XE Series
Screw-Driven Positioners

Parker high-precision screw driven tables are divided into families (or groups) which are distinguished by the primary bearing style and precision. All tables are offered with several drive mechanism options and are designed for direct connection to standard frame size stepper or servo motors. Parker offers the most comprehensive array of products in the industry and advanced product development. Screw-driven products integrate seamlessly with other Parker components including servo motors, motor drives, controls, interfaces, actuators, pneumatics, and structural components. Products are available with modular construction from standard catalog tables or custom systems designed and built to specification for any application.

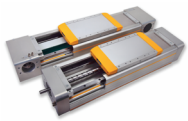
Parker Screw-Driven Industrial Systems

- Easy, multi-axis connectivity
- Submicron precision
- Velocities up to 1.5 meters/second
- Cleanroom and vacuum compatible
- Thorough testing and certification

XR Series Precision Screw-Driven Positioners

The XR product family offers consistent accuracy, reliable performance, high strength, and unmatched versatility.
View Here

HMR High Moment Rodless Series Industrial Screw Driven Positioners



The user-friendly and versatile HMR has enormous moment and payload capacity bundled in a low-profile, yet sleek package. The HMRS is powerful and precise.
View Here

XE Series Economy Screw-Driven Positioners

Rugged steel body construction, integrated precision ballscrew, and bearing guide in a highly accurate, cost-effective line of positioners.

404XE Series Screw-Driven Positioners

The 404XE positioners combine versatility with rugged construction in a compact motion platform that is ideal for 24/7 process automation.
View Here

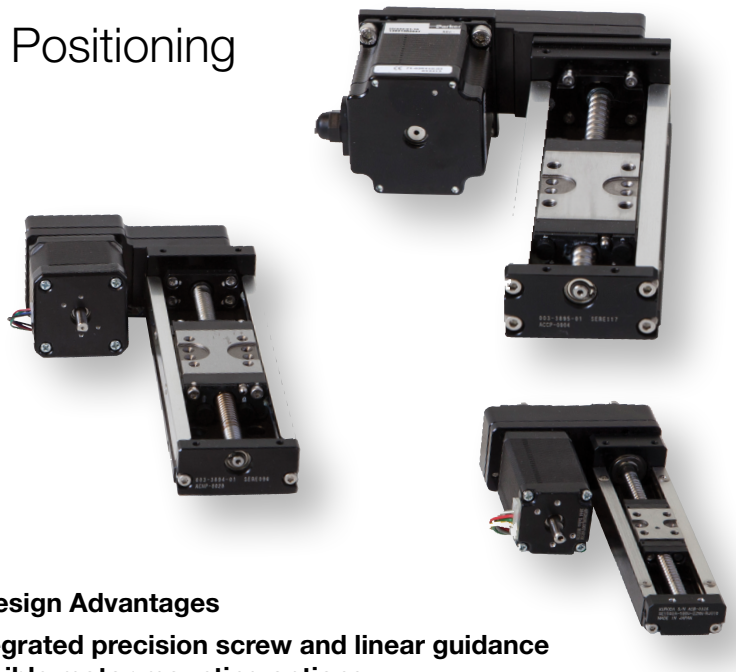
OSPE-SB and OSPE-ST Medium-Capacity Screw Driven Positioners

The OSPE offers reliability, performance, easy handling, and optimized design flexibility. Ballscrew for precise positioning and Trapezoidal Screw for zero backdrive.
View Here

XE Series Positioners

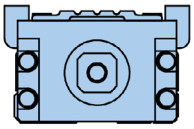
Dependable, Cost-Effective Positioning

- **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**

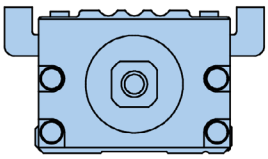


Key Design Advantages

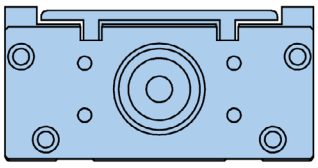
- **Integrated precision screw and linear guidance**
- **Flexible motor mounting options**
- **Rigid steel U-Channel body**
- **Packaged adjustable limit sensors**
- **Precision ballscrew drive train**



401XE



402XE



403XE

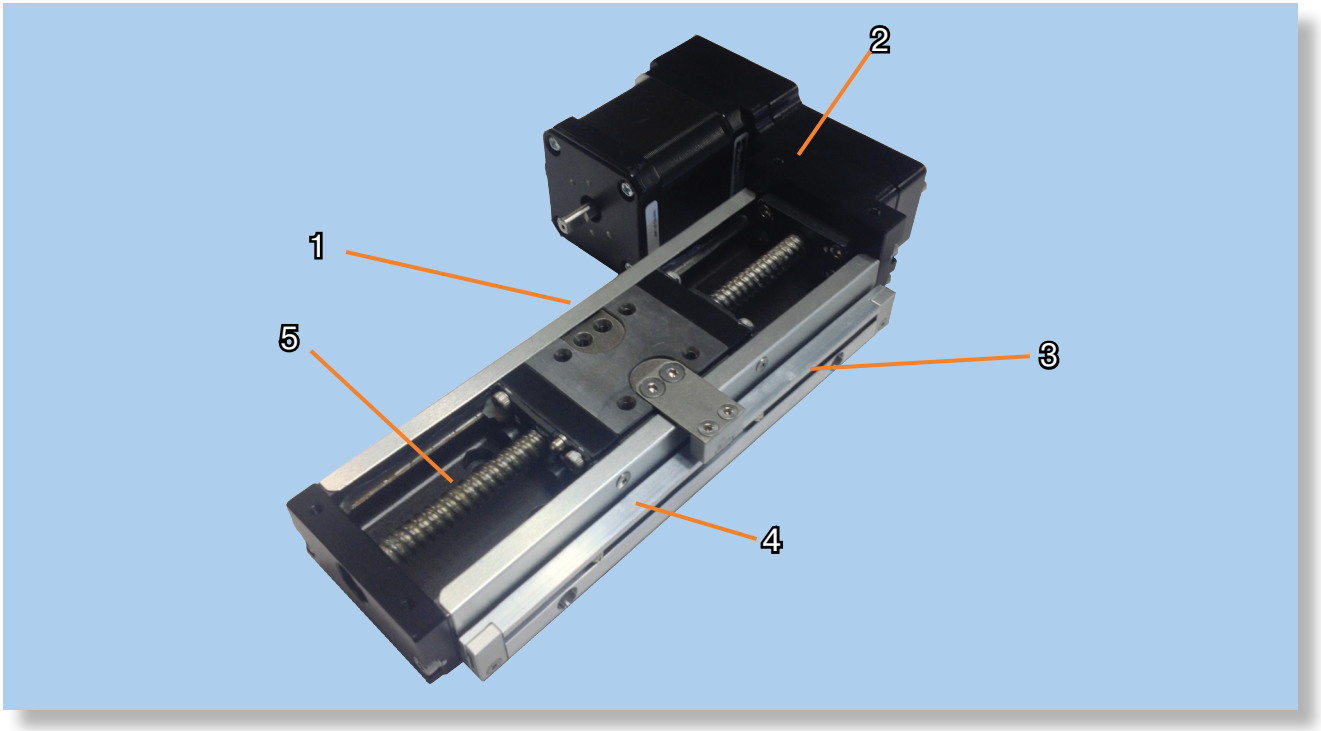
	401XE	402XE	403XE
Maximum Travel (mm)	160	220	655
Maximum Payload (N)	156	882	1,569
Maximum Acceleration (m/s²)	20	20	20

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

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. 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.



1 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.

2 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.

3 Rigid Steel U-Channel Body

Provides structural rigidity for minimal deflection. 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.

4 Packaged Adjustable Limit Sensors

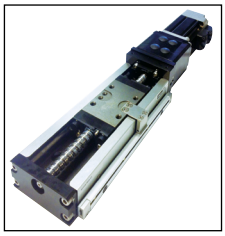
Provide adjustable stroke lengths, easily connected, fewer cables to manage, and no pinch points in an aesthetically pleasing manner.

5 Precision Ballscrew Drive Train

Provides smooth motion with high accuracy and high mechanical efficiency.

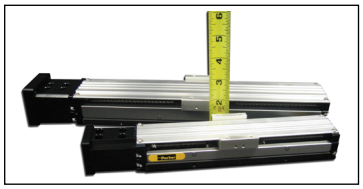
Motor Mounting Flexibility

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.



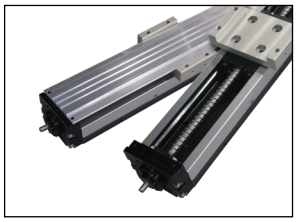
Low-Profile Design

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.



Hardcover Protection

or 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.



SPECIFICATIONS

The XE series combines a rugged steel body construction with an integrated precision ball screw and bearing guide producing a highly accurate, cost effective line of tables ideal for applications in the hard disk, semiconductor, medical, machine building and many other industries.

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

Travel-Dependent Performance Specifications

401 XE

			Travel Length (Order Option Code)		
	Performance Specification	**Units**	**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^2 x 10^{-6}	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

			Travel Length (Order Option Code)			
	Performance Specification	**Units**	**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^2 x 10^{-6}	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^2 x 10^{-6}	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, 0.15 kg for the NEMA 23 option, and 0.12 kg for the SM16 option.

Travel-Dependent Performance Specifications

403 XE

			Travel Length (Order Option Code)							
	Performance Specification	**Units**	**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^2 x 10^{-6}	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^2 x 10^{-6}	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, 0.15 kg for the NEMA 23 option, and 0.12 kg for the SM16 option.

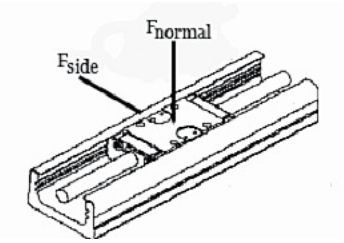
Standard XY Mounting Configurations with other XE products

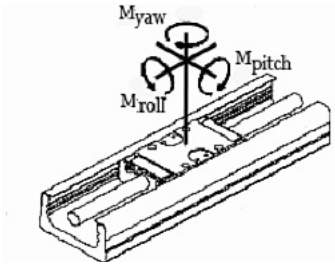
	Top Stage			
Bottom Stage	**401XE**	**402XE**	**403XE**	**404XE**
401XE	X			
402XE	X	X		
403XE	X	X	X	
404XE		X	X	X

XE Series 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.

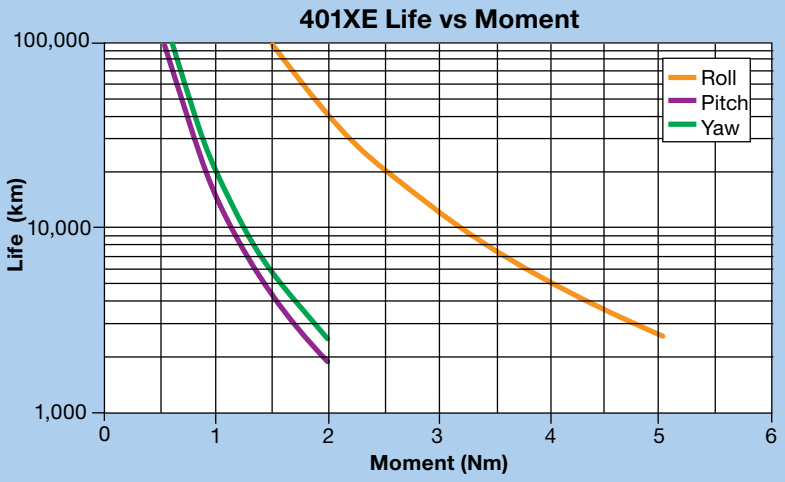
These forces include both static components resulting from payload weight, and dynamic components due to acceleration/deceleration of the load. In multi-axis applications, the primary positioner at the bottom of the stack usually establishes the load limits for the combined axes.

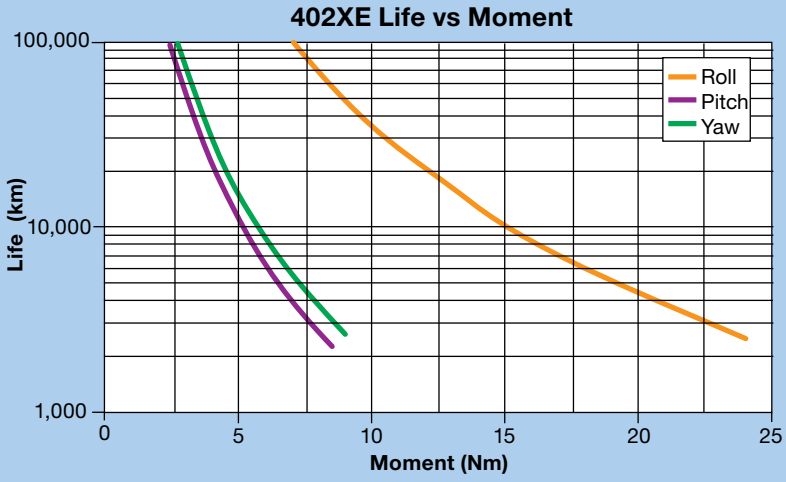


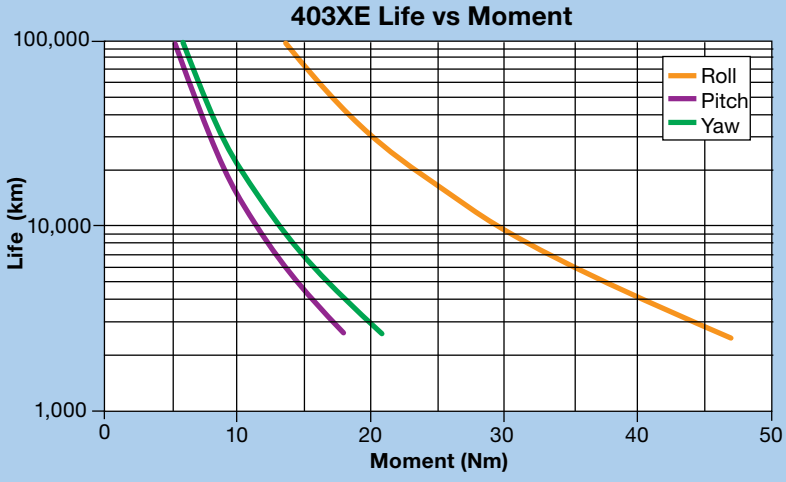


When evaluating life versus load, it is critical to include the weight of all positioning elements that contribute to the load supported by the primary axis. The following graphs are used to establish the table life relative to the applied loads. For more information, download the product manual at **parker.com/emc**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

Carriage Life with Moment

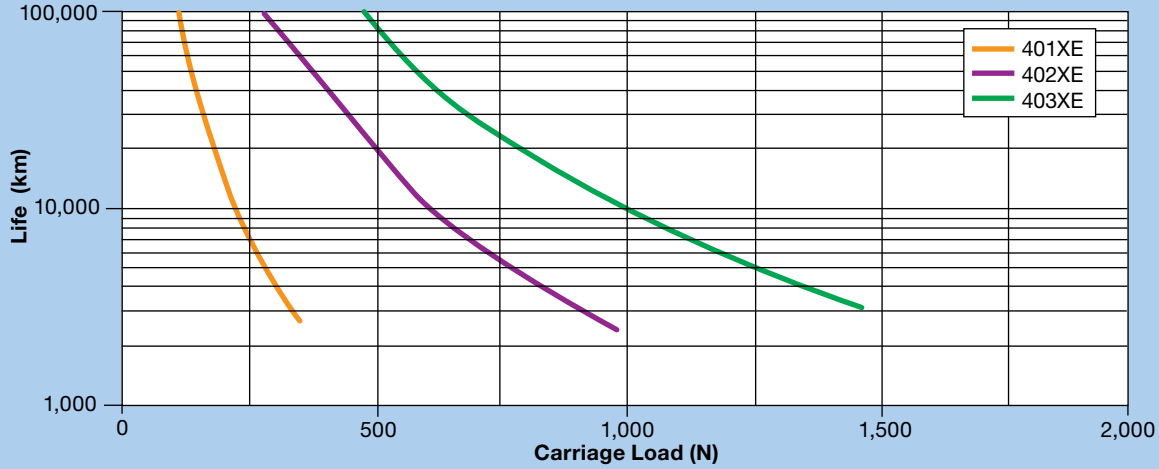




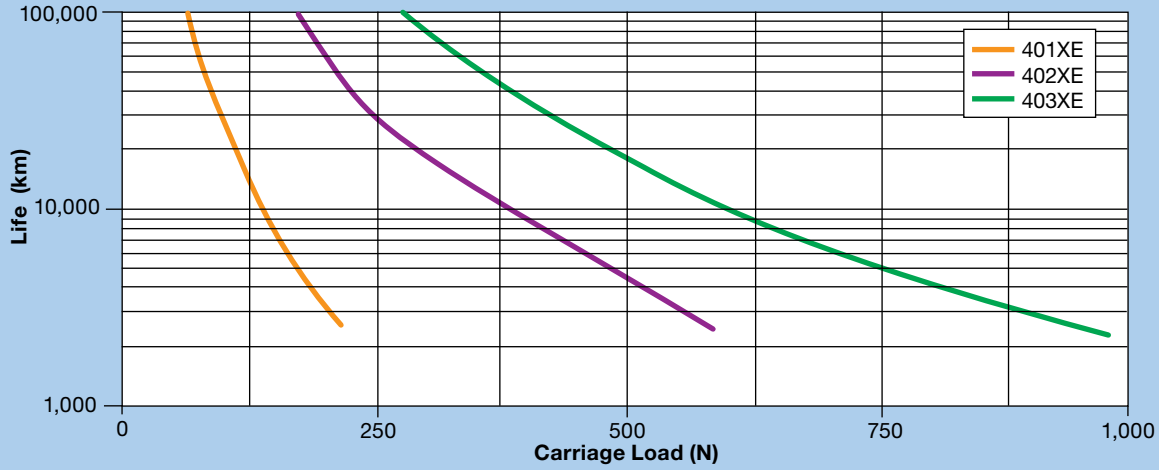


XE Series Load-Life Performance

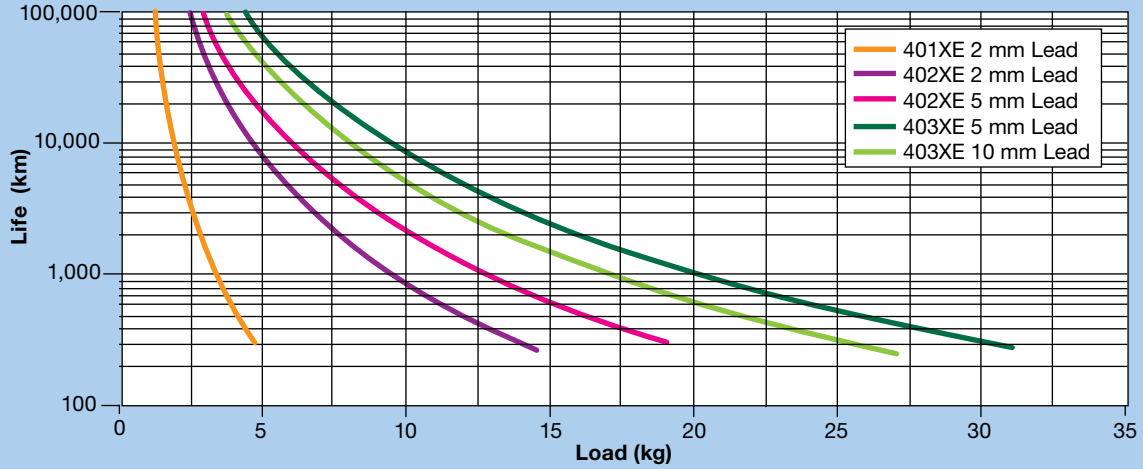
Carriage Life with Normal or Inverted Load



Carriage Life with Side Load



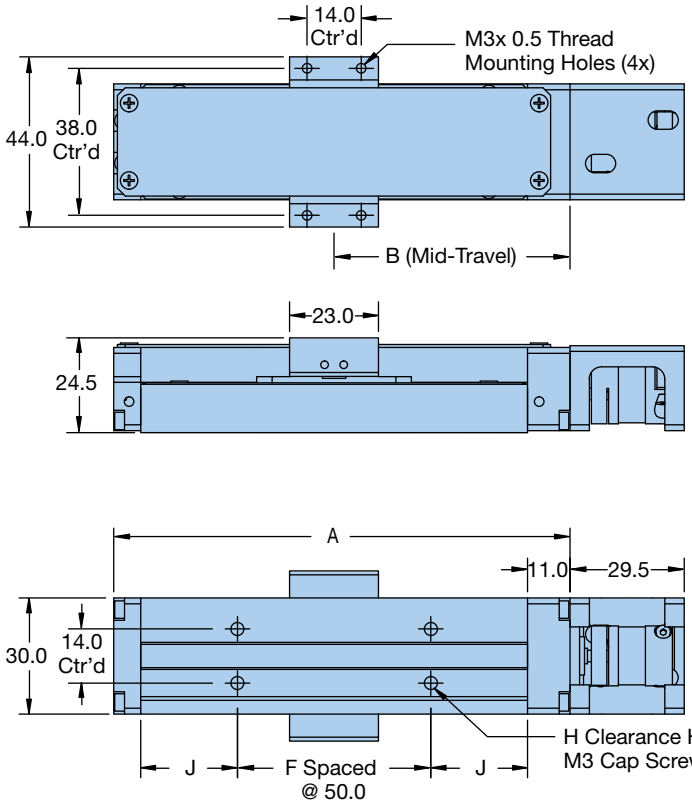
Ballscrew Life with Axial Load



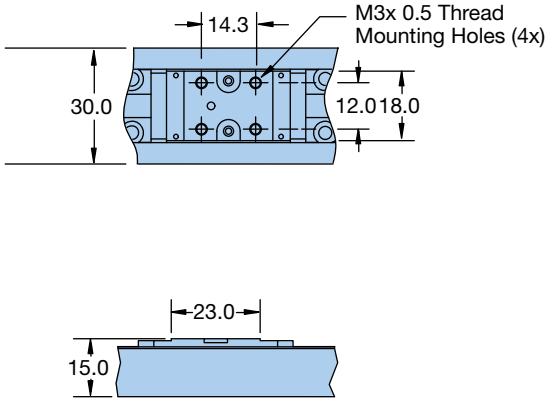
DIMENSIONS

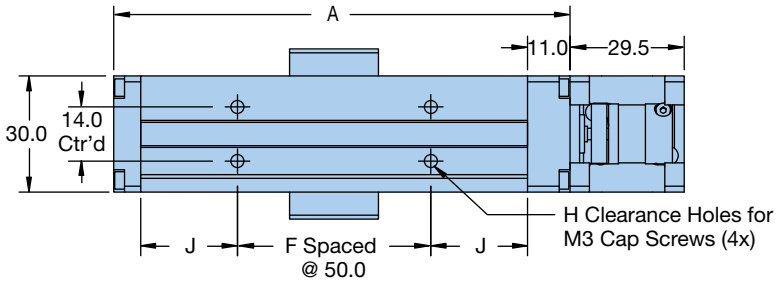
401XE Dimensions (mm)

401XE with Hard Cover

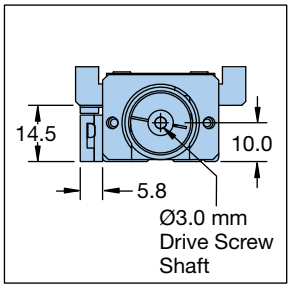


401XE without Hard Cover



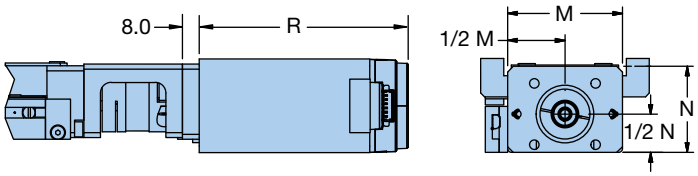


Optional Limit/Home Sensor



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

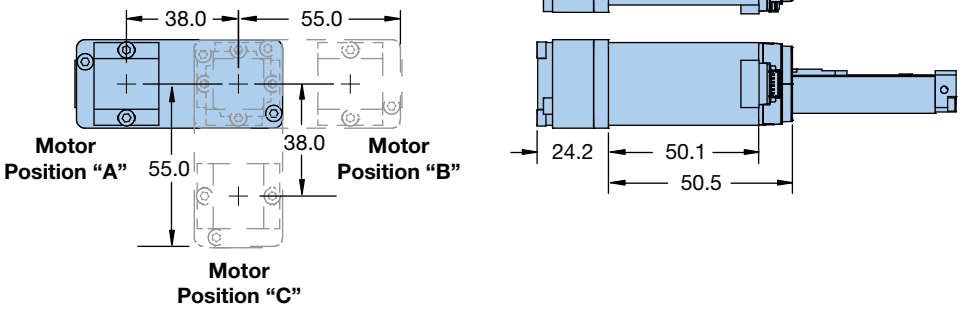
401XE with NEMA 11 & 17 Inline Motor



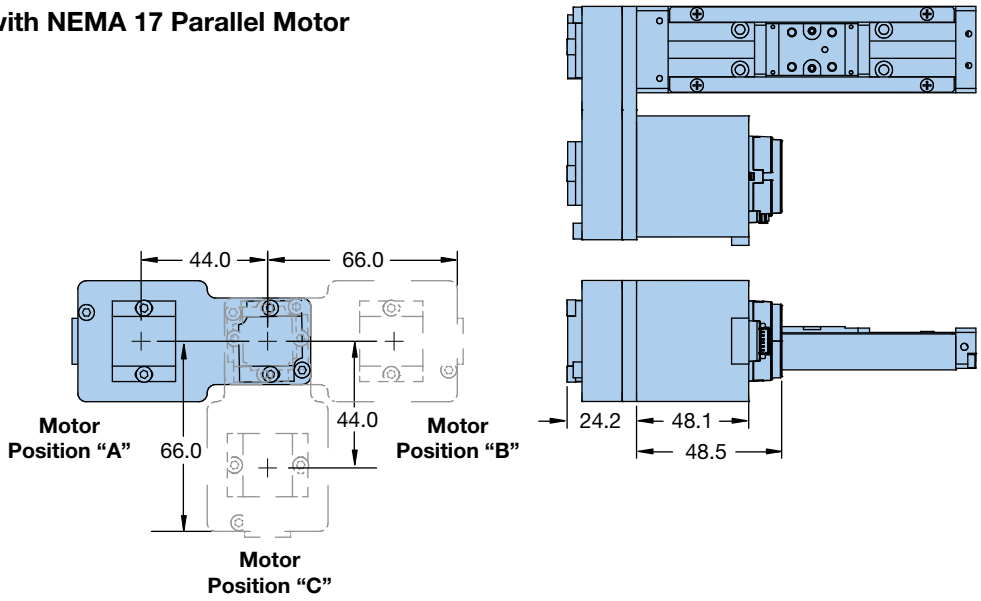
Motor Option*	Motor Size	M	N	R
M11	NEMA 11	28.2	28.2	50.5
M17	NEMA 17	43.0	37.0	48.5

***When configuring an XE stage and selecting your motor option in Ordering Information, note that the "M" motor options come with motors while "N" options are only prepped for those motors.**

401XE with NEMA 11 Parallel Motor



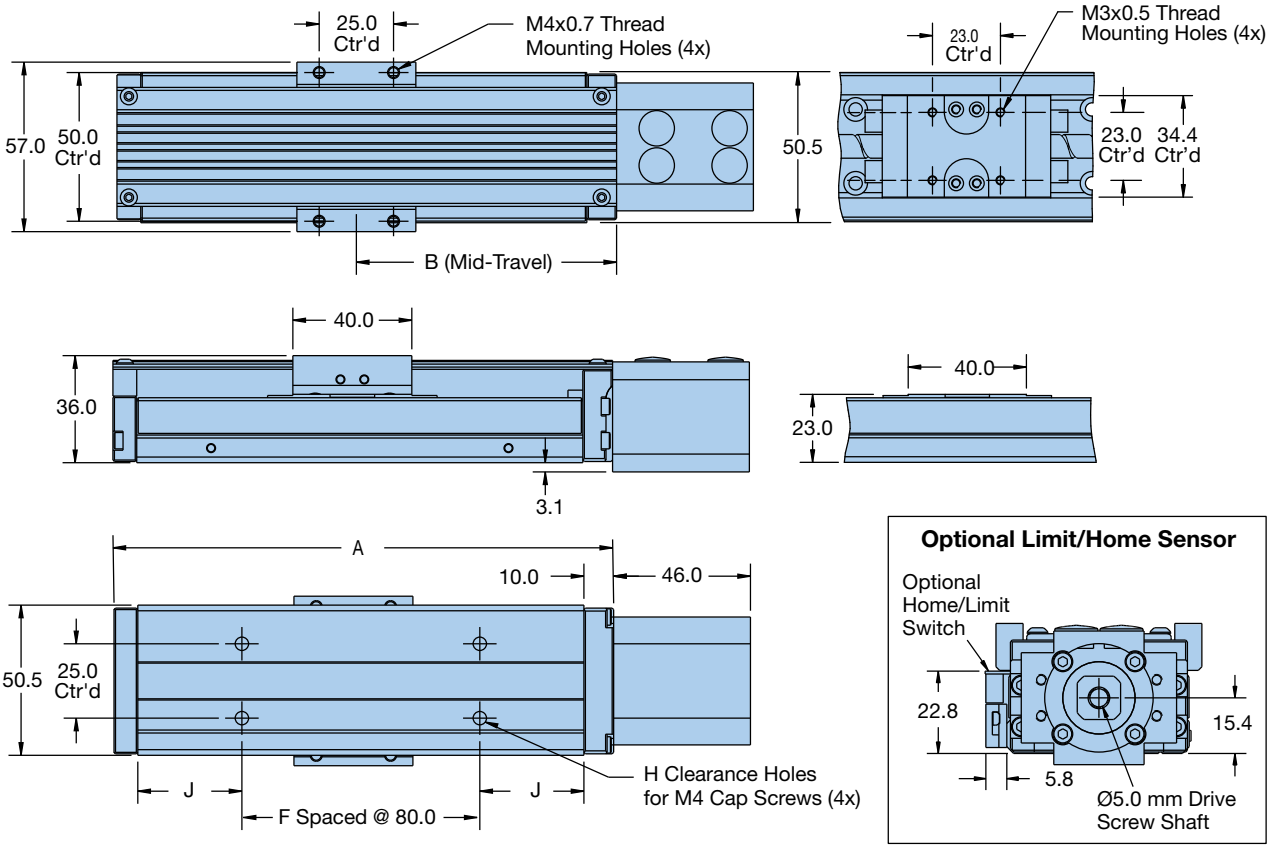
401XE with NEMA 17 Parallel Motor



402XE Dimensions (mm)

402XE with Hard Cover

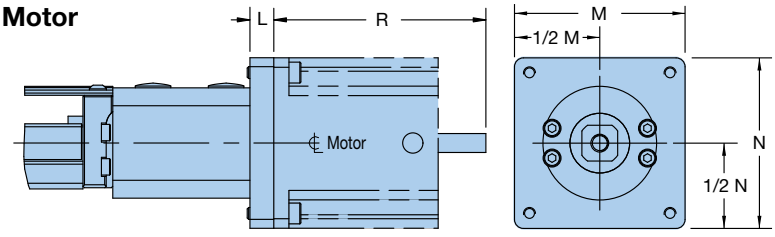
402XE without Hard Cover



Optional Limit/Home Sensor

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



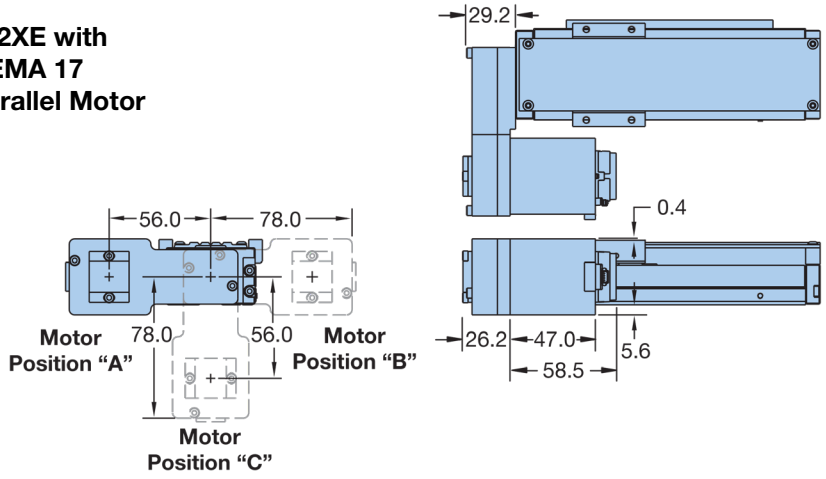
Rear shaft not available on SM162

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
M23	NEMA 23	8.0	57.2	57.2	51.2

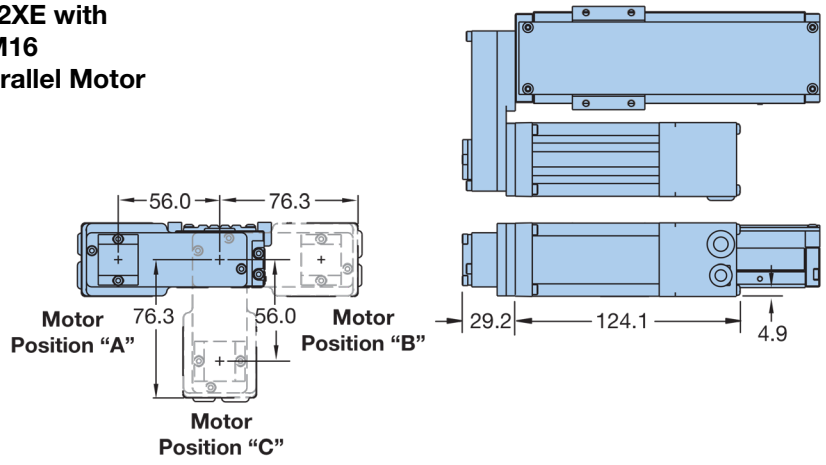
***When configuring an XE stage and selecting your motor option in Ordering Information, note that the "M" motor options come with motors while "N" options are only prepped for those motors.**

402XE Dimensions (mm)

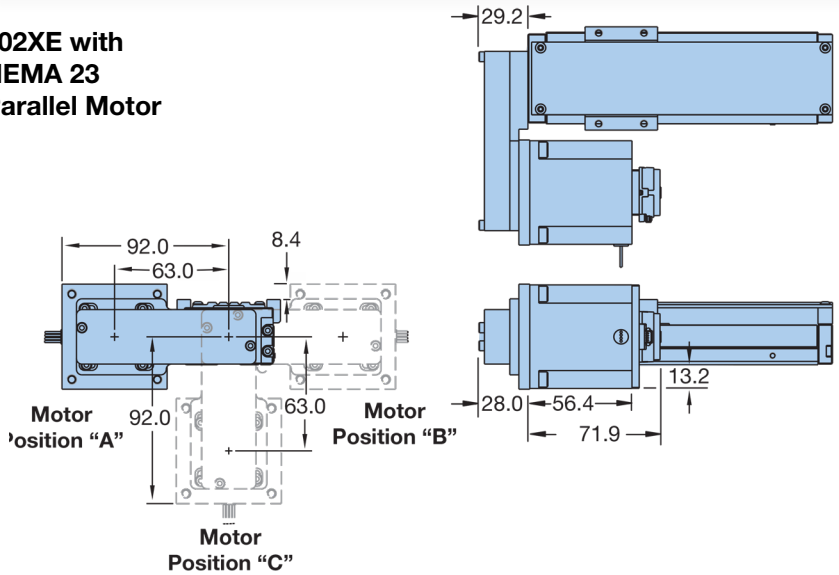
402XE with NEMA 17 Parallel Motor



402XE with SM16 Parallel Motor

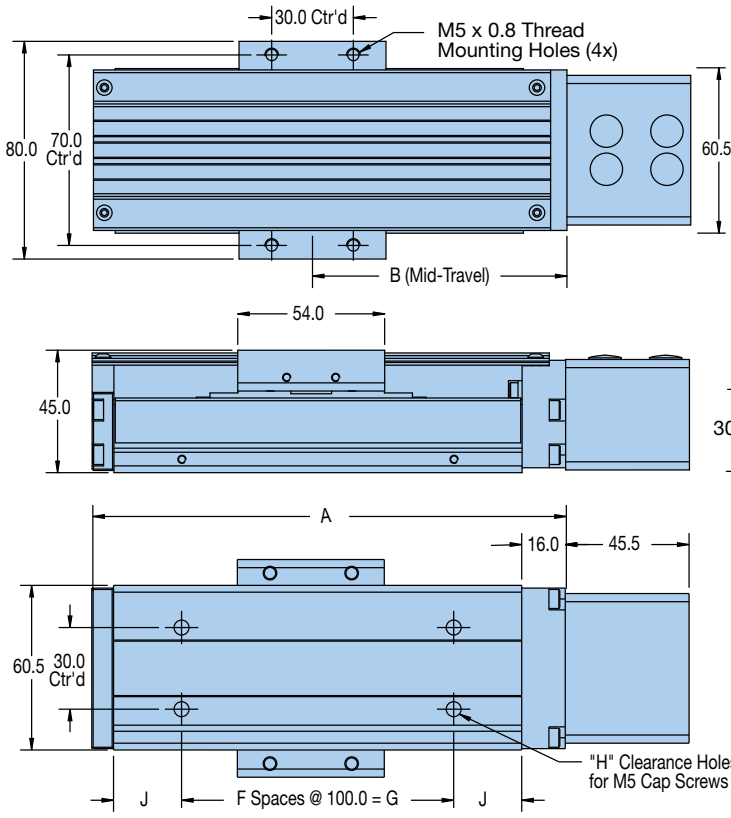


402XE with NEMA 23 Parallel Motor

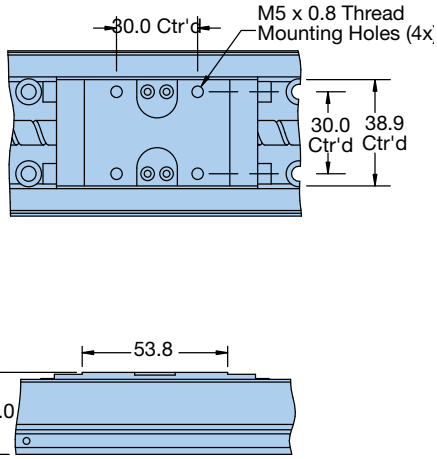


403XE Dimensions (mm)

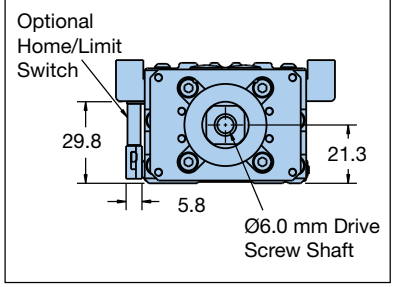
403XE with Hard Cover



403XE without Hard Cover

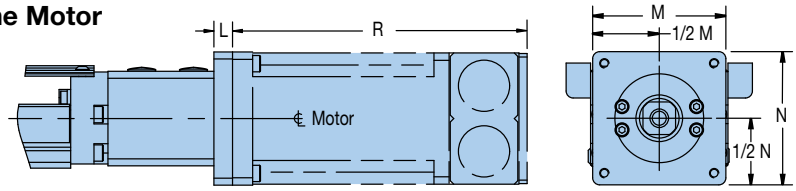


Optional Limit/Home Sensor



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

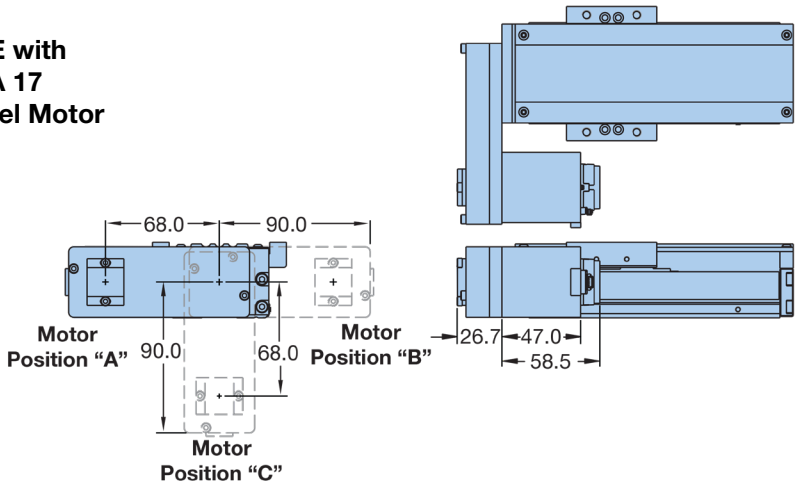


Motor Option*	Motor Size	L	M	N	R
M17	NEMA 17	8.0	43.0	37.0	58.5
M16	SM162AE-N10N	8.0	42.2	42.2	136.5
M23	NEMA 23	9.5	57.2	57.2	51.2

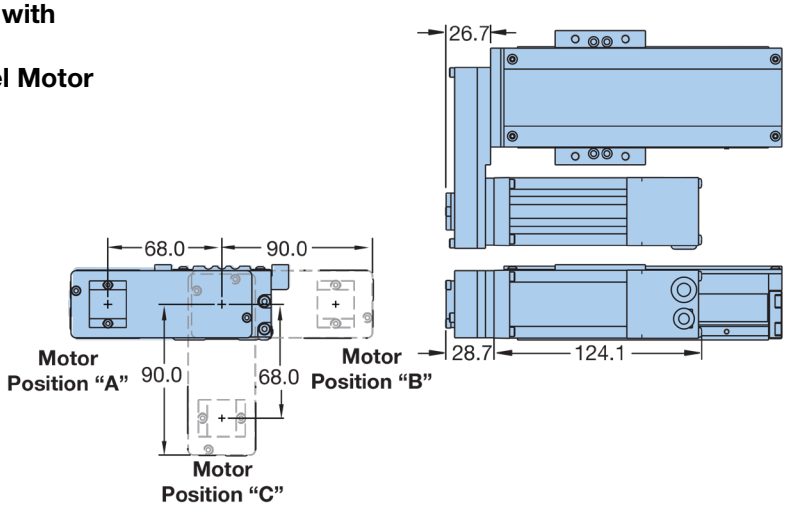
***When configuring an XE stage and selecting your motor option in Ordering Information, note that the "M" motor options come with motors while "N" options are only prepped for those motors.**

403XE Dimensions (mm)

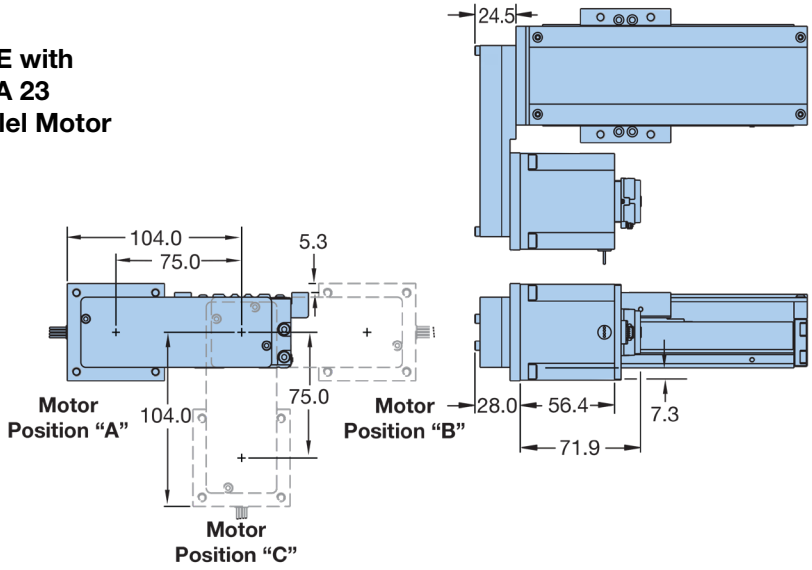
403XE with NEMA 17 Parallel Motor



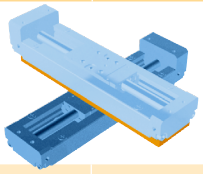
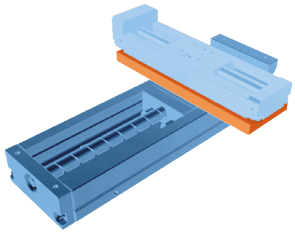
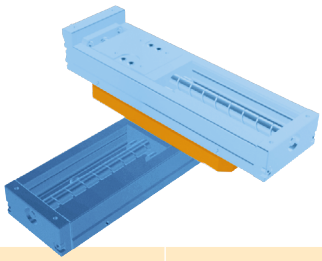
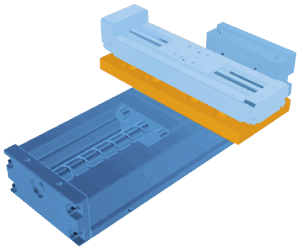
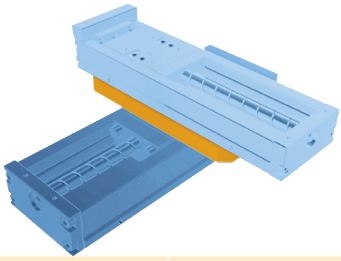
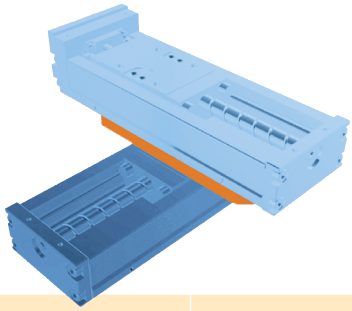
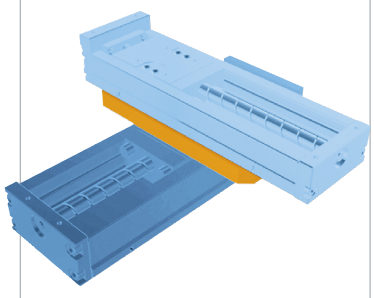
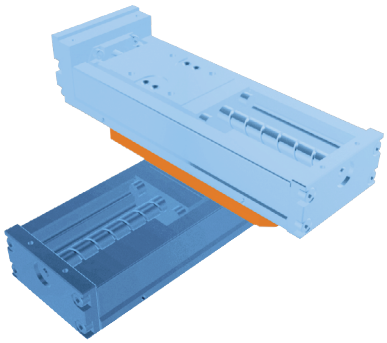
403XE with SM16 Parallel Motor



403XE with NEMA 23 Parallel Motor



Design Flexibility with Standard X-Y Bracket Options

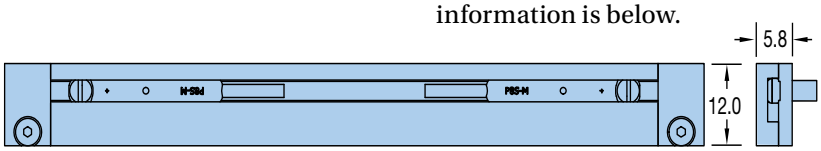
X-Axis	Y-Axis					
	401XE		**402XE**		**403XE**	
	Y-Axis Travel Length Order Code	**X-Y Bracket Part Number**	**Y-Axis Travel Length Order Code**	**X-Y Bracket Part Number**	**Y-Axis Travel Length Order Code**	**X-Y Bracket Part Number**
401XE						
	01 – 03	002-2975-01				
402XE						
			01	002-2819-01		
	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

OPTIONS & ACCESSORIES

Packaged Limit Sensors

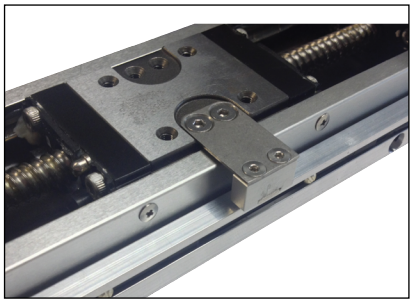
The XE series uses the Parker global mini sensors for home and limit sensing. These sensors are packaged within a miniature sensor housing which allows the flying-leads style cables to exit with 3 meters of cable from the point of the sensor. To further accommodate each application's unique needs, the 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.



Spare Limit/Home Sensors

Part Number	Switching Type	Logic	Cabling
P8SAMMFAZ	NPN	NC	3 Meter, Flying Leads
P8SAMNFAZ	NPN	NO	
P8SAMPFAZ	PNP	NO	
P8SAMQFAZ	PNP	NC	



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: ≤±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)

Wiring Connection

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

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.

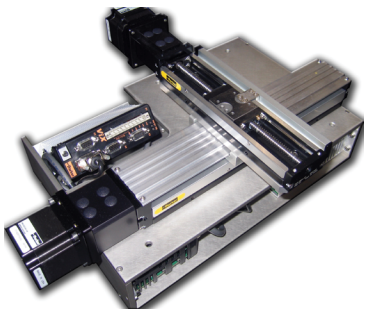
To accommodate riser plates can be provided to space the unit above the mounting surface. See XE product manual for dimensional details and part numbers. Also available are X-Y transition plates for XE to XE mounting.

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.

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.



ORDERING INFORMATION
XE Series

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

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

Series

401
402
403

Travel (mm)

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

Family

XE XE Series

Grade

S Standard

Drive Screw Q

D9 2 mm lead (401, 402 only) 1)
D2 5 mm lead (402, 403 only) 2)
D3 10 mm lead (403 only) 3)

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

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

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

Home Sensor (Qty 1)

H0 No home sensor Q
HA NPN, N.C., flying leads Q
HB NPN, N.O., flying leads Q
HC PNP, N.C., flying leads Q
HD PNP, N.O., flying leads Q

Limit Sensors (Qty 2)

L0 No limits sensors Q
LA NPN, N.C., flying leads Q
LB NPN, N.O., flying leads Q
LC PNP, N.C., flying leads Q
LD PNP, N.O., flying leads Q

Motor Mount Orientation

L Inline motor mounting Q
A Parallel motor mounting*
B Parallel motor mounting*
C Parallel motor mounting*

* Refer to dimension drawings for orientation

Motor option

N00 No motor mount Q
N11 NEMA 11 motor mount 1) Q
N17 NEMA 17 motor mount Q
N16 SM 16 servo motor mount 2) Q
N40 PM-FAL servo motor mount 2) Q
N23 NEMA 23 inline motor mount 2)
M11 NEMA 11 stepper motor 1)
M17 NEMA 17 stepper motor
M16 SM162AE-N10N servo motor, 1000 line encoder 2)
M40 MPE 0402A4E-KC1N 2)
M23 NEMA 23 stepper motor 2)

1) 401XE only
2) Not available on 401XE

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

Motor Encoder

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

Environmental Option

R0 No cover Q
R1 Hard cover Q

Q Need an XE in a Hurry?

The Q 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.

Free sizing and selection support from Virtual Engineer at virtualengineer.com