8	8	8	8
Axial thrust force		[N]	44	44	44	44	123	123	123	123
Breakaway torque		[Nm]	0.021	0.021	0.021	0.021	0.050	0.050	0.050	0.050
Running torque	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	-	-	-	-
Inertia (without motor and coupling)	1.0 mm lead	[10^{-7}kgm^2]	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)		[min^{-1}]	1200	1200	1200	1200	3000	3000	3000	3000
Screw diameter		[mm]	6.35	6.35	6.35	6.35	8.00	8.00	8.00	8.00
Maximum speed	1.0 mm lead	[mm/s]	20	20	20	20	-	-	-	-
	2.0 mm lead		40	40	40	40	100	100	100	100
	10.0 mm lead		200	200	200	200	-	-	-	-
Bidirectional repeatability*	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	-	-	-	-
Positional accuracy*	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	-	-	-	-
Straightness & flatness		[µm]	8	12	16	20	8	12	16	20
Screw efficiency	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	-	-	-	-
Bearing friction coefficient		-	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Duty cycle		[%]	50	50	50	50	100	100	100	100
Unit weight	Table only	[kg]	0.597	0.597	1.003	1.268	0.694	0.694	1.114	1.392
	with 2-stack stepper		0.748	0.748	1.154	1.419	0.845	0.845	1.265	1.513
Carriage weight (unloaded)		[kg]	0.194	0.194	0.353	0.471	0.291	0.291	0.464	0.595

* **Notes: MX80SS (leadscrew drive)**

(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 µm/300 mm.

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

* **Notes: MX80S (ballscrew drive)**

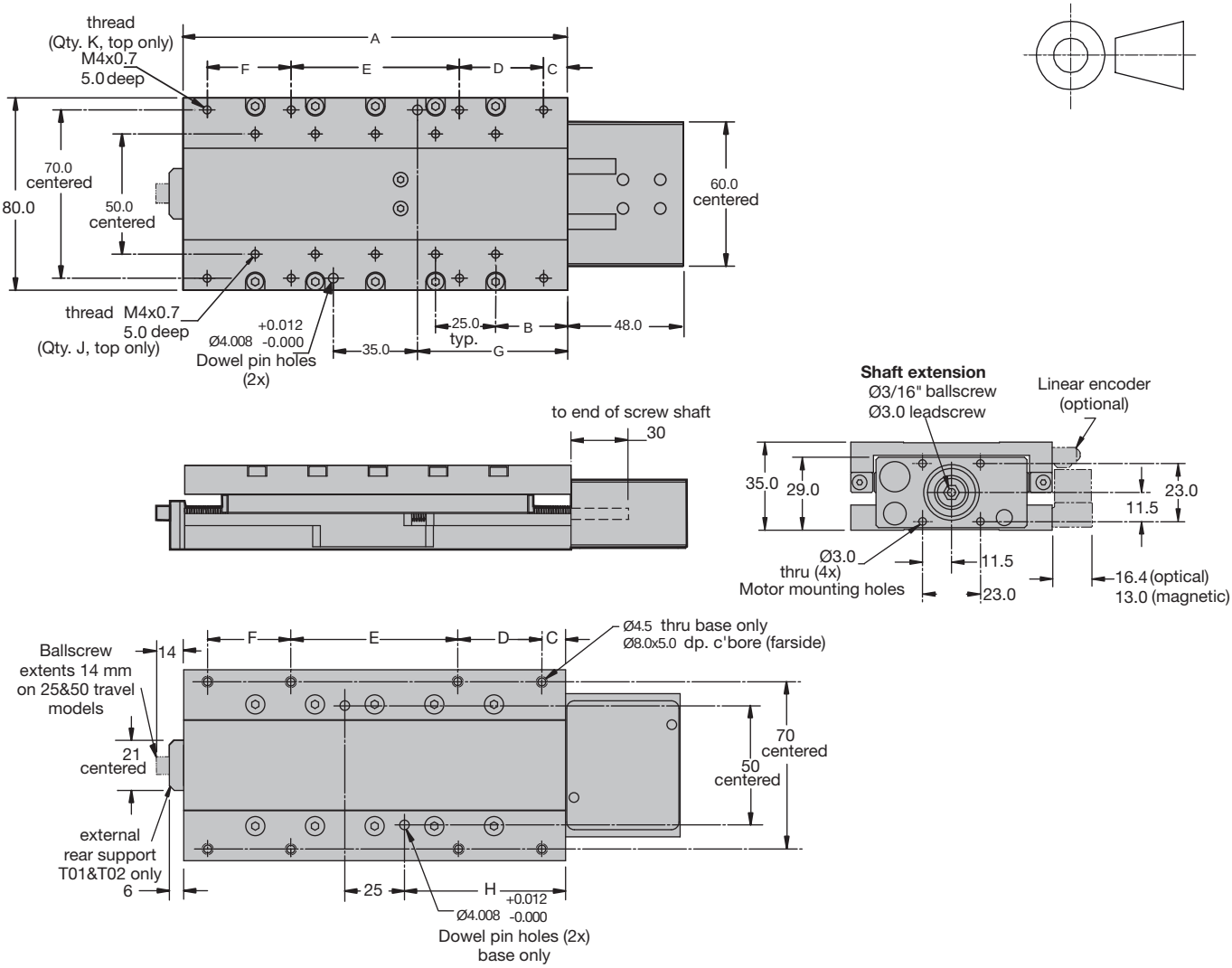
(1) Measured at the carriage center, 35 mm above the mounting surface @ 20 °C with no load. Unit bolted to granite surface, flat to within 1 µm/300 mm.

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

(3) Repeatability valid with M21 servo motor.

Dimensions

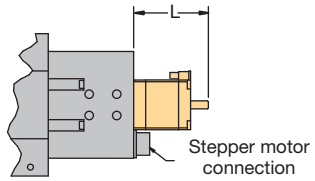
Dimensions [mm]



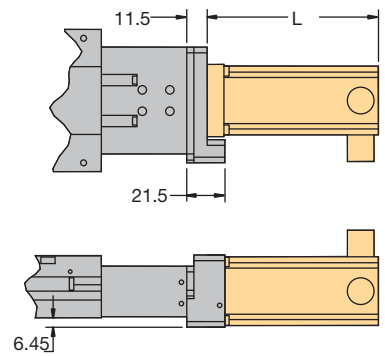
Travel	A	B	C	D	E	F	G	H	J	K
	[mm]									
25	80	15	5	70	—	—	22.5	27.5	6	4
50	80	15	5	70	—	—	22.5	27.5	6	4
100	160	30	10	35	70	35	62.5	67.5	10	8
150	210	30	5	65	70	65	87.5	92.5	14	8

Mounting

Stepper motor



Servo motor

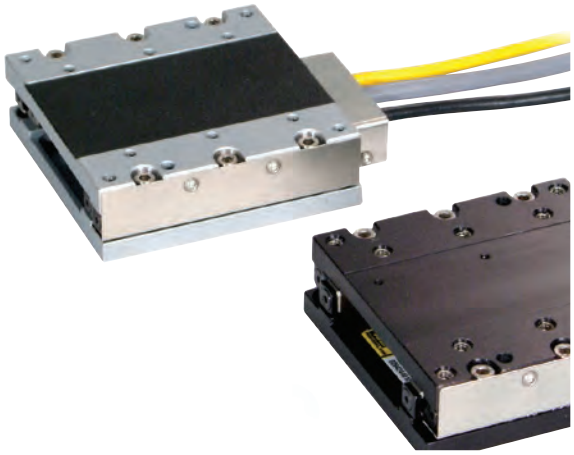


Model	Stack	NEMA	L [mm]
Stepper motor	1 2 3	11	42.0 50.0 61.5
Servo motor	1	16	83.6

MX80L - Linear Motor Driven Stages

Description

Parker's MX80L 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.



Features

- **Low profile miniature size (25 mm high x 80 mm wide)**
- **Short settling times**
- **Submicrometer precision**
- **High velocity 2 m/s**
- **Multi-axis platform**
- **Six linear encoder resolutions: (0.01...5.0 µm)**
- **Travels: 25, 50, 100, 150 and 200 mm**
- **Cross roller bearing (zero cage creep design)**
- **Precision or standard grade**
- **Cleanroom and low ESD option**
- **Fully adjustable home and limit sensors**
- **Dowel holes for repeatable payload mounting**
- **Master reference surface to travel path**
- **Plug-in intelligent drive**
- **Pneumatic Z-axis counterbalance**
- **No moving cables**

MX80L 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 49 m/s².

- Acceleration 50 m/s²
- Repeatability to ±0.8 µm
- Straightness 6 µm
- Light weight aluminum body
- Low luster black anodize finish

MX80LS

MX80L 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.

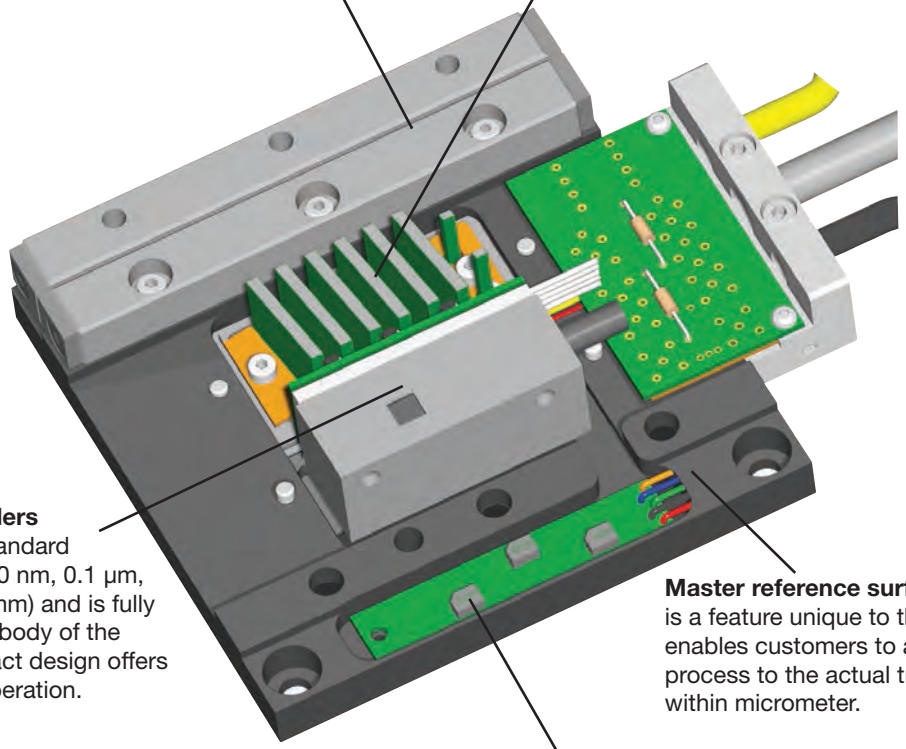
- Acceleration 40 m/s²
- Repeatability to ±0.4 µm
- Straightness 4 µm
- Steel body construction
- Precision ground mounting and bearing surfaces
- Electroless nickel protective finish

MX80LP

Product Design

Cross roller bearings
provide high stiffness and extremely smooth linear travel. A rack and pinion anti-cage creep design within the bearing races prevents cage creep even at high acceleration, or with cantilevered loads.

Linear servo motors
features a patent pending ironcore design that provides high thrust density for linear acceleration to 50 m/s² and velocities to 2 m/s. 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 µm, 0.5 µm, 1.0 µm, 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 micrometer.

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

Technical Characteristics

		Unit	MX80L Precision Grade				MX80L Standard Grade				
			T01	T02	T03	T04	T01	T02	T03	T04	T05
Travel		[mm]	25	50	100	150	25	50	100	150	200
Continuous force		[N]	4	4	8	8	4	4	8	8	8
Peak force		[N]	12	12	24	24	12	12	24	24	24
Continuous current		[A_{rms}]	0.8	0.8	1.6	1.6	0.8	0.8	1.6	1.6	1.6
Peak current**		[A]	2.4	2.4	4.8	4.8	2.4	2.4	4.8	4.8	4.8
Force constant		[N/A_{rms}]	5.51	5.51	5.51	5.51	5.51	5.51	5.51	5.51	5.51
Nominal load		[kg]	8	8	8	8	8	8	8	8	8
Max. speed Encoder resolution:	5.0 µm	[mm/s]	1100	1500	2000	2000	1100	1500	2000	2000	2000
	1.0 µm		1100	1500	2000	2000	1100	1500	2000	2000	2000
	0.5 µm		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
	Sine Cosine		1100	1500	2000	2000	1100	1500	2000	2000	2000
Max. acceleration		[m/s^2]	40	40	40	30	50	50	50	40	30
Bidirectional repeatability* Encoder resolution:	5.0 µm	[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		±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
	Sine Cosine		±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.4	±0.5
Positional accuracy* Encoder resolution:	5.0 µm	[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		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
	Sine Cosine		3	4	5	5	12	15	20	20	20
Straightness & flatness		[µm]	4	4	5	6	6	6	10	12	14
Duty cycle		[%]	100	100	100	100	100	100	100	100	100
Unit weight		[kg]	0.590	0.590	1.027	1.345	0.475	0.475	0.875	1.125	1.370
Carriage weight (unloaded)		[kg]	0.282	0.282	0.509	0.676	0.213	0.213	0.405	0.537	0.695

** based on a winding temperature of up to 60 °C for a period of
T01, T02: 1.2 s
T03, T04, T05: 5 s

* **Notes MX80L (Precision):**
(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 µm/300 mm.
(2) Total accuracy and bi-directional repeatability over full travel (peak to peak).
(3) Precision grade with slope correction value. Consult factory if better accuracy is required.

* **Notes MX80L (Standard):**
(1) Total accuracy and bi-directional repeatability over full travel (peak to peak).

Diagram: Force - Speed

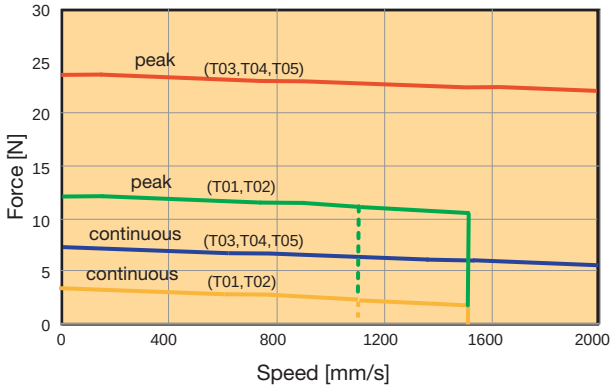
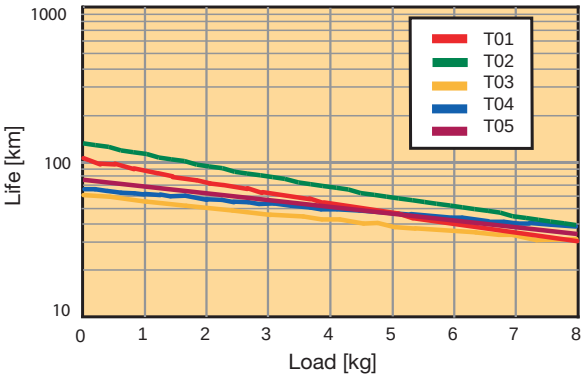
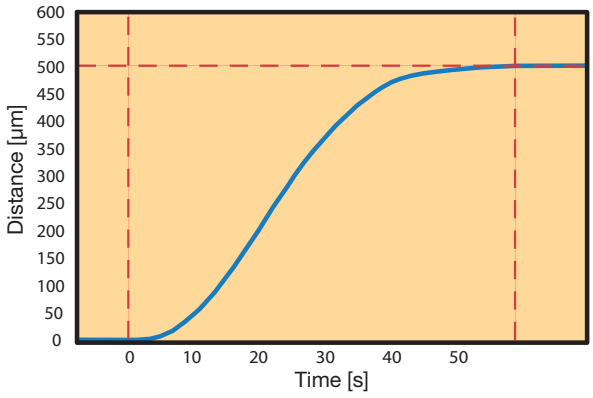


Diagram: Life - Load (Normal Load)



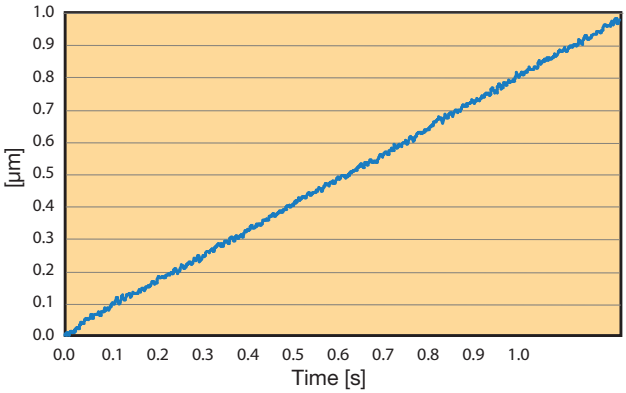
Note:
T01 (25 mm travel) is limited to a maximum speed of 1100 mm/s.
T02 (50 mm) is limited to 1500 mm (due to limited travel).

Diagram: Distance vs Time



Note:
1 kg payload, 500 µm move: Move and settle to within 1 µm in 47 ms.

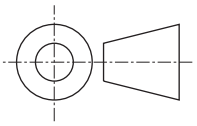
Diagram: Velocity Ripple



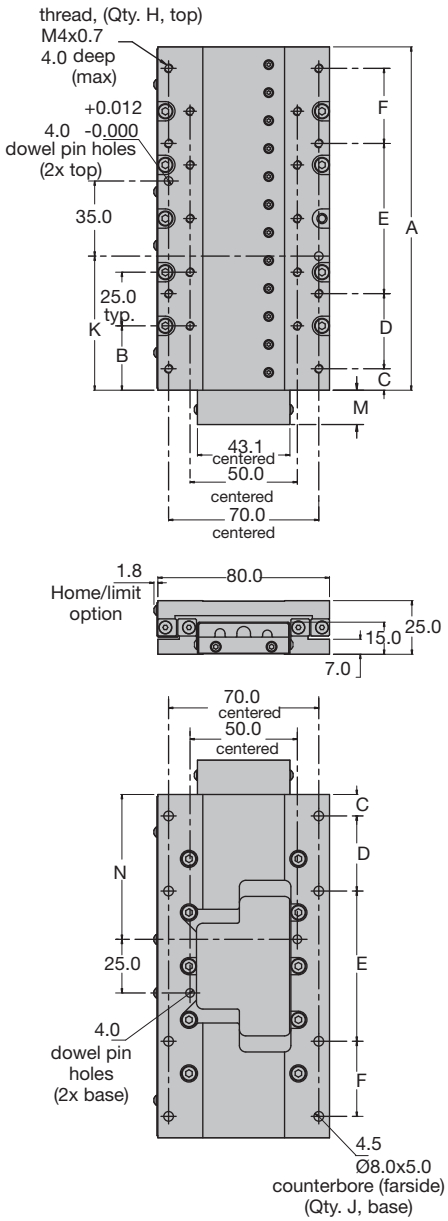
Note:
Tests were performed using a model MX80LT04D13E8 with a 20 nm linear encoder.

Dimensions

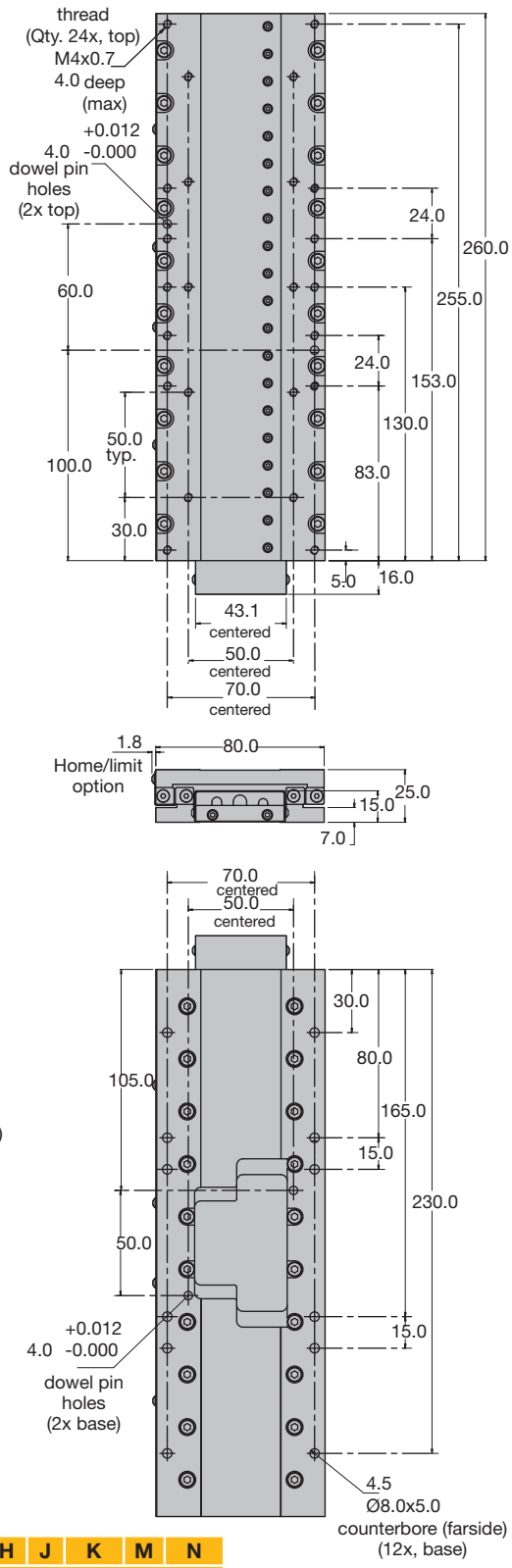
Dimensions [mm]



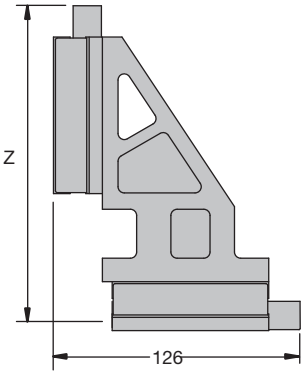
T01, T02, T03, T04



T05

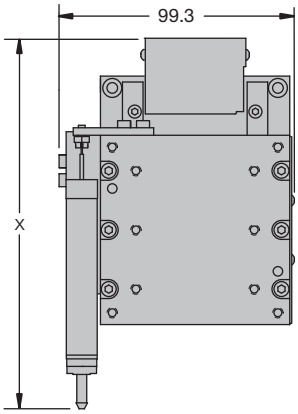


Z-axis



Travel	Z [mm]
25	166
50	166
100	251
150	326
200	not possible

Pneumatic vertical axis counter balance



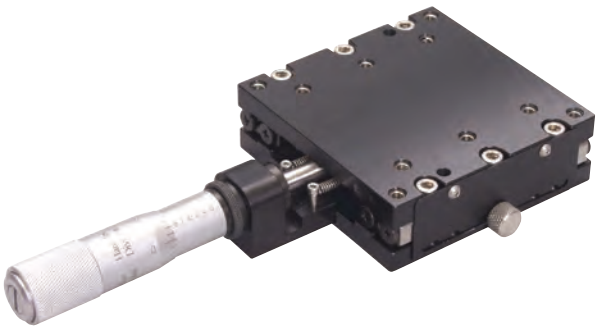
Travel	X [mm]
25	156.6
50	156.6
100	230.6
150	310.6
200	not possible

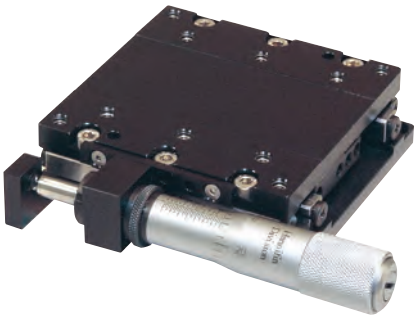
Travel	A	B	C	D	E	F	H	J	K	M	N
	[mm]										
25	80	15	5	70	—	—	10	4	22.5	22	27.5
50	80	15	5	70	—	—	10	4	22.5	22	27.5
100	160	30	10	35	70	35	18	8	62.5	16	67.5
150	210	30	5	65	70	65	22	8	87.5	16	92.5

MX80M - Free Travel and Micrometer Driven Stages

Description

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.





Features

- **Precision cross roller bearings**
- **Clean room preparation (option)**
- **Low ESD coating (option)**
- **Dowel holes in top & base**
- **Interchangable mounting with motorized MX80 models**
- **Positive position lock**

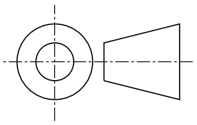
Technical Characteristics

	Unit	MX80M free travel		MX80M micrometer driven	
		T01	T02	T01	T02
Travel	[mm]	25	50	25	50
Nominal load	[kg]	20	20	20	20
Axial force [1]	[N]				
F_a		-	-	44.1	44.1
F_b		-	-	5.9	9.8
Straight line accuracy (per 25 mm travel)	[µm]	2	2	2	2
Micrometer resolution	-				
0.001 in		-	-	Yes	Yes
0.01 mm		-	-	Yes	Yes
Digital micrometer	-				
0.00005 in		-	-	Yes	Yes
0.001 mm		-	-	Yes	Yes

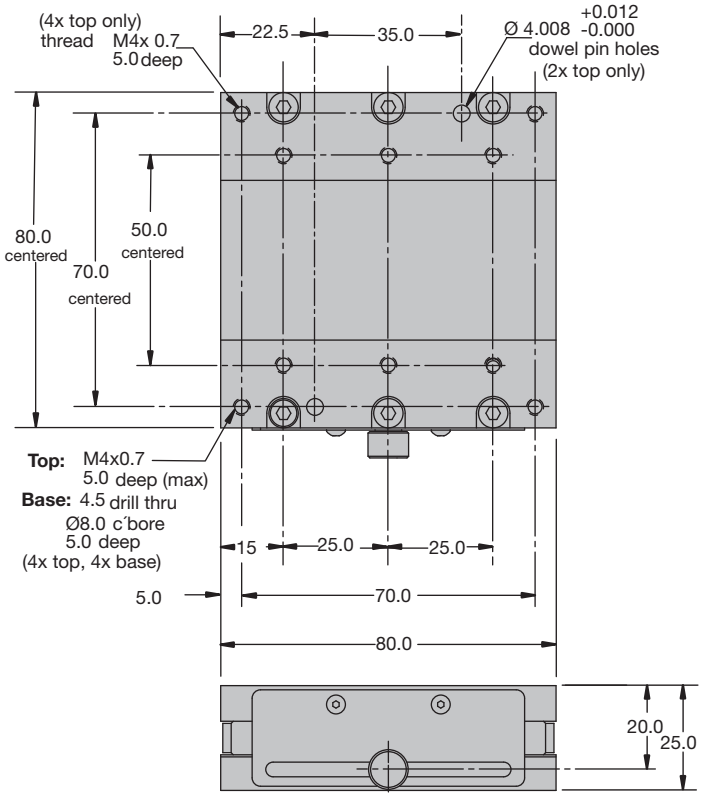
[1] F_a (Force acting against micrometer)
F_b (Force acting against spring)

Dimensions

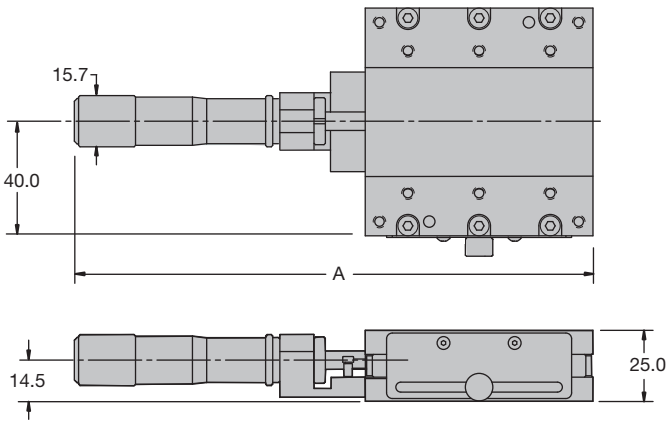
Dimensions [mm]



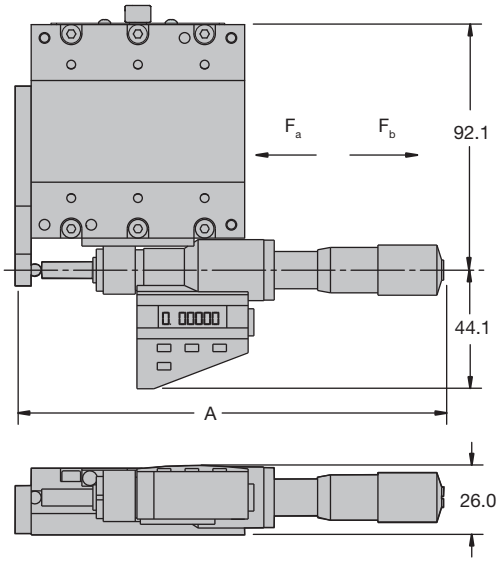
Free travel (with position lock)



Standard micrometer (center drive shown)



Digital micrometer (side drive shown)



Drive orientation	Travel [mm]	A [mm]
Center	25	182.2
	50	231.4
Side	25	117.2
	50	167.4

Drive orientation	Travel [mm]	A [mm]
Center	25	225.6
	50	273.5
Side	25	160.6
	50	209.5

Options and Accessories

Encoder Option

Order codes: E..

Linear Encoder

MX80
A non-contact linear optical encoder provides a quadrature output and offers resolution ranging from 10 nm to 5 µm further more there is a sine output available.
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.
MX45
On the MX45S, the encoder is mounted externally to the stage body, an addition which can be added later if application requirements change.


MX45S with linear encoder

Rotary Encoder

When using stepper motors, positional feedback is readily available with the optional rotary encoder. 400- and 500-line rotary encoders provide position verification and position maintenance.


Rotary encoder

Home and Limit Sensor Option

Order codes: H.., L..
The MX45S features an innovative, compact, fully adjustable and field-installed home/limit sensor pack. The output format is either NPN or PNP and is available as either N.O. or N.C. The sensor pack is powered with 5 to 24 VDC and is capable of sinking or sourcing up to 50 mA per switch.
On the MX80 series the 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.


MX45S with home/limit sensor pack

Cable Option "Plug & Play" (MX80)

Order codes: CM..
"User convenience" is high on the list of cable features found in the MX series. 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
- Color coded jackets and labeling
- Connectors simplify installation

Motor Mounting Options

Order codes: N.., M..
The MX series can be ordered with motor or prepared for motor mounting. Motor availability depends on the ordered MX drive technology.

Environmental Protection Option (MX80)

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.

Cleanroom Option

Order codes: R..

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 Finish

Order codes: R..

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.

Z-Axis Counterbalance Option (MX80L)

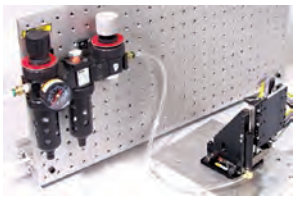
Order codes: X..

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 413.7 kPa is required for operation.

Pneumatic Package (MX80L)

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 µm.

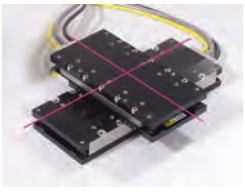
Part number: 002-2236-01



System Orthogonality Option (MX80)

Order codes: S..

In any multi-axis positioning system, the perpendicular alignment of the axes must be clearly specified. „Degree of orthogonality“ defines the perpendicular alignment of one axis 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.



Mounting Bracket Kit Option (MX45S)

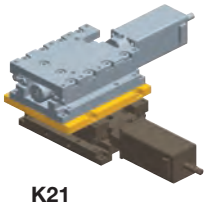
Order codes: K..

MX45S to MX45S (Mounting Bracket Kits)

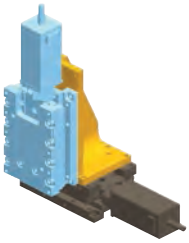
To build multi-axis MX45S systems, mounting bracket kits are available to build the two and three-axis configurations.
Note that only Y-axis travel is a selection criteria; X- and Z-axis travel is not.

2-axis system configuration

K20



K21

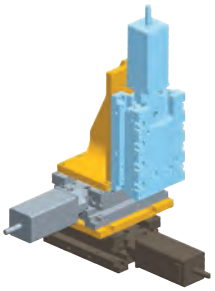


K22

K23

K24

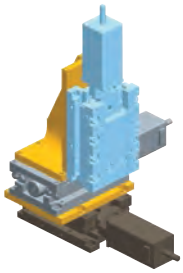
3-axis system configuration



K31

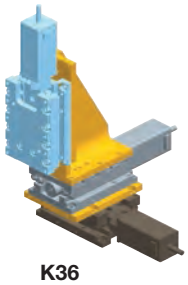
K32

K33



K34

K35



K36

Multi-axis bracket kits

		Part number		
	Bracket Kit	T01 *	T02 *	T03 *
2-axis system configuration	**K20**	002-2956-200	002-2956-201	002-2956-202
	K21	002-2956-200	002-2956-201	002-2956-202
	K22	-	002-2956-220	-
	K23	-	002-2956-220	-
	K24	-	002-2956-240	-
3-axis system configuration	**K31**	002-2956-310	002-2956-311	002-2956-312
	K32	002-2956-310	002-2956-311	002-2956-312
	K33	002-2956-330	002-2956-331	002-2956-332
	K34	002-2956-310	002-2956-311	002-2956-312
	K35	002-2956-310	002-2956-311	002-2956-312
	K36	002-2956-330	002-2956-331	002-2956-332

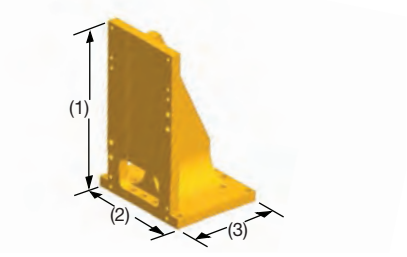
* T01, T02 and T03 designates Y axis travel only

Z-axis bracket*

Bracket Kit	T01, T02, T03		
	Height (1) [mm]	Width (2) [mm]	Depth (3) [mm]
K22, K23	85	45	55
K24, K33, K36	104	45	55
K31, K32, K34, K35	85	55	45

* not compatible with N11 motor mounts

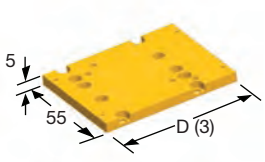
Z-axis bracket



X-Y axis bracket

Bracket Kit	T01	T02	T03
	Depth (3) [mm]		
K20, K21, K31, K32, K33, K34, K35, K36	60	70	85

X-Y axis transition plate bracket



MX45S to MX80 (Mounting Brackets)

MX45S positioners can also be used as a Y- or Z-axis in conjunction with MX80 positioners.

Kit	Configuration	Part number	Height	Width	Depth
			[mm]		
X-Y	MX45ST01 - MX80	002-2958-01	5	80	80
	MX45ST02 - MX80	002-2958-02	5	80	80
	MX45ST03 - MX80	002-2958-03	5	80	92.5
X-Z*	MX45S (all) - MX80	002-2958-04	87.5	80	80

* not compatible with N11 motor mounts

Z-Axis Bracket (MX80)

Lightweight aluminium Z-brackets are available for easy construction of vertical axis combinations (MX80).

Part number: Standard model

25, 50 mm: 002-2238-01
100, 150 mm: 002-2240-01

Part number: ESD-protection

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

Digital Drives - Simple Configuration

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 several Parker tools. Seamless integration of drives and controls ensures performance matched functionality of the completed motion system.

MX80 with ViX

ViX - Intelligent Servo & Microstepping Drives/Controller

Order separately

The ViX servo and microstepping drives are the perfect drive solution to be paired with the MX80 series. 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.

VXLPSU - Power Supply Module

Order separately

The Parker power supply offers a convenient way of powering a ViX servo drive. The continuous rated output is 240 W at 230 VAC or 960 W at 400 VAC input and supplies the 80 V main DC rail and operates directly from all AC supplies between 90 V and 264 V. No external EMC filters are required unless the motor leads are exceptionally long (e.g. greater than 30 m).
Part number: VXLPSU240 and VXLPSU960

Compax3 - Intelligent Servo Drives/Controllers

Order separately

With a Compax3 drive, a transformer must be used. Parker provides a suitable transformer.
Part number: TO255

MX80 with Compax3

Order Code

MX45S

	1	2	3	4	5	6	7	8	9
Order example	**MX45S**	**T01**	**S**	**K**	**D1**	**N00**	**E000**	**L0**	**K00S**

1 Series

MX45S	Miniature Linear Positioner

2 Travel - mm

T01	5
T02	15
T03	25

3 Grade

S	Standard (leadscrew drive)
P	Precision (ballscrew drive)

4 Bearing type*

K	Anti-creep system (ACS) crossed roller bearings

5 Drive type

D1	0.5 mm leadscrew (1)
D2	1 mm leadscrew (1)
D3	1 mm ballscrew (2)

(1) With standard grade only.
(2) With precision grade only.

6 Motor mounting option

N00	No motor no motor flange, no coupler
N08	No motor, NEMA 8 motor flange, & coupler
N11	No motor, NEMA 11 motor flange, & coupler (1)
M10	NEMA 8 stepper motor mounted (2)
M11	NEMA 8 stepper motor mounted (3)

(1) Not available with T03 travel option on K20 and K22 X-Y axis bracket kits or Z-axis bracket kits (K22 thru K36).
(2) With 1 m cable, flying leads.
(3) With 1 m cable with P2 drive connector.

7 Encoder option*

E000	None
ER10	Rotary Encoder, 400-line (1), flying leads
ER11	Rotary Encoder, 400-line (1), ViX connector
ER12	Rotary Encoder, 400-line (1) ACR connector
ER13	Rotary Encoder, 400-line (1) 6K connector
ER20	Rotary Encoder, 500-line (1), flying leads
ER21	Rotary Encoder, 500-line (1), ViX connector
ER22	Rotary Encoder, 500-line (1), ACR connector
ER23	Rotary Encoder, 500-line (1), 6K connector
EL20	Linear Encoder (2) 1 µm resolution
EL30	Linear Encoder (2) 0.5 µm resolution
EL40	Linear Encoder (2) 0.1 µm resolution
EL50	Linear Encoder (2) 5 µm resolution
EL70	Linear Encoder (2) sine output

* Consult factory for other options.
(1) Encoder equipped with 1 m high-flex cable
(2) Encoder equipped with 1 m high-flex cable, 15-pin D-sub connector; Z-channel in center position

8 Home/limit sensor option*

L0	None
L2	N.O. home/N.C. limit, NPN, 1 m cable flying leads
L4	N.O. home/N.C. limit, PNP, 1 m cable flying leads

* NC=Normally Closed; NO=Normally Open.
Home switch not available with T01; use one of the limits as home for T01.

9 Multi-axis kit option

K00S	Single-axis
K20X	X-Y System Multi-Axis Mounting Bracket-Kit (9 o-clock) - X-axis designator
K20Y	X-Y System Multi-Axis Mounting Bracket-Kit (9 o-clock) - Y-axis designator
K21X	X-Y System Multi-Axis Mounting Bracket-Kit (3 o-clock) - X-axis designator
K21Y	X-Y System Multi-Axis Mounting Bracket-Kit (3 o-clock) - Y-axis designator
K22X	X-Z System Multi-Axis Mounting Bracket-Kit (9 o-clock) - X-axis designator
K22Z	X-Z System Multi-Axis Mounting Bracket-Kit (9 o-clock) - Z-axis designator
K23X	X-Z System Multi-Axis Mounting Bracket-Kit (3 o-clock) - X-axis designator
K23Z	X-Z System Multi-Axis Mounting Bracket-Kit (3 o-clock) - Z-axis designator
K24X	X-Z System Multi-Axis Mounting Bracket-Kit (12 o-clock) - X-axis designator
K24Z	X-Z System Multi-Axis Mounting Bracket-Kit (12 o-clock) - Z-axis designator
K31X	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/6 o-clock) - X-axis designator
K31Y	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/6 o-clock) - Y-axis designator
K31Z	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/6 o-clock) - Z-axis designator
K32X	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/12 o-clock) - X-axis designator
K32Y	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/12 o-clock) - Y-axis designator
K32Z	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/12 o-clock) - Z-axis designator
K33X	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/3 o-clock) - X-axis designator
K33Y	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/3 o-clock) - Y-axis designator
K33Z	X-Y-Z System Multi-Axis Mounting Bracket-Kit (9/3 o-clock) - Z-axis designator
K34X	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/6 o-clock) - X-axis designator
K34Y	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/6 o-clock) - Y-axis designator
K34Z	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/6 o-clock) - Z-axis designator
K35X	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/12 o-clock) - X-axis designator
K35Y	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/12 o-clock) - Y-axis designator
K35Z	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/12 o-clock) - Z-axis designator
K36X	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/9 o-clock) - X-axis designator
K36Y	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/9 o-clock) - Y-axis designator
K36Z	X-Y-Z System Multi-Axis Mounting Bracket-Kit (3/9 o-clock) - Z-axis designator

MX80S

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Order example	**MX80S**	**T04**	**M**	**P**	**K**	**D4**	**M1**	**H3L3**	**CM08**	**E3**	**Z1**	**R1**	**A1**	**S1**	**X1**

1 Series

MX80S

2 Travel - mm

T01	25
T02	50
T03	100
T04	150

3 Mounting

M	Metric

4 Grade

S	Standard (leadscrew drive)
P	Precision* (ballscrew drive)

* Must order digital option E3 or E4

5 Bearing type

K	ACS cross roller

6 Drive type

D1	1 mm leadscrew (1)
D2	2 mm leadscrew (1)
D3	10 mm leadscrew (1),(3)
D6	2 mm ballscrew (2),(3)

(1) With standard grade only.
(2) With precision grade only.
(3) Not available with 1- or 2-stack stepper motor.

7 Motor mounting option

M0	No motor, no flange, no coupling
M1	No motor, no coupling NEMA 16 flange
M14	LV111 (stepper motor, 1 stack, NEMA 11)
M15	LV112 (stepper motor, 2 stack, NEMA 11)
M16	LV113 (stepper motor, 3 stack, NEMA 11)
M21	Servo motor (1 stack, NEMA 16)

8 Home/limit sensor option

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

9 Cable option (high-flex)

CM01	None
CM02	1 m Highflex Limits/Home Sensor Only Cable (flying leads)
CM03	3 m Highflex Limits/Home Sensor Only Cable (flying leads)
CM04	1 m Highflex Limits/Home Sensor Only Cable with ViX Connector
CM05	3 m Highflex Limits/Home Sensor Only Cable with ViX Connector
CM06	1 m Highflex Stepper Motor Cables with ViX Connector
CM07	3 m Highflex Stepper Motor Cables with ViX Connector
CM08	1 m Highflex Stepper Motor Cables with ViX Connector, no Limits/Home
CM09	3 m Highflex Stepper Motor Cables with ViX Connector, no Limits/Home
CM15	3 m Highflex Servo Motor Cables with ViX Connector
CM17	3 m Highflex Servo Motor Cables with ViX Connector, no Limits/Home

10 Encoder 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 Finish

R1	Standard finish (black anodized)
R2	Cleanroom preparation
R10	Low ESD finish
R20	Low ESD finish & cleanroom preparation

13 Digital drive

A1	None

14 Orthogonality

S1	None (single-axis)
S2	X-axis base unit (cables @ 12 o'clock)
S3	Y-axis 60 arcsec (cables @ 3 o'clock)
S4	Y-axis 60 arcsec (cables @ 9 o'clock)
S5	Y-axis 15 arcsec (cables @ 3 o'clock)
S6	Y-axis 15 arcsec (cables @ 9 o'clock)

15 Required designator

X1

MX80L

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Order example	**MX80L**	**T02**	**M**	**P**	**D11**	**H3**	**L2**	**CM08**	**Z3**	**E7**	**R1**	**A1**	**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

5	**Drive type**	
	D1	None - free travel/idler
	D11	4 pole (25 & 50 mm travel only)
	D13	8 pole (100, 150 & 200 mm travel only)
6	**Home sensor**	
	H1	None - for drive type D1
	H2	N.C., sinking
	H3	N.O., sinking
7	**Limit sensor**	
	L1	None - for Drive type D1
	L2	N.C., sinking
	L3	N.O., sinking
8	**Cable option (high-flex)**	
	CM03	None - for Drive type D1
	CM04	1 m Highflex Cables with ViX Connector
	CM05	3 m Highflex Cables with ViX Connector
	CM06	1 m Highflex Cables with ViX Connector, no Limits/Home
	CM07	3 m Highflex Cables with ViX Connector, no Limits/Home
	CM08	1 m Highflex Cables with Compax3 Connector
	CM09	3 m Highflex Cables with Compax3 Connector*

*Please note:
With a Compax3 drive, a transformator (e.g. TO255) must be used, i.e. the intermediate voltage must not exceed 80 VDC.

9	**Z channel location**	
	Z1	None
	Z3	Center position
10	**Encoder option**	
	E1	None
	E2	1.0 µm resolution
	E3	0.5 µm resolution
	E4	0.1 µm resolution
	E7	Sine Cosine V_{ss} (for C3F12)
	E8	0.02 µm resolution (20 nm)
	E9	0.01 µm resolution (10 nm)
11	**Finish**	
	R1	Standard finish (black anodized)
	R2	Cleanroom preparation
	R10	Low ESD finish
	R20	Low ESD finish & cleanroom preparation
12	**Digital drive**	
	A1	None
13	**Additional option**	
	X1	None
	X2	Z-axis pneumatic counter balance*

* not available with T05 travel

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

MX80M

	1	2	3	4	5	6	7	8	9
Order example	**MX80M**	**T02**	**M**	**S**	**C2**	**D22**	**R1**	**X4**	**S1**

1	**Series**	
	MX80M	
2	**Travel - mm**	
	T01	25
	T02	50
3	**Mounting**	
	M	Metric
4	**Grade**	
	S	Standard
5	**Type**	
	C1	None - free travel/idler
	C2	Center drive
	C3	Lateral drive
6	**Drive type**	
	D1	None
	D20	Metric micrometer
	D21	English micrometer
	D22	Digital micrometer
7	**Finish**	
	R1	Standard finish (black anodized)
	R2	Cleanroom preparation
	R10	Low ESD finish
	R20	Low ESD finish & cleanroom preparation
8	**Lock option**	
	X1	None
	X4	With lock
9	**Axis designator**	
	S1	None (single-axis)
	S2	X-axis base unit (micrometer @12 o'clock)
	S3	Y-axis 60 arcsec (micrometer @3 o'clock)
	S4	Y-axis 60 arcsec (micrometer @9 o'clock)
	S5	Y-axis 15 arcsec (micrometer @3 o'clock
	S6	Y-axis 15 arcsec (micrometer @9 o'clock)

Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 00800 27 27 5374

Aerospace

Key Markets

Aftermarket services
Commercial transports
Engines
General & business aviation
Helicopters
Launch vehicles
Military aircraft
Missiles
Power generation
Regional transports
Unmanned aerial vehicles

Key Products

Control systems & actuation products
Engine systems & components
Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

Climate Control

Key Markets

Agriculture
Air conditioning
Construction Machinery
Food & beverage
Industrial machinery
Life sciences
Oil & gas
Precision cooling
Process
Refrigeration
Transportation

Key Products

Accumulators
Advanced actuators
CO_2 controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

Electromechanical

Key Markets

Aerospace
Factory automation
Life science & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery & converting
Primary metals
Semiconductor & electronics
Textile
Wire & cable

Key Products

AC/DC drives & systems
Electric actuators, gantry robots & slides
Electrohydrostatic actuation systems
Electromechanical actuation systems
Human machine interface
Linear motors
Stepper motors, servo motors, drives & controls
Structural extrusions

Filtration

Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

Key Products

Analytical gas generators
Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems

Fluid & Gas Handling

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
Truck hydraulics
Turf equipment

Key Products

Accumulators
Cartridge valves
Electrohydraulic actuators
Human machine interfaces
Hybrid drives
Hydraulic cylinders
Hydraulic motors & pumps
Hydraulic systems
Hydraulic valves & controls
Hydrostatic steering
Integrated hydraulic circuits
Power take-offs
Power units
Rotary actuators
Sensors

Pneumatics

Key Markets

Aerospace
Conveyor & material handling
Factory automation
Life science & medical
Machine tools
Packaging machinery
Transportation & automotive

Key Products

Air preparation
Brass fittings & valves
Manifolds
Pneumatic accessories
Pneumatic actuators & grippers
Pneumatic valves & controls
Quick disconnects
Rotary actuators
Rubber & thermoplastic hose & couplings
Structural extrusions
Thermoplastic tubing & fittings
Vacuum generators, cups & sensors

Process Control

Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

Key Products

Analytical Instruments
Analytical sample conditioning products & systems
Chemical injection fittings & valves
Fluoropolymer chemical delivery fittings, valves & pumps
High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/ controllers
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves

Sealing & Shielding

Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
EMI shielding
Extruded & precision-cut, fabricated elastomeric seals
High temperature metal seals
Homogeneous & inserted elastomeric shapes
Medical device fabrication & assembly
Metal & plastic retained composite seals
Shielded optical windows
Silicone tubing & extrusions
Thermal management
Vibration dampening

192-590015N9 February 2016

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