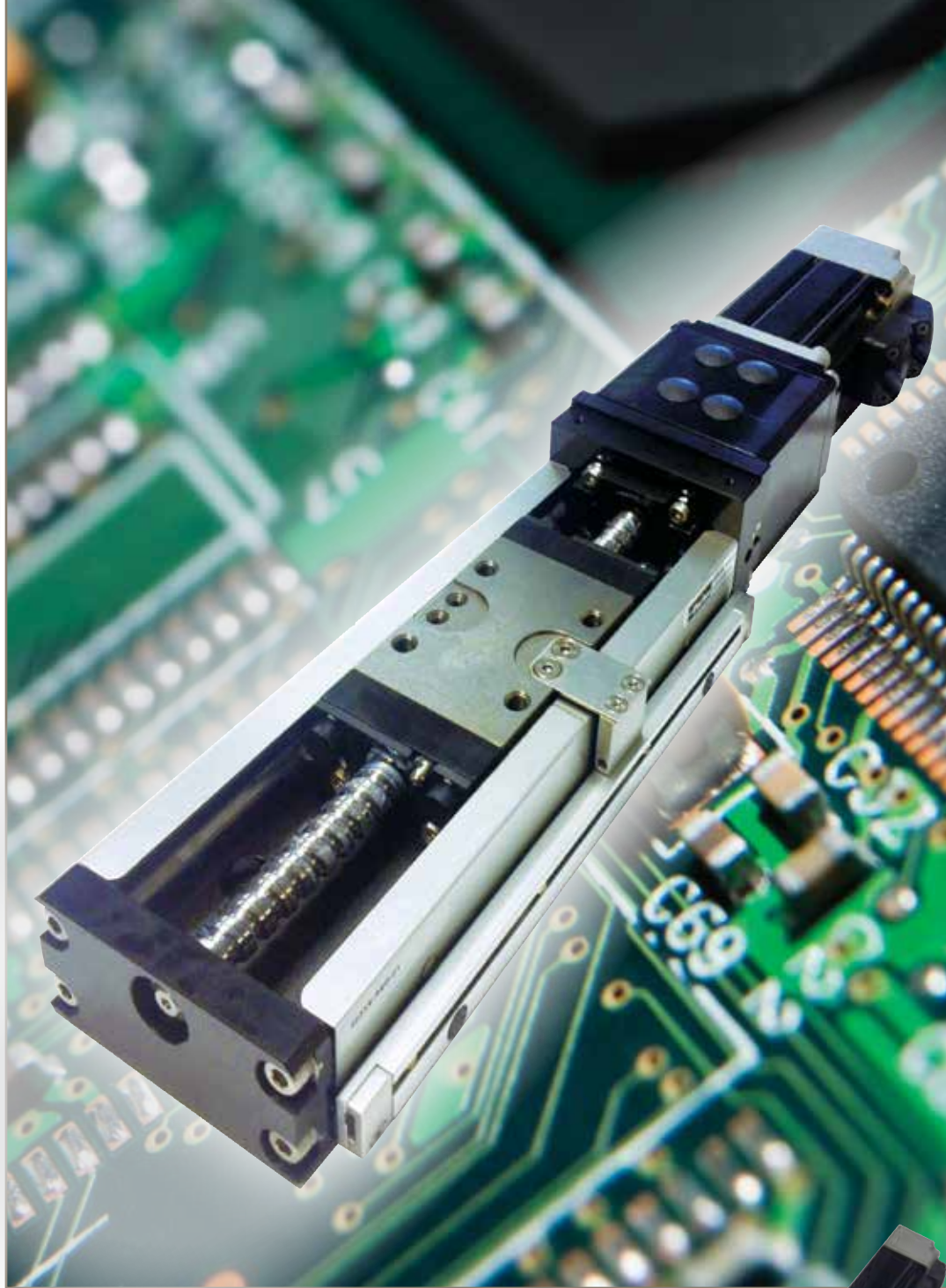


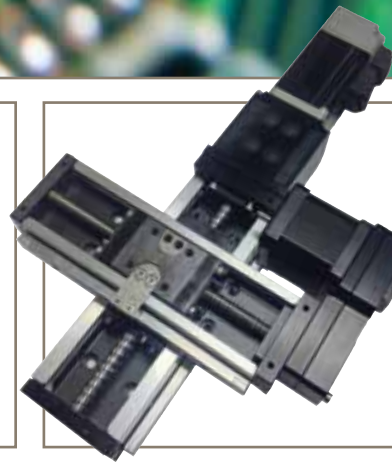


aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



## XE Series Positioners

Miniature, Mono-Carrier Style Linear Positioners



ENGINEERING YOUR SUCCESS.

# XE Series Positioners

## Dependable, Cost-Effective Positioning

Parker's XE series, mono-carrier style linear positioners combine a rugged steel body with an integrated precision ball screw and bearing guide – producing a highly accurate, cost-effective line of linear positioners. The XE series is the ideal linear positioner for applications in the manufacturing of electronics, semi-conductors, or life science applications requiring high precision, long life and compact packaging.

OEM's looking to produce machines that position moderate payloads with tight space constraints should look no further than the XE series of linear positioners. The XE series has superior load-life characteristics when compared to a lead screw



driven positioner in similar packaging. The mono-carrier style arrangement of the XE series gives it the highest payload per packaging of any Parker ball screw driven linear stage.

### XE Series Benefits:

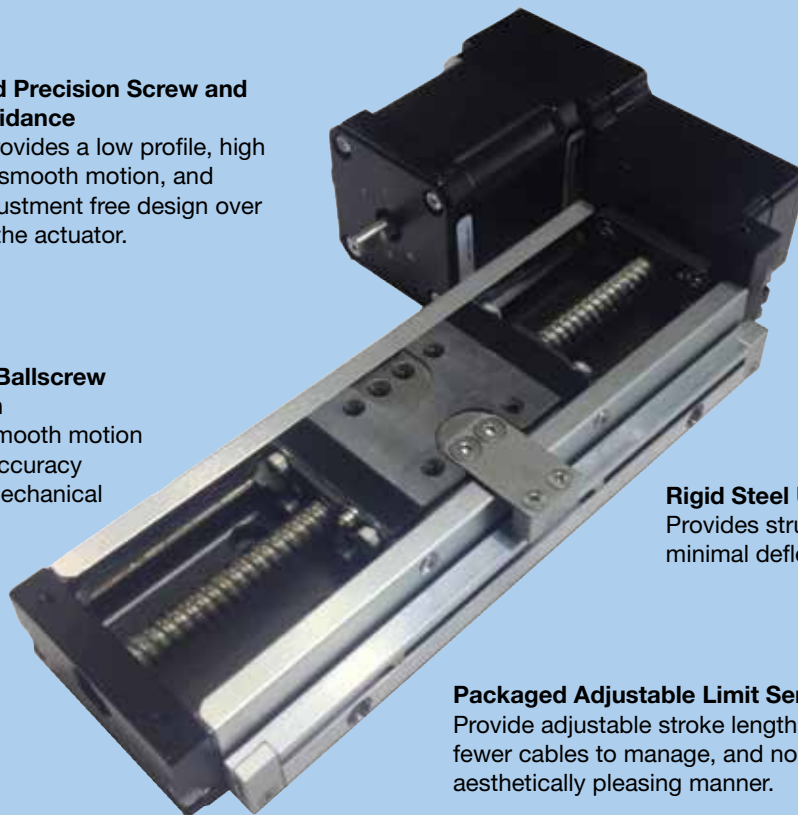
- **Integrated bearing and carriage assembly**
- **Rigid U-channel, steel body**
- **High force per dollar value**
- **Easily adapted into multi-axis configuration**
- **Small package size as compared to actuators with separate bearing arrangements**

### Integrated Precision Screw and Linear Guidance

Bearing provides a low profile, high accuracy, smooth motion, and robust adjustment free design over the life of the actuator.

### Precision Ballscrew Drive Train

Provides smooth motion with high accuracy and high mechanical efficiency.



### Flexible Motor Mounting Options

Provides a variety of motor drive options, including servo and stepper motors, which can either be mounted inline or parallel to the stage.

### Rigid Steel U-Channel Body

Provides structural rigidity for minimal deflection.

### Packaged Adjustable Limit Sensors

Provide adjustable stroke lengths, easily connected, fewer cables to manage, and no pinch points in an aesthetically pleasing manner.

## XE Series Performance Overview

Series	Units	401	402		403	
		2 mm lead	2 mm lead	5 mm lead	5 mm lead	10 mm lead
<b>Travel (max)</b>	mm	160	220	220	655	655
<b>Repeatability</b>						
<b>Inline Motor Mount</b>	μm	±10	±5	±5	±5	±5
<b>Parallel Motor Mount</b>		±30	±15	±30	±30	±60
<b>Breakaway Torque</b>	Nm	0.012	0.06	0.06	0.15	0.15
<b>Maximum Input Speed</b>	rev/sec	50	50	50	50	50
<b>Maximum Velocity</b>	mm/sec	100	100	250	250	500
<b>Maximum Load (Normal and Inverted)</b>	kg	16	90	90	160	160
<b>Maximum Moment</b>						
<b>Pitch</b>	Nm	10	46	46	101	101
<b>Yaw</b>		11	51	51	120	120
<b>Roll</b>		28	134	134	260	260
<b>Screw Diameter</b>	mm	6	8	8	10	10
<b>Screw Efficiency</b>						
<b>Inline Motor Mount</b>	%	90	90	90	90	90
<b>Parallel Motor Mount</b>		86	86	86	86	86
<b>Linear Bearing Coefficient of Friction</b>	-	0.01	0.01	0.01	0.01	0.01
<b>Running Torque</b>	Nm	0.011	0.05	0.05	0.1	0.1
<b>Maximum Axial Load</b>	kg	5	13	17	31	27
<b>Moment of Inertia</b>						
<b>I<sub>x</sub> of Guide Rail</b>	mm <sup>4</sup>	2710	14,400	14,400	38,800	38,800
<b>I<sub>y</sub> of Guide Rail</b>		23,600	137,000	137,000	314,000	314,000
<b>Weight of Carriage</b>	kg	0.05	0.26	0.26	0.3	0.3
<b>Maximum Acceleration</b>	G's	2	2	2	2	2
<b>Rated Duty Cycle</b>	%	100	100	100	100	100



### XE Compliance:

**As standard all XE series positioners are fully compliant to both RoHS and CE Directives.**

# XE Series Positioners

## Travel-Dependent Performance Specifications

### 401 XE

Performance Specification		Units	Travel Length (Order Option Code)		
			01	02	03
2 mm Lead	Travel	mm	60	110	160
	Flatness	μm	15	15	15
	Straightness	μm	15	15	15
	Accuracy				
	Inline Motor Mount	μm	65	70	75
	Parallel Motor Mount		95	100	105
	Input Inertia				
	Inline Motor Mount	kg-m <sup>2</sup> x 10 <sup>-6</sup>	0.122	0.171	0.224
	Parallel Motor Mount		0.327	0.376	0.429
	Weight				
Inline Motor Mount*	kg	0.41	0.49	0.58	

\* Adding the parallel motor mount option adds 0.08 kg for the NEMA 11 option, and 0.10 kg for the NEMA 17 option.

### 402 XE

Performance Specification		Units	Travel Length (Order Option Code)			
			01	02	03	04
2 mm Lead	Travel	mm	70	120	170	220
	Flatness	μm	15	15	15	15
	Straightness	μm	15	15	15	15
	Accuracy					
	Inline Motor Mount	μm	70	75	85	90
	Parallel Motor Mount		85	90	100	105
	Input Inertia					
	Inline Motor Mount	kg-m <sup>2</sup> x 10 <sup>-6</sup>	0.615	0.772	0.929	1.090
	Parallel Motor Mount		0.820	0.977	1.134	1.295
	Weight					
Inline Motor Mount*	kg	1.19	1.40	1.60	1.81	
5 mm Lead	Travel	mm	70	120	170	220
	Flatness	μm	15	15	15	15
	Straightness	μm	15	15	15	15
	Accuracy					
	Inline Motor Mount	μm	70	75	85	90
	Parallel Motor Mount		85	90	100	105
	Input Inertia					
	Inline Motor Mount	kg-m <sup>2</sup> x 10 <sup>-6</sup>	0.741	0.898	1.060	1.210
	Parallel Motor Mount		0.946	1.103	1.265	1.415
	Weight					
Inline Motor Mount*	kg	1.19	1.40	1.60	1.81	

\* Adding the parallel motor mount option adds 0.11 kg for the NEMA 17 option, and 0.15 kg for the NEMA 23 option, 0.12 kg for the SM16 option, and 0.11 kg for the MPE40 option.

# 403 XE

Performance Specification		Units	Travel Length (Order Option Code)							
			01	02	03	04	05	06	07	08
5 mm Lead	Travel	mm	55	105	205	305	405	505	605	655
	Flatness	μm	15	15	15	15	25	25	25	25
	Straightness	μm	15	15	15	15	25	25	25	25
	Accuracy									
	Inline Motor Mount	μm	70	80	90	95	100	110	120	130
	Parallel Motor Mount		100	110	120	125	130	140	150	160
	Input Inertia									
	Inline Motor Mount	kg-m <sup>2</sup> x 10 <sup>-6</sup>	1.720	2.100	2.870	3.630	4.400	5.170	5.930	6.690
	Parallel Motor Mount		1.925	2.305	3.075	3.835	4.605	5.375	6.135	6.900
	Weight									
Inline Motor Mount*	kg	1.85	2.25	2.85	3.55	4.25	4.85	5.55	6.20	
10 mm Lead	Travel	mm	55	105	205	305	405	505	605	655
	Flatness	μm	15	15	15	15	25	25	25	25
	Straightness	μm	15	15	15	15	25	25	25	25
	Accuracy									
	Inline Motor Mount	μm	70	80	90	95	100	110	120	130
	Parallel Motor Mount		130	140	150	155	160	170	180	190
	Input Inertia									
	Inline Motor Mount	kg-m <sup>2</sup> x 10 <sup>-6</sup>	2.500	2.880	3.650	4.420	5.180	5.950	6.700	7.100
	Parallel Motor Mount		2.705	3.085	3.855	4.625	5.385	6.155	6.905	7.305
	Weight									
Inline Motor Mount*	kg	1.85	2.25	2.85	3.55	4.25	4.85	5.55	6.20	

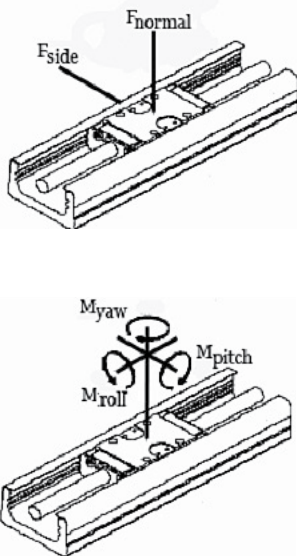
\* Adding the parallel motor mount option adds 0.11 kg for the NEMA 17 motor option, and 0.15 kg for the NEMA 23 option, 0.12 kg for the SM16 option and 0.11 kg for the MPE40 option.

# XE Series Positioners

## Load-Life Performance

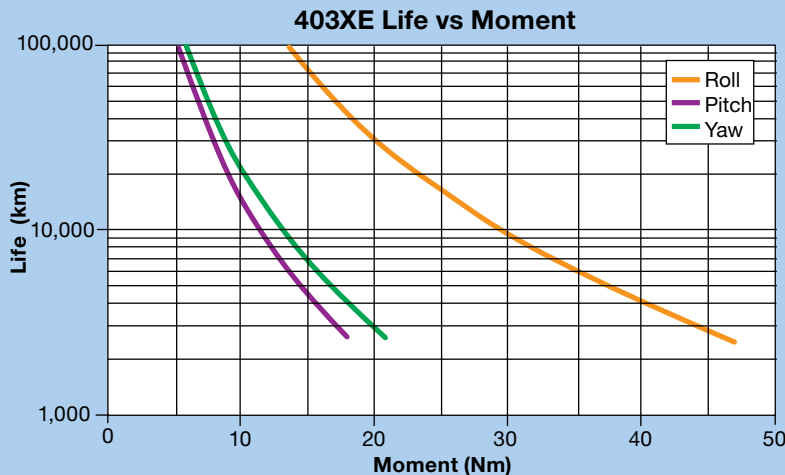
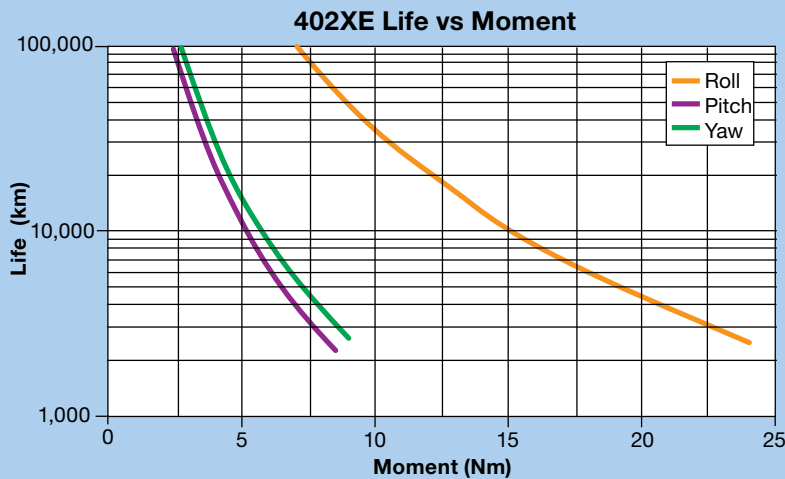
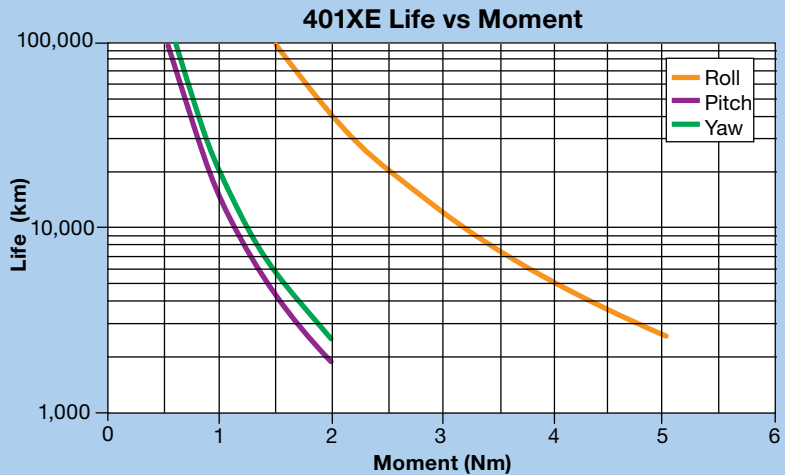
The following performance information is provided as a supplement to the product specification pages. The useful life of a linear table at full catalog specifications is dependent on the forces acting upon it.

These forces include both static components resulting from payload weight, and dynamic components due to acceleration/deceleration of the load. In multi-axis applications, the primary positioner at the bottom of the stack usually establishes the load limits for the combined axes.

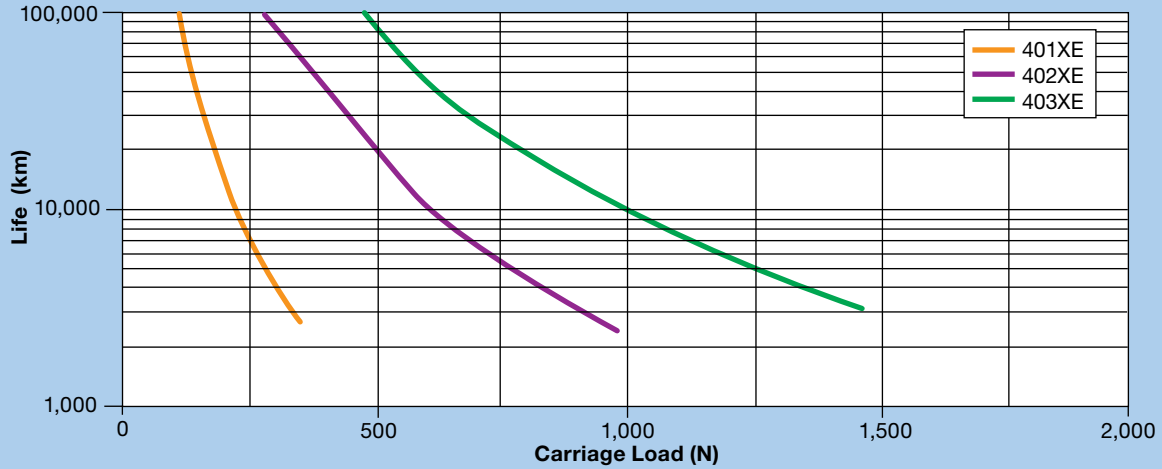


When evaluating life versus load, it is critical to include the weight of all positioning elements that contribute to the load supported by the primary axis. The following graphs are used to establish the table life relative to the applied loads. For more information, download the product manual at [www.parkermotion.com](http://www.parkermotion.com) or contact our applications department at (800) 245-6903.

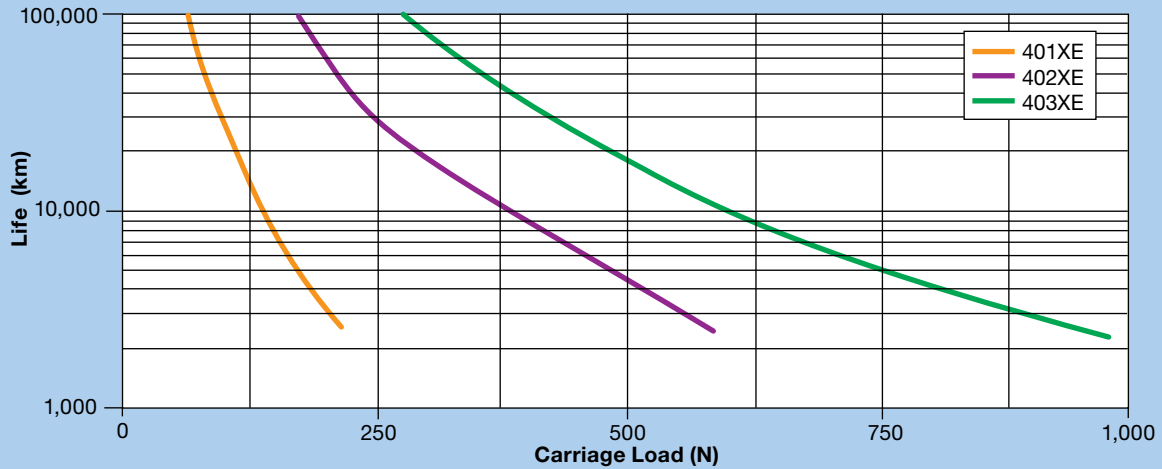
### Carriage Life with Moment



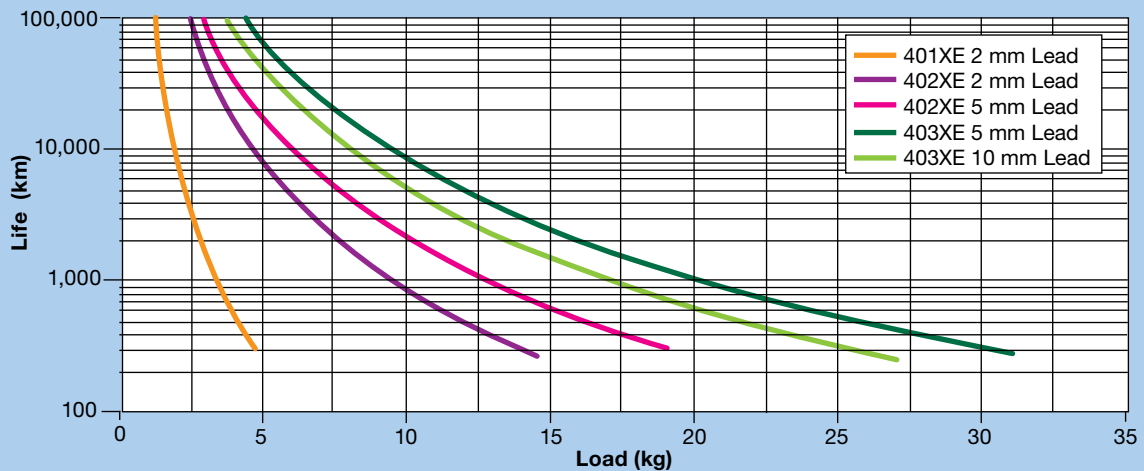
## Carriage Life with Normal or Inverted Load



## Carriage Life with Side Load



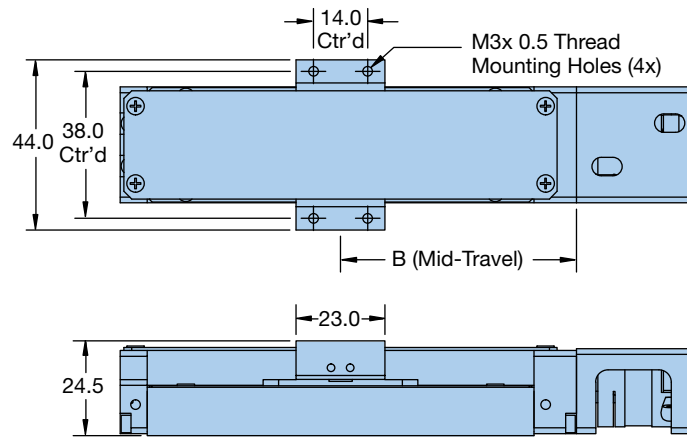
## Ballscrew Life with Axial Load



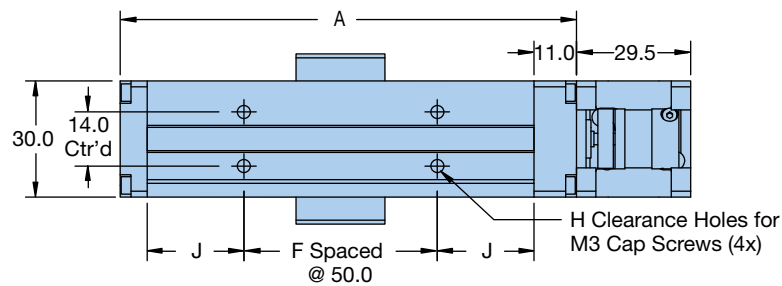
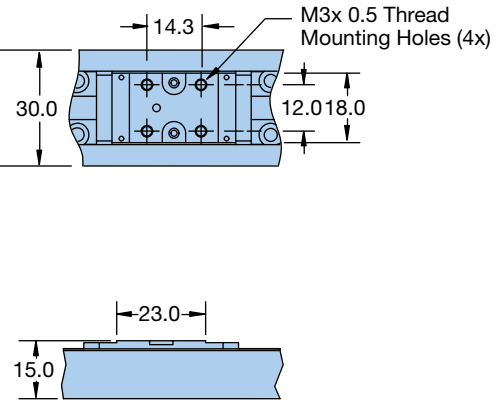
# XE Series Positioners

## 401XE Dimensions (mm)

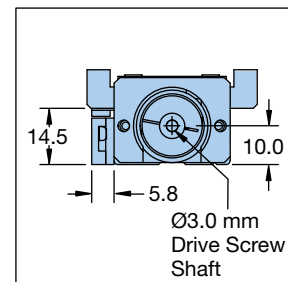
### 401XE with Hard Cover



### 401XE without Hard Cover



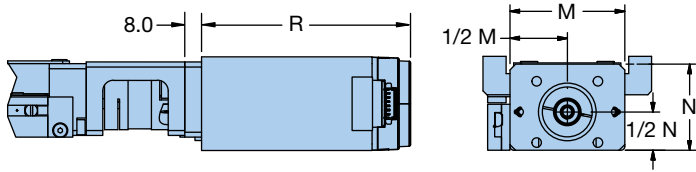
### Optional Limit/Home Sensor



Order Code	Travel (mm)	A	B	F	H	J
01	60	118	61	1	4	25
02	110	168	86	2	6	25
03	160	218	111	3	8	25

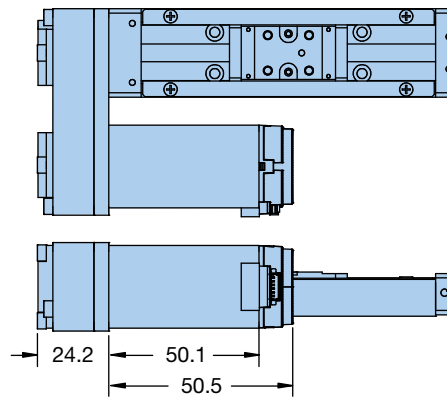
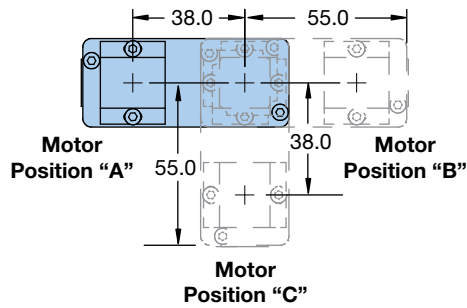


### 401XE with NEMA 11 & 17 Inline Motor

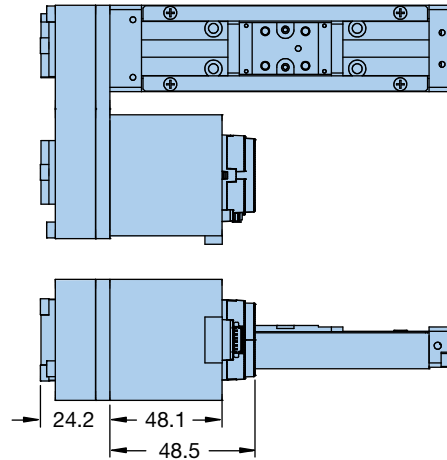
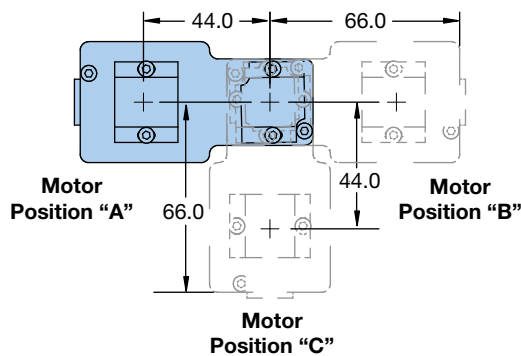


Motor Option	Motor Size	M	N	R
M11	NEMA 11	28.2	28.2	50.5
M17	NEMA 17	43.0	37.0	48.5

### 401XE with NEMA 11 Parallel Motor



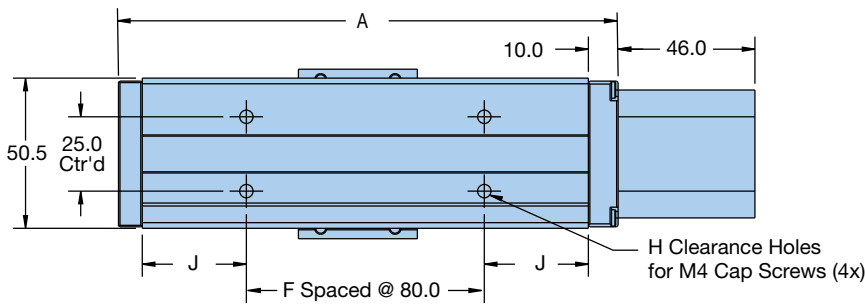
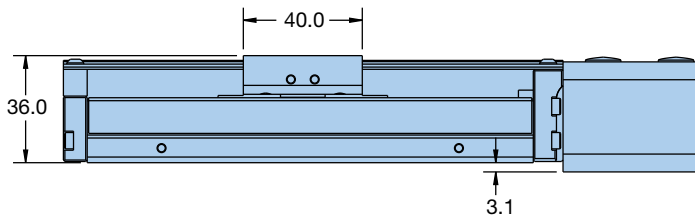
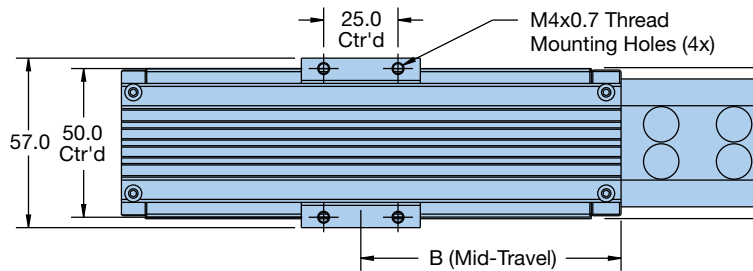
### 401XE with NEMA 17 Parallel Motor



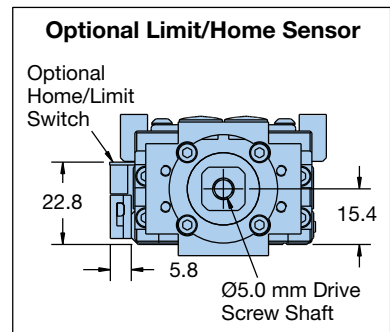
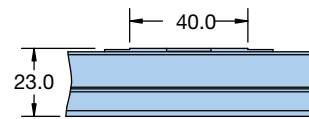
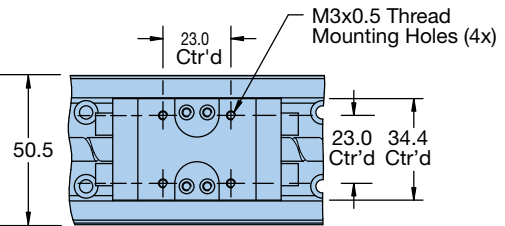
# XE Series Positioners

## 402XE Dimensions (mm)

### 402XE with Hard Cover

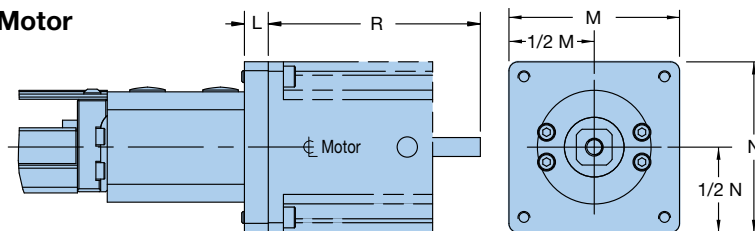


### 402XE without Hard Cover



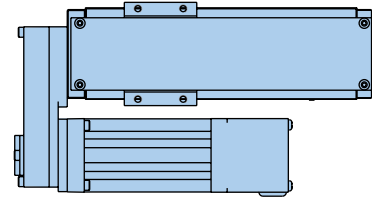
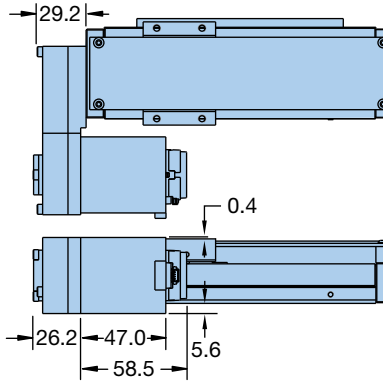
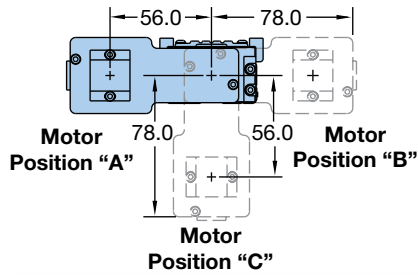
Order Code	Travel (mm)	A	B	F	H	J
01	70	168.0	87.5	1	4	35.0
02	120	218.0	112.5	2	6	20.0
03	170	268.0	137.5	2	6	45.0
04	220	318.0	162.5	3	8	30.0

### 402XE with Inline Motor

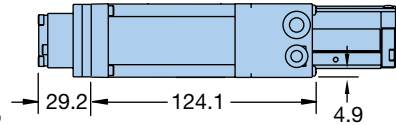
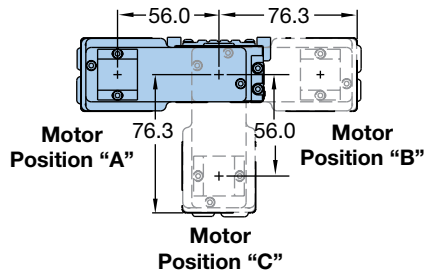


Motor Option	Motor Size	L	M	N	R
M17	NEMA 17	8.0	43.0	37.0	58.5
M16	SM162AE-N10N	8.0	42.2	42.2	136.5
M40	MPE0402A4E-KC1N	8.0	40.6	57.2	90.8
M23	NEMA 23	15.0	40.0	40.0	71.8

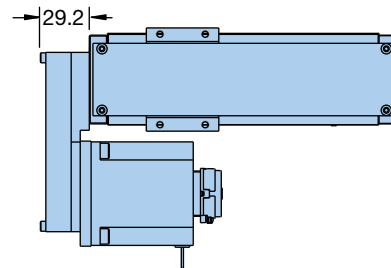
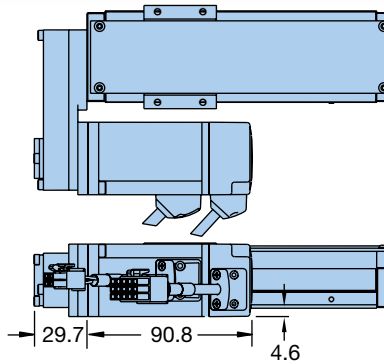
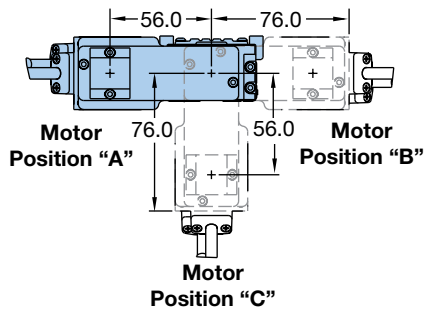
**402XE with  
NEMA 17  
Parallel Motor**



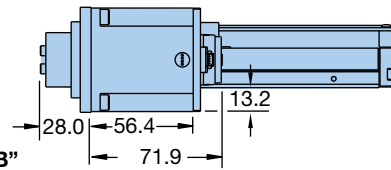
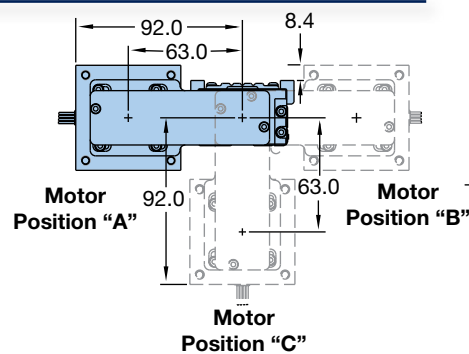
**402XE with  
SM16  
Parallel Motor**



**402XE with  
MPE040  
Parallel Motor**



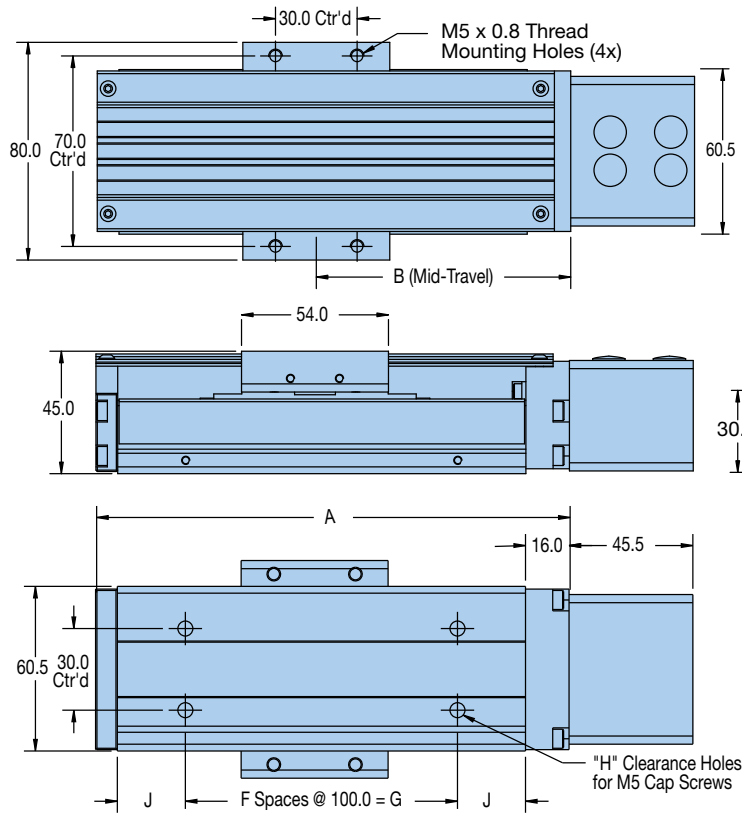
**402XE with  
NEMA 23  
Parallel Motor**



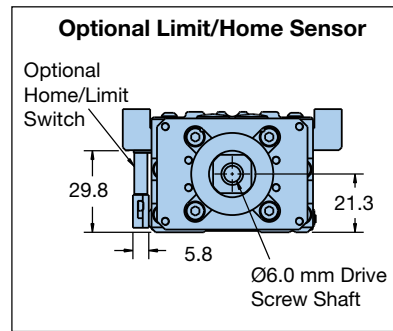
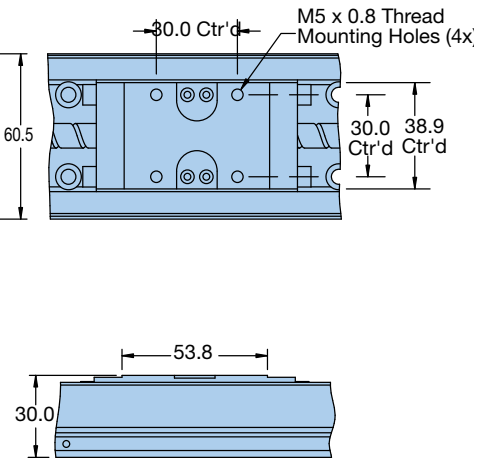
# XE Series Positioners

## 403XE Dimensions (mm)

### 403XE with Hard Cover

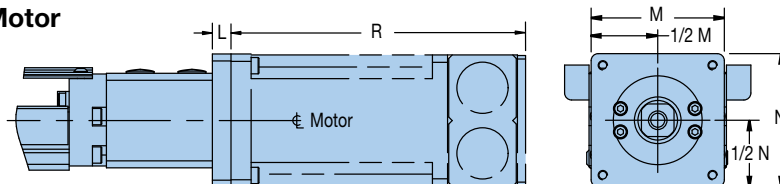


### 403XE without Hard Cover



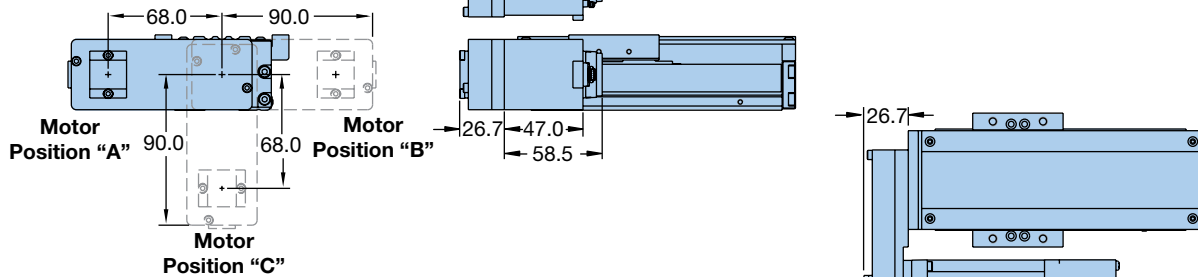
Order Code	Travel (mm)	A	B	F	G	H	J
01	55	174.0	93.5	1	100.0	4	25.0
02	105	224.0	118.5	1	100.0	4	50.0
03	205	324.0	168.5	2	200.0	6	50.0
04	305	424.0	218.5	3	300.0	8	50.0
05	405	524.0	268.5	4	400.0	10	50.0
06	505	624.0	318.5	5	500.0	12	50.0
07	605	724.0	368.5	6	600.0	14	50.0
08	655	774.0	383.5	7	700.0	16	25.0

### 403XE with Inline Motor

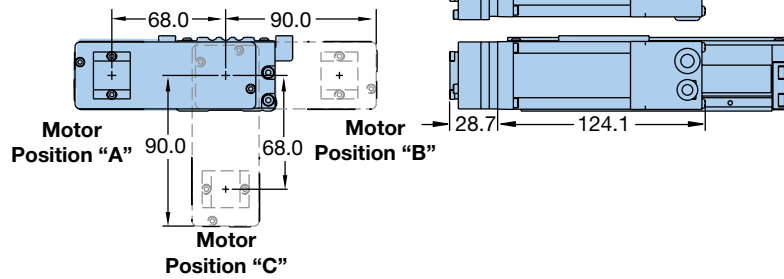


Motor Option	Motor Size	L	M	N	R
M17	NEMA 17	8.0	43.0	37.0	58.5
M16	SM162AE-N10N	8.0	42.2	42.2	136.5
M40	MPE0402A4E-KC1N	8.0	40.6	57.2	90.8
M23	NEMA 23	15.0	40.0	40.0	71.8

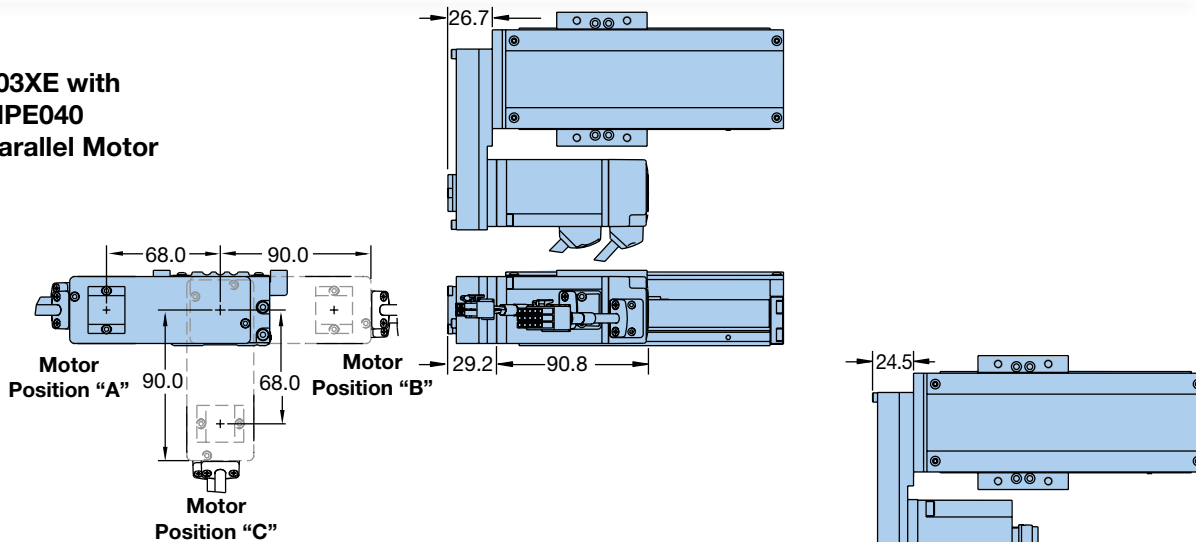
**403XE with  
NEMA 17  
Parallel Motor**



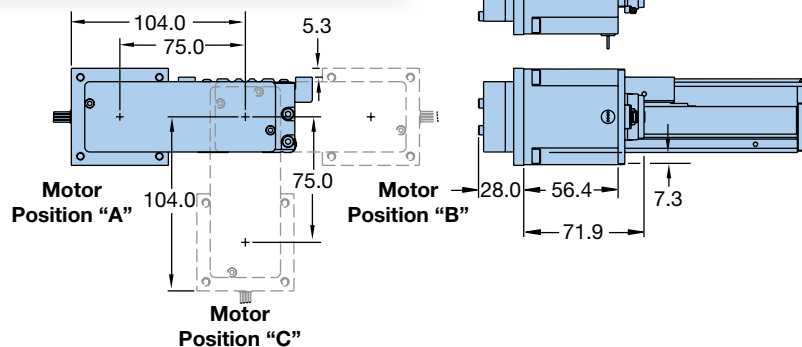
**403XE with  
SM16  
Parallel Motor**



**403XE with  
MPE040  
Parallel Motor**



**403XE with  
NEMA 23  
Parallel Motor**



# XE Series Positioners

## Design Flexibility with Standard Options

The XE Series offers complete flexibility, from motor-mounting options to cleanroom compatibility and a variety of offerings in between. Whether the application calls for a hardcover protection for the linear guide, cleanroom compatible solutions, custom motors mounted at the factory, or an aesthetically appealing engineered limit sensor package, the 401/402/403XE can be customized to fit the task at hand.

### Motor Mounting Flexibility



With standard inline and parallel motor mounting options for the NEMA 11, NEMA 17, NEMA 16, NEMA 23, and other Parker Automation motors, the XE Series allows the user to select the motor of their choice without being restricted to one model. To further customize the application solution, the 401/402/403XE can be ordered ready to mount onto most other manufacturers' motors as well.

### Low-Profile Design



The highly integrated ballscrew and guide bearing design allows for a greatly reduced overall height when compared to traditional stacking of a bearing and screw assembly. This results

in a more compact footprint.

### Rigidity



With the steel U channel body and integrated bearing design, the structural rigidity of the 401/402/403XE is significantly stiffer than most aluminum body positioners. The increased stiffness results in reduced overall cost due to the elimination of support structures.

### Hardcover Protection



For added protection to the bearing system and drive train, an optional hardcover is available. This will bring the positioner to an IP20 rating and prevent large particles from entering and damaging the screw or bearings.

### Cleanroom & Raydent Coatings

Cleanroom ratings are possible with the XE product. The actual cleanroom rating will be dependent upon such variables as the location of the sniffer device, the velocity of the table, etc. Consult the factory for specific cleanroom-capability details or



test results.

### Riser Plates

Most of the motors used with the 401/402/403XE and some of the 404XE motors have a taller profile than the positioner. Thus the motor can interfere with the positioner mounting surface. To accommodate riser plates can be provided to space the unit above the mounting surface. See XE product manual for dimensional details and part numbers. Also available are X-Y transition plates for XE to XE mounting.

### Demo Units



Order 803-0346 for a multi-axis demo unit to learn the product and display for shows and presentations. The demo will come in a watertight pelican carrying case and will be ready for demonstration programmed from the factory.

## Packaged Limit Sensors

The XE series uses the Parker global mini sensors for home and limit sensing. These sensors are packaged within a miniature sensor housing which allows the flying-leads style cables to exit with 3 meters of cable from the point of the sensor. To further accommodate each application's unique needs, the sensors can be specified as either NPN, PNP, normally open, or normally closed varieties. The unmatched design of the sensor pack on the XE series, allows for fully adjustable sensors along the travel length of the positioner, which creates no pinch points for other cables or hoses to be sliced.

The limit/home switch installed on the XE series is a Hall effect sensor tripped by a magnet located on a flag which is attached to the moving carriage. On the switch body an LED indicates activation. Normally open sensors are typically used for home sensing and normally closed are typically used for limits. With a current sinking sensor, the output lead provides a path to ground when activated, and with a current sourcing sensor, the output lead provides a positive (+) voltage potential relative to ground. Refer to your controller's manual for sensor compatibility. Limit/home switch information is below.



Limit sensor mounting screws are reverse-thread style so tightening the screw loosens the limit sensor in the track and vice versa.

### Specifications

**Operating Voltage:** 10-30 VDC

**Repeatability:**  $\leq \pm 0.1$  mm

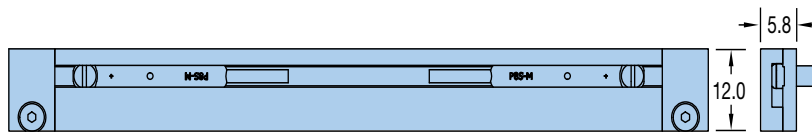
**EMC:** EN 60 947-5-2

**Short circuit protections:** Yes

**Reverse Polarity Protection:** Yes

**Enclosure Rating:** IP 67

**Operating Temperature Range:** -25° to 75° C (-13° to 167° F)



### Spare Limit/Home Sensors






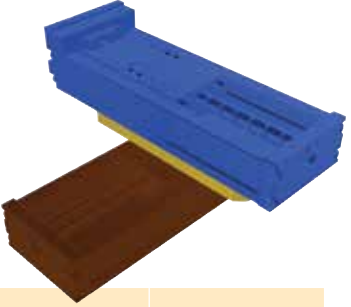
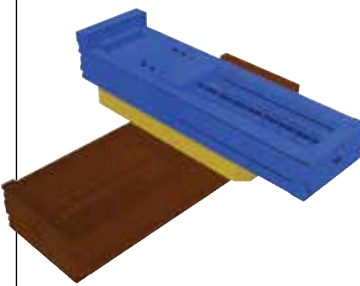
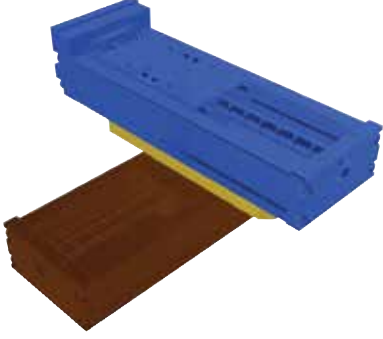
Part Number	Switching Type	Logic	Cabling
P8S-MMFLY	NPN	NC	3 Meter, Flying Leads
P8S-MNFLY	NPN	NO	
P8S-MPFLY	PNP	NO	
P8S-MQFLY	PNP	NC	

### Wiring Connection

Pin	Wire	Function
1	Brown	+ VDC
4	Black	NO
3	Blue	- VDC

# XE Series Positioners

## Design Flexibility with Standard X-Y Bracket Options

X-Axis	Y-Axis					
	401XE		402XE		403XE	
	Y-Axis Travel Length Order Code	X-Y Bracket Part Number	Y-Axis Travel Length Order Code	X-Y Bracket Part Number	Y-Axis Travel Length Order Code	X-Y Bracket Part Number
401XE						
	01 – 03	002-2975-01				
402XE						
			01	002-2819-01		
	01 – 03	002-2976-01	02 – 04	002-2820-01		
403XE						
			01	002-2821-01	01	002-2821-01
	01 – 03	002-2977-01	02 – 04	002-2822-01	02 – 04	002-2822-01
404XE						
			02 – 08	002-2823-01	02 – 08	002-2823-01



# XE Ordering Information

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
Order Example:	401	01	XE	S	D9	H0	L0	L	N00	C1	E0	R0

## ① Series

**401**  
**402**  
**403**

## ② Travel (mm)

	401XE	402XE	403XE
<b>01</b>	60	70	55
<b>02</b>	110	120	105
<b>03</b>	160	170	205
<b>04</b>	—	220	305
<b>05</b>	—	—	405
<b>06</b>	—	—	505
<b>07</b>	—	—	605
<b>08</b>	—	—	655

## ③ Family

**XE** XE Series

## ④ Grade

**S** Standard

## ⑤ Drive Screw <sup>□</sup>

**D9** 2 mm lead (401, 402 only) <sup>1)</sup>  
**D2** 5 mm lead (402, 403 only) <sup>2)</sup>  
**D3** 10 mm lead (403 only) <sup>3)</sup>

<sup>1)</sup> D9 is a quick ship option for all 401XE travel options and 01 – 02 options for the 402XE.

<sup>2)</sup> D2 is a quick ship option for the 03 – 04 for the 402XE, and the 01, 02 and 03 option for the 403XE.

<sup>3)</sup> D3 is a quick ship option for the 04 – 06 options for the 403XE

## ⑥ Home Sensor (Qty 1)

**H0** No home sensor <sup>□</sup>  
**HA** NPN, N.C., flying leads <sup>□</sup>  
**HB** NPN, N.O., flying leads <sup>□</sup>  
**HC** PNP, N.C., flying leads <sup>□</sup>  
**HD** PNP, N.O., flying leads <sup>□</sup>

## ⑦ Limit Sensors (Qty 2)

**L0** No limits sensors <sup>□</sup>  
**LA** NPN, N.C., flying leads <sup>□</sup>  
**LB** NPN, N.O., flying leads <sup>□</sup>  
**LC** PNP, N.C., flying leads <sup>□</sup>  
**LD** PNP, N.O., flying leads <sup>□</sup>

## ⑧ Motor Mount Orientation

**L** Inline motor mounting <sup>□</sup>  
**A** Parallel motor mounting\*  
**B** Parallel motor mounting\*  
**C** Parallel motor mounting\*

\* Refer to dimension drawings for orientation

## ⑨ Motor option

**N00** No motor mount<sup>□</sup>  
**N11** NEMA 11 motor mount<sup>1)□</sup>  
**N17** NEMA 17 motor mount<sup>□</sup>  
**N16** SM 16 servo motor mount<sup>2)□</sup>  
**N40** MPE 040 servo motor mount<sup>2)□</sup>  
**N23** NEMA 23 inline motor mount<sup>2)</sup>  
**M11** NEMA 11 stepper motor<sup>1)</sup>  
**M17** NEMA 17 stepper motor  
**M16** SM162AE-N10N servo motor, 1000 line encoder<sup>2)</sup>  
**M40** MPE 0402A4E-KC1N<sup>2)</sup>  
**M23** NEMA 23 stepper motor<sup>2)</sup>

<sup>1)</sup> 401XE only

<sup>2)</sup> Not available on 401XE

## ⑩ Motor Coupling

**C1** No coupler  
**C2** 0.25" Oldham  
**C3** 0.25" Bellows  
**C4** 0.375" Oldham  
**C5** 0.375" Bellows  
**C6** 5 mm Oldham  
**C7** 5 mm Bellows  
**C8** 8 mm Oldham  
**C9** 8 mm Bellows

## ⑪ Motor Encoder

**E0** No encoder  
**E2** 500 line encoder  
(Available only with M11, M17, M23 motor options)

## ⑫ Environmental Option

**R0** No cover <sup>□</sup>  
**R1** Hard cover <sup>□</sup>

### <sup>□</sup> Need an XE in a Hurry?

The <sup>□</sup> above designates quick ship options, that will give fastest delivery possible. These options are only good for the stroke and screw combinations denoted above, with any home and limit sensor option, inline motor mounts only, and are available with or without the hard cover option.

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