Electric Cylinders

Electric cylinders are often in high-force, thrust style applications, but with the advent of linear motor driven cylinders, high-speed diverting applications area also available. Electric cylinders are commonly used in push-to-force, holding, reach and retract, and fluid power conversion applications. Parker offers a full range of cylinder products, each with a multitude of configurable options to suit almost any application. Pair these cylinders with Parker motor, drive, and control technologies to provide a complete solution.

ETH Series
High-Force Electric Cylinders

The ETH design offers unrivaled power density due to larger screw and bearing designs in smaller packages. User-friendly and offered in a diversified range of configurations.
Page 391.

XFC Extreme Force
Electric Thrust Cylinder

This industrially hardened cylinder product utilizes an all-steel contruction and achieves far greater thrust capacities than typical electric cylinders. Maximum thrust up to 356,000N (80,000lbs).
Page 441.

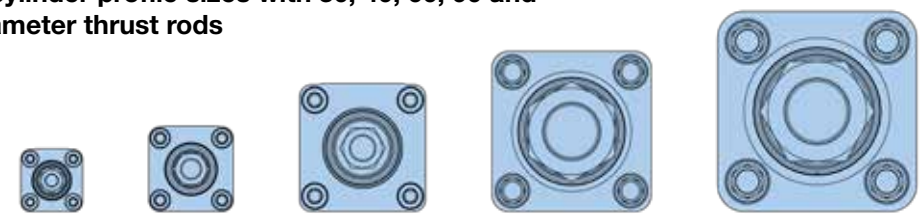
The ETH Series

High Force Ballscrew Driven Electric Cylinders

- **Unrivaled power density — high forces and small frame sizes**
- **Sensor cables can be concealed in the profile**
- **Optimized for safe handling and simple cleaning**
- **Long service life**
- **Reduced maintenance costs with lubricating hole in the cylinder flange**
- **Pneumatic ISO flange norm (DIN ISO 15552:2005-12) conformity**
- **Anti-rotation device integrated**
- **Reduced noise emission**
- **Complete system from a single source: parker offers matching controllers, motors and gearheads for all ETH cylinders**

NEW frame sizes available! ETH cylinders are now available in five sizes with 32 up to 125 mm profiles. Both in-line and parallel motor configurations provide stroke lengths up to 2000 mm and speeds to 1.7 m/sec.

- **High mechanical efficiency up to 90%**
- **Strokes up to 2000 mm**
- **High traction/thrust force up to 114,000 N (25,628 lbs)**
- **Repeatability up to ±0.03 mm**
- **Speeds up to 1.7 m/s**
- **Toothed belt drive (for parallel motor mounting)**
- **5 to 32 mm screw leads offering fine resolution or high speed options**
- **Three ISO cylinder profile sizes with 30, 40, 60, 90 and 110 mm diameter thrust rods**
- **Predefined standardized motor and gearhead flanges for simplified selection. The motors are available directly from Parker (all from one source).**
- **Three protection classes available:**
  - **IP54 with galvanized steel hardware**
  - **IP54 with stainless steel hardware**
  - **IP65 epoxy coated cylinder**



ETH032 **ETH060** **ETH80** **ETH100** **ETH125**

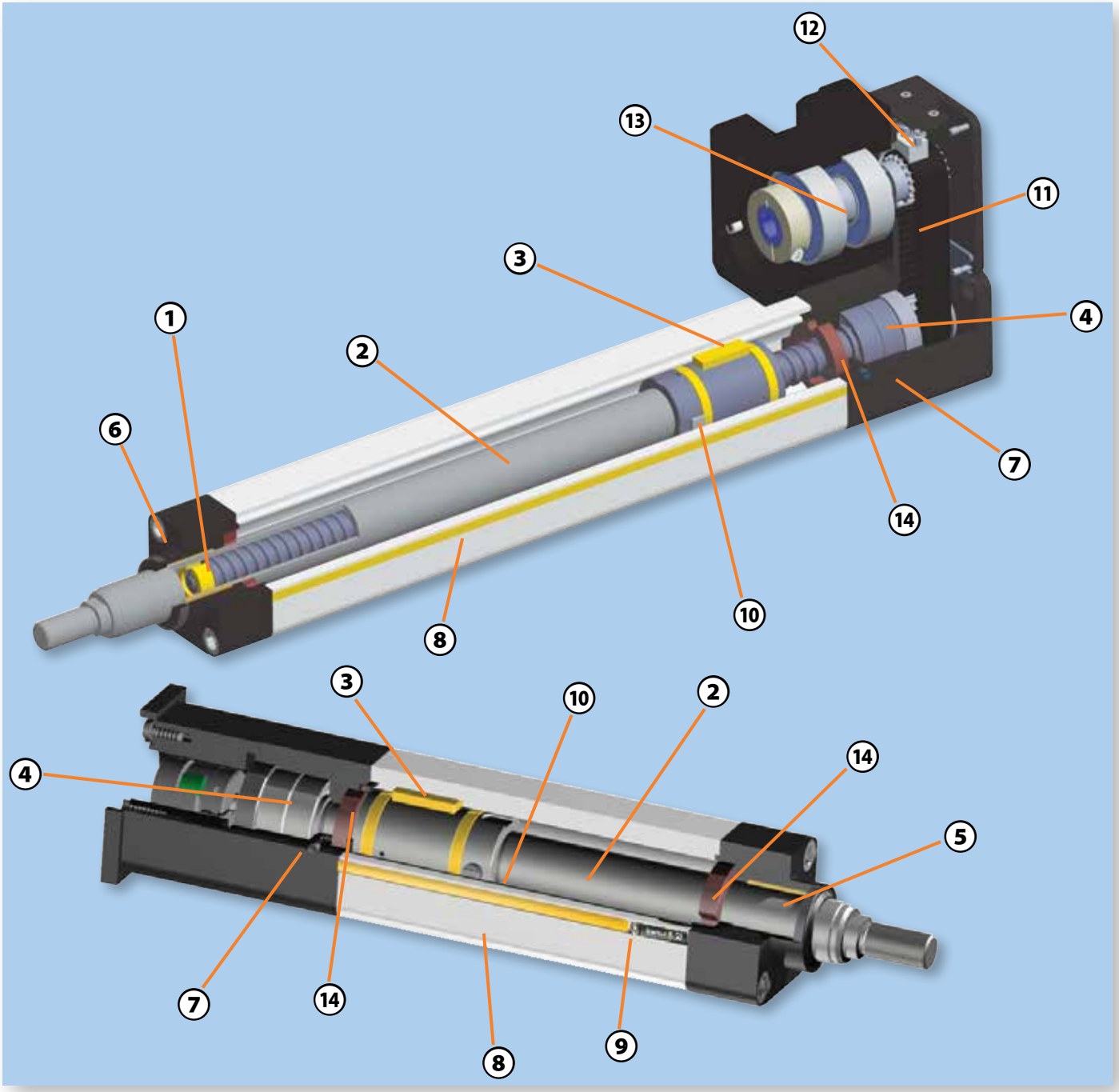
Series	ETH032	ETH060	ETH080	ETH100	ETH125
Maximum Travel (mm)	1,000	1,200	1,600	2,000	2,000
Maximum Payload (N)	3,700	9,300	25,100	56,000	114,000
Maximum Acceleration (m/sec²)	12	15	15	10	10

The Parker ETH series is the next generation version of the well known, widely used ET Series.

The ETH design offers unrivaled power density due to larger screw and bearing designs in smaller packages. The result is a product that offers increased force output from a given frame size or increased product life at the same force output.

The ETH is a user-friendly design offered in a diversified range of configurations in order to meet specific application requirements. Motor and cylinder design versatility and flexibility make the ETH Series the most user-friendly design.

For applications where overall length requirements restrict the actuator's footprint, the parallel motor configurations are the best solution. The parallel mount configuration is offered with multiple motor options, motor locations and motor orientations. This flexibility gives the user multiple smaller package solutions for solving applications that require increased force density in space-restricted applications.



① Support Bearing

The non-motor end of the screw is supported by a hardened polymer bushing which eliminates vibration and minimizes noise for smoother, quieter motion. This also improves precision, increases dynamic performance, and lengthens screw life.

② Precision Ballscrew Drive

The ETH drive train features a Class 7 ballscrew (ISO 3408) providing low frictional resistance for smooth motion over the entire speed range. This design also ensures longer product life, excellent efficiency and a lower dB rating. The ballscrew drive provides higher speeds and force capabilities than comparably-sized alternative drive mechanisms.

③ Unique Anti-rotation Guide

The ETH features a unique piston rod anti-rotation device. This high quality, maintenance free polymer bushing offers robust guidance that prevents the piston rod from twisting as the rod extends and retracts.

④ Screw Support Bearing

A set of double stacked angular contact bearings allows high thrust forces in both extend and retract directions. This design provides high force density and minimizes backlash when changing the direction of motion.

(Continued next page)

⑤ Piston Rod Support Bearing

The piston rod is supported by an extra long rod bushing. This bushing braces the rod in all directions allowing for smooth travel with high side loading capabilities.

⑥ Combination Lip and Wiper Seal

The lip and wiper seal keeps contaminants out and lubricating grease in for increased actuator life. For harsh environments, the ETH is available in a robust IP65 version for maximum protection.

⑦ Lubrication Port

The ETH comes standard with an integrated lubrication port located in the rear endcap of the cylinder, making scheduled maintenance quick, simple and easy. An optional lubrication bore is available in the middle of the cylinder body for applications where the integrated lubrication port is inaccessible.

⑧ Extruded Cylinder Body

The extrusion of the ETH was designed to reduce the number of negative geometry slots and grooves for a cleaner, and more environmentally friendly design. In addition to that, the ETH ships standard with sensor groove covers to help eliminate areas where debris can be trapped.

⑨ Home/End of Travel Sensors

The ETH was designed to use Parker's Global Series sensors which mount into the dovetail grooves that run the entire length of the cylinder body. The sensors mount flush to the extrusion body, having no effect on the overall product width. The sensor cables can be concealed with dovetail groove covers giving the actuator a clean, aesthetically appealing appearance. The Global Series sensors are compatible with other Parker products, including pneumatics, helping reduce inventory and spare part complexity.

ETH Solutions for Critical Conditions

If you have harsh environmental conditions or critical design specifications, please contact us. We offer many non-standard design options not covered in this brochure that will help match the ETH to your specific application requirements, such as:

- **Oil-splash lubrication**
- **Customized mountings and rod ends**
- **Mounting of customer motors**
- **Hardened cylinder protection for aggressive environmental conditions**
- **Overlong, polished or chrome-plated thrust rods**
- **Rod bellows**

⑩ Permanent magnets

All ETH cylinders are equipped with several permanent magnets integrated into the screw nut which actuate the home/end of travel sensors.

⑪ High Force Timing Belt

The parallel mount configuration utilizes a robust toothed timing belt, offering slip-free motion with minimal belt wear. The 1:1 ratio design was designed to transmit higher torques, allowing greater thrust forces at higher speeds. Contact the factory for additional timing belt ratios.

⑫ Belt Tensioning

A patent-pending belt tensioning station makes the parallel belt tensioning process quick and easy. This unique design allows for precise and repeatable tensioning, allowing for faster installation time and reduced down time.

⑬ Overhung Load Adaptor

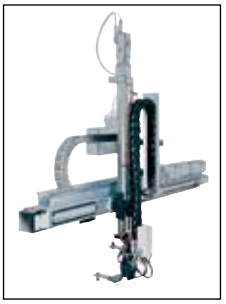
For all parallel mounting options which do not include a gearhead, an Overhung Load Adaptor (OLA) is included as part of the actuator assembly. The OLA simplifies the motor mounting process and protects the bearings of the motor from the radial forces induced by the parallel belt tensioning.

⑭ Over-stroke Bumpers

Polyurethane over-stroke bumpers are designed in at both ends of the cylinder to protect the internal components from damage as a result of unintended crashes.

Typical ETH Applications

The ETH closes the gap between electromechanical and hydraulic cylinder performance, making it suitable for higher force applications where increased reliability is required in the production process.Taking the costs of the hydraulic system components into consideration, in most cases an electromechanical system such as the ETH electric cylinder offers the more economical solution. Combined with a wide choice of accessories, it offers many possibilities in the following areas of application:



- **Test equipment and laboratory**
- **Valve and flap actuation**
- **Pressing**
- **Packaging machinery**
- **Food and beverage process automation**
- **Material handling and feed systems including: wood and plastic working, vertical actuators for machine tool loading, textile tensioning/gripping, automotive component transport/feeding**

SPECIFICATIONS

Performance by Cylinder Size and Screw Lead*

Cylinder Size			ETH032			ETH050			ETH080		
Screw Lead Designation			**M05**	**M10**	**M16**	**M05**	**M10**	**M20** [1]	**M05**	**M10**	**M32**
Screw Lead		mm	5	10	16	5	10	20	5	10	32
Screw Diameter		mm		16			20			32	
Available Strokes**		mm		50 – 1000			50 – 1200			50 – 1600	
Max. Speed at Designated Stroke:											
50 – 400 mm		mm/s	333	667	1067	333	667	1333	267	533	1707
600 mm			286	540	855	333	666	1318	267	533	1707
800 mm			196	373	592	238	462	917	267	533	1707
1000 mm			146	277	440	177	345	684	264	501	1561
1200 mm			–	–	–	139	270	536	207	394	1233
1400 mm			–	–	–	–	–	–	168	320	1006
1600 mm			–	–	–	–	–	–	140	267	841
Max. Acceleration		m/s^2	4	8	12	4	8	15	4	8	15
Max. Axial Traction/Thrust Force –											
In-Line		N	3600	3700	2400	9300	7000	4400	17,800	25,100	10,600
Parallel	**n < 100**	N	3600	3280	2050	9300	4920	2460	17,800	11,620	3630
(@ "n" rpm	**100 < n < 300**			2620	1640	7870	3930	1960		11,620	3630
Motor Speed)	**n > 300**			1820	1140	5480	2740	1370		10,720	3350
Axial Force – 2500 km Service Life		N	1130	1700	1610	2910	3250	2740	3140	7500	6050
Max. Transmissible Torque –											
In-Line		Nm	3.2	6.5	6.8	8.2	12.4	15.6	15.7	44.4	60.0
Parallel	**n < 100**	Nm	3.5	6.4	6.4	9.1	9.3	9.3	17.5	22.8	22.8
(@ "n" rpm	**100 < n < 300**		3.5	5.2	5.2	7.7	7.7	7.7	17.5	22.8	22.8
Motor Speed)	**n > 300**		3.5	3.6	3.6	5.4	5.4	5.4	17.5	21.1	21.1
Force Constant* –**	**In-Line**	N/Nm	1131	565	353	1131	565	283	1131	565	177
	Parallel		1018	509	318	1018	509	254	1018	509	159
Max Torque – No Load		Nm	0.77	0.85	0.94	0.85	1.28	1.70	1.87	2.13	2.38
Weight – (including cylinder rod)											
Base Unit with Zero Stroke		kg	1.2	1.2	1.3	2.2	2.3	2.5	6.9	7.6	8.7
Additional Stroke		kg/m	4.8	4.8	4.8	8.6	8.6	8.6	18.7	18.7	18.7
Weight – (cylinder rod only)											
Base Unit with Zero Stroke		kg		0.06			0.15			0.59	
Additional Stroke		kg/m		0.99			1.85			4.93	
Moments of Inertia											
In-line – without stroke		$kgmm^2$	7.1	7.6	12.9	25.3	25.7	33.1	166.2	164.5	252.9
Parallel – without stroke			8.3	8.8	14.1	30.3	30.6	38.0	215.2	213.6	301.9
In-line/Parallel – per meter stroke		$kgmm^2/m$	41.3	37.6	41.5	97.7	92.4	106.4	527.7	470.0	585.4
Accuracy: Repeatability (ISO230-2)											
In-line		mm					±0.03				
Parallel							±0.05				
Efficiency – (incl. friction torques)											
In-line		%					90				
Parallel							81				
Temperature											
Operating		°C					-10 ... +70				
Ambient							-10 ... +40				
Storage							-20 ... +40				
Humidity		%					0 ... 95 % (non-condensing)				
Elevation (Max.)		m					3000				

* Technical data based on normal conditions and only for single cylinder and load mode. For compound loads, please verify in accordance with normal physical laws and technical standards whether individual ratings should be reduced. Please contact Parker with any questions.

** Refer to Ordering Information for standard strokes available for specified model size and type.

***Efficiency factors are included in force constants

[1] ATEX on request

ETH Series Performance by Cylinder Size and Screw Lead*

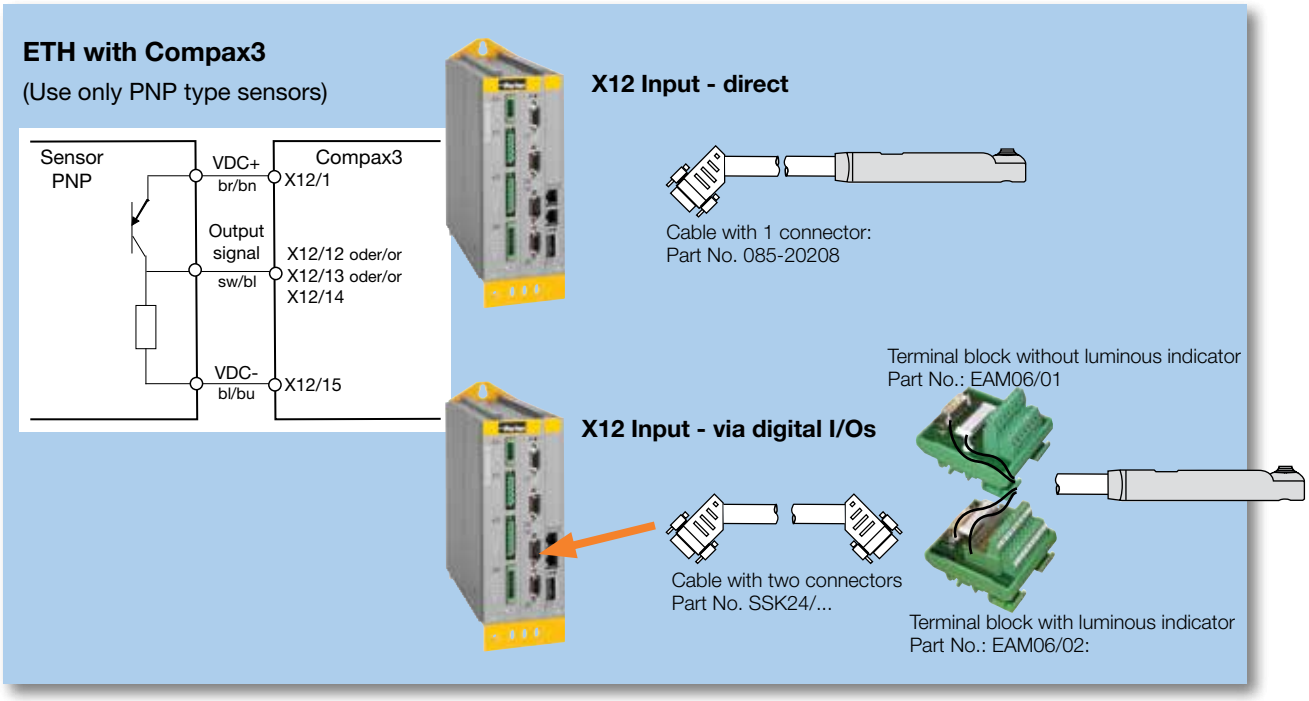
Cylinder Size		ETH100		ETH125	
Screw Lead Designation		**M10**	**M20**	**M10** [1]	**M20** [1]
Screw Lead	mm	10	20	10	20
Screw Diameter	mm	50		63	
Available Strokes**	mm	200 – 2000		200 – 2000	
Max. Speed at Designated Stroke:					
200 – 400 mm	mm/s	400	800	417	833
500 mm		400	747	417	807
600 mm		333	622	395	684
800 mm		241	457	290	514
1000 mm		185	354	224	405
1200 mm		148	284	180	329
1400 mm		122	235	148	275
1600 mm		102	198	125	234
2000 mm		76	148	94	170
Max. Acceleration	m/s^2	8	10	8	10
Max. Axial Traction/Thrust Force –					
In-Line	N	54,800	56,000	88,700	114,000
Parallel (@ "n" rpm Motor Speed) **n < 100**	N	54,800	50,800	76,300	81,400
100 < n < 300			43,200		73,700
n > 300			35,600		61,000
Axial Force – 2500 km Service Life	N	18,410	27,100	27,100	49,600
Max. Transmissible Torque –					
In-Line	Nm	100	200	150	400
Parallel (@ "n" rpm Motor Speed) **n < 100**	Nm	108	200	150	320
100 < n < 300			170		290
n > 300			140		240
Force Constant* – In-Line**	N/Nm	565	283	565	283
Parallel		509	254	509	254
Max Torque – No Load	Nm				
Weight – (including cylinder rod)		Please consult factory.			
Base Unit with Zero Stroke	kg				
Additional Stroke	kg/m				
Weight – (cylinder rod only)					
Base Unit with Zero Stroke	kg				
Additional Stroke	kg/m				
Moments of Inertia					
In-line – without stroke	$kgmm^2$	2240	2620	12,960	13,400
Parallel – without stroke		5860	6240	17,050	17,990
In-line/Parallel – per meter stroke	$kgmm^2/m$	4270	4710	10,070	10,490
Accuracy: Repeatability (ISO230-2)					
In-line	mm	±0.03			
Parallel		±0.05			
Efficiency – (incl. friction torques)					
In-line	%	90			
Parallel		81			
Temperature					
Operating	°C	-10 ... +70			
Ambient		-10 ... +40			
Storage		-20 ... +40			
Humidity	%	0 ... 95 % (non-condensing)			
Elevation (Max.)	m	3000			

* Technical data based on normal conditions and only for single cylinder and load mode. For compound loads, please verify in accordance with normal physical laws and technical standards whether individual ratings should be reduced. Please contact Parker with any questions.
** Refer to Ordering Information (page 52) for standard strokes available for specified model size and type.
***Efficiency factors are included in force constants
[1] ATEX on request

Sizing/Selection Design Considerations

Step	Sizing/Selection Design Consideration	Recommendation
1	**Basic Operating Parameters**	Check the basic conditions for the use of the ETH in your application. Use the performance chart and the speed-thrust graphs to confirm the ETH can meet your application's basic performance (e.g. force, velocity, acceleration) mechanical and environmental conditions
2	**Required Space**	Check the space available in your application and choose the appropriate motor mounting option: inline or parallel. Basic cylinder dimensions, along with dimensions for motor mounting options, can be found in the Dimensions section.
3	**Maximum Velocity**	Select the screw lead required to reach the application's maximum velocity
4	**Maximum Acceleration**	Verify that the maximum acceleration does not exceed the cylinder's limits
5	**Axial Forces**	Calculate the axial forces required in the individual segments of the application.
6	**Maximum Force Required**	Determine the maximum required axial force that the electric cylinder must provide.
7	**Select Stroke**	Determine the usable stroke and safety travels required for the application, then: • Select the desired stroke from the list of standard strokes • Or, if standard stroke will not work choose a desired stroke in steps of one mm. Please do not exceed the maximum permissible stroke given for each frame size.
8	**Buckling Risk**	Check that the maximum required axial force does not exceed the rod buckling limitations.
9	**Service Life**	Calculate the service life using the equivalent axial forces, the operational environment (application factor), and the load-life curves.
10	**Lateral Forces/Side Loads**	Determine the lateral forces present in the application and compare them to the permissible lateral forces for the cylinder.
11	**Relubrication**	Determine the lubricating cycle (maintenance schedule) and check that it is suitable.
12	**Motor/Gearhead Selection**	Calculate the required torque needed to the generate the required force of the ETH.
13	**Motor Mounting Flange**	Select a suitable motor mounting flange
14	**Mounting Type**	Select the mounting method of the electric cylinder
15	**Cylinder Rod End**	Select the desired rod end for load mounting
16	**Model number**	Develop model number

ETH Cylinders Connection with Compax3 Drives/Controllers



Xpress Motion Packages

Mounting Code	Motor Part Number	Gearhead Part Number[1]	Recommended Compax3 Servo Drive(s)	Motor Cable	Feedback Cable
XPC	BE233FJ-KPSN	—	C3S063V2F12IxxTxxMxx	P-1A1-xx	F-2C1-xx
XPD	CM233FJ-115027	—			
XPG	BE344LJ-KPSN	—	C3S100V2F12IxxTxxMxx	P-3B1-xx	
XPH	BE344LJ-KPSB	—			
XPL	MPP1003D1E-KPSN	—	C3S150V2F12IxxTxxMxx		
XPM	MPP1003D1E-KPSB	—			
XPN	MPP1003D1E-KPSN	PV34/PV90-003			
XPP	MPP1003D1E-KPSB	PV34/PV90-004			
XPQ	MPP1003R1E-KPSN	—	CS3S063V2F12IxxTxxMxx[2] or C3S075V4F12IxxTxxMxx		
XPR	MPP1003R1E-KPSB	—			
XPS	MPP1003R1E-KPSN	PV34/PV90-003			
XPT	MPP1003R1E-KPSB	PV34/PV90-004			
XPU	MPP1154B1E-KPSN	—	C3S150V2F12IxxTxxMxx		
XPV	MPP1154B1E-KPSB	—			
XPW	MPP1154B1E-KPSN	PV115-003			
XPX	MPP1154B1E-KPSB	PV115-004			
XPY	MPP1154P1E-KPSN	—	CS3S063V2F12IxxTxxMxx[2] or C3S075V4F12IxxTxxMxx		
XPZ	MPP1154P1E-KPSB	—			
XP1	MPP1154P1E-KPSN	PV115-003			
XP2	MPP1154P1E-KPSB	PV115-004			

[1] PV34 will be used for all inline motor mounting configurations. PV90 will be used when the motor is mounted in parallel.
[2] Motors are rated for 460 volts AC. This combination, with the 230 volt drive, will result in motor running at 1/2 its rated speed

ETH032 Speed-Thrust with Motors (170 VDC)

Maximum Thrust with Motor*:

- Parallel motor mount limitation
- Max thrust w/2540 km life (see page 45 for details)

XPC – BE233FJ
- Peak
- Continuous

XPG – BE344LJ
- Peak
- Continuous

Maximum Speed:

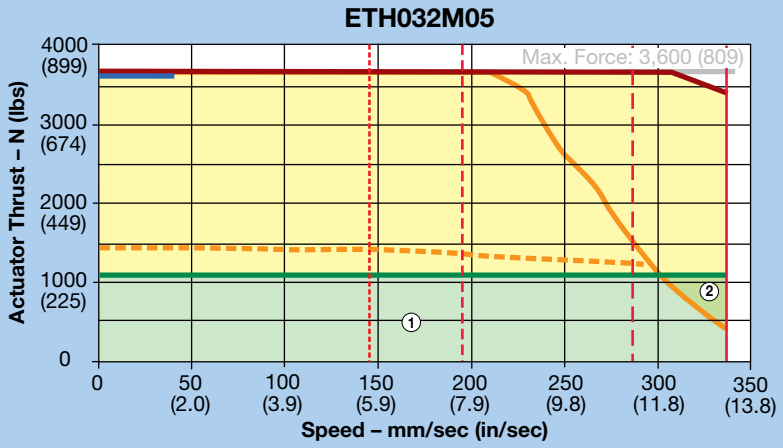
- 1000 mm stroke
- 800 mm stroke
- 600 mm stroke
- Max actuator speed

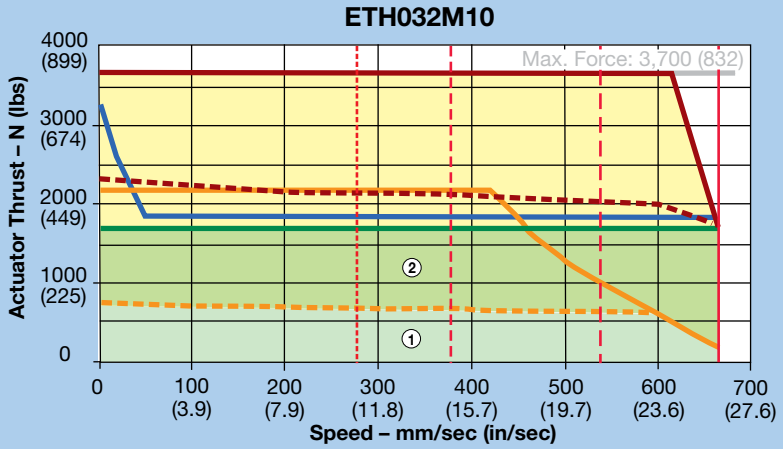
Performance Zones:

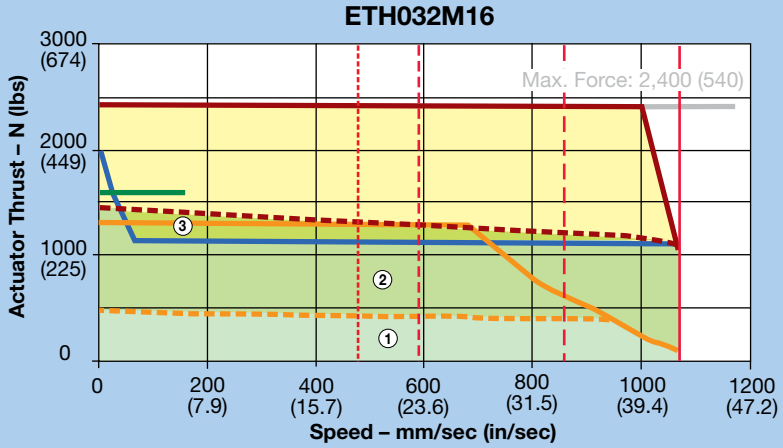
Motor Codes	Continuous Operation ①	②	③
XPC (1)	•		
XPD (2)	•		
XPG (1)	•	•	•*
XPH (2)	•	•	•*

(1) Without brake (2) With brake
* In-line motor mount only

Intermittent Zone – Consult Factory
(operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel motor mount limitation curve)







** Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load. For limitations on column buckling, please see page 43.*

ETH032 Speed-Thrust with Motors (340 VDC)

Maximum Thrust with Motor*:

- Parallel motor mount limitation
- Max thrust w/2540 km life (see page 45 for details)

XPC – BE233FJ
- Peak
- Continuous

XPG – BE344LJ
- Peak
- Continuous

Maximum Speed:

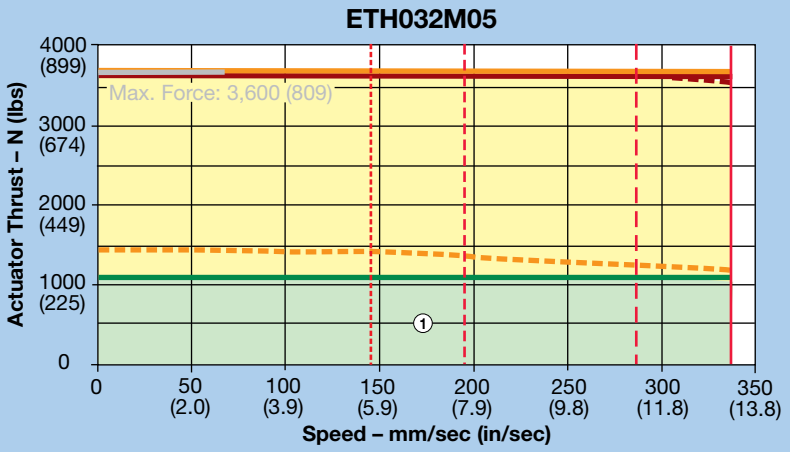
- 1000 mm stroke
- 800 mm stroke
- 600 mm stroke
- Max actuator speed

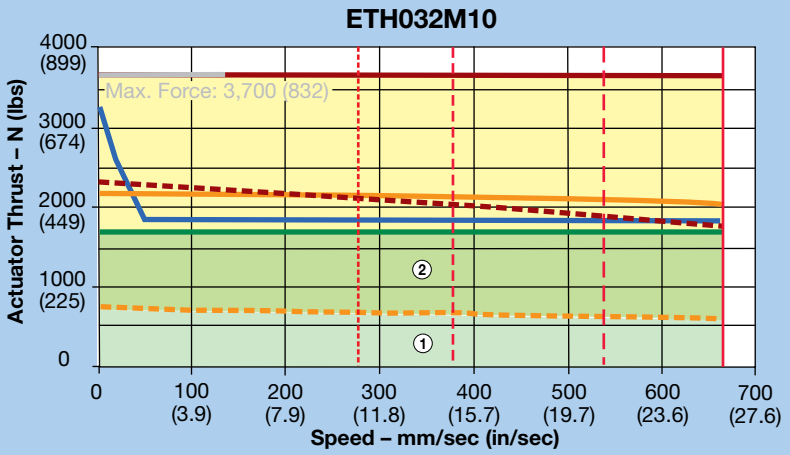
Performance Zones:

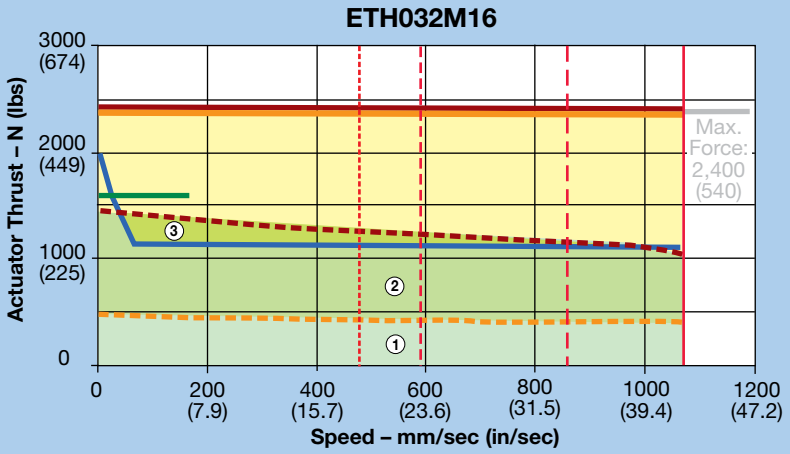
Motor Codes	Continuous Operation ①	②	③
XPC [1]	•		
XPD [2]	•		
XPG [1]	•	•	•*
XPH [2]	•	•	•*

[1] Without brake [2] With brake
* In-line motor mount only

Intermittent Zone – Consult Factory
(operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel motor mount limitation curve)







** Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load. For limitations on column buckling, please see page 43.*

ETH050 Speed-Thrust with Motors (170 VDC)

Maximum Thrust with Motor*:

- Parallel motor mount limitation
- Max thrust w/2540 km life (see page 45 for details)

XPG – BE344LJ

- Peak
- Continuous

Maximum Speed:

- 1200 mm stroke
- 1000 mm stroke
- 800 mm stroke
- Max actuator speed

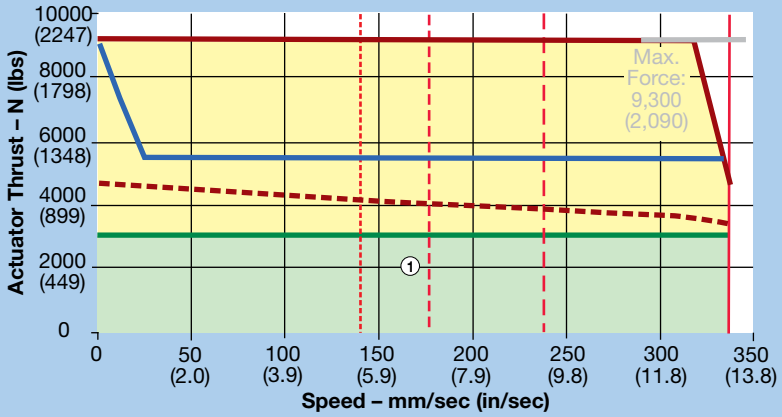
Performance Zones:

Motor Codes	Continuous Operation
	①
XPG [1]	•
XPH [2]	•

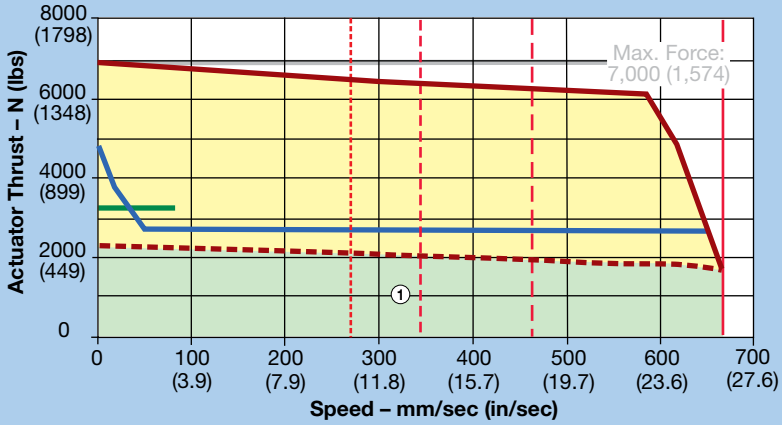
[1] Without brake [2] With brake
* In-line motor mount only

Intermittent Zone – Consult Factory
(operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel motor mount limitation curve)

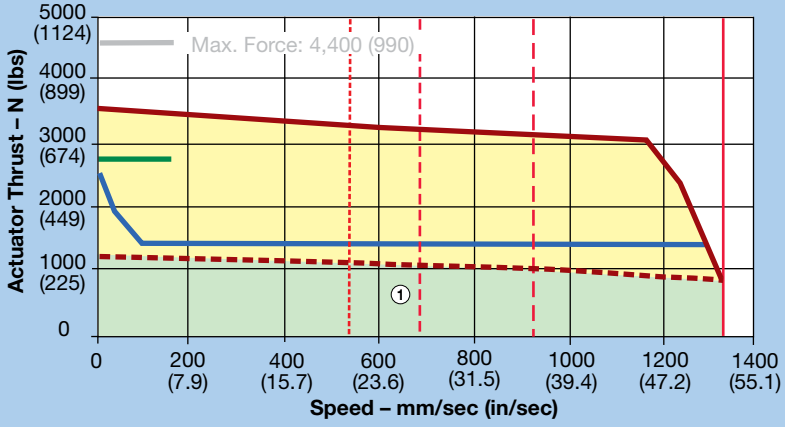
ETH050M05



ETH050M10



ETH050M20



** Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load. For limitations on column buckling, please see page 43.*

ETH050 Speed-Thrust with Motors (340 VDC)

Maximum Thrust with Motor*:

- Parallel motor mount limitation
- Max thrust w/2540 km life (see page 45 for details)

XPL – MPP1003D1E
- Peak
- Continuous

XPN – MPP1003D1E (with PV34FE-003)
- Peak
- Continuous

Maximum Speed:

- 1200 mm stroke
- 1000 mm stroke
- 800 mm stroke
- Max actuator speed

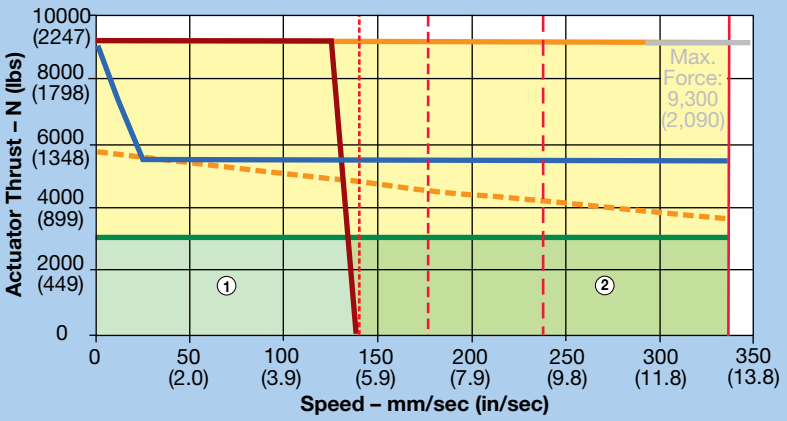
Performance Zones:

Motor Codes	Continuous Operation ①	②	③	④
XPL [1]	•		•	
XPM [2]	•		•	
XPN [1]	•	•		•*
XPP [2]	•	•		•*

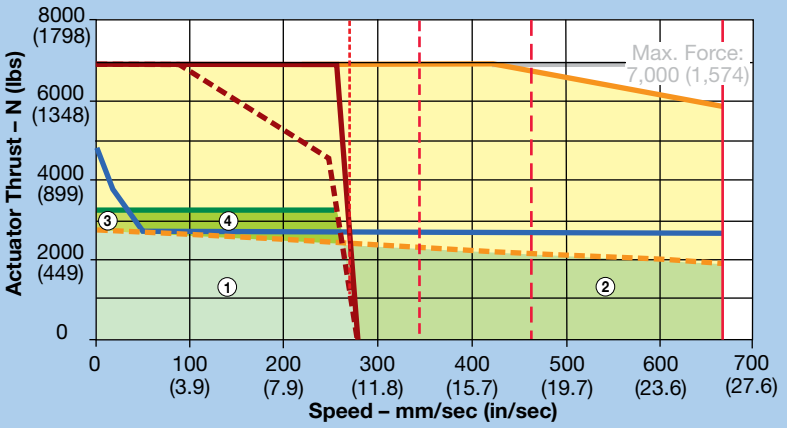
[1] Without brake [2] With brake
* In-line motor mount only

Intermittent Zone – Consult Factory
(operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel motor mount limitation curve)

ETH050M05



ETH050M10



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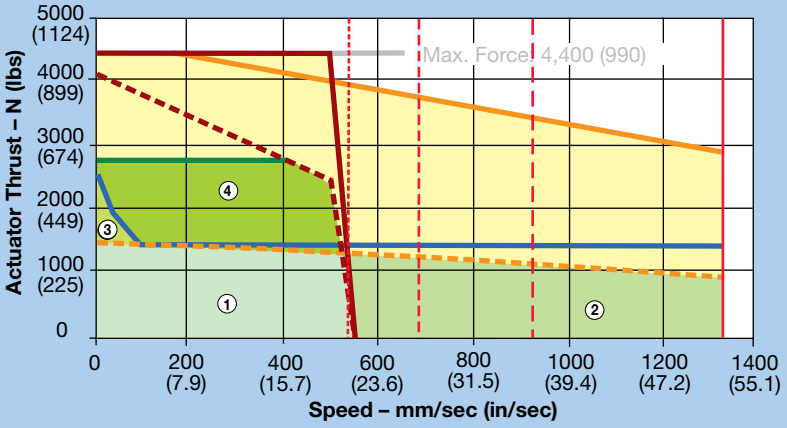


** Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load. For limitations on column buckling, please see page 43.*

ETH050 Speed-Thrust with Motors (680 VDC)

Maximum Thrust with Motor*:

- Parallel motor mount limitation
- Max thrust w/2540 km life (see page 45 for details)

XPQ – MPP1003R1E
- Peak
- Continuous

XPS – MPP1003R1E (with PV34FE-003)
- Peak
- Continuous

Maximum Speed:

- 1200 mm stroke
- 1000 mm stroke
- 800 mm stroke
- Max actuator speed

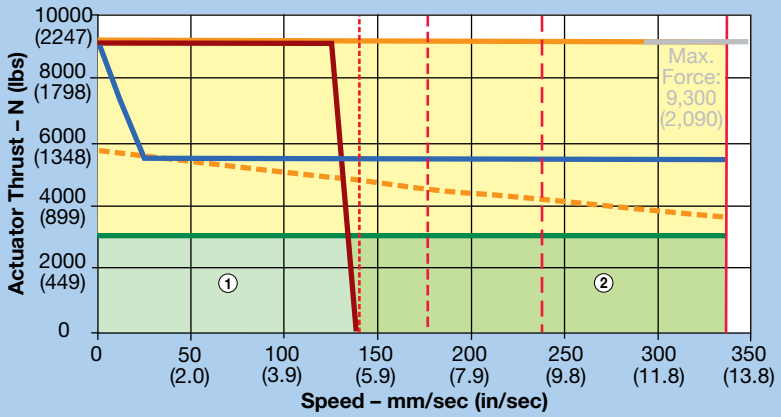
Performance Zones:

Motor Codes	Continuous Operation ①	②	③	④
XPQ (1)	•		•	
XPR (2)	•		•	
XPS (1)	•	•		•*
XPT (2)	•	•		•*

(1) Without brake (2) With brake
* In-line motor mount only

Intermittent Zone – Consult Factory
(operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel motor mount limitation curve)

ETH050M05



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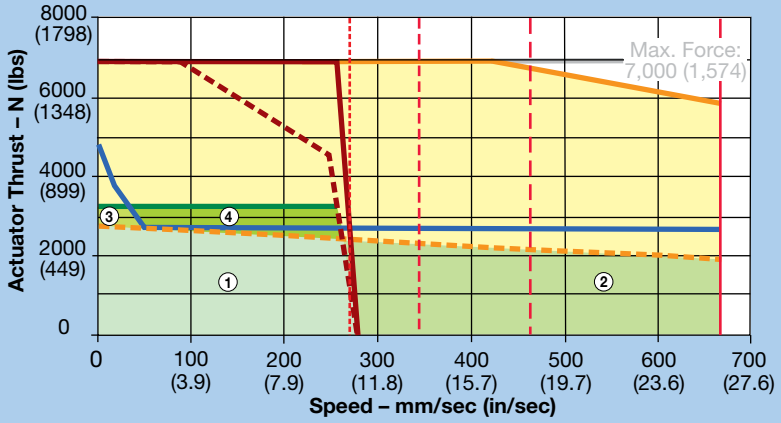

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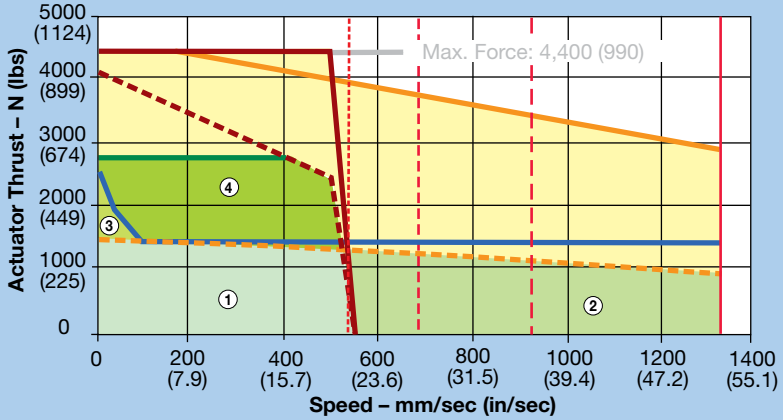


** Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load. For limitations on column buckling, please see page 43.*

ETH080 Speed-Thrust with Motors (340 & 680 VDC)

Maximum Thrust with Motor*:

- Parallel motor mount limitation
- Max thrust w/2540 km life (see page 45 for details)

XPQ – MPP1003R1E
- Peak
- Continuous

XPS – MPP1003R1E (with PV34FE-003)
- Peak
- Continuous

XPU – MPP1154B1E
- Peak
- Continuous

XPW – MPP1154B1E (with PV115-003)
- Peak
- Continuous

Maximum Speed:
- 1600 mm stroke
- 1400 mm stroke
- 1200 mm stroke
- 1000 mm stroke
- Max actuator speed

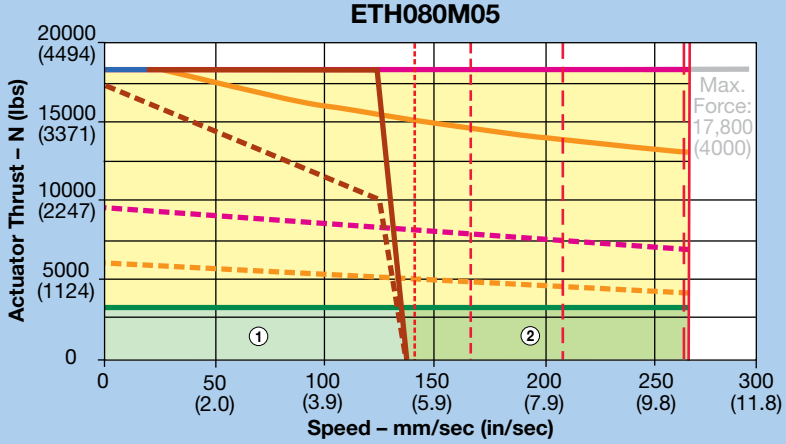
Performance Zones:

Motor Codes	Continuous Operation ①	②	③	④	⑤	⑥
XPQ (1)	•	•	•			
XPR (2)	•	•	•			
XPS (1)	•	•		•		
XPT (2)	•	•		•		
XPU (1)	•	•	•			
XPV (2)	•	•	•			
XPW (1)	•			•	•	•*
XPX (2)	•			•	•	•*

(1) Without brake (2) With brake
* In-line motor mount only

Intermittent Zone – Consult Factory
(operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel motor mount limitation curve)

ETH080M05



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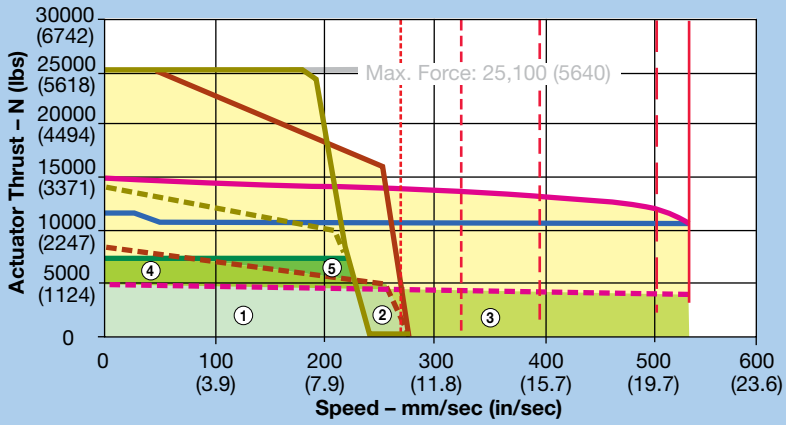
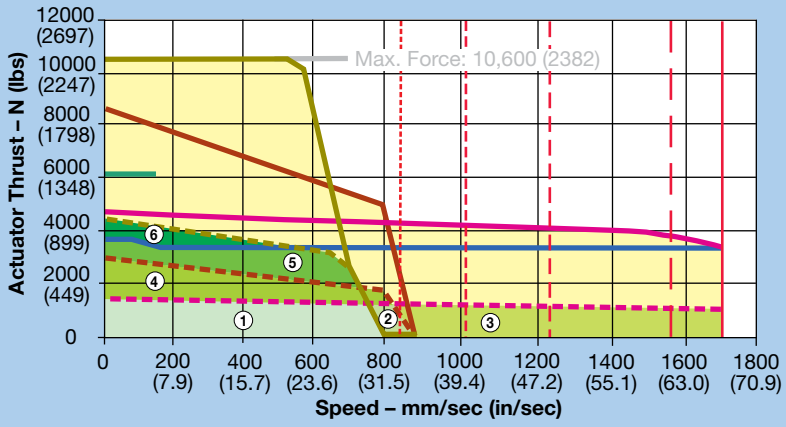


ETH080M32



** Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load. For limitations on column buckling, please see page 43.*

Design Considerations — Calculating Axial Force

Use the equations below to calculate the thrust required to extend and retract the piston rod.

Once the individual segments are calculated, the maximum required axial force can be determined. This maximum axial force is used to determine the size of the cylinder and to check that the buckling load limit is not exceeded (see Permissible Axial Force, next page). Note that the axial forces calculated for each segment are later used as the calculation basis for the service life (see Design Considerations – Service Life).

Calculation of Axial Forces:

Determine the axial forces occurring during each individual segment of the application cycle. (Index "j" for the individual segments of the application cycle.)

Cylinder Rod Extending:

$$F_{x,a,j} = \left| F_{x,ext} + (m_{ext} + m_{Kse} + m_{Ks,0} + m_{Ks,Hub} \bullet Hub) \bullet (a_{K,j} + \sin\alpha \bullet 9{,}81\frac{m}{s^2}) \right|$$

Cylinder Rod Retracting:

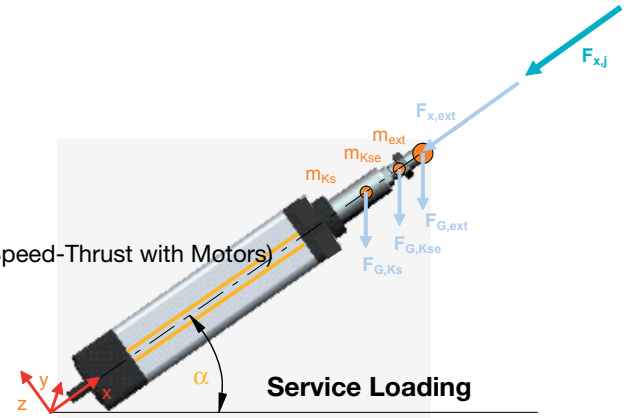
$$F_{x,e,j} = \left| - F_{x,ext} + (m_{ext} + m_{Kse} + m_{Ks,0} + m_{Ks,Stroke} \bullet Stroke) \bullet (a_{K,j} + \sin\alpha \bullet 9{,}81\frac{m}{s^2}) \right|$$

The values Fx,a,j and Fx,e,j are always positive.

Formula Abbreviations

$F_{x,a,j}$	Axial forces during extension (N)
$F_{x,e,j}$	Axial forces during retraction (N)
$F_{x,ext}$	External axial force (N)
$F_{G,ext}$	Weight force caused by an additional mass (N)
$F_{G,Kse}$	Weight force caused by the cylinder rod end (N)
$F_{G,Ks}$	Weight force caused by the cylinder rod (N)
m_{ext}	Additional mass (kg)
m_{Kse}	Mass of the cylinder rod end (kg) (see "Rod End Options" in Options & Accessories)
$m_{Ks,0}$	Mass of the cylinder rod at zero stroke in kg (see Speed-Thrust with Motors)
$m_{Ks,stroke}$	Mass of the cylinder rod per mm of stroke (kg)
Stroke	Selected stroke (m)
$a_{K,j}$	Acceleration at the cylinder rod (m/s²)
α	Alignment angle (°)
$F_{x,max}$	Maximum permissible axial force (N)

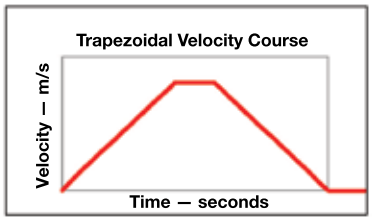
Index "j" for the individual segments of the application cycle



Example Calculation

Vertical Mounting

- ETH50
- Stroke = 500 mm = 0.5 m
- Pitch = 5 mm
- Rod End: External thread
- Trapezoidal velocity course
- Acceleration a_K = 4 m/s²
- m_{ext} = 150 kg
- $F_{x,ext}$ = 1000 N
- m_{Kse} = 0.15 kg
- $m_{Ks,0}$ = 0.15 kg
- $m_{Ks,Stroke}$ = 1.85 kg/m
- Alignment angle α = -90°



Thrust rod extending: Mass is moved downwards

Load case: Acceleration

$$F_{x,1} = \left| 1000N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m} \cdot 0{,}5m \right) \cdot \left(4\frac{m}{s^2} + \sin(-90°) \cdot 9{,}81\frac{m}{s^2} \right) \right| = 121N$$

Load case: Constant Velocity

$$F_{x,2} = \left| 1000N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m} \cdot 0{,}5m \right) \cdot \left(0\frac{m}{s^2} + \sin(-90°) \cdot 9{,}81\frac{m}{s^2} \right) \right| = 484N$$

Load case: Deceleration

$$F_{x,3} = \left| 1000N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m} \cdot 0{,}5m \right) \cdot \left(-4\frac{m}{s^2} + \sin(-90°) \cdot 9{,}81\frac{m}{s^2} \right) \right| = 1088N$$

Thrust rod retracting: Mass is moved upwards

Load case: Acceleration

$$F_{x,4} = \left| -1000N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m} \cdot 0{,}5m \right) \cdot \left(4\frac{m}{s^2} - \sin(-90°) \cdot 9{,}81\frac{m}{s^2} \right) \right| = 1088N$$

Load case: Constant Velocity

$$F_{x,5} = \left| -1000N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m} \cdot 0{,}5m \right) \cdot \left(0\frac{m}{s^2} - \sin(-90°) \cdot 9{,}81\frac{m}{s^2} \right) \right| = 484N$$

Load case: Deceleration

$$F_{x,6} = \left| -1000N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m} \cdot 0{,}5m \right) \cdot \left(-4\frac{m}{s^2} - \sin(-90°) \cdot 9{,}81\frac{m}{s^2} \right) \right| = 121N$$

Design Considerations — Permissible Axial Force

The risk of buckling is dependent on the stroke and mounting method. Use the charts below for the applicable mounting method and cylinder size to verify that the application's maximum axial force (calculations on previous page), is possible with the planned mounting method at the desired stroke. Please note that the retraction forces do not pose a buckling risk.

Method 1

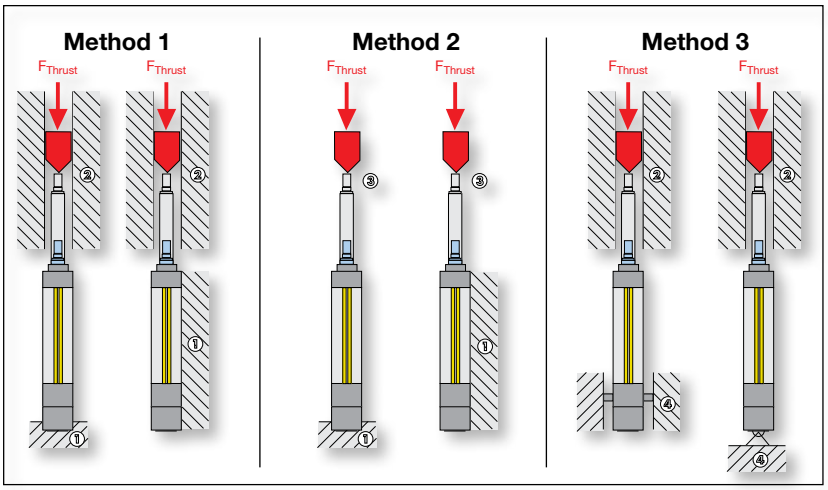
① Cylinders fixed with mounting flanges, foot mounting or mounting plates
② Thrust rod with axial guiding

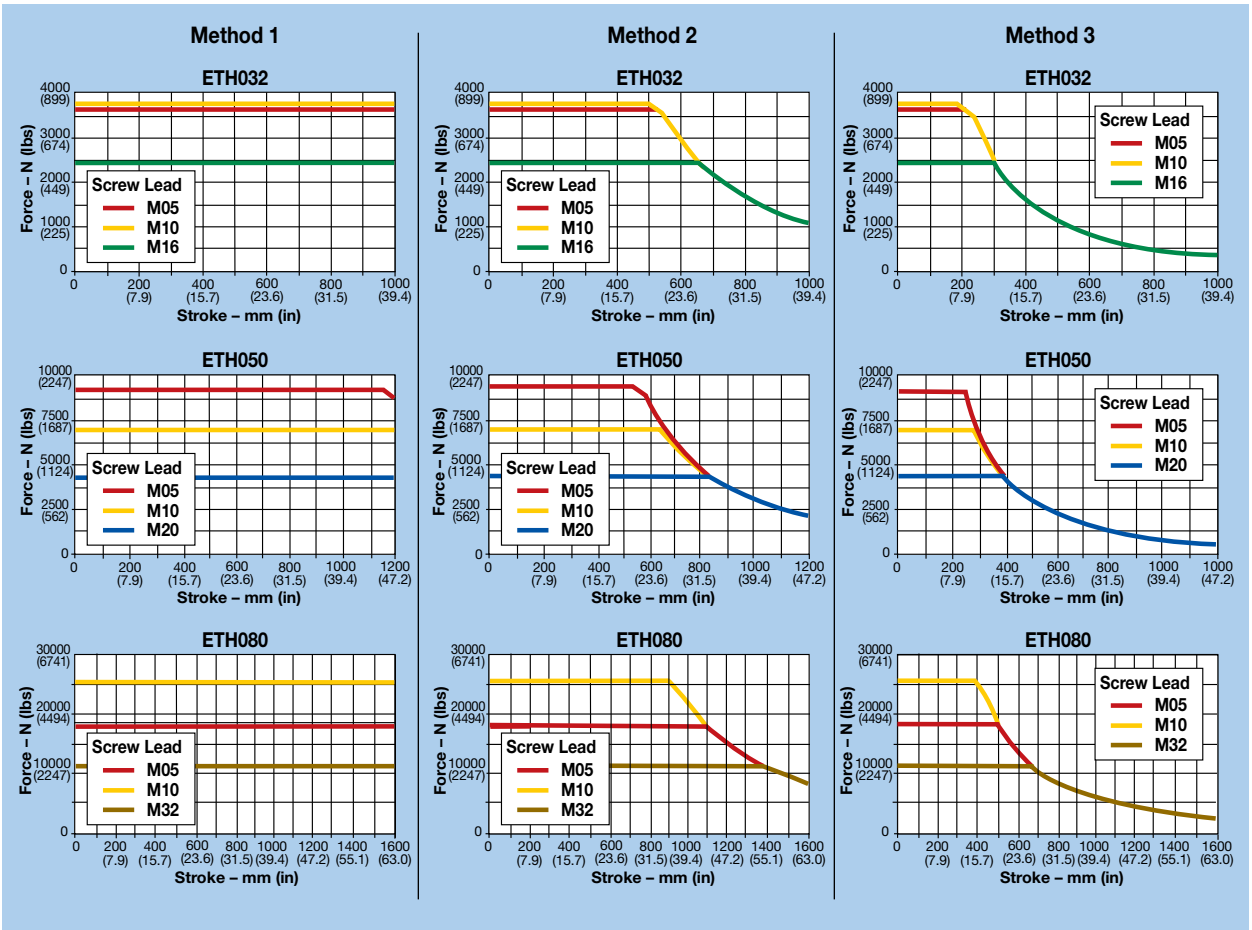
Method 2

① Cylinders fixed with mounting flanges, foot mounting or mounting plates
③ Thrust rod without axial guiding

Method 3

④ Cylinders mounted via center trunnion or rear clevis
② Thrust rod with axial guiding





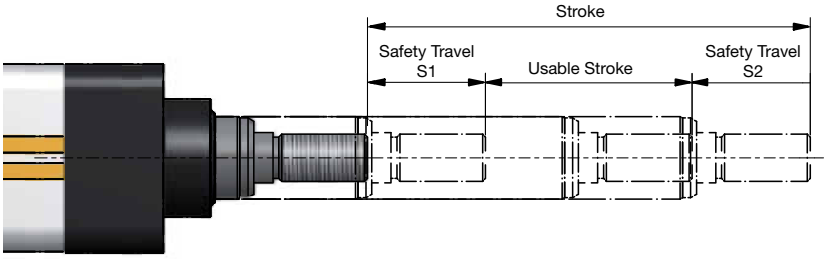
Design Considerations — Stroke, Usable Stroke and Safety Travel

Stroke:

The stroke to be indicated in the order code is the mechanically maximal possible stroke, which is the stroke between the internal end stops.

Usable Stroke:

The usable stroke is the distance needed for the application. It is always shorter than the stroke.



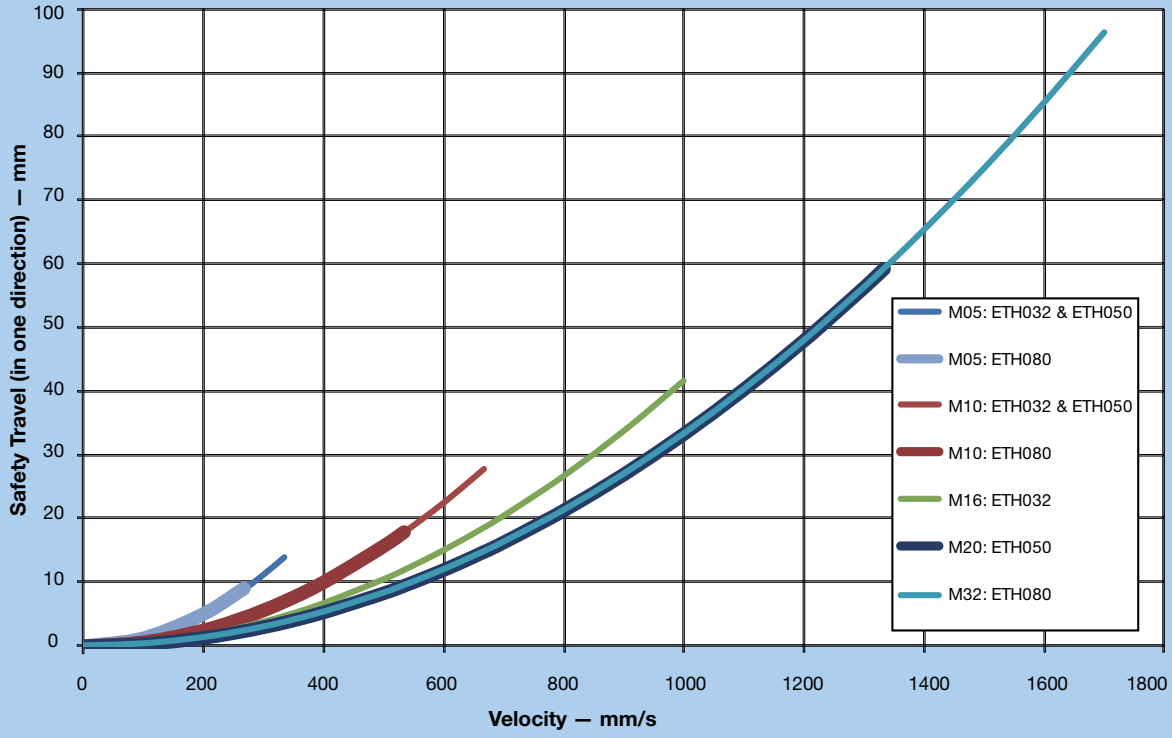
Safety Travel (S1 & S2)

The safety travels are required to slow down the cylinder after it has passed a limit switch, Emergency stop in order to avoid contact with the mechanical limit stops.

Depending on the screw lead and the maximum speed, the following diagram recommends a minimum safety travel, which is sufficient for most applications according to experience.

With demanding applications (great masses and high dynamic), the safety travel has to be calculated and enlarged accordingly (dimensioning on demand).

The safety travel shown in the diagram is for one direction only. The diagram value must be multiplied by two for the total safety travel for both extend and retract directions.



Design Considerations — Service Life

Nominal Service Life[1]

The nominal service life of the electric cylinder can be determined with the aid of the known forces.

The nominal service life is calculated as follows:

The forces calculated for each individual segment of the application cycle must be summarized into an equivalent axial force F_m (see "Calculating Required Axial Force" in previous section).

$$F_m = \sqrt[3]{\frac{1}{s_{ges}} (F^3_{x,1} \bullet s_1 + F^3_{x,2} \bullet s_2 + F^3_{x,3} \bullet s_3 + ...)}$$

(Index "j" for the individual segments of the application cycle. For example, the first segment would be F^3_{x1} where j = 1, the second segment would be F^3_{x2} where j = 2, etc.)

Nominal Service Life Prerequisites

- Bearing and screw temperature between 20°C and 40°C
- No impairment of the lubrication, for example by external particles
- Relubrication in accordance with the specifications
- The given values for thrust force, speed and acceleration must be adhered to at any rate
- No approaching the mechanical end stops (external or internal), no other abrupt loads, as the given maximum force of the cylinder may never be exceeded
- The given lateral forces applied to the cylinder rod must always be respected
- No high exploitation of several power features at a time (for example maximum speed or thrust force)
- No regulating oscillation at standstill

[1] Nominal service life is the service life reached by 90 % of a sufficient number of similar electric cylinders until the first signs of material fatigue occur.

Actual Service Life

The actual service life can only be approximated due to a variety of different effects. The nominal service life L calculation does, for instance, not take insufficient lubrication, impacts and vibrations into consideration. These effects can however be estimated with the aid of the application factor f_w.

The actual service life is calculated as follows:

$$L_{fw} = \frac{L}{f_w^3}$$

If you need the service life as the number of possible cycles, just divide the service life in kilometers by twice the stroke traveled.

Standstill times are not taken into consideration when determining the equivalent axial force (Fm), as sj=0.

CAUTION: always consider the stroke as well as the return stroke.

Formula Abbreviations

F_m	Equivalent axial force (N)
F_x F_j	Resulting axial force in N (see formula 1 & 2, Calculating Axial Force)
s_j	Travel given a defined force Fx,a,j (mm)
s_{total}	Total travel (mm)
L	Nominal service life in km (see Service Life graphs)
L_{fw}	Service life as a function of the application factor (km)
f_w	Application factor (see "Application Factor F_w" table at right)

Application Factor f_w **

Movement Cycle	Shocks/Vibrations None	Light	Medium	Heavy
More than 2.5 screw rotations	1.0	1.2	1.4	1.7
1.0 to 2.5 screw rotations* (short stroke applications)	1.8	2.1	2.5	3.0

* After max. 10 000 movement cycles, a lubrication run must be performed (see lubrication run intervals table).

**** Boundary Conditions for Application Factor f_w:**

- Externally guided electric cylinders
- Accelerations <10 m/s²
- Application factor <1.5
- For other conditions, please contact Parker

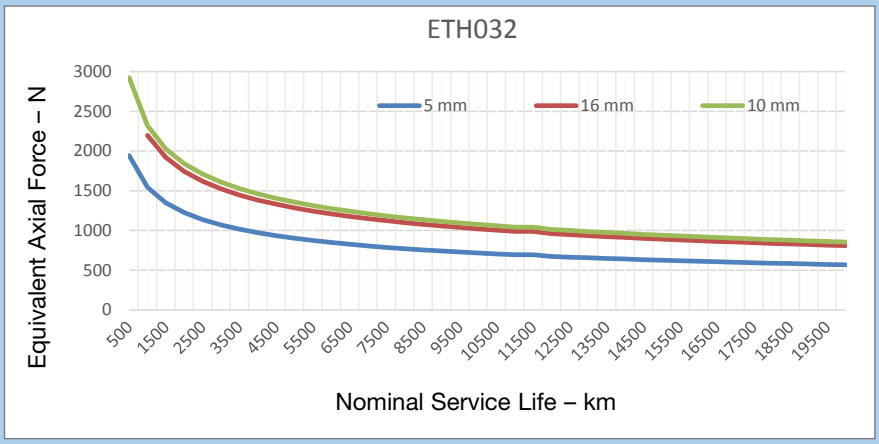
Lubrication Run Lengths for Short Stroke Applications

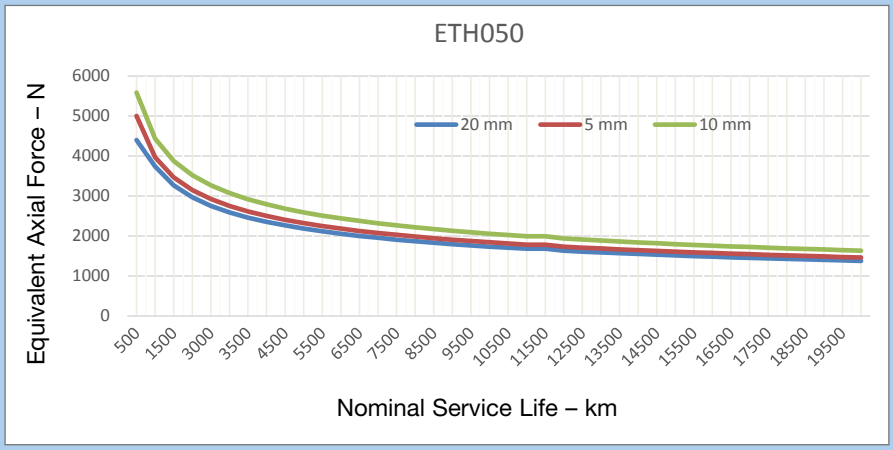
	ETH032			ETH050			ETH080			ETH100		ETH125	
Run Length	M05	M10	M16	M05	M10	M20	M05	M10	M32	M10	M20	M10	M20
mm	>45	>54	>58	>40	>46	>58	>47	>65	>95	>102	>140	>122	>210

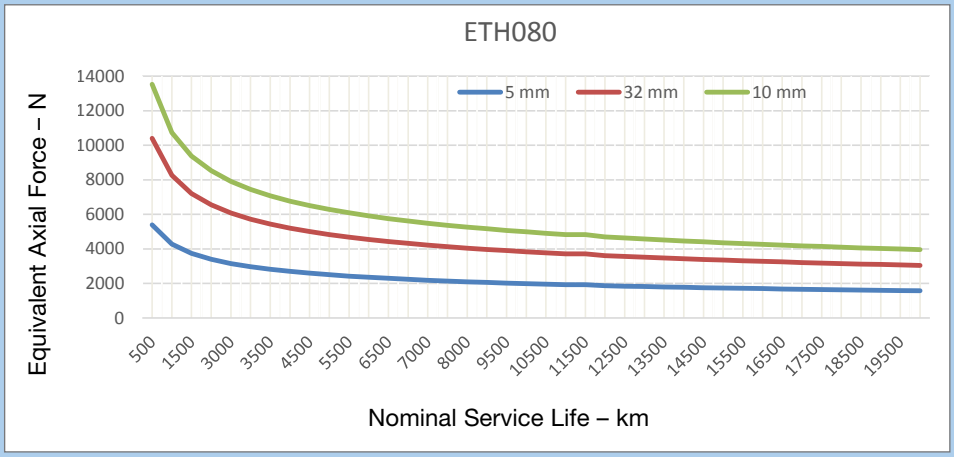
Design Considerations — Service Life

Values are based on following recommended lubrication intervals.

(See Relubrication for details in Sizing & Selection.







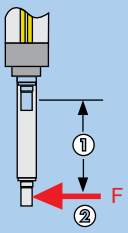
Design Considerations — Permissible Side Load

The electric cylinder features a generously dimensioned cylinder rod and screw nut bearing in the form of high-quality plastic sliding bushings to absorb the lateral force.

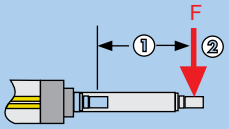
Please note that electric cylinders with a longer stroke permit a higher lateral force at the same extension length. It may therefore be useful to choose a longer stroke than required for the application in order to increase the permissible lateral force.

If the permissible lateral forces are exceeded or if the maximum axial force occurs at the same time, the optional outrigger bearing (option R) must be used.

Permissible lateral forces in vertical mounting position



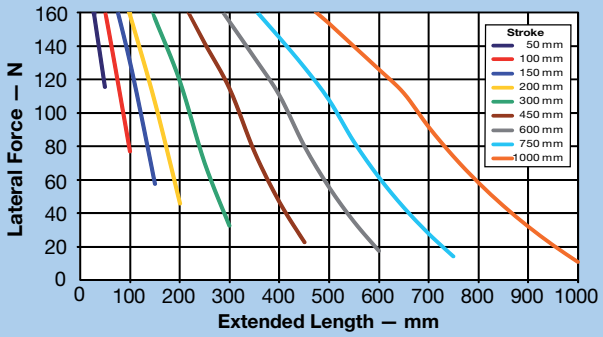
Permissible lateral forces in horizontal mounting position



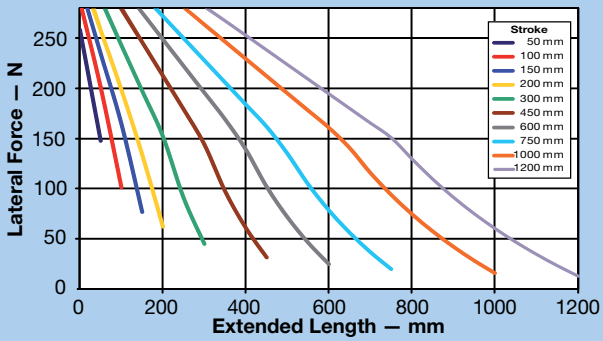
1 Extended length
2 Force application (at the middle of the cylinder rod thread)

Vertical Mounting Positions*

ETH032



ETH050



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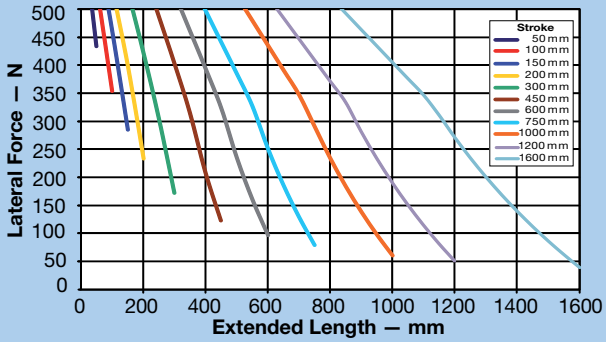
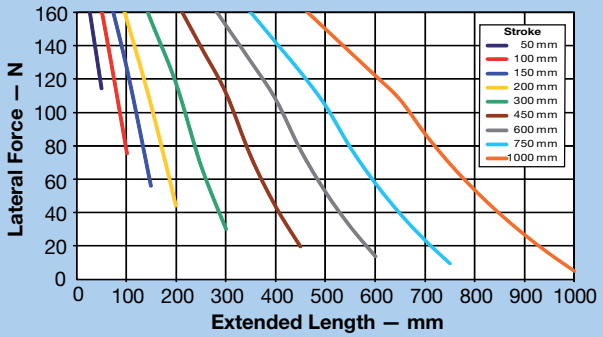
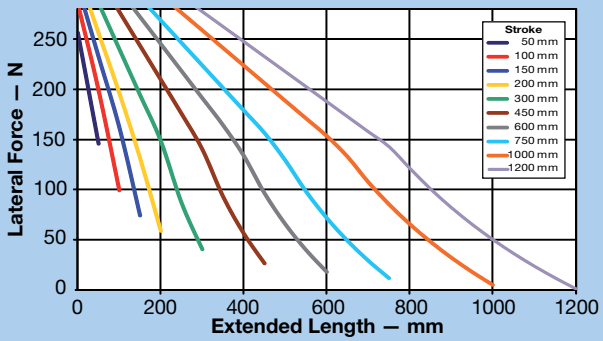


Horizontal Mounting Positions*

ETH032



ETH050



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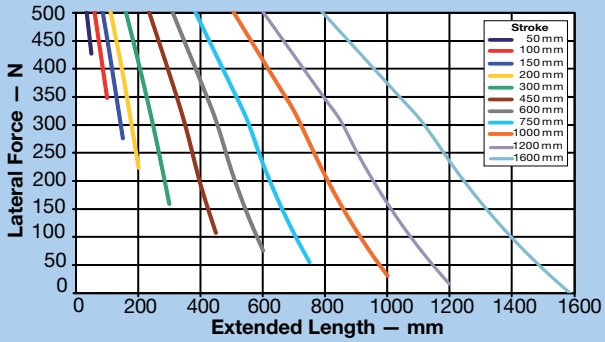
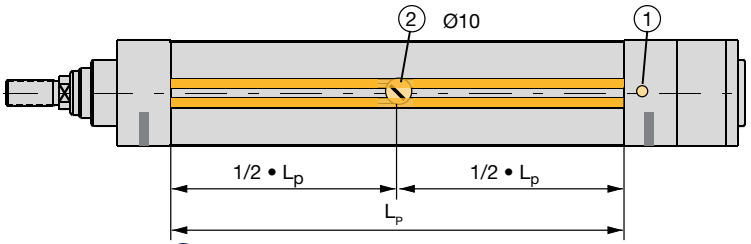


* The diagrams apply for a medium travel speed of 0.5 m/s, an ambient temperature of 20°C and all housing orientations.

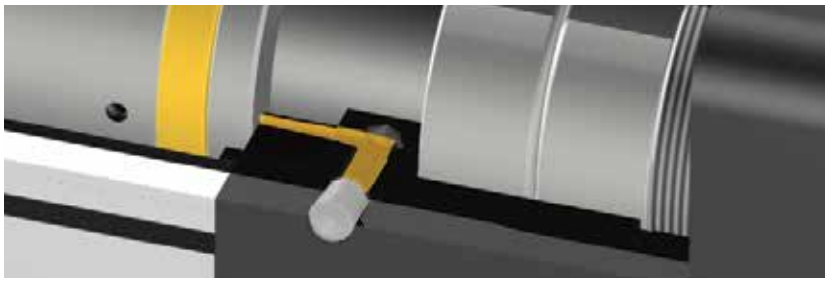
Design Considerations — Relubrication

All frame sizes are designed with a range of lubrication port locations for maximum easy access. Contact factory for special needs not shown.



1 Central lubrication (standard)
2 Optional lubrication (possible on all 4 sides):
L_P: Length of profile

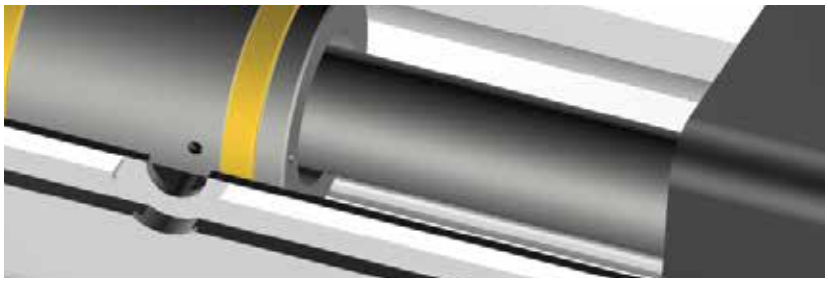
Option 1: Integrated lubrication Port (standard)



Relubrication is simple with the easy access port. Users simply perform a controlled retract of the cylinder approaching the endstop under slow speed and grease the cylinder.

The standard easy access port is always at the 3 o'clock position.

Option 2...5: Lubrication Hole (optional)



If a space constraint does not allow easy access to the standard lubrication port, other options in the part number configuration allow for a port at the center of the extrusion.

Free access to this bore even after integration of the cylinder into a system can be ensured by choosing the corresponding profile orientation (see Ordering Information). The bore is located exactly in the middle of the aluminum profile.

Lubrication Intervals*

Lubrication intervals depend on the operating conditions (nominal size, pitch, speed, acceleration, loads, etc.) and the ambient conditions (e.g. temperature). Ambient influences such as high loads, impacts and vibrations shorten the lubrication intervals.

Under normal operating conditions, the given lubrication intervals apply. If the total travel per year is shorter than the given intervals, the cylinder must be relubricated at least once per year. In the event of small loads and if the application is impact and vibration free, the lubrication intervals can be extended.

The lubricant used is Klüber and is available worldwide.

Normal Operating Conditions:

- Medium screw velocity 2000 rpm
- Operating factor f_W=1.0
- No impacts and vibrations

ETH032			ETH050			ETH080		
M05	**M10**	**M16**	**M05**	**M10**	**M20**	**M05**	**M10**	**M32**
300 km	600 km	960 km	300 km	600 km	1200 km	300 km	600 km	1500 km

Design Considerations — Motor and Gearhead Selection

Drive Torque Calculation

The torques to be produced by the motor result from the acceleration, the load and the friction torque. The drive torques must be calculated for all segments of the application cycle (represented by index "j"). Index "j" for the individual segments of the application cycle.

Calculation of the **acceleration torque** with respect to the rotary moments of inertia:

$$M_{B,j} = \left((J_{i/p,0} + J_{i/p,Hub} \bullet Hub) \bullet \frac{1}{\eta_{ETH}} \bullet \boxed{\frac{1}{i_G{}^2 \bullet \eta_G} + J_G} + J_M \right) \bullet 10^{-3} \bullet \frac{6{,}28 \bullet a_{K,j}}{P_h}$$

(use only with gearhead)

The acceleration forces due to the translatory moved masses are taken into consideration in the calculation of the axial forces (see Design Considerations — Calculating Axial Force.)

The **load torques** result from the occurring axial forces:

$$M_{L,j} = \frac{F_{x,a\,/\,e,j}}{\text{Thrust force factor}} \bullet \boxed{\frac{1}{i_G \bullet \eta_G}}$$

(use only with gearhead)

The motor must therefore generate the following **drive torques**:

$$M_{M,j} = M_{B,j} + M_{L,j}$$

The peak torque of the motor must exceed the maximum occurring drive torque.

The **effective torque** can be deduced from the drive torques for all segments of the application cycle:

$$M_{eff} = \sqrt[2]{\frac{1}{t_{ges}} \bullet (M_{M1}{}^2 \bullet t_1 + M_{M2}{}^2 \bullet t_2 + \ldots)}$$

The nominal torque of the motor must exceed the calculated effective torque. Refer to the Motor Mounting Configuration charts (see Dimensions), to verify that the motor is mechanically compatible to the corresponding electric cylinder.

Formula Abbreviations

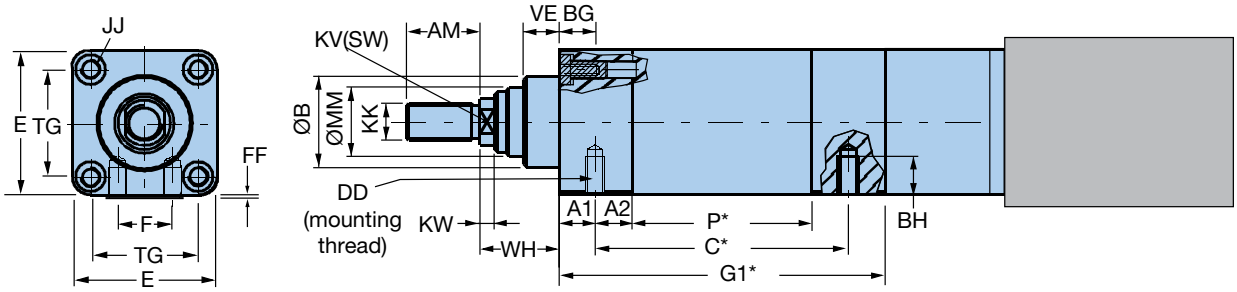
$M_{B,j}$	Variable acceleration torque in Nm
$J_{i/p,0}$	Red. rot. mass moment of inertia at zero stroke for inline/parallel motor configuration in kgmm² (see graphs in Speed/Thrust with Motors)
$J_{i/p,\ stroke}$	Red. rot. mass moment of inertia per mm of stroke for inline/parallel motor configuration in kgmm² (see graphs in Speed/Thrust with Motors)
Stroke	Selected stroke in mm
η_{ETH}	Efficiency of the electric cylinder (0.9 – inline drive configuration; 0.81 – parallel motor)
i_G	Gearhead ratio
ηG	Efficiency of the gearhead (see gearhead manufacturer specifications)
J_M	Motor mass moment of inertia in kgmm² (see motor manufacturer specifications)
J_G	Gearhead mass moment of inertia in kgmm² (see gearhead manufacturer specifications)
$a_{K,j}$	Acceleration at the cylinder rod in m/s²
P_h	Screw pitch in mm
$M_{L,j}$	Load torque in Nm
$F_{x,a/e,j}$	Loads in x direction in N (see Design Considerations — Calculating Axial Force)
$M_{M,j}$	Drive torque in Nm
M_{eff}	Effective value — motor in Nm
t_{total}	Total cycle time in s
t_j	Amount of time in the cycle in s

DIMENSIONS

ETH Motor Mounting Configurations

Download 2D & 3D files from www.parker.com/emn

Inline Dimensions (mm)

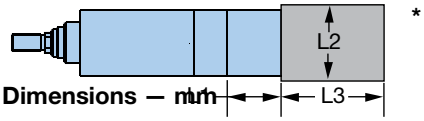


* Specified dimension + selected stroke

Cylinder Size		ETH032			ETH050			ETH080			ETH100		ETH125	
Screw Lead		M05	M10	M16	M05	M10	M20	M05	M10	M32	M10	M20	M10	M20
C	IP54	93.5	103.0	106.5	99.5	105.5	117.5	141.5	159.5	189.5	— [2]	— [2]	— [2]	— [2]
	IP65	94.5	103.5	107.5	100.5	106.5	118.5	142.5	160.5	190.5	— [2]	— [2]	— [2]	— [2]
G1	IP54	133.0	142.0	146.0	154.0	160.0	172.0	197.0	215.0	245.0	323.0	361.0	461.0	549.0
	IP65	180.5	189.5	193.5	198.5	204.5	216.5	259.5	277.5	307.5	349.5	387.5	487.5	575.5
P		66.0	75.0	79.0	67.0	73.0	85.0	89.0	107.0	137.0	162.0	200.0	192.0	280.0
A1	IP54	14.0			15.5			21.0			— [2]		— [2]	
	IP65	60.0			58.5			82.0			— [2]		— [2]	
A2		17.0			18.5			32			— [2]		— [2]	
AM		22.0			32.0			40.0			70.0		96.0	
BG		16.0			25.0			26.0			32.0		44.0	
BH		9.0			12.7			18.5			— [2]		— [2]	
DD		M6x1.0			M8x1.25			M12x1.75			— [2]		— [2]	
E		46.5			63.5			95.0			120.0		150.0	
F		16.0			24.0			30.0			— [2]		— [2]	
FF		0.5			0.5			1.0			0		0	
JJ		M6x1.0 [1]			M8x1.25			M10x1.5			M16x2		M20x2.5	
KK		M10x1.25			M16x1.5			M20x1.5			M10x1.5		M20x2.5	
KV		10.0			17.0			22.0			46.0		55.0	
ØMM		22.0			28.0			45.0			70.0		85.0	
TG		32.5			46.5			72.0			89.0		105.0	
KW		5.0			6.5			10.0			10.0		10.0	
VE		12.0			16.0			20.0			20.0		20.0	
WH		26.0			37.0			46.0			51.0		53.0	
ØB		30.0			40.0			60.0			90.0		110.0	

[1] Thru holes should have a minimum diameter of 7 mm on any component attached to the front threaded screw holes on bolt pattern TG.
[2] ETH100 & ETH125 do not have a mounting thread on the underside
For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Inline Mounts with Xpress Motors



Flange & Coupling to Accept Xpress Motor

Dimensions — mm

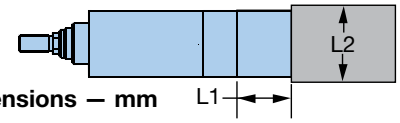
Cylinder Size	Xpress Order Code	Motor (w/Gearhead) Description	Pilot	Bolt Circle	Shaft Ø	Shaft Length	L1	L2	L3
ETH032	XPC	BE233FJ-KPSN	38.10	66.68	9.52	20.8	66.0	58.0	145.0
	XPD	CM233FJ-115027	38.10	66.68	9.52	20.8	66.0	58.0	177.0
	XPG	BE344LJ-KPSN	73.03	98.43	12.70	30.2	65.0	85.0	188.0
	XPH	BE344LJ-KPSB	73.03	98.43	12.70	30.2	65.0	85.0	231.0
ETH050	XPC	BE233FJ-KPSN	38.10	66.68	9.52	31.8	65.0	65.0	145.0
	XPD	CM233FJ-115027	38.10	66.68	9.52	31.8	65.0	65.0	177.0
	XPG	BE344LJ-KPSN	73.03	98.43	12.70	30.2	63.0	85.0	188.0
	XPH	BE344LJ-KPSB	73.03	98.43	12.70	30.2	63.0	85.0	231.0
	XPL [3]	MPP1003D1E-KPSN	95.00	115.00	19.00	40.0	88.0	98.0	175.0
	XPM [3]	MPP1003D1E-KPSB	95.00	115.00	19.00	40.0	88.0	98.0	223.0
	XPN	MPP1003D1E-KPSN [1]	73.03	98.43	12.70	31.8	63.0	100.0	288.0
	XPP	MPP1003D1E-KPSB [1]	73.03	98.43	12.70	31.8	63.0	100.0	336.0
	XPQ [3]	MPP1003R1E-KPSN	95.00	145.00	19.00	40.0	88.0	98.0	175.0
	XPR [3]	MPP1003R1E-KPSB	95.00	145.00	19.00	40.0	88.0	98.0	223.0
	XPS	MPP1003R1E-KPSN [1]	73.03	98.43	12.70	31.8	63.0	100.0	288.0
	XPT	MPP1003R1E-KPSB [1]	73.03	98.43	12.70	31.8	63.0	100.0	336.0
ETH080	XPG	BE344LJ-KPSN	73.03	98.43	12.70	30.2	92.5	98.0	188.0
	XPH	BE344LJ-KPSB	73.03	98.43	12.70	30.2	92.5	98.0	231.0
	XPL	MPP1003D1E-KPSN	95.00	115.00	19.00	40.0	101.5	98.0	175.0
	XPM	MPP1003D1E-KPSB	95.00	115.00	19.00	40.0	101.5	98.0	223.0
	XPN	MPP1003D1E-KPSN [1]	73.03	98.43	12.70	31.8	92.5	100.0	288.0
	XPP	MPP1003D1E-KPSB [1]	73.03	98.43	12.70	31.8	92.5	100.0	336.0
	XPQ	MPP1003R1E-KPSN	95.00	115.00	19.00	40.0	101.5	98.0	175.0
	XPR	MPP1003R1E-KPSB	95.00	115.00	19.00	40.0	101.5	98.0	223.0
	XPS	MPP1003R1E-NPSN [1]	73.03	98.43	12.70	31.8	92.5	100.0	288.0
	XPT	MPP1003R1E-NPSB [1]	73.03	98.43	12.70	31.8	92.5	100.0	336.0
	XPU	MPP1154B1E-KPSN	110.00	130.00	24.00	50.0	111.5	113.0	203.0
	XPV	MPP1154B1E-KPSB	110.00	130.00	24.00	50.0	111.5	113.0	252.0
	XPW	MPP1154B1E-KPSN [2]	110.00	130.00	24.00	50.0	111.5	115.0	352.5
	XPX	MPP1154B1E-KPSB [2]	110.00	130.00	24.00	50.0	111.5	115.0	401.5
	XPY	MPP1154P1E-KPSN [2]	110.00	130.00	24.00	50.0	111.5	115.0	203.0
	XPZ	MPP1154P1E-KPSB [2]	110.00	130.00	24.00	50.0	111.5	115.0	252.0
	XP1	MPP1154P1E-KPSN [2]	110.00	130.00	24.00	50.0	111.5	115.0	352.5
	XP2	MPP1154P1E-KPSB [2]	110.00	130.00	24.00	50.0	111.5	115.0	401.5

[1] With Parker PV34FE-003 gearhead
[2] With Parker PV115FB-003 gearhead
[3] Requires coupling housing on ETH050 with a square dimension of 80 mm to accommodate a larger coupling.

* L1 = Length Coupling Housing + Flange
L2 = Maximum Motor or Gearhead Square Flange
L3 = Length Motor + Gearhead

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Inline Mounts for other Parker Motors



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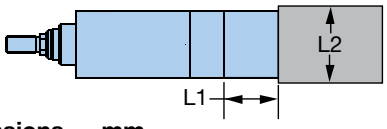
Flange & Coupling to Accept Parker Motor — **Dimensions — mm**

Cylinder Size	Kit Order Code	Parker Motor Description	Pilot	Bolt Circle	Shaft Ø	Shaft Length	L1	L2
ETH032	KCB	SM23X	38.10	66.68	9.52	20.8	60.0	58.0
	KBB	BE23X	38.10	66.68	9.52	31.8	66.0	58.0
	KCA	SM16/BE16	20.00	46.69	6.35	25.0	62.0	58.0
	KEA	LV23/HV23	38.10	66.68	6.35	20.8	60.0	58.0
	KBC	BE34X	73.03	98.43	12.70	30.2	65.0	85.0
	KEB	LV34/HV34	73.03	98.43	12.70	37.1	73.0	85.0
ETH050	KCB	SM23X	38.10	66.68	9.52	20.8	57.5	65.0
	KBB	BE23X	38.10	66.68	9.52	31.8	65.0	65.0
	KBC	BE34X	73.03	98.43	12.70	30.2	63.0	85.0
	KAA	MPP92/MPJ92	80.00	100.00	16.00	40.1	74.0	90.0
	KEB	LV34/HV34	73.03	98.43	12.70	37.1	70.0	85.0
	KAB [1]	MPP100/MPJ100	95.00	115.00	19.00	40.1	88.0	98.0
ETH080	KBC	BE34X	73.03	98.43	12.70	30.2	92.5	98.0
	KAA	MPP92/MPJ92	80.00	100.00	16.00	40.1	101.5	98.0
	KAB	MPP100/MPJ100	95.00	115.00	19.00	40.0	101.5	98.0
	KAC	MPP115/MPJ115	110.00	130.00	24.00	50.0	111.5	113.0

[1] Requires coupling housing on ETH050 with a square dimension of 80 mm to accommodate a larger coupling.
For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Inline Mounts for Parker Gearheads



*

Flange & Coupling to Accept Parker Gearhead — **Dimensions — mm**

Cylinder Size	Kit Order Code	Parker Gearhead Description	Pilot	Bolt Circle	Shaft Ø	Shaft Length	L1	L2
ETH032	PAN	PV60FB/PX60	50.00	70.00	16.00	25.0	61.0	62.0
	PCN	PV23FE/PX23	38.10	66.68	9.52	25.4	60.0	58.0
	PDN	PV34FE/PX34	73.03	98.43	12.70	31.8	65.0	85.0
ETH050	PAN	PV60FB/PX60	50.00	70.00	16.00	25.0	60.5	65.0
	PBN [1]	PV90FB/PX90	80.00	100.00	20.00	40.0	93.0	90.0
	PCN	PV23FE/PX23	38.10	66.68	9.52	25.4	57.5	65.0
	PDN	PV34FE/PX34	73.03	98.43	12.70	31.8	63.0	85.0
ETH080	PBN	PV90FB/PX90	80.00	100.00	20.00	40.0	101.5	90.0
	PJN	PV115FB/PX115	110.00	130.00	24.00	50.0	111.5	115.0
	PDN	PV34FE/PX34	73.03	98.43	12.70	31.8	92.5	98.0
	PEN	PV42FE/PX42	55.55	125.70	15.88	38.1	100.0	113.0

[1] Requires coupling housing on ETH050 with a square dimension of 80 mm to accommodate a larger coupling.
For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

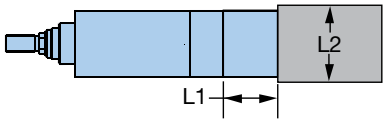
* L1 = Length Coupling Housing + Flange
L2 = Maximum Motor or Gearhead Square Flange

Inline Mounts for Non-Standard Motors

Inline Mounting Compatible Motor Dimensions – mm

Model	Maximum Motor Shaft Ø With Key	Maximum Motor Shaft Ø Without Key
ETH032	16	16
ETH050	24	24
ETH080	28	28

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.



* L1 = Length Coupling Housing + Flange
L2 = Maximum Motor or Gearhead Square Flange

Couplers

Order Code	Coupler Size (Motor Shaft Ø)	Compatibility ETH032	ETH050	ETH080
A	No Coupler	•	•	•
B	0.25”	•	•	
C	0.375”	•	•	
D	0.5”	•	•	•
E	0.625”	•	•	•
H	6 mm	•	•	
J	8 mm	•	•	
K	9 mm	•	•	
L	11 mm	•	•	
M	14 mm	•	•	•
N [1]	16 mm	•	•	•
P [1]	19 mm		•	•
Q [1]	20 mm		•	•
R [1]	22 mm		•	•
S [1]	24 mm		•	•

[1] Requires coupling housing on ETH050 with a square dimension of 80 mm to accommodate a larger coupling.
For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Ordering Non-Standard Motor Mounts

Use the appropriate order codes from the charts to build the desired “Flange Only” or “Flange and Coupler” Kit Order Code. Note: all non-standard motor mount kits use three character descriptions beginning with an N, followed by a Coupler and a Flange designator.

Kit Order Code Designators: N [ ] [ ]

1. **Non-standard motor mount**
2. **Coupler order code**
3. **Flange order code**

Kit Order Code Examples	Kit Order Code
No flange, no coupler	NAA
Flange C (for ETH050), no coupler	NAC
Flange C (for ETH050), 0.5” coupler	NDC

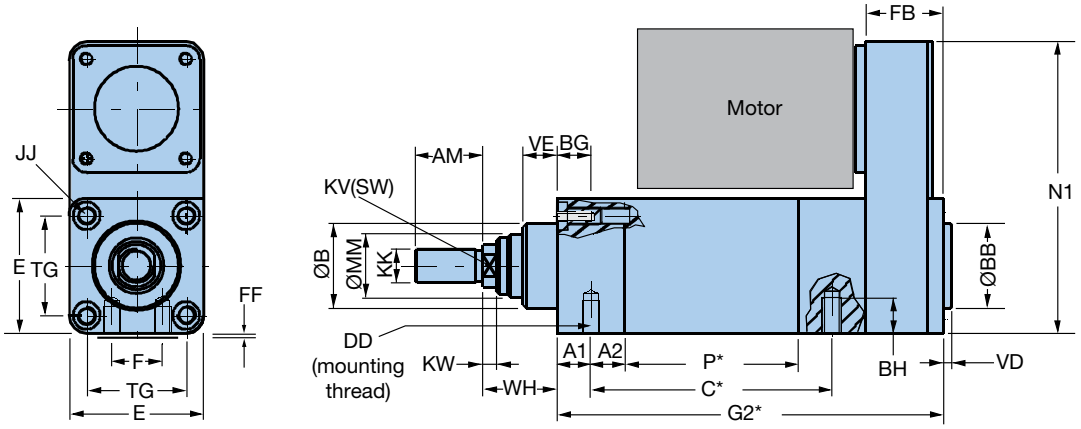
Flanges

Dimensions — mm

Order Code	Bolt Circle	Bolt Hole	Pilot Ø	Pilot Depth	Motor Shaft Length	Compatibility ETH032 L1	ETH032 L2	ETH050 L1	ETH050 L2	ETH080 L1	ETH080 L2
A			No Flange			0.0		0.0		0.0	
B	46.00	M4	30.00	3.5	25.0	60.0	58.0	—	—	—	—
C	63.00	M5	40.00	3.5	20.0	60.0	58.0	57.5	65.0	—	—
D	70.00	M5	50.00	3.5	30.0	67.0	65.0	65.5	65.0	—	—
E	75.00	M5	60.00	3.5	23.0	60.0	70.0	59.0	70.0	—	—
F	75.00	M5	60.00	3.5	30.0	66.0	70.0	65.5	70.0	—	—
G	90.00	M6	70.00	3.5	40.0	—	—	84.0	96.0	92.5	96.0
H	95.00	M6	50.00	3.5	30.0	76.0	82.0	65.5	82.0	—	—
J	100.00	M6	80.00	3.5	40.0	76.0	89.0	84.0	96.0	94.5	96.0
K	115.00	M8	95.00	3.5	40.0	—	—	84.0	100.0	94.5	100.0
L	130.00	M8	110.00	3.5	50.0	—	—	—	—	104.5	115.0
M	130.00	M8	95.00	3.5	50.0	—	—	—	—	101.5	115.0

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Parallel Dimensions

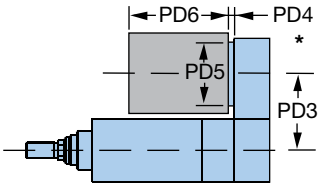


* Specified dimension + selected stroke

Cylinder Size		ETH032			ETH050			ETH080			ETH100		ETH125	
Screw Lead		M05	M10	M16	M05	M10	M20	M05	M10	M32	M10	M20	M10	M20
C	IP54	93.5	103.0	106.5	99.5	105.5	117.5	141.5	159.5	189.5	— [2]	— [2]	— [2]	— [2]
	IP65	94.5	103.5	107.5	100.5	106.5	118.5	142.5	160.5	190.5	— [2]	— [2]	— [2]	— [2]
G2	IP54	180.5	189.5	193.5	194.0	200.0	212.0	257.0	275.0	305.0	451.0	489.0	624.0	712.0
	IP65	228.5	237.5	241.5	239.0	245.0	257.0	320.0	338.0	368.0	478.0	516.0	651.0	739.0
P		66.0	75.0	79.0	67.0	73.0	85.0	89.0	107.0	137.0	162.0	200.0	192.0	280.0
A1	IP54	14.0			15.5			21.0			— [2]		— [2]	
	IP65	60.0			58.5			82.0			— [2]		— [2]	
A2		17.0			18.5			32			— [2]		— [2]	
AM		22.0			32.0			40.0			70.0		96.0	
BG		16.0			25.0			26.0			32.0		44.0	
BH		9.0			12.7			18.5			— [2]		— [2]	
DD		M6x1.0			M8x1.25			M12x1.75			— [2]		— [2]	
E		46.5			63.5			95.0			120.0		150.0	
F		16.0			24.0			30.0			— [2]		— [2]	
FF		0.5			0.5			1.0			0		0	
JJ		M6x1.0 [1]			M8x1.25			M10x1.5			M16x2		M20x2.5	
KK		M10x1.25			M16x1.5			M20x1.5			M42x2		M48x2	
KV		10.0			17.0			22.0			46.0		55.0	
ØMM		22.0			28.0			45.0			70.0		85.0	
TG		32.5			46.5			72.0			89.0		105.0	
KW		5.0			6.5			10.0			10.0		10.0	
N1		126.0			160.0			233.5			347.0		450.0	
FB	IP54	47.5			40.0			60.0			128.0		163.0	
	IP65	48.0			40.5			60.5			128.5		163.5	
VD		4.0			4.0			4.0			4.0		5.0	
ØBB		30.0			40.0			45.0			90.0		110.0	
VE		12.0			16.0			20.0			20.0		20.0	
WH		26.0			37.0			46.0			51.0		53.0	
ØB		30.0			40.0			60.0			90.0		110.0	

[1] Thru holes should have a minimum diameter of 7 mm on any component attached to the front threaded screw holes on bolt pattern TG.
[2] ETH100 & ETH125 do not have a mounting thread on the underside.
For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Parallel Mounts with Xpress Motors



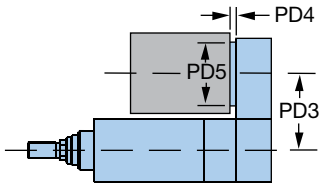
Cylinder Size	Xpress Order Code	Motor (w/Gearhead) Description	Flange & Coupling to Accept Xpress Motor — Dimensions — mm							
			Pilot	Bolt Circle	Shaft Ø	Shaft Length	PD3	PD4	PD5	PD6
ETH032	XPC	BE233FJ-KPSN	38.10	66.68	9.52	31.8	67.5	78.5	62.0	145.0
	XPD	CM233FJ-115027	38.10	66.68	9.52	31.8	67.5	78.5	62.0	177.0
	XPG	BE344LJ-KPSN	73.03	98.43	12.70	30.2	67.5	78.5	80.0	188.0
	XPH	BE344LJ-KPSB	73.03	98.43	12.70	30.2	67.5	78.5	80.0	231.0
ETH050	XPC	BE233FJ-KPSN	38.10	66.68	9.52	31.8	87.5	78.5	62.0	145.0
	XPD	CM233FJ-115027	38.10	66.68	9.52	31.8	87.5	78.5	62.0	177.0
	XPG	BE344LJ-KPSN	73.03	98.43	12.70	30.2	87.5	84.0	90.0	188.0
	XPH	BE344LJ-KPSB	73.03	98.43	12.70	30.2	87.5	84.0	90.0	231.0
	XPL	MPP1003D1E-KPSN	95.00	115	19.00	40.0	87.5	92.5	100.0	175.0
	XPM	MPP1003D1E-KPSB	95.00	115	19.00	40.0	87.5	92.5	100.0	223.0
	XPN	MPP1003D1E-KPSN *	73.03	98.43	12.70	31.8	87.5	128.0	100.0	175.0
	XPP	MPP1003D1E-KPSB *	73.03	98.43	12.70	31.8	87.5	128.0	100.0	223.0
	XPQ	MPP1003R1E-KPSN	73.03	98.43	12.70	31.8	87.5	92.5	100.0	175.0
	XPR	MPP1003R1E-KPSB	73.03	98.43	12.70	31.8	87.5	92.5	100.0	223.0
	XPS	MPP1003R1E-KPSN *	73.03	98.43	12.70	31.8	87.5	128.0	100.0	175.0
	XPT	MPP1003R1E-KPSB *	73.03	98.43	12.70	31.8	87.5	128.0	100.0	223.0
ETH080	XPG	BE344LJ-KPSN	73.03	98.43	12.70	30.2	130.0	84.0	90.0	188.0
	XPH	BE344LJ-KPSB	73.03	98.43	12.70	30.2	130.0	84.0	90.0	231.0
	XPL	MPP1003D1E-KPSN	95.00	115.00	19.00	40.0	130.0	95.3	100.0	175.0
	XPM	MPP1003D1E-KPSB	95.00	115.00	19.00	40.0	130.0	95.3	100.0	223.0
	XPN	MPP1003D1E-KPSN **	73.03	98.43	12.70	31.8	130.0	137.0	100.0	175.0
	XPP	MPP1003D1E-KPSB **	73.03	98.43	12.70	31.8	130.0	137.0	100.0	223.0
	XPQ	MPP1003R1E-KPSN	95.00	115.00	19.00	40.0	130.0	95.3	100.0	175.0
	XPR	MPP1003R1E-KPSB	95.00	115.00	19.00	40.0	130.0	95.3	100.0	223.0
	XPS	MPP1003R1E-KPSN **	73.03	98.43	12.70	31.8	130.0	137.0	100.0	175.0
	XPT	MPP1003R1E-KPSB **	73.03	98.43	12.70	31.8	130.0	137.0	100.0	223.0
	XPU	MPP1154B1E-KPSN	110.00	130.00	24.00	50.0	130.0	127.0	115.0	203.0
	XPV	MPP1154B1E-KPSB	110.00	130.00	24.00	50.0	130.0	127.0	115.0	252.0
	XPW	MPP1154B1E-KPSN ***	110.00	130.00	24.00	50.0	130.0	170.0	115.0	203.0
	XPX	MPP1154B1E-KPSB ***	110.00	130.00	24.00	50.0	130.0	170.0	115.0	252.0
	XPY	MPP1154P1E-KPSN	110.00	130.00	24.00	50.0	130.0	127.0	115.0	203.0
	XPZ	MPP1154P1E-KPSB	110.00	130.00	24.00	50.0	130.0	127.0	115.0	252.0
	XP1	MPP1154P1E-KPSN ***	110.00	130.00	24.00	50.0	130.0	170.0	115.0	203.0
	XP2	MPP1154P1E-KPSB ***	110.00	130.00	24.00	50.0	130.0	170.0	115.0	252.0

* With Parker PV34FE-003 gearhead
** With Parker PV90FB-003 gearhead
*** With Parker PV115FB-003 gearhead

* PD4 = Flange + Gearhead/overhung load adaptor
PD5 = Flange + Gearhead/overhung load adaptor
PD6 = Motor only

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Parallel Mounts for other Parker Motors



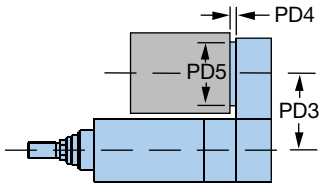
*

Flange & Coupling to Accept Parker Motor **Dimensions — mm**

Cylinder Size	Kit Order Code	Parker Motor Description	Pilot	Bolt Circle	Shaft Ø	Shaft Length	PD3	PD4	PD5
ETH032	KCB	SM23X	38.10	66.68	9.52	20.8	67.5	72.5	62.0
	KBB	BE23X	38.10	66.68	9.52	31.8	67.5	78.5	62.0
	KCA	SM16/BE16	20.00	46.69	6.35	25.0	67.5	72.5	62.0
	KEA	LV23/HV23	38.10	66.68	6.35	20.8	67.5	72.5	62.0
	KBC	BE34X	73.03	98.43	12.70	30.2	67.5	78.5	80.0
	KEB	LV34/HV34	73.03	98.43	12.70	37.1	67.5	78.5	80.0
ETH050	KCB	SM23X	38.10	66.68	9.52	20.8	87.5	72.5	62.0
	KBB	BE23X	38.10	66.68	9.52	31.8	87.5	78.5	62.0
	KBC	BE34X	73.03	98.43	12.70	30.2	87.5	84.0	90.0
	KAA	MPP92/MPJ92	80.00	100	16.00	40.1	87.5	92.5	90.0
	KEB	LV34/HV34	73.03	98.43	12.70	37.1	87.5	92.5	90.0
	KAB	MPP100/MPJ100	95.00	115	19.00	40.1	87.5	92.5	100.0
ETH080	KBC	BE34X	73.03	98.43	12.70	30.2	130.0	87.0	90.0
	KAA	MPP92/MPJ92	80.00	100.00	16.00	40.1	130.0	96.0	90.0
	KAB	MPP100/MPJ100	95.00	115.00	19.00	40.0	130.0	96.0	100.0
	KAC	MPP115/MPJ115	110.00	130.00	24.00	50.0	130.0	127.0	115.0

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Parallel Mounts for Parker Gearheads



*

Flange & Coupling to Accept Parker Motor **Dimensions — mm**

Cylinder Size	Kit Order Code	Parker Gearhead Description	Pilot	Bolt Circle	Shaft Ø	Shaft Length	PD3	PD4	PD5
ETH032	PAN	PV60FB/PX60	50.00	70.00	16.00	25.0	67.5	12.0	62.0
ETH050	PAN	PV60FB/PX60	50.00	70.00	16.00	25.0	87.5	12.0	63.5
	PDN	PV34FE/PX34	73.03	98.43	12.70	31.8	87.5	15.0	90.0
ETH080	PBN	PV90FB/PX90	80.00	100.00	20.00	40.0	130.0	18.0	90.0
	PJN	PV115FB/PX115	110.00	130.00	24.00	50.0	130.0	20.0	115.0

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

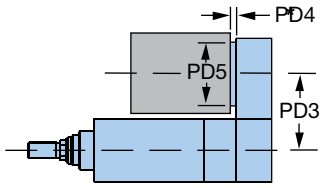
* PD4 = Flange + Gearheadoverhung load adaptor
PD5 = Flange + Geahead/overhung load adaptor
PD6 = Motor only

Parallel Mounts for Non-Standard Motors

Parallel Mounting Compatible Motor Dimensions - mm

Cylinder Size	Max. Shaft Ø		Max. Square Motor Flange
	With Key	Without Key	
ETH032	—	14 (w/PV60 gearhead)	85
ETH050	—	20 (w/PV90 gearhead} or	100
ETH080	—	24 (w/PV115 gearhead}	150

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.



* PD4 = Flange + Gearheadoverhung load adaptor
PD5 = Flange + Geahead/overhung load adaptor
PD6 = Motor only

Sleeves

Order Code	Sleeve Size (Motor Shaft Ø)	Compatibility		
		ETH032	ETH050	ETH080
A	No Sleeve			
B	0.25”	•		
C	0.375”	•	•	
D	0.5”	•	•	
E	0.625”	•	•	
H	6 mm	•		
J	8 mm	•		
K	9 mm	•	•	
L	11 mm	•	•	
M	14 mm	•	•	•
N	16 mm		•	•
P	19 mm		•	•
Q	20 mm			•
R	22 mm			•
S	24 mm			•

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

Ordering Non-Standard Motor Mounts

Use the appropriate order codes from the charts to build the desired “Flange Only” or “Flange and Sleeve” Kit Order Code. Note: all non-standard motor mount kits use three character descriptions beginning with an N, followed by a Sleeve and a Flange designator.

Kit Order Code Designators: ① ② ③ — N _ _

① **Non-standard motor mount**
② **Sleeves order code**
③ **Flange order code**

Kit Order Code Examples	Kit Order Code
No flange, no sleeve	NAA
Flange C (for ETH050), no sleeve	NAC
Flange C (for ETH050), 0.5” sleeve	NDC

Flanges

Dimensions — mm

Order Code	Bolt Circle	Bolt Hole	Pilot Ø	Pilot Depth	Motor Shaft Length	Compatibility								
						ETH032			ETH050			ETH080		
						PD3	PD4	PD5	PD3	PD4	PD5	PD3	PD4	PD5
A	No Flange						0.0			0.0			0.0	
B	46.00	M4	30.00	3.5	25.0	67.5	72.5	62.0	—	—	—	—	—	—
C	63.00	M5	40.00	3.5	20.0	67.5	72.5	62.0	87.5	72.5	60.0	—	—	—
D	70.00	M5	50.00	3.5	30.0	67.5	78.5	62.0	87.5	78.5	63.5	—	—	—
E	75.00	M5	60.00	3.5	23.0	67.5	78.5	62.0	87.5	84.0	90.0	—	—	—
F	75.00	M5	60.00	3.5	30.0	67.5	72.5	62.0	87.5	84.0	90.0	—	—	—
G	90.00	M6	70.00	3.5	40.0	—	—	—	87.5	92.5	90.0	130.0	96.0	90.0
H	95.00	M5	50.00	3.5	30.0	67.5	78.5	82.0	87.5	84.0	90.0	—	—	—
J	100.00	M6	80.00	3.5	40.0	—	—	—	87.5	92.5	90.0	130.0	96.0	90.0
K	115.00	M8	95.00	3.5	40.0	—	—	—	87.5	92.5	100.0	130.0	96.0	100.0
L	130.00	M8	110.00	3.5	50.0	—	—	—	—	—	—	130.0	127.0	115.0
M	130.00	M8	95.00	3.5	50.0	—	—	—	—	—	—	130.0	116.0	115.0

For ETH100 and 125 sizes, please consult factory for motor and gearhead mounting options.

How to use Speed Thrust Curves

Option 1: Xpress System Sizing

Parker offers pre-selected motor and motor/gearhead combinations to maximize the power output of each ETH frame size. This option is ideal for customer's working on time-sensitive applications and/or those that value the many benefits of a single-source solution.

To select the system solution, use the Speed/Thrust with Motors graphs in Specifications to locate the application's required linear velocity and thrust.

If the point lies within a green shaded region, and it is not to the right of the relevant critical speed line, then the application can be solved with the motor or motor/gearhead combination corresponding to the number in that region while still getting full rated life (2,540 Km).

If the point is in the yellow intermittent zone, then the actuator will experience a reduced life, in which case another screw lead or a larger profile size is recommended.

If the point falls above the solid blue line, then the application cannot be solved with that actuator profile size and lead combination when using a motor mounted in parallel.

Once a solution is found simply order the ETH with the correct Xpress motor code and pair with the recommended Compax3 drive and motor power and feedback cables from Limit Sensors in Options & Accessories 31 to complete the Xpress system.

Performance Zones:

Motor Codes	Continuous Operation
XPG [1]	•
XPH [2]	•

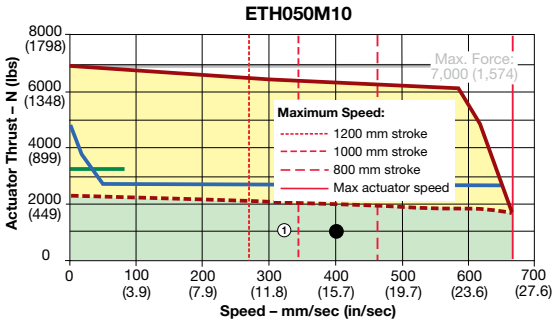
[1] Without brake [2] With brake
* In-line motor mount only

Example:

For an application needing 1000 N thrust at 400 mm/sec velocity, both the XPG and XPH motor/gearhead combinations will solve the application. Note: the actuator stroke must be less than approximately 900 mm in order to reach the required speed.

Solution:

Cylinder: ETH050M10xxXPGxxxxxxxx
Servo motor: BE344LJ-KPSN
Drive: C3S100V2F12IxxTxxMxx
Cables: P-3B1-xx and F-2C1-xx



Option 2: Hybrid Speed/Thrust Graphs

Back by popular demand, Parker has recreated the hybrid speed/thrust graphs for the new ETH Series actuators. These graphs are an ideal way to size an actuator for non-Xpress or third-party motors. These speed/thrust graphs plot linear velocity, linear thrust, required motor velocity, required motor torque, and critical speed.

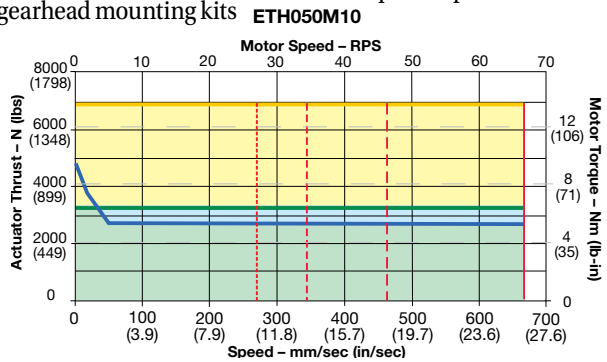
To select a motor or motor/gearhead combination, use the graphs on the following pages to locate the application's required linear velocity and thrust on the graph.

Once that point is determined, extend the lines to the secondary axes to determine the required motor torque and motor speed for the application.

Once the motor requirements are known, simply order the ETH with the proper Parker motor or gearhead mounting kits or use one of the non-standard mounting kit options.

Example:

For an application needing 1000 N thrust at 400 mm/sec linear velocity, and requiring a minimum life of 2,540 Km, the motor would have to be sized for 2 Nm of torque at 40 rps. Note: the actuator stroke must be less than approximately 900 mm to reach the required speed.



Option 3: Traditional Step-by-step Selection Process

For the most dynamic applications, or to double check critical application elements when using sizing options 1 and 2, the traditional step-by-step process (starting with Sizing/Selection Design Considerations), can be used to size the ETH cylinder.

ETH032 Speed-Thrust

See graphs in Sizing & Selection for information on Speed-thrust with Motors.

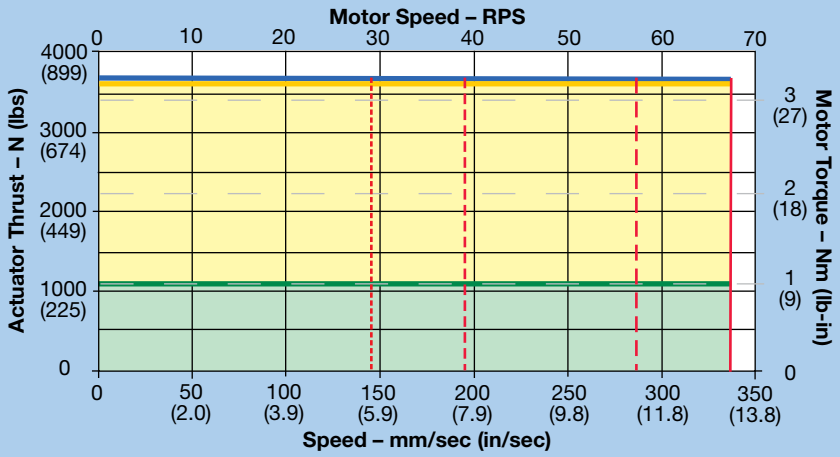
Maximum Thrust*:
- Inline motor mount
- Parallel motor with timing belt limitation
- Max thrust at 2540 km of life (see page 45 for details)

Maximum Speed:
- 1000 mm stroke
- 800 mm stroke
- 600 mm stroke
- Max actuator speed

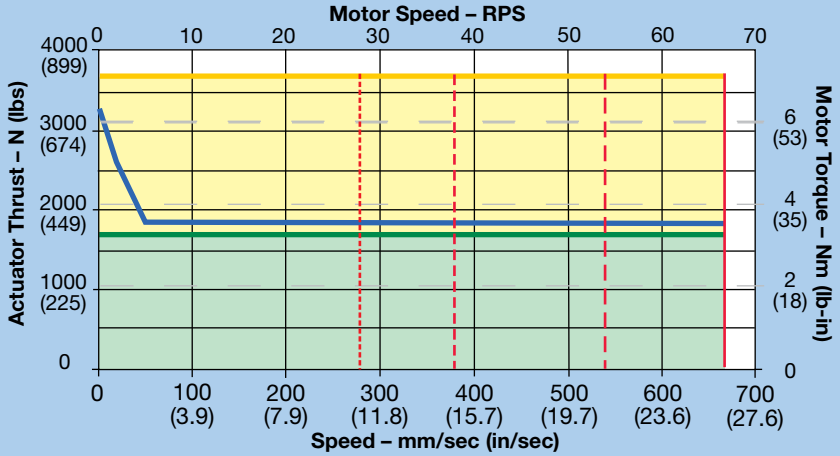
Performance Zones:
- Full life region (greater than 2540 km of life)
- Acceptable zone for Inline motor mounts only (motor mount option A or B)
- Intermittent zone (operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel limitation curve)

*Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load, for limitations on column buckling, please see page 43.

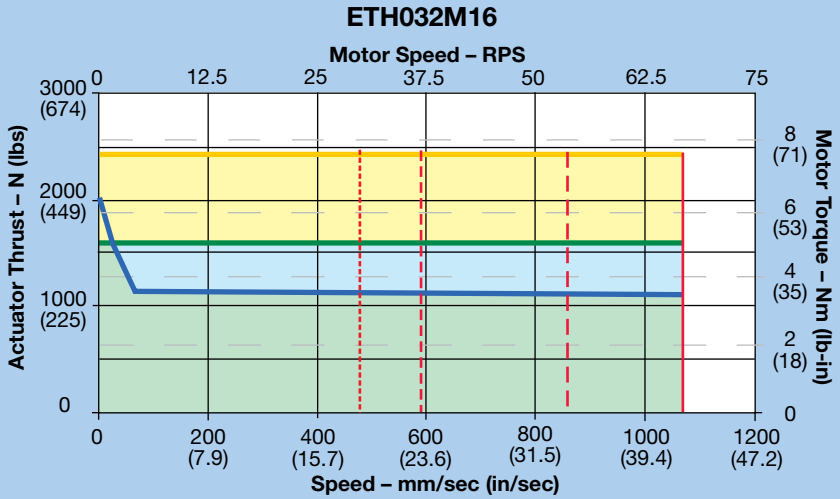
ETH032M05



ETH032M10



ETH032M16



ETH050 Speed-Thrust

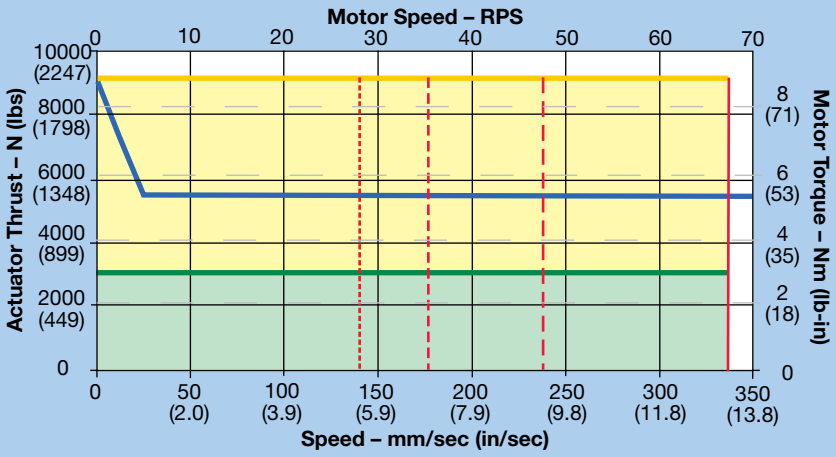
Maximum Thrust*:
- Inline motor mount
- Parallel motor with timing belt limitation
- Max thrust at 2540 km of life (see page 45 for details)

Maximum Speed:
- 1200 mm stroke
- 1000 mm stroke
- 800 mm stroke
- Max actuator speed

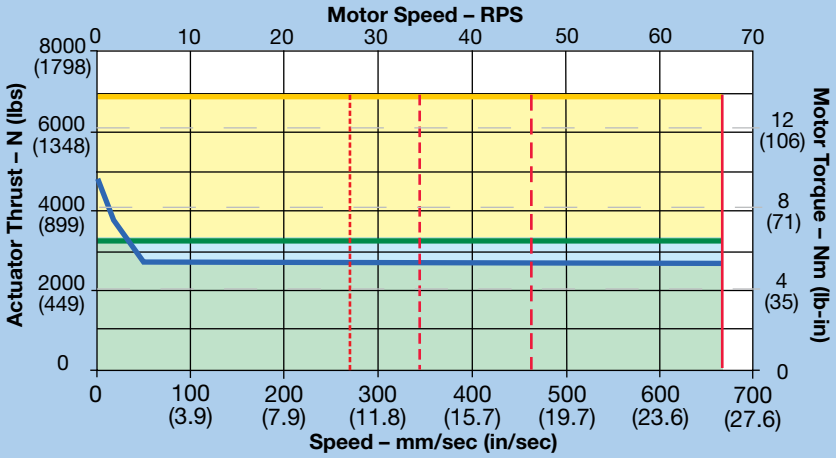
Performance Zones:
- Full life region (greater than 2540 km of life)
- Acceptable zone for Inline motor mounts only (motor mount option A or B)
- Intermittent zone (operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel limitation curve)

*Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load, for limitations on column buckling, please see page 43.

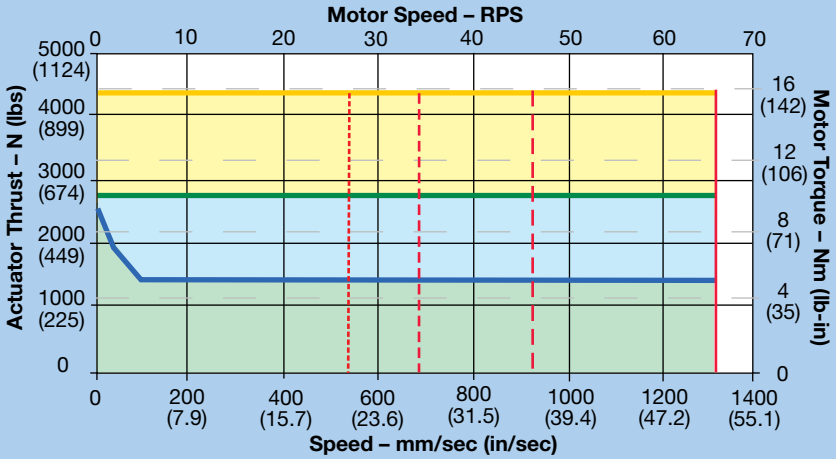
ETH050M05



ETH050M10



ETH050M20



ETH080 Speed-Thrust

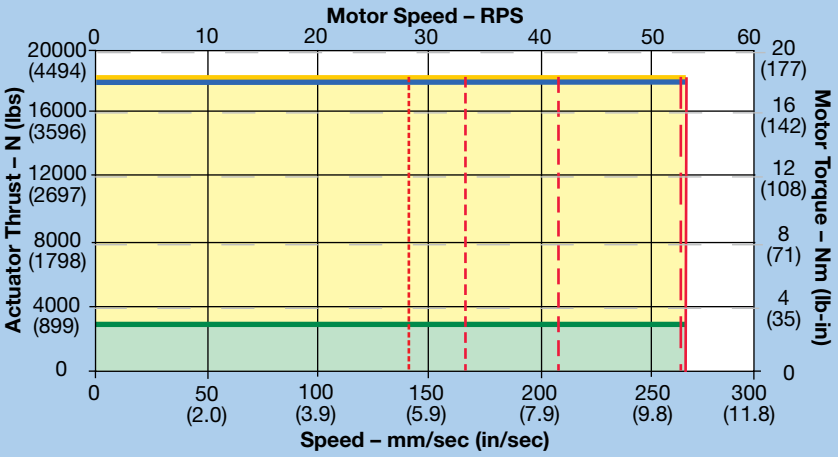
Maximum Thrust*:
- Inline motor mount
- Parallel motor with timing belt limitation
- Max thrust at 2540 km of life (see page 45 for details)

Maximum Speed:
- 1600 mm stroke
- 1400 mm stroke
- 1200 mm stroke
- 1000 mm stroke
- Max actuator speed

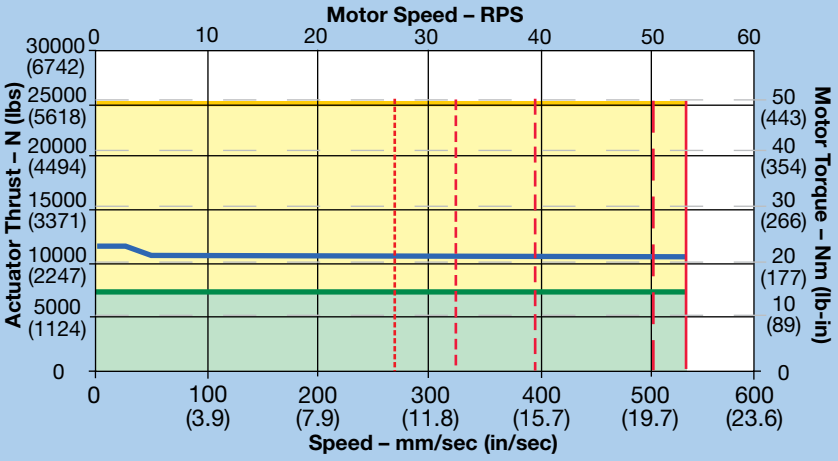
Performance Zones:
- Full life region (greater than 2540 km of life)
- Acceptable zone for Inline motor mounts only (motor mount option A or B)
- Intermittent zone (operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel limitation curve)

*Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load, for limitations on column buckling, please see page 43.

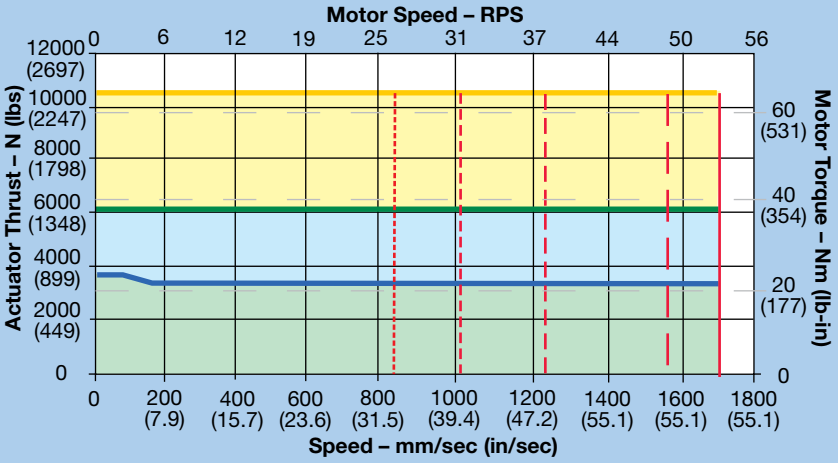
ETH080M05



ETH080M10



ETH080M32



ETH100 Speed-Thrust

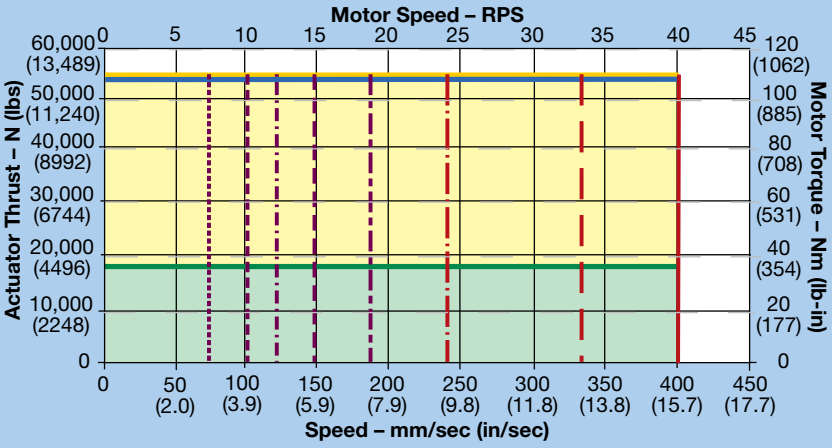
Maximum Thrust*:
- Inline motor mount
- Parallel motor with timing belt limitation
- Max thrust at 2540 km of life (see page 45 for details)

Maximum Speed:
- 2000 mm stroke
- 1600 mm stroke
- 1400 mm stroke
- 1200 mm stroke
- 1000 mm stroke
- 800 mm stroke
- 600 mm stroke
- 500 mm stroke
- Max actuator speed

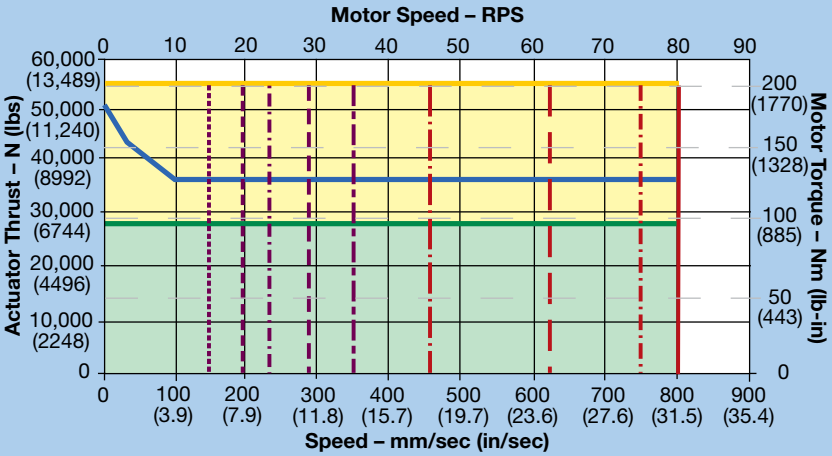
Performance Zones:
- Full life region (greater than 2540 km of life)
- Acceptable zone for Inline motor mounts only (motor mount option A or B)
- Intermittent zone (operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel limitation curve)

*Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load, for limitations on column buckling, please see page 43.

ETH100M10



ETH100M20



ETH125 Speed-Thrust

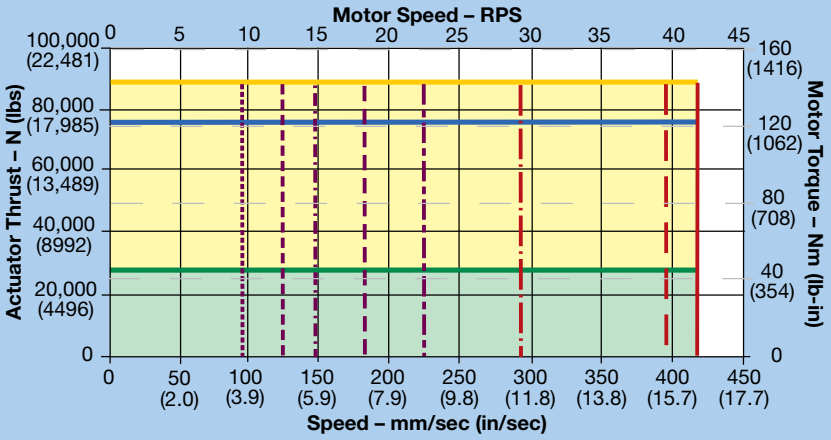
Maximum Thrust*:
- Inline motor mount
- Parallel motor with timing belt limitation
- Max thrust at 2540 km of life (see page 45 for details)

Maximum Speed:
- 2000 mm stroke
- 1600 mm stroke
- 1400 mm stroke
- 1200 mm stroke
- 1000 mm stroke
- 800 mm stroke
- 600 mm stroke
- 500 mm stroke
- Max actuator speed

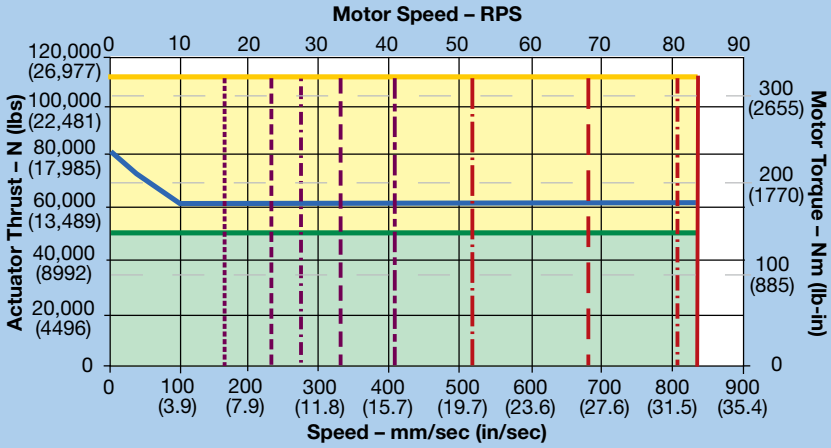
Performance Zones:
- Full life region (greater than 2540 km of life)
- Acceptable zone for Inline motor mounts only (motor mount option A or B)
- Intermittent zone (operation will result in reduced life of the actuator and is not acceptable for parallel motor options if above the parallel limitation curve)

*Maximum thrust assumes a cylinder mounting orientation with a fixed mounting position and a guided load, for limitations on column buckling, please see page 43.

ETH125M10



ETH125M20



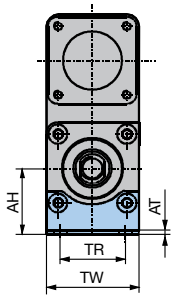
OPTIONS & ACCESSORIES

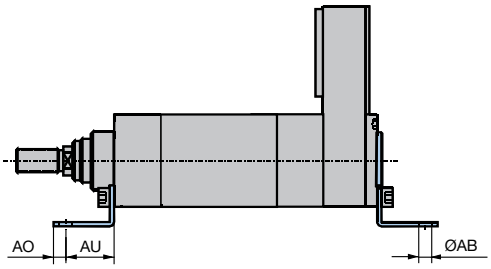
ETH Cylinder Mounting Options

Order Code

B Foot Mount

Available with parallel motor configurations only





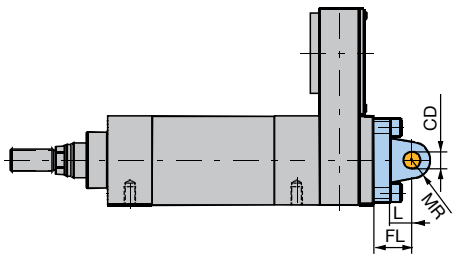
Dimensions — mm

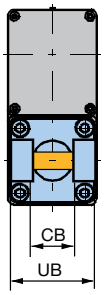
Size	Part Number* (1 piece each) Rear Bracket	Front Bracket	AH	AT	TR	ØAB (H14)	AO	AU	TW
ETH032	0111.065		32	4	32	7.0	8	24	48
ETH050	0121.065		45	4	45	9.0	12	32	65
ETH080	0131.065-01	0131.065-02	63	6	63	13.5	15	41	95
ETH100	0142.916		94	14				164	
ETH125	0152.916		114	14				214	

* Use order code when ordering cylinder; use part number for ordering spare replacement parts

C Rear Clevis Mount

Available with parallel motor configurations only





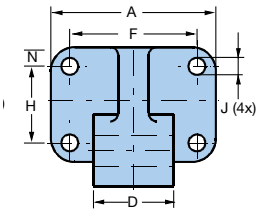
Dimensions — mm

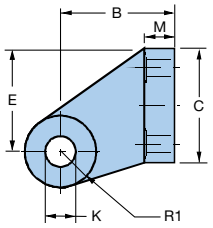
Size	Part Number*	UB (h13)	CB (H14)	ØCD (H9)	MR	L	FL ±0.2
ETH032	0112.031	46.5	26	10	9.5	13	22
ETH050	0122.031	63.5	32	12	12.5	16	27
ETH080	0132.031	95	50	16	17.5	22	36
ETH100	0142.031	120	60.5	30	100	40	65
ETH125	0152.031	150	70.5	50	145	55	90

* Use order code when ordering cylinder; use part number for ordering spare replacement parts

Optional Bearing Block

Mating mount bracket to rear clevis. Please order separately.





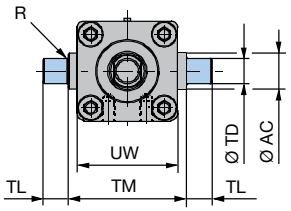
Images shown are for ETH32 and ETH50 units only. See product manuals for other ETH drawings. Dimensional specs in the table for the other units are accurate.

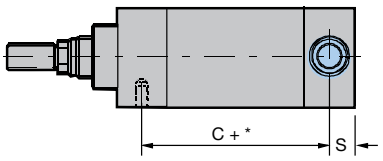
Dimensions — mm

Cylinder Size	Part Number	Mounting Holes	A	B	C	D	E	F	H	H1	ØJ (H13)	ØK (H9)	M	N	R1
ETH032	0112.039	4	55	32	55	26	51.5	38	38	—	9	10	8	8.5	11.0
ETH050	0122.039	4	70	45	70	32	63.5	48	48	—	11	12	12	11	13.0
ETH080	0132.039	8	95	63	150	50	143.0	72	45	40	13	18	16	12.5	16.5
ETH100	0142.039	12	120	95	200	60	215.0					30	25	15	30.0
ETH125	0152.039	16	150	130	350	70	365.0					50	35	20	45.0

Order Code

D Center Trunnion Mount





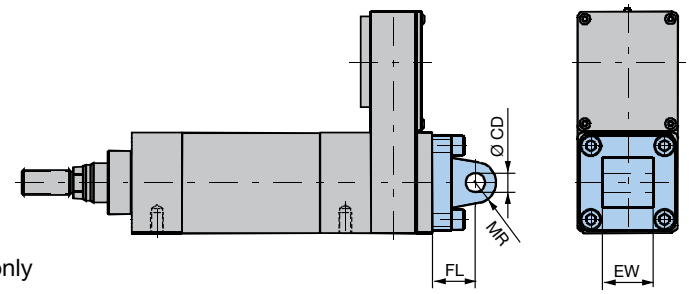
Factory installed. Cannot be ordered separately.

Dimensions — mm

Cylinder Size	UW	ØTD**	R	TL	TM	ØAC	S
ETH032	46.5	12	1	12	50	18	25.5
ETH050	63.5	16	1	16	75	25	39
ETH080	95.3	25	2	25	110	35	34.5
ETH100	120	40	4	40	140	57	57
ETH125	150	50	10	52	160	90	100

* Dimension C+ = Dimension + length of desired stroke (see Stroke, Usable Stroke and Safety Travel in Sizing & Selection for calculating stroke)
**: ØTD in accordance with ISO tolerance zone h8
Note: For relubrication option "1" (Integrated lubrication port) please see mounting method with option "D" center trunnion always on 6 o'clock!

E Rear Eye Mount



Available with parallel motor configurations only

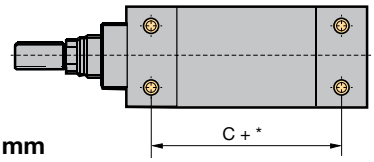
Dimensions — mm

Cylinder Size	Part Number*	EW	ØCD	MR (H9)	FL ±0.2
ETH032	0112.033	26	10	11	22
ETH050	0122.033	32	12	13	27
ETH080	0132.033	50	16	17	36
ETH100	0142.033	60	30	35	80
ETH125	0152.033	70	50	45	115

* Use order code when ordering cylinder; use part number for ordering spare replacement parts

F Tapped Bottom Holes (Standard)

Mounting with 4 threaded holes on bottom of the cylinder.
Available ETH032 – ETH080 only.



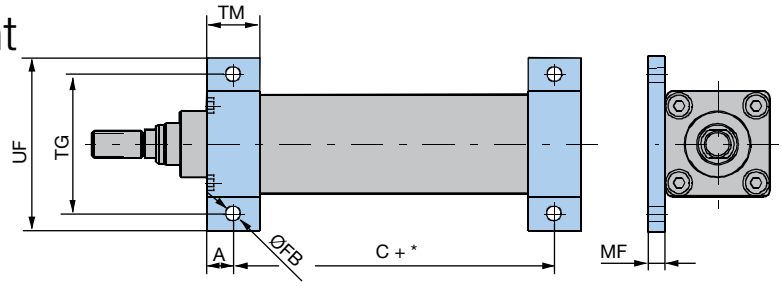
Dimension C + — mm

Cylinder Size		ETH032			ETH050			ETH080		
Screw Lead		**M05**	**M10**	**M16**	**M05**	**M10**	**M20**	**M05**	**M10**	**M32**
C + *	IP54	93.5	103.0	106.5	99.5	105.5	117.5	141.5	159.5	189.5
	IP65	94.5	103.5	107.5	100.5	106.5	118.5	142.5	160.5	190.5

* Dimension C+ = Dimension + length of desired stroke (see Stroke, Usable Stroke and Safety Travel in Sizing & Selection for calculating stroke)

Order
Code

G Side Flange Mount



Flanges are stainless steel

Cylinder Size	Part Number**	Dimensions — mm					
		TG	UF	ØFB	TM	MF	A
ETH032	1440.079	62	78	6.6	25	8	12.5
ETH050	1441.093	84	104	9.0	30	10	15.0
ETH080	0131.078	120	144	13.5	40	12	20.0

* Dimension C+ = Dimension + length of desired stroke (see Stroke, Usable Stroke and Safety Travel in Sizing & Selection for calculating stroke)
** Use order code when ordering cylinder; use part number for ordering spare replacement parts (one piece per part number)

H Rear Plate Mount

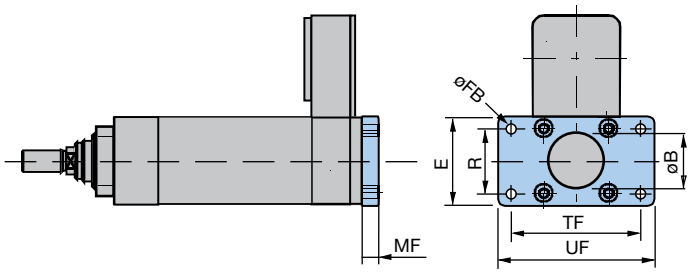


Plate is stainless steel

Cylinder Size	Part Number*	Dimensions — mm						
		MF	UF	TF	E	R	ØFB	ØB
ETH032	0111.064	10	80	64	48	32	7	30
ETH050	0121.064	12	110	90	65	45	9	40
ETH080	0131.064-01	16	150	126	95	63	12	45
ETH100	0142.918	25	258	220	120	80	17.5	90
ETH125	0152.918	40	320	270	150	100	21.5	110

* Use order code when ordering cylinder; use part number for ordering spare replacement parts (one piece per part number)

Order Code

J Front Plate Mount

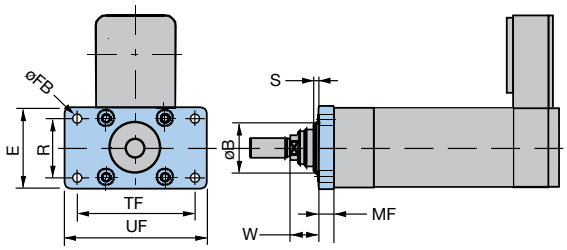
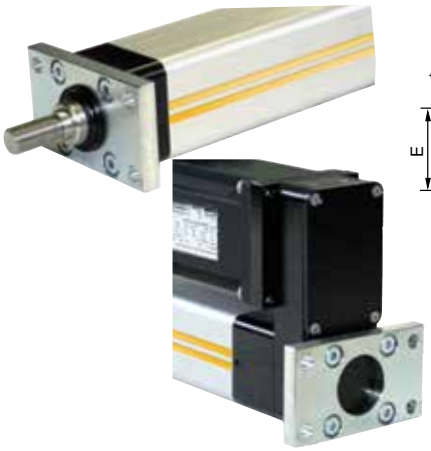


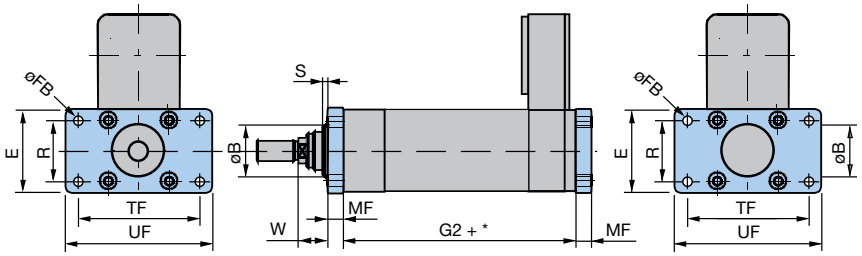
Plate is stainless steel

Cylinder Size	Part Number*	Dimensions — mm S	W	MF	UF	TF	E	R	ØFB	ØB
ETH032	0111.064	2	16	10	80	64	48	32	7	30
ETH050	0121.064	4	25	12	110	90	65	45	9	40
ETH080	0131.064-02	4	30	16	150	126	95	63	12	60

* Use order code when ordering cylinder; use part number for ordering spare replacement parts (one piece per part number)

N Front & Rear Plate Mount





Plates are stainless steel

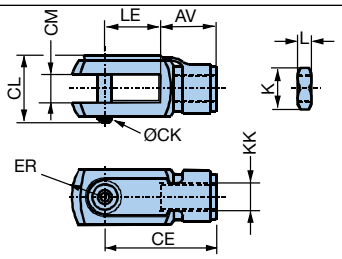
Cylinder Size	Part Number**		Dimensions — mm S	W	MF	UF	TF	E	R	ØFB	ØB
ETH032	Front & Rear	0111.064	2	16	10	80	64	48	32	7	30
ETH050	Front & Rear	0121.064	4	25	12	110	90	65	45	9	40
ETH080	Front	0131.064-02	4	30	16	150	126	95	63	12	60
	Rear	0131.064-01									45
ETH100	Front & Rear	0142.918	-	26	25	258	220	120	80	17.5	90
ETH125	Front & Rear	0152.918	-	13	40	320	270	150	100	21.5	110

* Dimension G2+ (parallel) or G1+ (inline) = Dimension + length of desired stroke (see Stroke, Usable Stroke and Safety Travel in Sizing & Selection for calculating stroke)
** Use order code when ordering cylinder; use part number for ordering spare replacement parts (one piece per part number)

ETH Rod End Options

Order Code

C Clevis Rod End

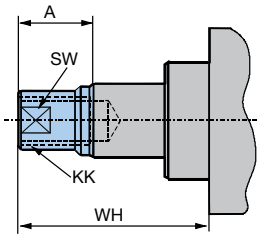


Dimensions — mm

Cylinder Size	Part Number*	Mass [kg]	KK	CL	CM		LE	CE	AV	ER	ØCK (h11/E9)	K	L
ETH032	4309	0.09	M10 x 1.25	26.0	10.2	+0.13/-0.05	20	40	20	14	10	17	5
ETH050	4312	0.34	M16 x 1.5	39.0	16.2	+0.13/-0.05	32	64	32	22	16	24	8
ETH080	4314	0.69	M20 x 1.5	52.5	20.1	+0.02/-0.0	40	80	40	30	20	30	10

*Use order code when ordering cylinder; use part number for ordering spare replacement parts (cylinder rod with male thread is required)

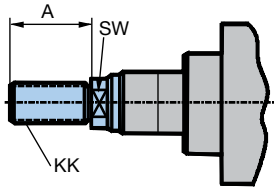
F Female Threaded Rod End



Cylinder Size	Part Number*	Mass [kg]	Dimensions — mm A	KK	WH	SW**
ETH032	0111.029	0.04	14	M10 x 1.25	32	12
ETH050	0121.029	0.14	24	M16 x 1.5	50	20
ETH080	0131.029	0.42	29	M20 x 1.5	59	26

*Use order code when ordering cylinder; use part number for ordering spare replacement parts
** SW = width across flat (position of the flat is not fixed)

M Male Threaded Rod End

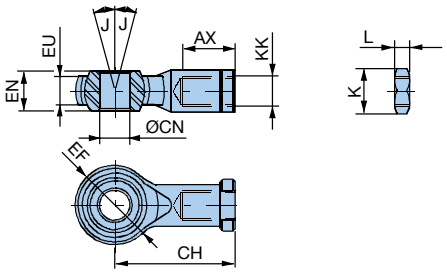


Cylinder Size	Part Number*	Mass [kg]	Dimensions — mm A	KK	SW**
ETH032	0111.028	0.06	22	M10 x 1.25	10
ETH050	0121.028	0.15	32	M16 x 1.5	17
ETH080	0131.028	0.48	40	M20 x 1.5	22

*Use order code when ordering cylinder; use part number for ordering spare replacement parts
** SW = width across flat (position of the flat is not fixed)

Order Code

S Spherical Rod End



Dimensions — mm

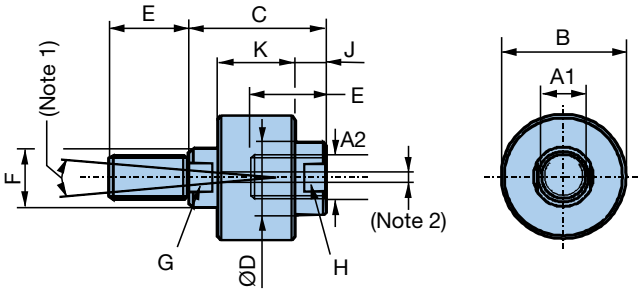
Cylinder Size	Part Number*	Mass [kg]	KK	ØCN (H9)	EN (h12)	EU	AX	CH	ØEF	J°	K	L
ETH032	4078-10	0.07	M10 x 1.25	10	14	10.5	20	43	28	13	17	5
ETH050	4078-16	0.23	M16 x 1.5	16	21	15.0	28	64	42	15	24	8
ETH080	4078-20	0.41	M20 x 1.5	20	25	18.0	33	77	50	14	30	10

* Use order code when ordering cylinder; use part number for ordering spare replacement parts (cylinder rod with male thread is required)

L Alignment Coupler

The alignment coupler mounts on the end of the cylinder rod to:

- Balance misalignments
- Increase the mounting tolerance
- Simplify cylinder mounting
- Increase cylinder guide service life
- Compensate for offsets between components and relieves guides from lateral force influences
- Maintain traction/thrust force bearing capacity



(1) Angle offset ±5° from centerline (2) Axial offset: ±1.5 mm from centerline

Dimensions — mm

Cylinder Size	Part Number*	Mass [kg]	A1	A2	B	C	ØD	E	F	G	H	J	K
ETH032	LC32-1010	0.26	M10x1.25	M10x1.25	40	51	19	19	16	13	16	13	26
ETH050	LC50-1616	0.64	M16x1.5	M16x1.5	54	59	32	29	25	22	29	14	33
ETH080	LC80-2020	1.30	M20x1.5	M20x1.5	54	59	32	29	25	22	29	14	33

*Use order code when ordering cylinder; use part number for ordering spare replacement parts (cylinder rod with male thread is required)

Order Code

R Linear Guide Module

Linear Guide Module offers:

- Anti-rotation control for higher torques
- Absorption of lateral forces

Additional stability and precision is achieved by:

- 2 hardened stainless steel guiding rods
- 4 linear ball bearings

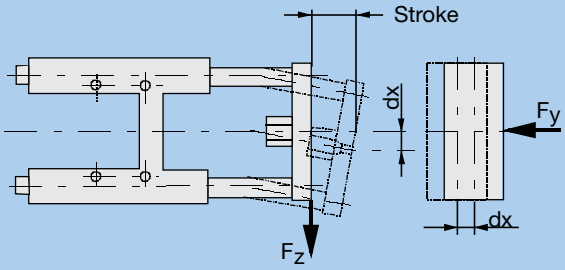
Not available with IP65 models

Linear Guide Module Specifications

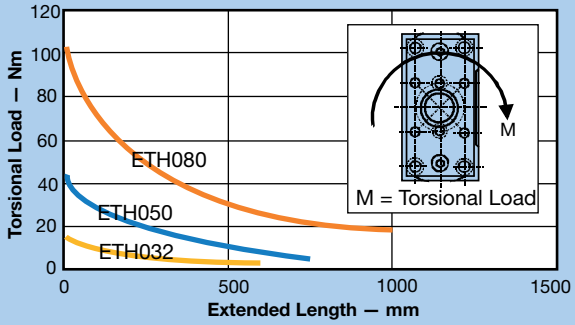
Cylinder Size	Part Number*	Total Mass (w/Zero Stroke) [kg]	Moving Mass (w/Zero Stroke) [kg]	Additional Mass [kg/m]
ETH032	32-2800R-xxxx	0.97	0.60	1.78
ETH050	50-2800R-xxxx	2.56	1.84	4.93
ETH080	80-2800R-xxxx	6.53	4.36	7.71

*Use order code when ordering cylinder; use part number for ordering spare replacement parts replacing xxxx with the desired stroke length. For example, order 50-2800R-0200 for 200 mm stroke. (Be sure to specify the same stroke as ordered on the matching ETH cylinder.)

Deflection*



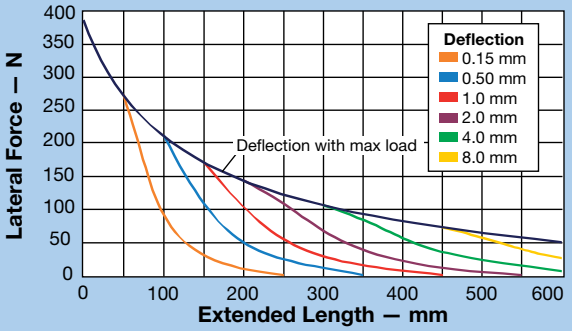
dx: Deflection valid for F_y and F_z



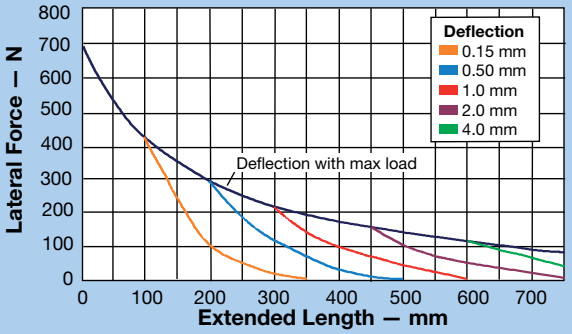
* Deflection curves represent cylinders mounted in any orientation

Cylinder Rigidity with Linear Guide Module

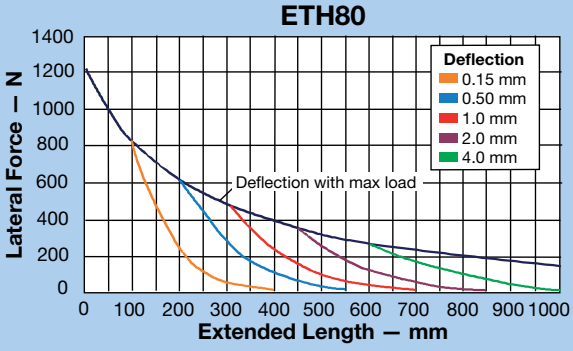
ETH32



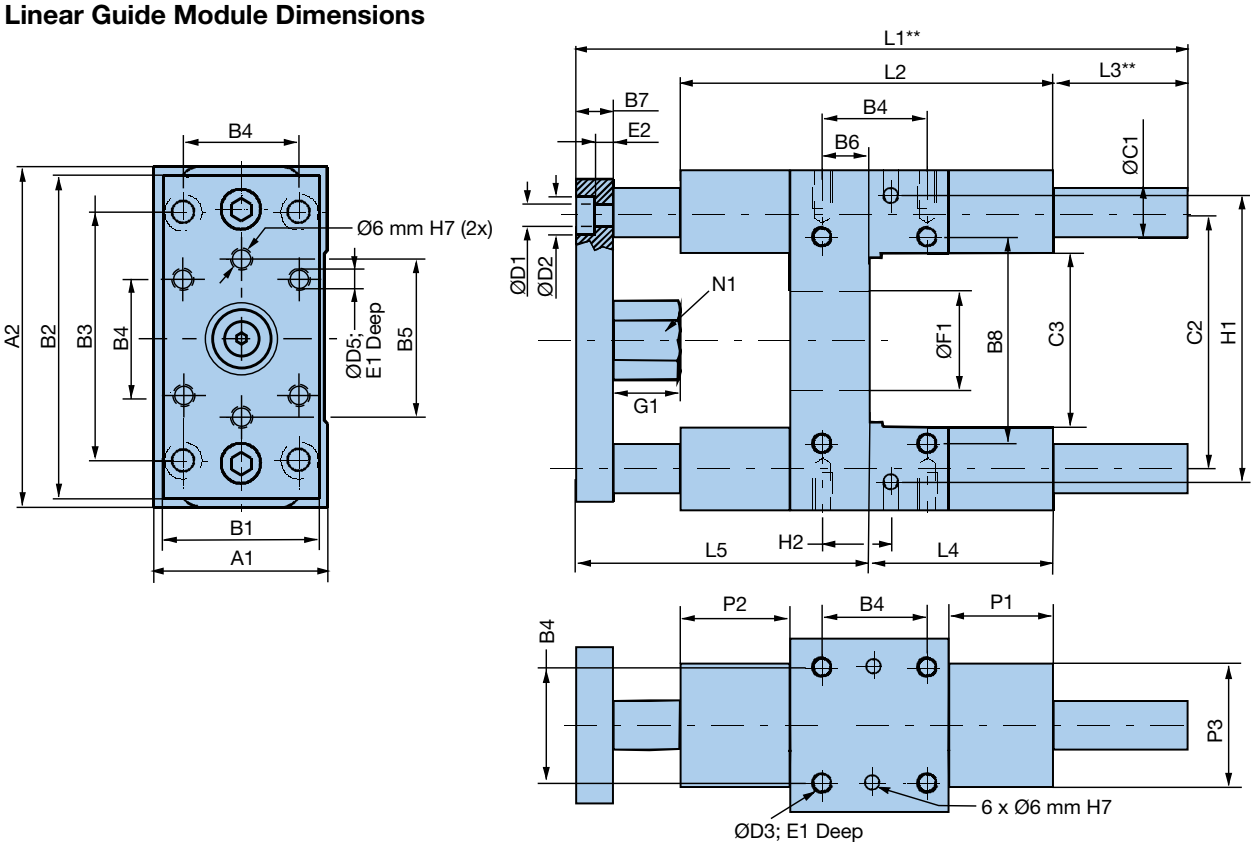
ETH50



ETH80



Linear Guide Module Dimensions



Dimensions — mm

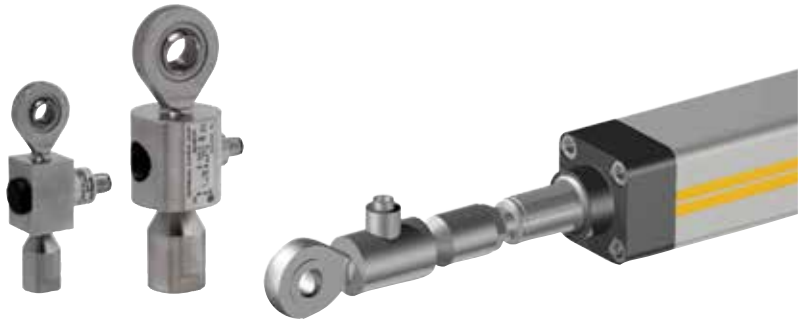
Part Number	A1	A2	B1	B2	B3	B4	B5	B6	B7	B8
32-2800R-xxxx	50.0	97.0	45.0	90.0	78.0	32.5	50.0	4.0	12.0	61.0
50-2800R-xxxx	70.0	137.0	63.0	130.0	100.0	46.5	72.0	19.0	15.0	85.0
80-2800R-xxxx	105.0	189.0	100.0	180.0	130.0	72.0	106.0	21.0	20.0	130.0

Part Number	ØC1	C2	C3	ØD1	ØD2	ØD3	E1 (Depth)	E2 (Depth)	ØF1	G1
32-2800R-xxxx	12.0	73.5	50.0	6.6	11.0	M6 x 1.00	12.0	7.25	30.0	17.0
50-2800R-xxxx	20.0	103.5	70.0	8.4	15.0	M8 x 1.25	16.0	9.25	40.0	27.0
80-2800R-xxxx	25.0	147.0	105.0	10.5	18.0	M10 x 1.50	20.0	11.25	60.0	32.0

Part Number	H1	H2	L1+*	L2	L3+*	L4	L5	N1 **	P1	P2	P3
32-2800R-xxxx	81.0	16.0	152.0	120.0	17.0	71.0	64.0	17.0	36.0	31.0	40.0
50-2800R-xxxx	119.0	23.0	193.0	150.0	25.0	79.0	89.0	24.0	42.0	44.0	50.0
80-2800R-xxxx	166.0	36.0	253.0	200.0	30.0	113.0	110.0	30.0	50.0	52.0	70.0

* L1+ and L3+ = Dimension + length of desired stroke (see see Stroke, Usable Stroke and Safety Travel in Sizing & Selection for calculating stroke)
** N1: Hexagon head; Linear guide module not available on IP65 models

Force Sensor Rod End



Jointed swivel head design with integrated force sensor

Swivel heads are important construction components with respect to rotary, pivoting and tilting movements. Force measurements are more and more frequently required in those applications.

The force transducers are suitable for direct mounting on the cylinder rod. They can, for example, be used to measure contact forces or overloads.

Thanks to thin film technology, the swivel head force transducers are very robust and long time stable. An integrated amplifier emits an output signal of 4 ... 20 mA.

The sensors correspond to the EN 61326 standard for electromagnetic compatibility (EMC) and are sense both thrust and traction forces.

Requires male thread rod end option "M", see Plate Mounts in Options & Accessories 22.

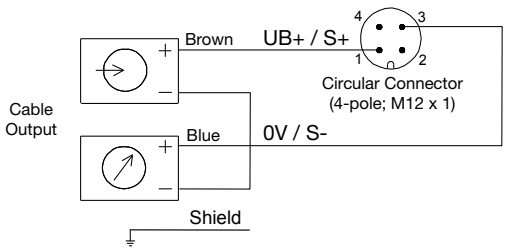
Features

- **Measuring range: traction/ thrust forces up to ±25 kN**
- **Thin film implants (instead of conventional bonded foil strain gauges)**
- **Corrosion resistant stainless steel version**
- **Integrated amplifier**
- **Small temperature drift**
- **High long term stability**
- **High shock and vibration resistance**
- **For dynamic or static measurements**
- **Good repeatability**
- **Simple mounting**

	ETH032		ETH050			ETH080			ETH100	ETH125	
	M05/M10	M16	M05	M10	M20	M05	M10	M32	M10/M20	M10	M20
Part Number	0111.916	0111.917	0121.916	0121.917	0121.918	0131.916	0131.917	0131.918	0131.918	0131.918	0131.918
Accuracy – %				2					1	1	1
Material	Stainless steel										
Protection class	IP67										
Calibration – kN	±3.7	±2.4	±9.3	±7.0	±4.4	±17.8	±25.1	±10.6	±56	±88.7	±114.0
Accuracy – N	14.8	9.6	37.2	28.0	17.6	71.2	100.4	42.4	1120	1774	2280

Electrical Connection

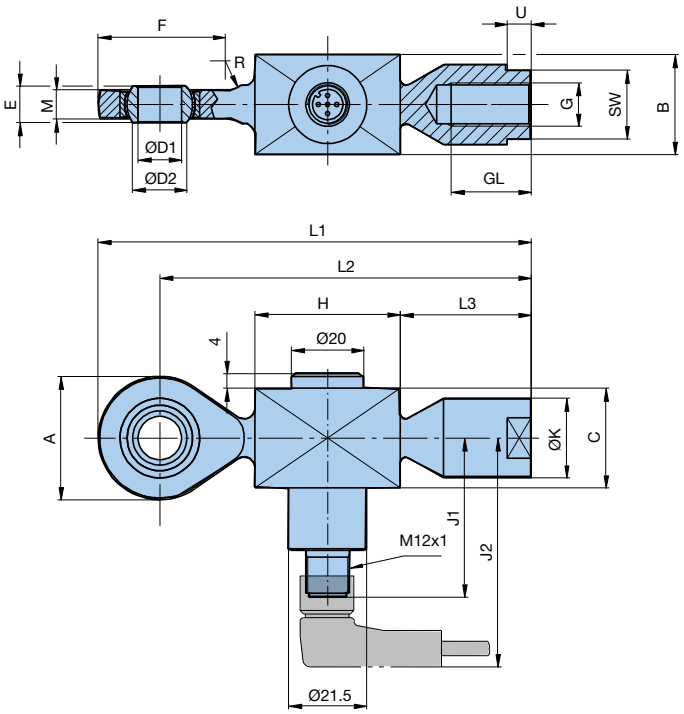
Analog output 4...20 mA (two-wire technology)



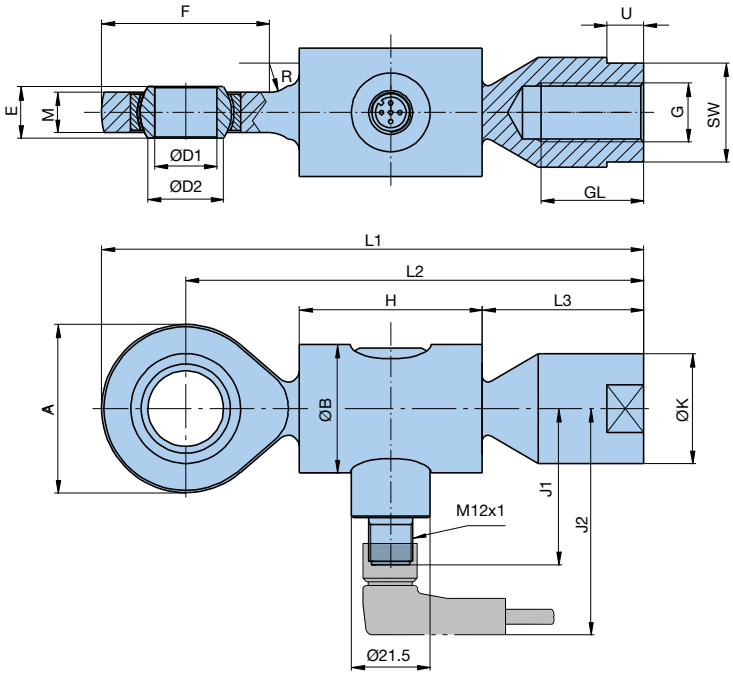
Force Sensor Cables

Part Number	Description
080-900446	2M sensor cable, straight connector, M12 to flying leads
080-900447	5M sensor cable, straight connector, M12 to flying leads
080-900456	2M sensor cable, 90 degree (symbol) angled connector, M12 to flying leads
080-900457	5M sensor cable, 90 degree (symbol) angled connector, M12 to flying leads

Force Sensor Rod End for ETH032



Force Sensor Rod End for ETH050 & ETH080

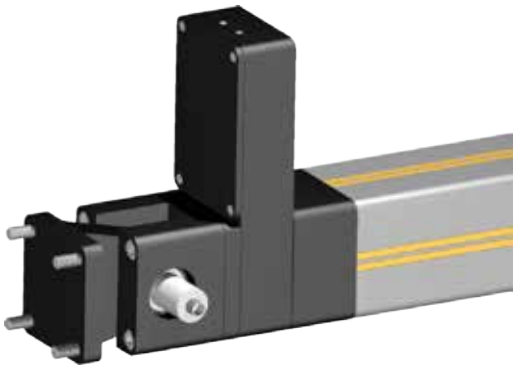


Dimensions — mm

Cylinder Size	A	B	ØB	C	ØD1	ØD2 0.008	E	F	G	GL	H	J1	J2	ØK	L1	L2	L3	M	SW*	U
ETH032	34	27	—	27	12	15	10	35	M10x1.25	22	40	44	63	22	119	102	36	8	19	8
ETH050	46	—	35	—	17	20.7	14	46	M16x1.5	28	50	43	62	30	148	125	44	11	27	12
ETH080	53	—	54	—	20	24.2	16	54	M20x1.5	33	54	44	63	35	171	144.5	54	13	32	13

*SW = width across flat

Force Sensor Rear Clevis



In some force measurement applications, a force sensor on the cylinder rod is not possible or will affect the application's scope. For these applications, Parker developed a special option for the ETH, where the force sensor is integrated into the end-cap of the cylinder. One of the main advantages of this design is that the sensor cable does not move as the rod extends and retracts. All force sensors are configured as traction/thrust sensors.

Analog standard output signals 4...20 mA are available. The sensors correspond to the EN 61326 standard for electromagnetic compatibility (EMC).

Features

- **Measuring range: traction/ thrust forces up to ±25 kN**
- **Thin film implants (instead of conventional bonded foil strain gauges)**
- **Corrosion resistant stainless steel version**
- **Integrated amplifier**
- **Small temperature drift**
- **High long term stability**
- **High shock and vibration resistance**
- **For dynamic or static measurements**
- **Good repeatability**
- **Simple mounting**

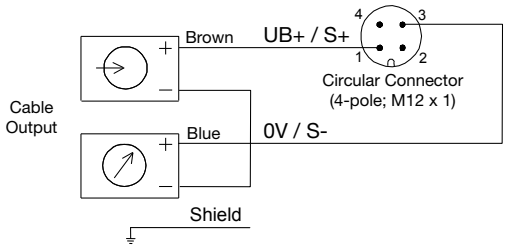
Compatible with parallel motor configurations only.

Requires tapped bottom hole cylinder mounting option "F", see Rear Clevis Mount in Optons & Accessories 19.

	ETH032			ETH050			ETH080			ETH100	ETH125
	M05	M10	M16	M05	M10	M20	M05	M10	M32	M10/M20	
Part Number	0112.034-01	0112.034-01	0112.034-02	0122.034-01	0122.034-02	0122.034-03	0132.034-01	0132.034-02	0132.034-03	0142.034-01	0152.034-01
Accuracy — %					1					2	2
Material	Stainless steel										
Protection class	IP67										
Calibration — kN	±3.7	±3.7	±2.4	±9.3	±7.0	±4.4	±17.8	±25.1	±10.6	±54.8	±81.4
Accuracy – N	74.0	74.0	48.0	186.0	140.0	88.0	356.0	502.0	212.0	2192.0	3256.0

Electrical Connection

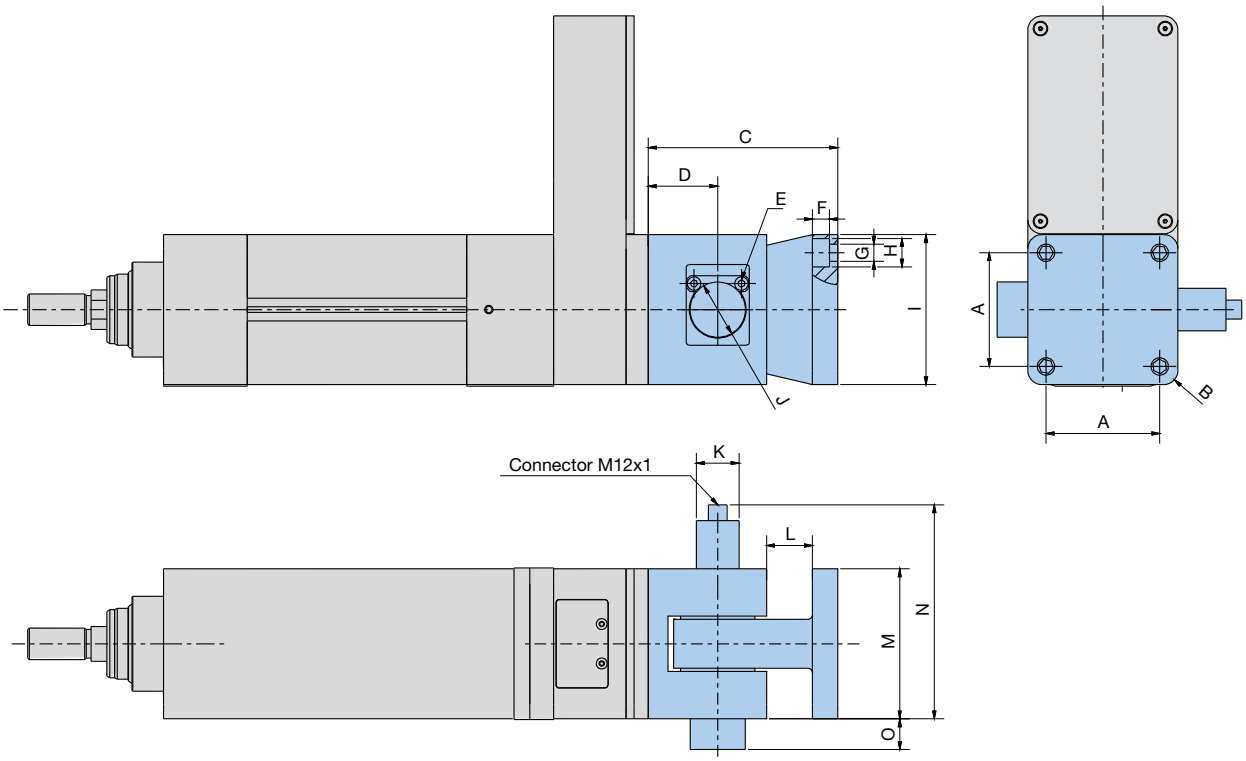
Analog output 4...20 mA (two-wire technology)



Force Sensor Cables

Part Number	Description
080-900446	2M sensor cable, straight connector, M12 to flying leads
080-900447	5M sensor cable, straight connector, M12 to flying leads
080-900456	2M sensor cable, 90 degree (symbol) angled connector, M12 to flying leads
080-900457	5M sensor cable, 90 degree (symbol) angled connector, M12 to flying leads

Force Sensor Rear Clevis for ETH032, ETH050, ETH080



Dimensions — mm

Size	A	B	C	D	E*	F	G	H	I	ØJ	ØK	L	M	N	O
ETH032	32.5	R7	72	27	SW3	6.4	6.6	11	46.5	20	27	12	46.5	98.25	6.75
ETH050	46.5	R8.5	89	32	SW3	8.8	9	15	63.5	25	27	17	63.5	111.75	3.25
ETH080	72.0	R9	123	47	SW4	10.8	11	18	95.0	35	27	29	95.0	135.50	0

*SW = width across flat

Limit Sensors

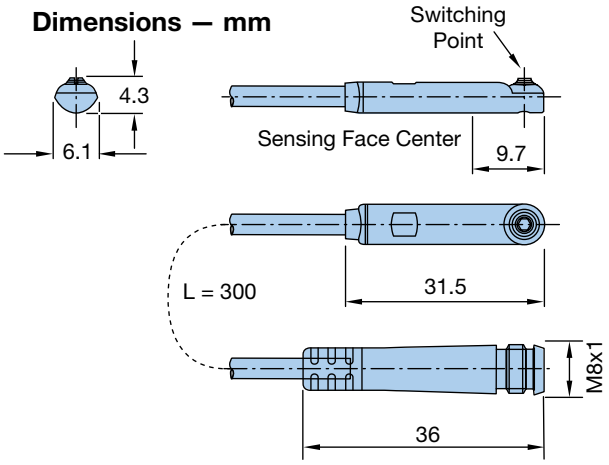
The ETH uses the Parker Global Sensor which can be mounted in the longitudinal grooves running along the cylinder body. These new sensors mount flush to the extrusion body, minimizing the overall width of the actuator.

The sensor cable can be concealed under the yellow T-slot covers which are provided with each unit.

Permanent magnets integrated into the screw nut actuate the sensors as the rod extends and retracts.

ETH032 and ETH050 sizes have two grooves on opposite sides of the cylinder; the ETH080 has two grooves on all four sides of the cylinder.

Dimensions — mm

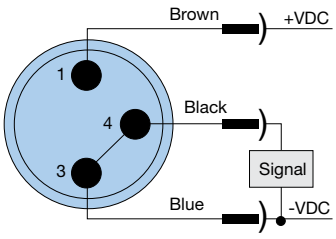


Note: Only PNP logic sensors are compatible with Compax3.

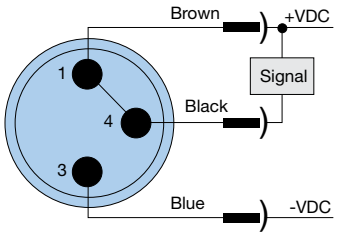
Common Specifications:

Electric current drain: 100 mA (max)
Switching current: 10 mA (max)
Supply voltage: 10 – 30 VDC
Switching Frequency: 5 kHz

PNP Wiring



NPN Wiring



Magnetic LED Cylinder Sensors

Model Number	Function	Logic	Cable	Compatible w/ Compax3
P8S-GPFAX	N.O.	PNP	3 m	Yes
P8S-GNFAX		NPN		No
P8S-GPCHX		PNP	0.3 m cable with M8 connector*	Yes
P8S-GNCHX		NPN		No
P8S-GQFAX	N.C.	PNP	3 m	Yes
P8S-GMFAX		NPN		No
P8S-GQCHX		PNP	0.3 m cable with M8 connector*	Yes
P8S-GMCHX		NPN		No

* 003-2918-01 is a 5 m extension cable to flying leads for these cables

ORDERING INFORMATION
ETH Series

Fill in an order code from each of the numbered fields to create a complete ETH model order code. Refer to the section listed for further details.

	①	②	③	④	⑤	⑥	⑦	⑧		⑨	⑩	
Order Example:	ETH	032	M05	A	2	XPC	B	C	N	0200	C	B

① Series
ETH

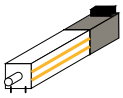
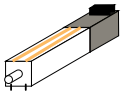
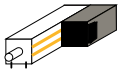
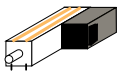
② Frame Size
(see "Performance by Cylinder Size and Screw Lead" chart and graphs in Specifications)

032	ISO32 cylinder size
050	ISO50 cylinder size
080	ISO80 cylinder size
100	ISO100 cylinder size
125	ISO125 cylinder size

③ Drive Screw
(see "Performance by Cylinder Size and Screw Lead" chart in Specifications)

M05	5 mm metric ballscrew
M10	10 mm metric ballscrew
M16	16 mm metric ballscrew (size ETH032 only)
M20	20 mm metric ballscrew (size ETH050 only)
M32	32 mm metric ballscrew (size ETH080 only)

④ Motor Mount/Cylinder Orientation

A		Inline w/groove for Initiator 3 & 9 o'clock
B		Inline w/groove for Initiator 6 & 12 o'clock
C		Parallel 12 o'clock w/groove for Initiator 3 & 9 o'clock
D		Parallel 12 o'clock w/groove for Initiator 6 & 12 o'clock
E		Parallel 3 o'clock w/groove for Initiator 3 & 9 o'clock*
F		Parallel 3 o'clock w/groove for Initiator 6 & 12 o'clock*
G		Parallel 6 o'clock w/groove for Initiator 3 & 9 o'clock
H		Parallel 6 o'clock / groove for Initiator 6 & 12 o'clock
J		Parallel 9 o'clock / groove for Initiator 3 & 9 o'clock
K		Parallel 9 o'clock w/groove for Initiator 6 & 12 o'clock

*When ordered with a lubrication bore option (item 5, order code 3), check to make sure the motor/gearbox length does not block the lubrication port option. This will be an issue for shorter strokes.

⑤ Lubrication Bore Option
(see Relubrication Section for details in Sizing & Selection)

1	Integrated lubrication port*
2	Lubrication hole at center of extrusion 12 o´clock
3	Lubrication hole at center of extrusion 3 o´clock
4	Lubrication hole at center of extrusion 6 o´clock
5	Lubrication hole at center of extrusion 9 o´clock

* Not available with Motor Mount/Cylinder Orientation with 3 o'clock orientation (order codes E and F)

⑥ Motor Mounting Configurations
Motor-specific mounting configurations are categorized into four primary groups:

"XP": With Parker Xpress motor systems (listed below)

"K": Flange & coupling kits for other Parker motor

"P": Flange & coupling kits for Parker Gearheads

"N": Kits for Non standard motors

(Refer to Dimensions for appropriate order codes and mounting specifications for available inline and parallel motor mounting configurations)

Parker Xpress Motor Systems		**ETH032**	**ETH050**	**ETH080**
XPC	BE233FJ-KPSN	•	•	
XPD	CM233FJ-115027	•	•	
XPG	BE344LJ-KPSN	•	•	•
XPH	BE344LJ-KPSB	•	•	•
XPL	MPP1003D1E-KPSN		•	•
XPM	MPP1003D1E-KPSB		•	•
XPN	MPP1003D1E-KPSN *		•	•
XPP	MPP1003D1E-KPSB *		•	•
XPQ	MPP1003R1E-KPSN		•	•
XPR	MPP1003R1E-KPSB		•	•
XPS	MPP1003R1E-KPSN *		•	•
XPT	MPP1003R1E-KPSB *		•	•
XPU	MPP1154B1E-KPSN			•
XPV	MPP1154B1E-KPSB			•
XPW	MPP1154B1E-KPSN **			•
XPX	MPP1154B1E-KPSB **			•
XPY	MPP1154P1E-KPSN			•
XPZ	MPP1154P1E-KPSB			•
XP1	MPP1154P1E-KPSN **			•
XP2	MPP1154P1E-KPSB **			•

* With PV34FE-003 gearhead on all inline and parallel sizes except size ETH080 parallel which comes with PV90FB-003
** With PV115FB-003 gearhead

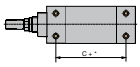
⑦ Cylinder Mounting Options
(see Options & Accessories for details)

B Foot mount

C Rear clevis

D Center trunnion

E Rear eye

F  Bottom tapped (standard)

G Side flange mount

H Rear flange plate

J Front flange plate

N Front and rear flange plates (combining H and J options

⑧ Rod End Mounting Options
(see Options & Accessories for details)

C Clevis

F Female thread

M Male thread

S Spherical rod end

L Alignment coupler

R Linear guide module

⑨ Stroke
For fastest delivery please choose a standard stroke length from the chart below. (See page 43 “Stroke, Usable Stoke and Safety Travel” to calculate appropriate stroke length.)

=32023Custom Lengths

	ETH032	ETH050	ETH080	ETH100	ETH125
XXXX	50 – 1000	50 – 1200	50 – 1600	200 – 1600	200 – 1600

(Customized length in 1 mm increments)

Standard Lengths

	ETH032	ETH050	ETH080	ETH100	ETH125
0050	•	•			
0100	•	•	•		
0150	•	•	•		
0200	•	•	•	•	•
0300	•	•	•	•	•
0400	•	•	•	•	•
0600	•	•	•	•	•
0900		•	•		
1000	•				•
1200		•	•	•	•
1600			•	•	•

⑩ IP Rating

A IP54 with galvanized steel hardware

B IP54 with stainless steel hardware

C IP65 epoxy coated cylinder

Free sizing and selection support from Virtual Engineer at parker.com/VirtualEngineer

Virtual Engineer

The XFC Series

Extreme Force Roller Screw Driven Electric Cylinders

Design Features

- Pre-engineered package
- Performance matched components
- Environmental protection
- Laser certified precision
- All steel construction with standard metric hydraulic type tie rod construction for durability, stiffness, and rigidity
- Elastomeric seals throughout with no gaskets for complete sealing
- Opposed preloaded angular contact bearings for bi-directional force capability
- Roller screw drive system for increased life, load, and shock loading capabilities
- Inline and parallel gear drive configurations for full transfer of thrust force
- Parker Stealth family advanced planetary gearheads direct mount to cylinder for standard reduction options from 3:1 to 10:1 with 100:1 available
- Parker MPP Series brushless servo motors for complete Parker system solution with gearhead, motor, drive, and controls
- Rod wiper and seal based on proven TS2000 design and composite rod bearing designed to survive rugged environments with minimal maintenance for the life of the cylinder

- **High mechanical efficiency up to 90%**
- **Strokes up to 2000mm**
- **Extreme thrust force up to 356,000 N / 80,000 lbs**
- **Repeatability up to ±0.03mm**
- **Speeds up to 1016 mm/s**
- **Six metric profile sizes: 075, 090,115,140,165, 190**
- **Anti-rotate option**

	075	090	115	140	165	190
Maximum Travel (mm)	1,150	1,700	2,000	2,000	2,000	2,000
Maximum Payload (N)	40,000	68,000	108,000	160,000	240,000	356,000
Maximum Acceleration (m/sec²)	1,016	712	548	444	712	568

Parker is pleased to introduce a new family of high thrust electric cylinders featuring roller screw drive technology. The XFC Series further extends the feature rich and force dense offering of Parker's electric cylinder products.The XFC Electric Cylinder is designed to provide machine builders a high force electromechanical solution: offering long life, minimal maintenance, low operating costs, and structural rigidity. All this, in addition to Parker's world class customer service and industry leading delivery times.

As a worldwide leader in fluid power cylinder products, Parker has combined the best of both worlds into one unique product. All the benefits of electromechanical control and cleanliness combined with the structural rigidity and durability of a traditional hydraulic tie rod cylinder.

Flexibility & Versatile Programmability

In applications where high loads are required, roller screws offer a very attractive solution:

- **Servo motors and controls feature simplified programming**
- **Electromechanical control systems provide infinite programmability**
- **Performance advantages not easily obtained by comparable fluid power technology include multiple move profiles, adjustable acceleration and deceleration, force control, and absolute positioning capabilities**

These features allow the system to easily adapt to changing application conditions and performance requirements with minimal modification.

Design Considerations

Installation

Due to the reduced number of components required for a complete system, the commissioning time required for operation is significantly reduced relative to comparable fluid power systems. This allows system builders to quickly install, troubleshoot, and test system capabilities faster and more reliably than other alternatives.

Additionally machine break-down and set-up can be accomplished with relative ease and without concern of hydraulic fluid spillage.

Environmental Considerations

With electromechanical system technology, fluid leaks, filter changes, and air bleeding are a thing of the past. Simply mount the cylinder, plug in the cables, download a program and you are up and running in record time.

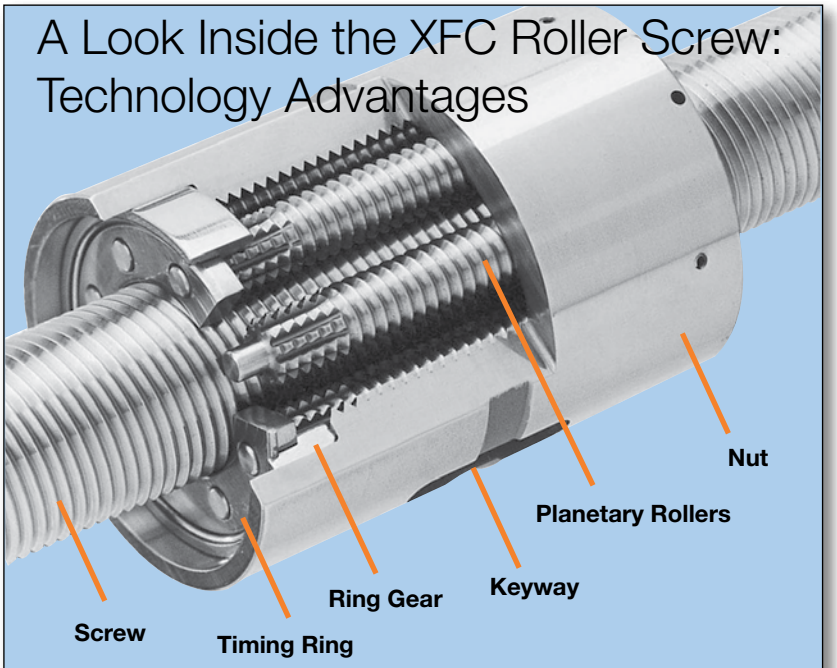
Anti-Rotation

Anti-rotation can now be achieved in XFC actuators thanks to a new design that incorporates a keying feature on the internal surface of the tubular body. This option can be configured through our standard part number structure.

Maintenance

Roller screw cylinder systems require little or no maintenance when compared to their fluid power alternatives, while still delivering long life and high performance. Series XFC cylinders are designed to be low maintenance with the factory installed full synthetic lubrication. For high duty cycle applications (>50%), oil filled cylinders are available with ports for recirculation as required.

A Look Inside the XFC Roller Screw: Technology Advantages



Planetary roller screws offer distinct benefits over traditional ball screw and lead screw mechanisms, and add features not easily attainable with hydraulic or pneumatic linear devices.

A planetary roller screw transmits rotary motion into linear motion similar to a ball or lead screw. The key difference in the roller screw design is the use of planetary rollers in place of ball bearings as the primary rolling elements.

The planetary rollers provide an increased number of contact surfaces between the external screw shaft and the internal threads of the roller nut relative to traditional ball or lead screw technology. The expanded number of contact points allow for:

- **Enhanced thrust capacity— 5X more thrust!**
- **Enhanced load carrying capabilities**
- **Higher speeds than traditional hydraulic cylinders**
- **Greatly extended life — 10X longer life!**

SPECIFICATIONS

Performance

XFC Frame Size		075	090	115	140	165	190
Continuous Thrust	kN (lbs)	20 (4,500)	34 (7,500)	54 (12,000)	80 (17,500)	120 (26,500)	178 (40,000)
Maximum Thrust	kN (lbs)	40 (9,000)	68 (15,000)	108 (24,000)	160 (35,000)	240 (53,000)	356 (80,000)
Maximum Acceleration	mm/sec^2 (in/sec^2)	19,600 (773)	19,600 (773)	19,600 (773)	19,600 (773)	19,600 (773)	19,600 (773)
Maximum Stroke [1]	mm (in)	1150 (55.12)	1700 (66.93)	2,000 (78.75)	2,000 (78.75)	2,000 (78.75)	2,000 (78.75)
Recommended Maximum Stroke Length of Unsupported Cylinder [2]	mm (in)	750 (29.53)	750 (29.53)	750 (29.53)	1,000 (39.37)	1,000 (39.37)	1,250 (49.21)

1) Consult factory for non-standard stroke lengths
2) Secondary support required for longer stroke lengths (consult factory)

System Characteristics

XFC Frame Size		075	090	115	140	165	190
Accuracy	mm (in)	0.08 (0.003)	0.08 (0.003)	0.08 (0.003)	0.08 (0.003)	0.13 (0.005)	0.13 (0.005)
Repeatability	mm (in)	0.03 (0.001)	0.03 (0.001)	0.03 (0.001)	0.03 (0.001)	0.05 (0.002)	0.05 (0.002)
Backlash	mm (in)	0.03 (0.001)	0.03 (0.001)	0.03 (0.001)	0.03 (0.001)	0.03 (0.001)	0.03 (0.001)

Screw Characteristics

XFC Size	Screw Diameter mm	Standard Lead [1] mm (in)/rev	Efficiency %	Ca Rating kN (lbf)	Thrust Tube Torque mN-m/N (lb-in/lbf)	Max. Speed [2] mm/sec (in/sec)
075	21	5 (0.197)	88.78	40.4 (9,082)	0.889 (0.035)	508 (20.0)
		10 (0.394)	91.17	44.6 (10,026)	1.752 (0.069)	1016 (40.0)
090	30	5 (0.197)	87.05	73.6 (16,546)	0.914 (0.036)	356 (14.0)
		10 (0.394)	90.38	74.4 (16,726)	1.752 (0.069)	712 (28.0)
115	39	5 (0.197)	85.18	103.4 (23,245)	0.939 (0.037)	274 (10.8)
		10 (0.394)	89.37	116.5 (26,190)	1.778 (0.070)	548 (21.6)
140	48	5 (0.197)	82.50	158.5 (35,632)	0.965 (0.038)	222 (8.7)
		10 (0.394)	88.34	171.2 (38,487)	1.803 (0.071)	444 (17.4)
165	60	10 (0.394)	87.05	238.6 (53,639)	1.829 (0.072)	356 (14.0)
		20 (0.787)	90.38	238.6 (53,639)	3.531 (0.139)	712 (28.0)
190	75	10 (0.394)	85.45	356.5 (80,144)	1.854 (0.073)	284 (11.2)
		20 (0.787)	90.97	356.5 (80,144)	3.658 (0.144)	568 (22.4)

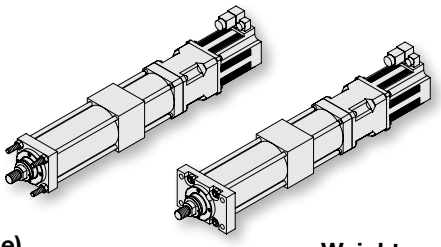
1) Consult factory for availability of non-standard leads
2) Speed is stroke dependant, see Maximum Speed charts for speed/stroke chart

Cylinder Temperature Rating*

Standard seals	-23 to 73°C (-10 to 165°F)
Fluorocarbon seals	-23 to 110°C (-10 to 230°F)

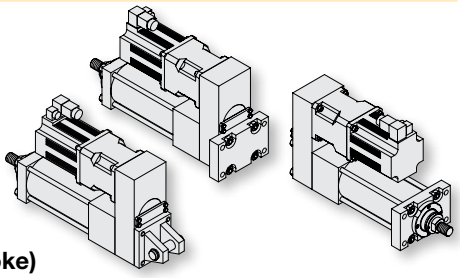
* Verify motor and gear box performance at higher temperatures.

Cylinder Weight — kg (lb)



Inline Configurations

XFC Frame Size	Base Weight with Mount (at Zero Stroke) J Front Flange	C Foot	D Trunnion	K Extended Tie Rod	Weight (Per 100 mm Stroke)
075	9.1 (20)	9.1 (20)	9.5 (21)	8.6 (19)	1.41 (3.1)
090	14.5 (32)	14.1 (31)	14.5 (32)	14.1 (31)	1.93 (4.3)
115	27.7 (61)	27.7 (61)	28.1 (62)	26.8 (59)	3.08 (6.8)
140	48.1 (106)	47.6 (105)	49.4 (109)	46.7 (103)	4.53 (10.0)
165	103.4 (182)	102.1 (180)	104.3 (185)	100.2 (175)	7.17 (15.8)
190	132.9 (293)	131.5 (290)	134.3 (296)	127.0 (280)	9.48 (20.9)



Parallel Configurations

XFC Frame Size	Base Weight with Mount (at Zero Stroke) J Front Flange	C Foot	D Trunnion	K, L, M Extended Tie Rod	H Rear Flange	B Rear Clevis	Weight (Per 100 mm Stroke)
075	11.3 (25)	10.9 (24)	11.3 (25)	10.9 (24)	11.3 (25)	11.3 (25)	1.41 (3.1)
090	17.7 (39)	17.2 (38)	17.7 (39)	17.2 (38)	18.1 (40)	18.6 (41)	1.93 (4.3)
115	34.0 (75)	34.0 (75)	34.9 (77)	33.1 (73)	35.4 (78)	35.4 (78)	3.08 (6.8)
140	59.4 (131)	58.5 (129)	60.3 (133)	57.6 (127)	61.7 (136)	62.1 (137)	4.53 (10.0)
165	103.4 (228)	102.1 (225)	104.3 (230)	100.2 (221)	107.0 (236)	110.7 (244)	7.17 (15.8)
190	163.7 (361)	162.4 (358)	170.6 (376)	158.8 (350)	171.5 (378)	171.9 (379)	9.48 (20.9)

Note: All weights above assume oil filled lubrication

Cylinder Inertia

Inertia matching of the cylinder assembly to the motor will improve the performance of the mechanical system. The inertia ratio of the cylinder and load to the motor should be less than 10:1. A general rule for screw driven systems is 5:1.

$$I_{Total} = I_{GearHead} + \frac{(I_{XFC} + I_{Mass})}{(GearHeadRatio)^2}$$

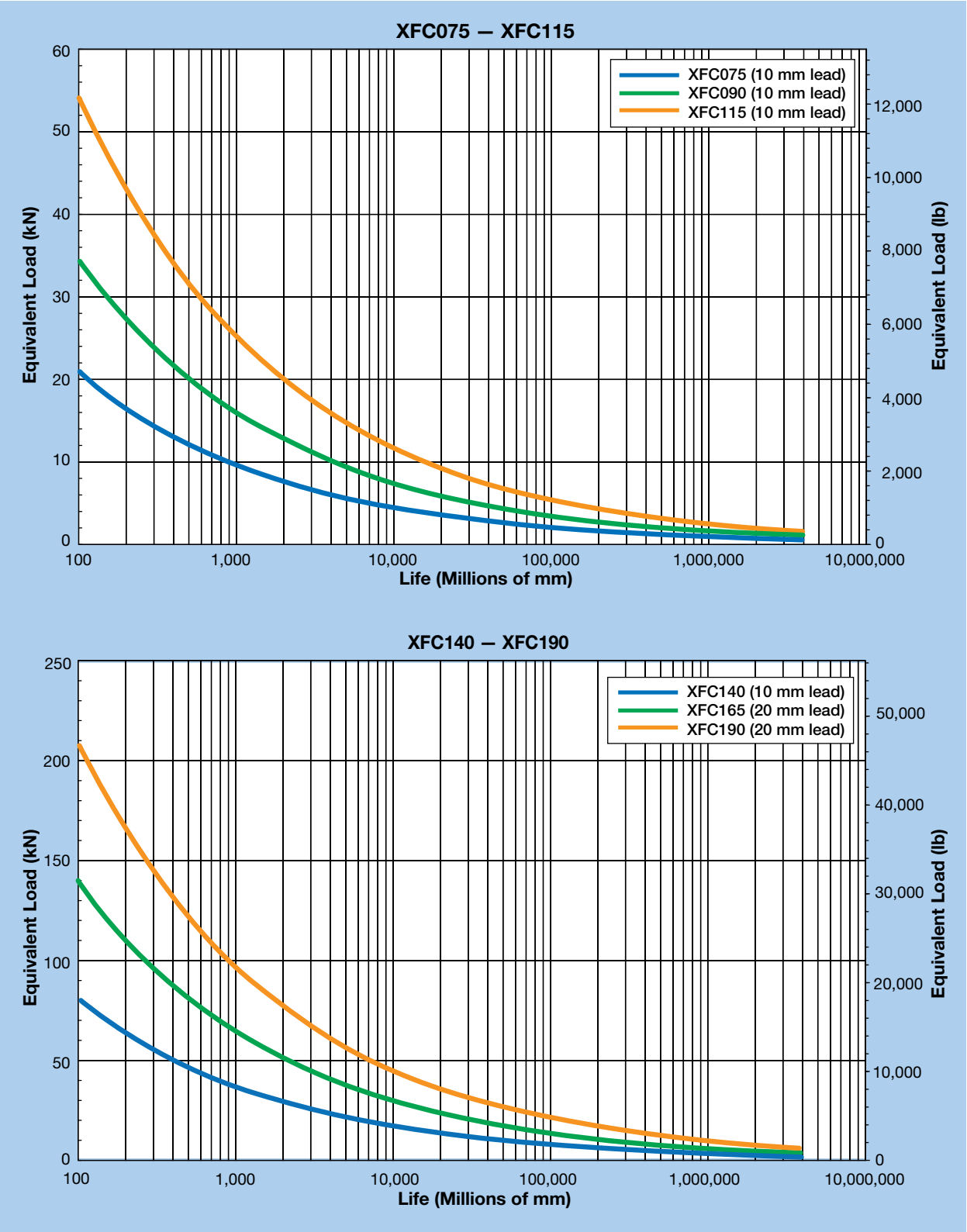
$$I_{Mass} = Mass_{Load}\,(kg)\left(\frac{Lead\,(mm)}{3141.6}\right)3$$

For PS Series gearhead inertia information, see: www.parkermotion.com

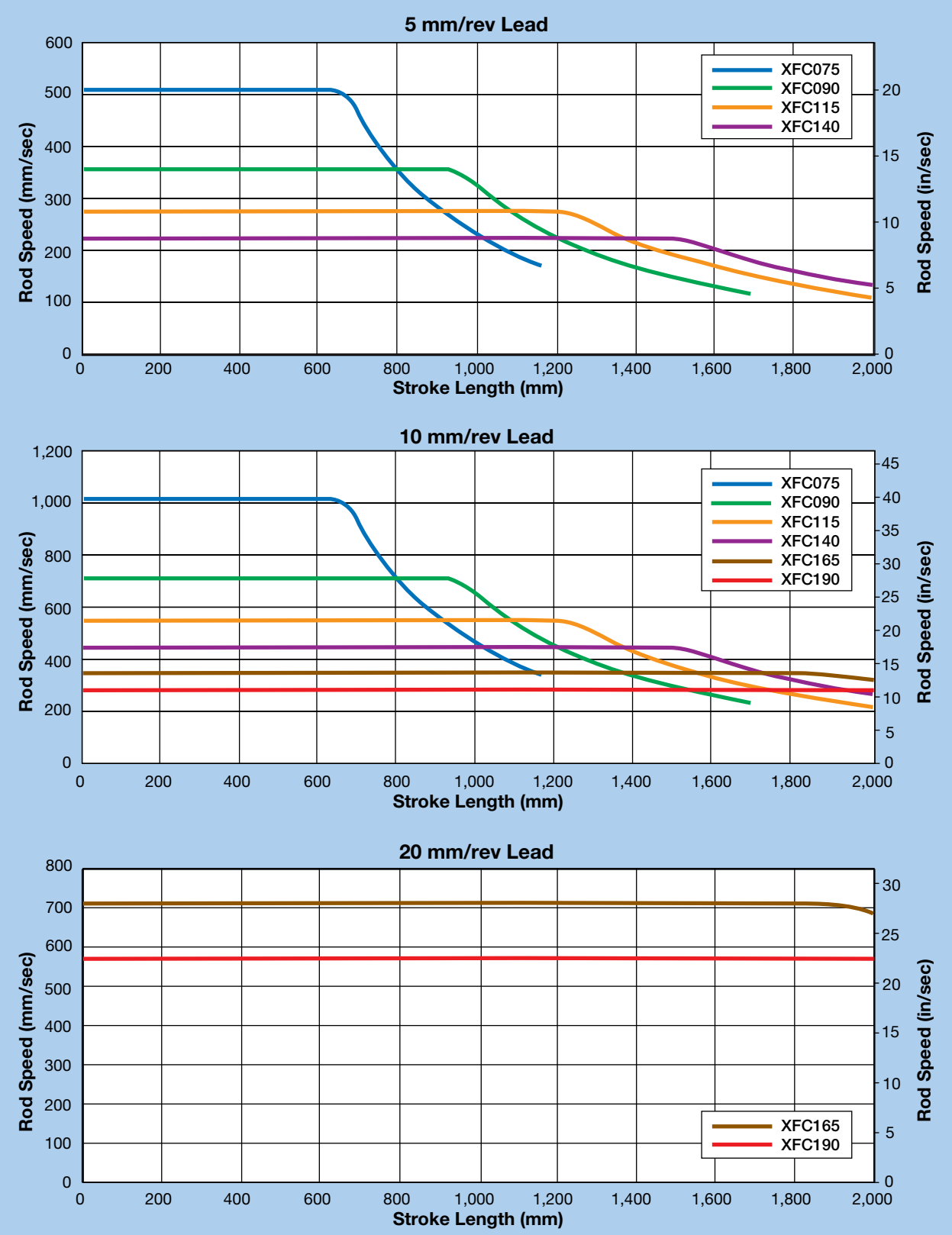
XFC Inertia I (kg-m²)

XFC Size	Inline (Zero Stroke)	Parallel (Zero Stroke)	Stroke (Per 100 mm)
075	0.00008903	0.00037951	0.00001499
090	0.00031974	0.00089394	0.00006242
115	0.00107620	0.00349671	0.00017800
140	0.00229637	0.00923002	0.00040900
165	0.00655544	0.02428162	0.00099900
190	0.02702120	0.05552601	0.00244000

Life Charts


XFC075 — XFC115
XFC075 (10 mm lead)
XFC090 (10 mm lead)
XFC115 (10 mm lead)
Equivalent Load (kN)
Equivalent Load (lb)
Life (Millions of mm)
0
10
20
30
40
50
60
2,000
4,000
6,000
8,000
10,000
12,000
100
1,000
10,000
100,000
1,000,000
10,000,000
XFC140 — XFC190
XFC140 (10 mm lead)
XFC165 (20 mm lead)
XFC190 (20 mm lead)
Equivalent Load (kN)
Equivalent Load (lb)
Life (Millions of mm)
0
50
100
150
200
250
10,000
20,000
30,000
40,000
50,000
100
1,000
10,000
100,000
1,000,000
10,000,000

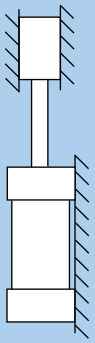
Maximum Speed Charts

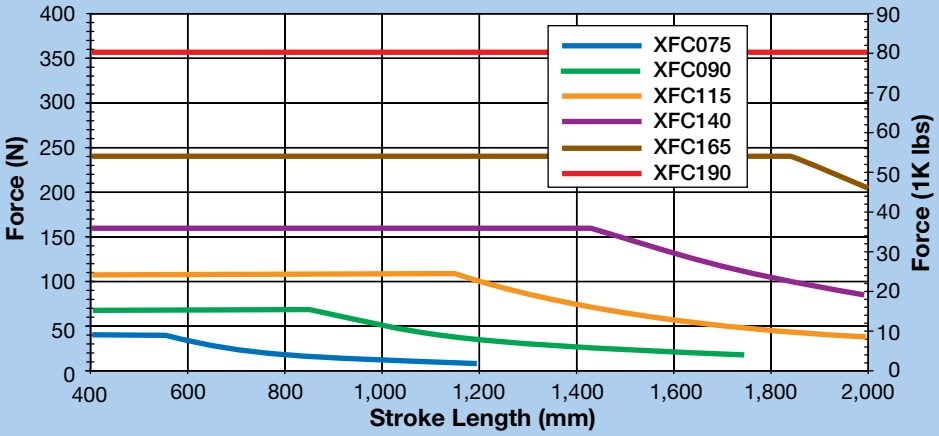


Buckling Strength Charts

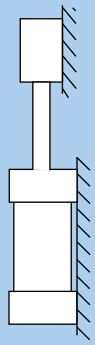
The buckling strength of the cylinder is the maximum compressive load able to be exerted through the cylinder. These values are a function of the screw and thrust tube size and do not account for specific motor or gearbox performance. The force value from the specific mounting class and length of stroke should not be exceeded to ensure safe mechanical performance. Tension loads are not subject to buckling strength restrictions.

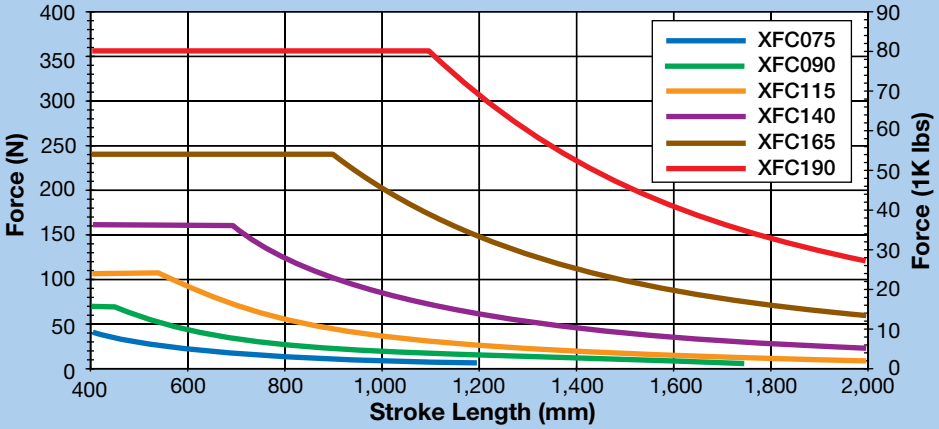
Maximum Compressive Force – Fixed Mount, Guided



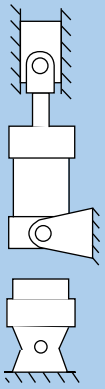


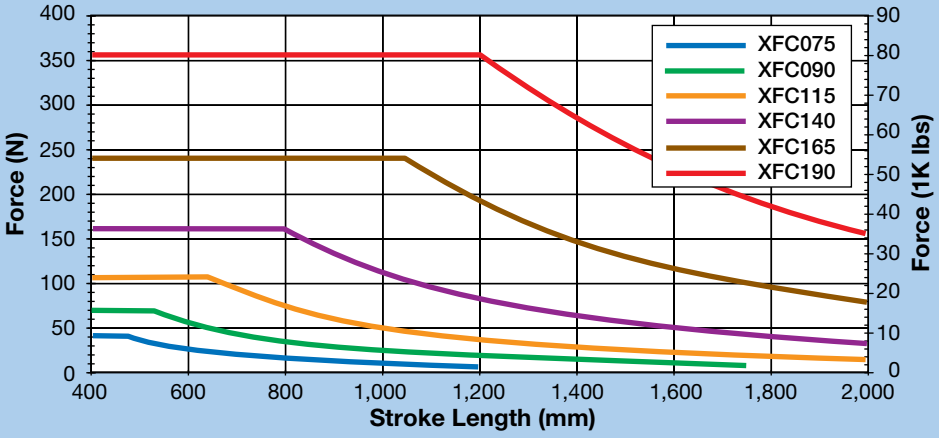
Maximum Compressive Force – Fixed Mount, Not Guided





Maximum Compressive Force – Rear Pivot Mount, Guided





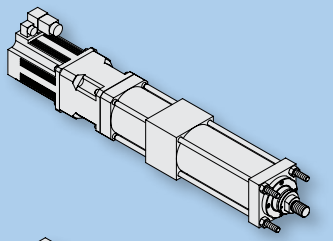
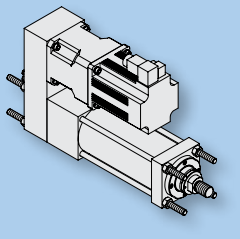
Available Mounts

Inline	Parallel

K, L, M Extended Tie Rod Mount

Cylinders with Extended Tie Rods are suitable for straight line force applications, and are particularly useful where space is limited.

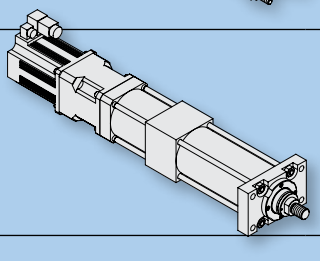
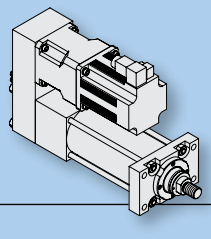
K Front Mount (inline and parallel)
L Rear Mount (parallel only)
M Both Front & Rear Mount (parallel only)

J Integral Front Flange Mount

These cylinders are suitable for use on straight line force transfer applications.

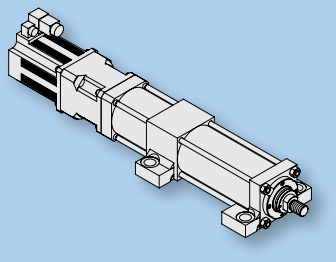
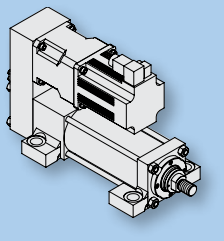
J Front Flange Mount (inline and parallel)

Foot Mount

Foot mounted cylinders do not absorb forces along their center line. As a result, the application of force by the cylinder produces a moment which attempts to rotate the cylinder about its mounting bolts. It is therefore very important that the cylinder be firmly secured to the mounting surface and the load should be rigidly guided to avoid side loads being applied to the cylinder bearings.

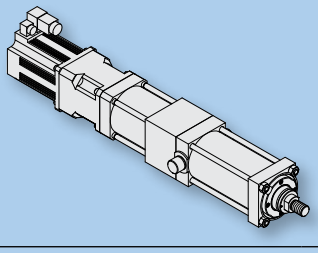
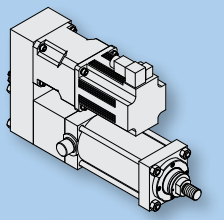
C Foot Mount (inline and parallel)

T Rear Trunnion Mount

Trunnion mounting is used for rotary or arc-line motion and offer flexibility when designing applications that are not confined to linear movements. Consult factory to review specific applications for stroke and configuration.

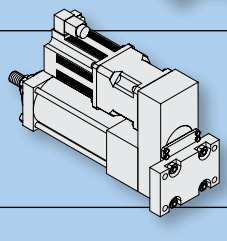
T Rear Trunnion Mount (inline and parallel)

H Rear Flange Mount

These cylinders are suitable for use on straight line force transfer applications.

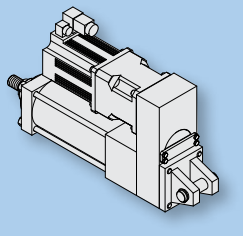
H Rear Flange Mount (parallel only)



B Rear Clevis Mount

Cylinders with pivot mountings, which absorb forces on their center lines, should be used where the machine member to be moved travels in a curved path. Pivot mountings may be used in tension (pull) or compression (push) applications. Cylinders using a fixed clevis may be used if the curved path of the thrust tube travels in a single plane.

B Rear Clevis Mount (parallel only)



DIMENSIONS

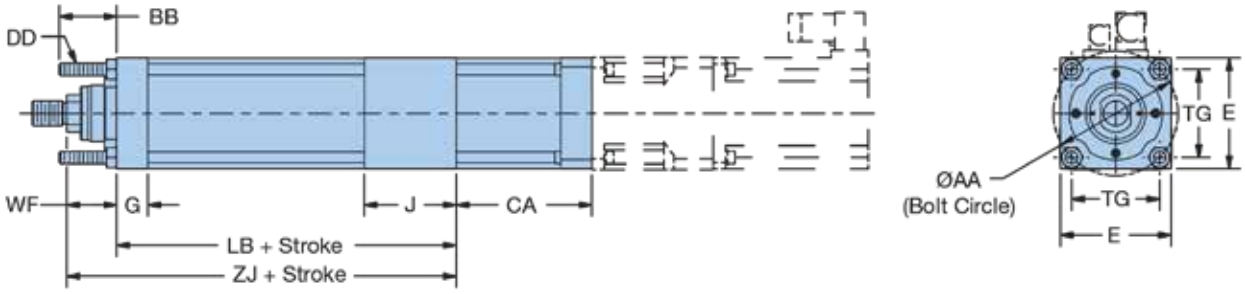
XFC Mount Options

Extended Tie Rod Mount — Inline

Order Code

FIRST ANGLE VIEW PROJECTION

K **Front Extended Tie Rods**



Dimensions — mm (in)

XFC Size	Ø AA	BB	DD	E	G	J	TG	WF	Add Stroke LB	Add Stroke ZJ
075	83 (3.27)	30 (1.18)	M8x1	76.2 (3.00)	22 (0.87)	62 (2.44)	58.69 (2.31)	38 (1.50)	205.5 (8.09)	243.5 (9.59)
090	100 (3.94)	35 (1.38)	M10x1.5	88.9 (3.50)	25 (0.98)	74 (2.91)	70.71 (2.78)	40 (1.57)	248 (9.76)	288 (11.34)
115	127 (5.00)	40 (1.57)	M12x1.25	114.3 (4.50)	30 (1.18)	91 (3.58)	89.80 (3.54)	45 (1.77)	293 (11.54)	338 (13.31)
140	155 (6.10)	50 (1.97)	M16x1.5	139.7 (5.50)	35 (1.38)	108 (4.25)	109.60 (4.32)	45 (1.77)	348 (13.70)	393 (15.47)
165	185 (7.28)	60 (2.36)	M22x1.5	165.1 (6.50)	40 (1.57)	123 (4.84)	130.81 (5.15)	60 (2.36)	417 (16.42)	477 (18.78)
190	215 (8.46)	75 (2.95)	M22x1.5	190.5 (7.50)	50 (1.97)	152 (5.98)	152.03 (5.99)	62 (2.44)	503 (19.80)	565 (22.24)

Motor/Gearhead

XFC Size	Dimension CA PS090	PS115	PS142	PS180	PS220	MPP115	MPP142	MPP190	MPP270
075	113 (4.45)	115 (4.53)	—	—	—	98 (3.86)	109 (4.29)	—	—
090	115 (4.53)	117 (4.61)	—	—	—	100 (3.94)	111 (4.37)	—	—
115	—	130 (5.12)	158 (6.22)	—	—	—	113 (4.45)	136 (5.35)	—
140	—	—	161 (6.34)	190 (7.48)	—	—	—	139 (5.47)	—
165	—	—	164 (6.46)	193 (7.60)	—	—	—	—	183 (7.20)
190	—	—	—	194 (7.64)	—	—	—	—	214 (8.43)

Free sizing and selection support from Virtual Engineer at parker.com/VirtualEngineer

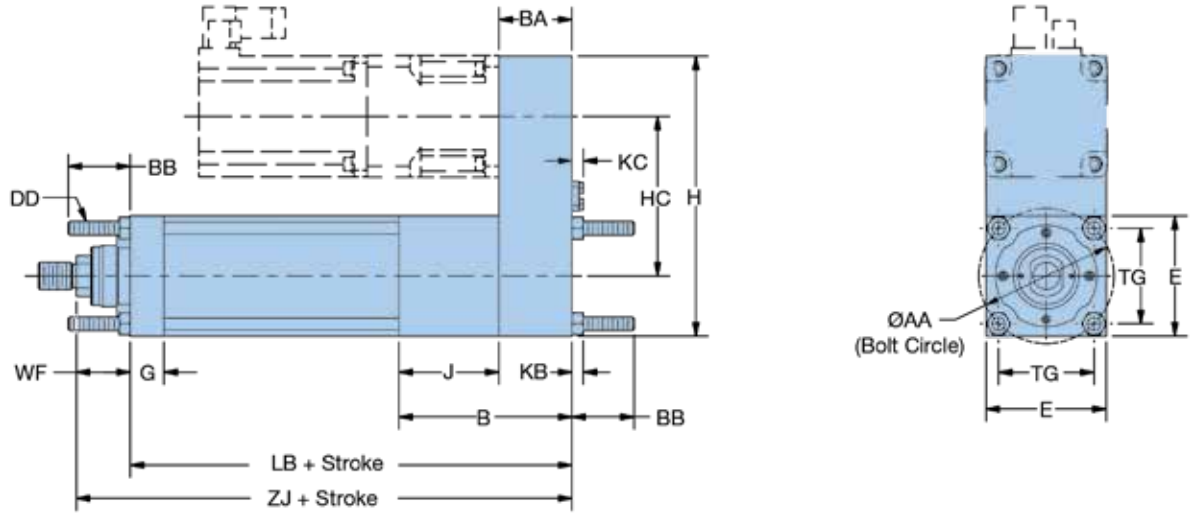
Virtual Engineer

Parallel Extended Tie Rod Mount — Parallel

Order Code

FIRST ANGLE VIEW PROJECTION

K	**Front Extended Tie Rods**
L	**Rear Extended Tie Rods**
M	**Both Front & Rear Extended Tie Rods**



Dimensions — mm (in)

XFC Size	Ø AA	B	BA	BB	DD	E	G	H
075	83 (3.27)	106 (4.17)	44 (1.73)	30 (1.18)	M8x1	76.2 (3.00)	22 (0.87)	174.2 (6.86)
090	100 (3.94)	128 (5.04)	54 (2.13)	35 (1.38)	M10x1.5	88.9 (3.50)	25 (0.98)	206.9 (8.15)
115	127 (5.00)	154 (6.06)	63 (2.48)	40 (1.57)	M12x1.25	114.3 (4.50)	30 (1.18)	271 (10.67)
140	155 (6.10)	180 (7.09)	72 (2.83)	50 (1.97)	M16x1.5	139.7 (5.50)	35 (1.38)	332.2 (13.08)
165	185 (7.28)	211 (8.31)	88 (3.46)	60 (2.36)	M22x1.5	165.1 (6.50)	40 (1.57)	379.1 (14.93)
190	215 (8.46)	252 (9.92)	100 (3.94)	75 (2.95)	M22x1.5	190.5 (7.50)	50 (1.97)	455.5 (17.93)

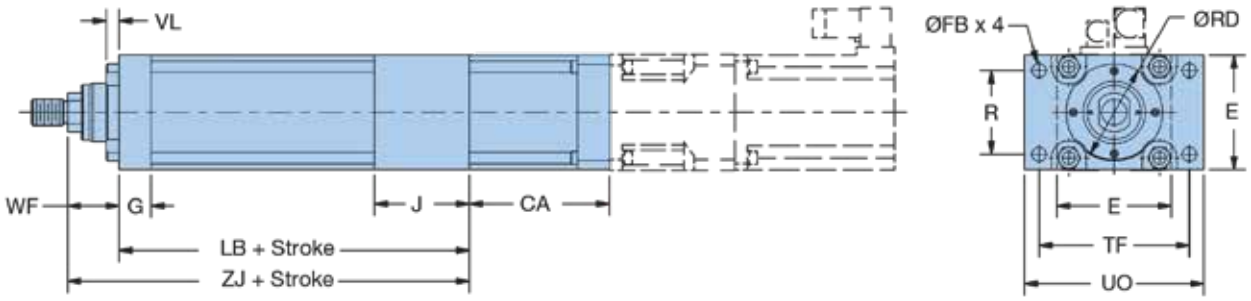
							Add Stroke	
XFC Size	HC	J	KB	KC	TG	WF	LB	ZJ
075	98 (3.86)	62 (2.44)	6.5 (0.26)	6.93 (0.27)	58.69 (2.31)	38 (1.50)	249.5 (9.82)	287.5 (11.32)
090	118 (4.65)	74 (2.91)	8 (0.31)	8.65 (0.34)	70.71 (2.78)	40 (1.57)	302 (11.89)	342 (13.46)
115	156 (6.14)	91 (3.58)	10 (0.39)	10.15 (0.40)	89.80 (3.54)	45 (1.77)	356 (14.02)	401 (15.79)
140	192.5 (7.58)	108 (4.25)	13 (0.51)	13.65 (0.54)	109.60 (4.32)	45 (1.77)	420 (16.54)	465 (18.31)
165	224 (8.82)	123 (4.84)	18 (0.71)	13.65 (0.54)	130.81 (5.15)	60 (2.36)	505 (19.88)	565 (22.24)
190	265 (10.43)	152 (5.98)	18 (0.71)	17.18 (0.68)	152.03 (5.99)	62 (2.44)	603 (23.74)	665 (26.18)

Front Flange Mount — Inline

Order Code

J

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	E	Ø FB	G	J	R	Ø RD_{f8}	TF	UO	VL	WF	Add Stroke LB	Add Stroke ZJ
075	76.2 (3.00)	9 (0.35)	22 (0.87)	62 (2.44)	52 (2.05)	65 (2.559)	105 (4.13)	125 (4.92)	10 (0.39)	38 (1.50)	205.5 (8.09)	243.5 (9.59)
090	88.9 (3.50)	11 (0.43)	25 (0.98)	74 (2.91)	65 (2.56)	75 (2.953)	117 (4.61)	139.7 (5.50)	10 (0.39)	40 (1.57)	248 (9.76)	288 (11.34)
115	114.3 (4.50)	14 (0.55)	30 (1.18)	91 (3.58)	83 (3.27)	95 (3.740)	149 (5.87)	175 (6.89)	12 (0.47)	45 (1.77)	293 (11.54)	338 (13.31)
140	139.7 (5.50)	18 (0.71)	35 (1.38)	108 (4.25)	107 (4.21)	110 (4.331)	172 (6.77)	210 (8.27)	12 (0.47)	45 (1.77)	348 (13.70)	393 (15.47)
165	165.1 (6.50)	21 (0.83)	40 (1.57)	123 (4.84)	120 (4.72)	135 (5.315)	215 (8.46)	260 (10.24)	14 (0.55)	60 (2.36)	417 (16.42)	477 (18.78)
190	190.5 (7.50)	22 (0.87)	50 (1.97)	152 (5.98)	155 (6.10)	155 (5.315)	253 (9.96)	300 (11.81)	16 (0.63)	62 (2.44)	503 (19.80)	565 (22.24)

Motor/Gearhead

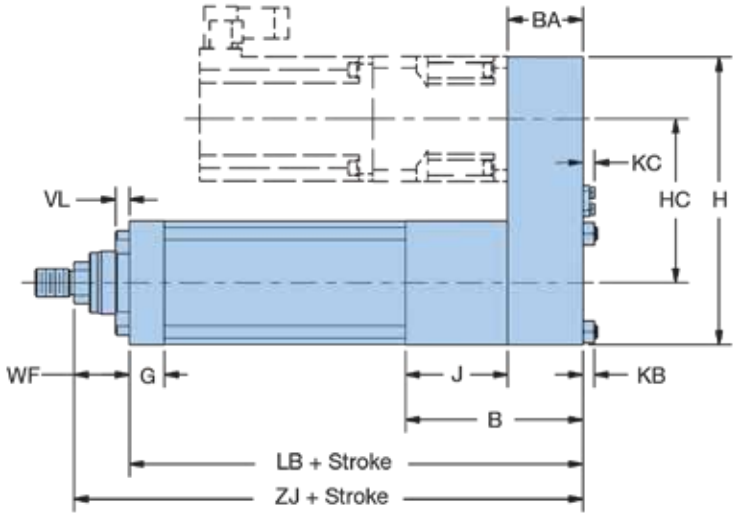
XFC Size	Dimension CA PS090	PS115	PS142	PS180	PS220	MPP115	MPP142	MPP190	MPP270
075	113 (4.45)	115 (4.53)	—	—	—	98 (3.86)	109 (4.29)	—	—
090	115 (4.53)	117 (4.61)	—	—	—	100 (3.94)	111 (4.37)	—	—
115	—	130 (5.12)	158 (6.22)	—	—	—	113 (4.45)	136 (5.35)	—
140	—	—	161 (6.34)	190 (7.48)	—	—	—	139 (5.47)	—
165	—	—	164 (6.46)	193 (7.60)	—	—	—	—	183 (7.20)
190	—	—	—	194 (7.64)	—	—	—	—	214 (8.43)

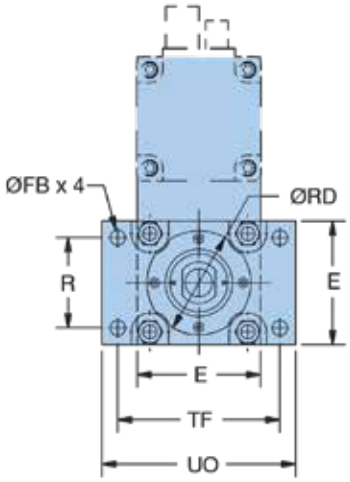
Front Flange Mount — Parallel

Order Code

J

FIRST ANGLE VIEW PROJECTION





Dimensions — mm (in)

XFC Size	B	BA	E	Ø FB	G	H	HC	J	KB
075	106 (4.17)	44 (1.73)	76.2 (3.00)	9 (0.35)	22 (0.87)	174.2 (6.86)	98 (3.86)	62 (2.44)	6.5 (0.26)
090	128 (5.04)	54 (2.13)	88.9 (3.50)	11 (0.43)	25 (0.98)	206.9 (8.15)	118 (4.65)	74 (2.91)	8 (0.31)
115	154 (6.06)	63 (2.48)	114.3 (4.50)	14 (0.55)	30 (1.18)	271 (10.67)	156 (6.14)	91 (3.58)	10 (0.39)
140	180 (7.09)	72 (2.83)	139.7 (5.50)	18 (0.71)	35 (1.38)	332.2 (13.08)	192.5 (7.58)	108 (4.25)	13 (0.51)
165	211 (8.31)	88 (3.46)	165.1 (6.50)	21 (0.83)	40 (1.57)	379.1 (14.93)	224 (8.82)	123 (4.84)	18 (0.71)
190	252 (9.92)	100 (3.94)	190.5 (7.50)	22 (0.87)	50 (1.97)	455.5 (17.93)	265 (10.43)	152 (5.98)	18 (0.71)

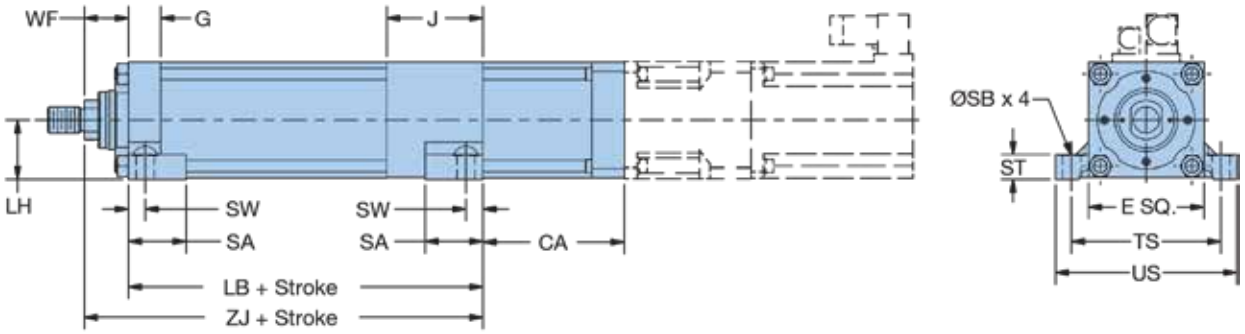
XFC Size	KC	R	Ø RD_{f8}	TF	UO	VL	WF	Add Stroke LB	Add Stroke ZJ
075	6.93 (0.27)	52 (2.05)	65 (2.559)	105 (4.13)	125 (4.92)	10 (0.39)	38 (1.50)	249.5 (9.82)	287.5 (11.32)
090	8.65 (0.34)	65 (2.56)	75 (2.953)	117 (4.61)	139.7 (5.50)	10 (0.39)	40 (1.57)	302 (11.89)	342 (13.46)
115	10.15 (0.40)	83 (3.27)	95 (3.740)	149 (5.87)	175 (6.89)	12 (0.47)	45 (1.77)	356 (14.02)	401 (15.79)
140	13.65 (0.54)	107 (4.21)	110 (4.331)	172 (6.77)	210 (8.27)	12 (0.47)	45 (1.77)	420 (16.54)	465 (18.31)
165	13.65 (0.54)	120 (4.72)	135 (5.315)	215 (8.46)	260 (10.24)	14 (0.55)	60 (2.36)	505 (19.88)	565 (22.24)
190	17.18 (0.68)	155 (6.10)	155 (5.315)	253 (9.96)	300 (11.81)	16 (0.63)	62 (2.44)	603 (23.74)	665 (26.18)

Foot Mount — Inline

Order Code

C

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	E	G	J	LH_{h10}	SA	ØSB	ST	SW	TS	US	WF	Add Stroke LB	Add Stroke ZJ
075	76.2 (3.00)	22 (0.87)	62 (2.44)	39 (1.535)	33.3 (1.31)	11 (0.43)	12.7 (0.50)	11 (0.43)	97 (3.82)	114.3 (4.50)	38 (1.50)	205.5 (8.09)	243.5 (9.59)
090	88.9 (3.50)	25 (0.98)	74 (2.91)	45.5 (1.791)	44.5 (1.75)	14 (0.55)	19.1 (0.75)	13 (0.51)	115 (4.53)	139.7 (5.50)	40 (1.57)	248 (9.76)	288 (11.34)
115	114.3 (4.50)	30 (1.18)	91 (3.58)	58 (2.283)	57.2 (2.25)	18 (0.71)	25.4 (1.00)	15 (0.59)	155 (6.10)	184.2 (7.25)	45 (1.77)	293 (11.54)	338 (13.31)
140	139.7 (5.50)	35 (1.38)	108 (4.25)	71 (2.795)	57.2 (2.25)	18 (0.71)	25.4 (1.00)	18 (0.71)	175 (6.89)	209.6 (8.25)	45 (1.77)	348 (13.70)	393 (15.47)
165	165.1 (6.50)	40 (1.57)	123 (4.84)	83.5 (3.287)	73.0 (2.87)	22 (0.87)	31.8 (1.25)	20 (0.79)	210 (8.27)	254 (10.00)	60 (2.36)	417 (16.42)	477 (18.78)
190	190.5 (7.50)	50 (1.97)	152 (5.98)	96.5 (3.799)	92.1 (3.63)	26 (1.02)	38.1 (1.50)	25 (0.98)	260 (10.24)	304.8 (12.00)	62 (2.44)	503 (19.80)	565 (22.24)

Motor/Gearhead

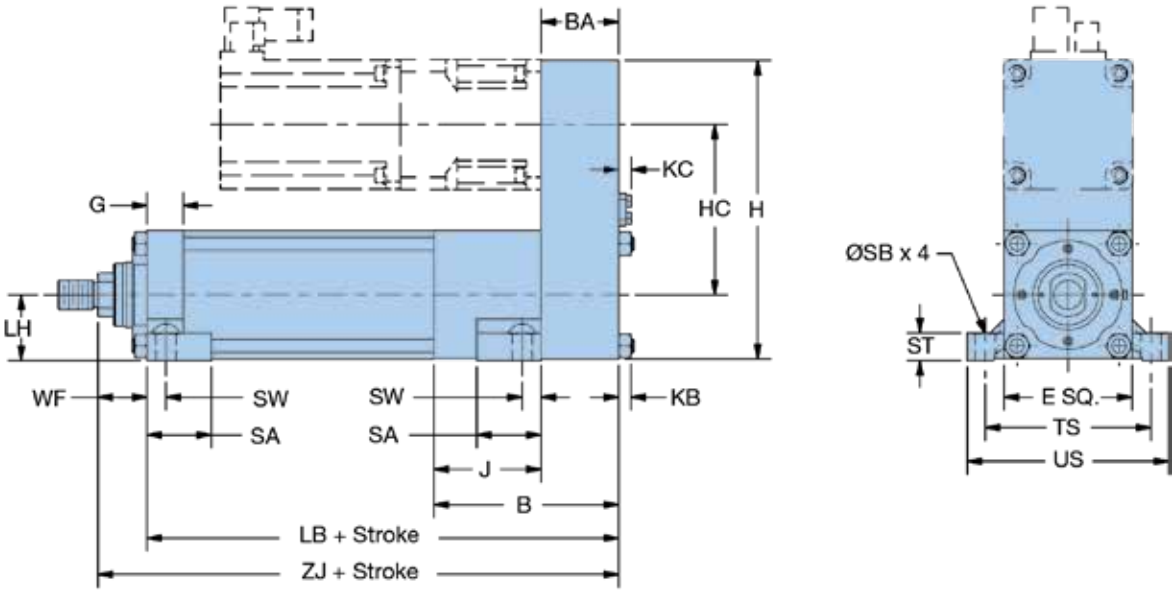
XFC Size	Dimension CA PS090	PS115	PS142	PS180	PS220	MPP115	MPP142	MPP190	MPP270
075	113 (4.45)	115 (4.53)	—	—	—	98 (3.86)	109 (4.29)	—	—
090	115 (4.53)	117 (4.61)	—	—	—	100 (3.94)	111 (4.37)	—	—
115	—	130 (5.12)	158 (6.22)	—	—	—	113 (4.45)	136 (5.35)	—
140	—	—	161 (6.34)	190 (7.48)	—	—	—	139 (5.47)	—
165	—	—	164 (6.46)	193 (7.60)	—	—	—	—	183 (7.20)
190	—	—	—	194 (7.64)	—	—	—	—	214 (8.43)

Foot Mount — Parallel

Order Code

C

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	B	BA	E	G	H	HC	J	KB	KC
075	106 (4.17)	44 (1.73)	76.2 (3.00)	22 (0.87)	174.2 (6.86)	98 (3.86)	62 (2.44)	6.5 (0.26)	6.93 (0.27)
090	128 (5.04)	54 (2.13)	88.9 (3.50)	25 (0.98)	206.9 (8.15)	118 (4.65)	74 (2.91)	8 (0.31)	8.65 (0.34)
115	154 (6.06)	63 (2.48)	114.3 (4.50)	30 (1.18)	271 (10.67)	156 (6.14)	91 (3.58)	10 (0.39)	10.15 (0.40)
140	180 (7.09)	72 (2.83)	139.7 (5.50)	35 (1.38)	332.2 (13.08)	192.5 (7.58)	108 (4.25)	13 (0.51)	13.65 (0.54)
165	211 (8.31)	88 (3.46)	165.1 (6.50)	40 (1.57)	379.1 (14.93)	224 (8.82)	123 (4.84)	18 (0.71)	13.65 (0.54)
190	252 (9.92)	100 (3.94)	190.5 (7.50)	50 (1.97)	455.5 (17.93)	265 (10.43)	152 (5.98)	18 (0.71)	17.18 (0.68)

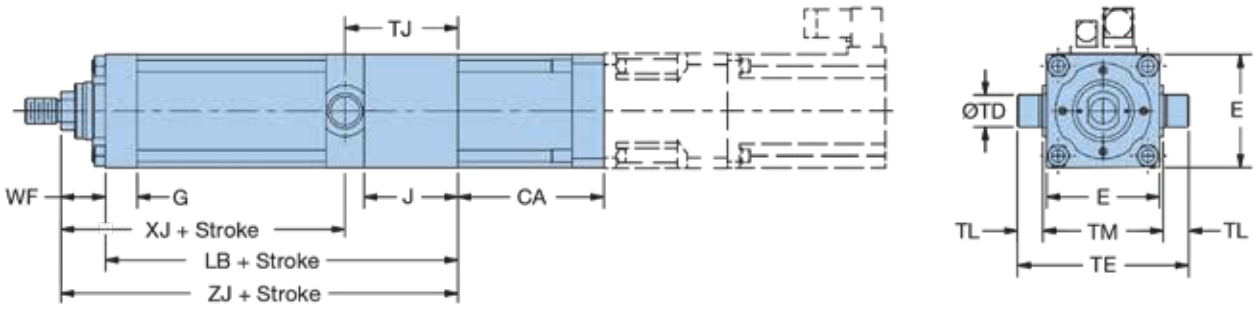
XFC Size	LH_{h10}	SA	ØSB	ST	SW	TS	US	WF	Add Stroke LB	Add Stroke ZJ
075	39 (1.535)	33.3 (1.31)	11 (0.43)	12.7 (0.50)	11 (0.43)	97 (3.82)	114.3 (4.50)	38 (1.50)	249.5 (9.82)	287.5 (11.32)
090	45.5 (1.791)	44.5 (1.75)	14 (0.55)	19.1 (0.75)	13 (0.51)	115 (4.53)	139.7 (5.50)	40 (1.57)	302 (11.89)	342 (13.46)
115	58 (2.283)	57.2 (2.25)	18 (0.71)	25.4 (1.00)	15 (0.59)	155 (6.10)	184.2 (7.25)	45 (1.77)	356 (14.02)	401 (15.79)
140	71 (2.795)	57.2 (2.25)	18 (0.71)	25.4 (1.00)	18 (0.71)	175 (6.89)	209.6 (8.25)	45 (1.77)	420 (16.54)	465 (18.31)
165	83.5 (3.287)	73.0 (2.87)	22 (0.87)	31.8 (1.25)	20 (0.79)	210 (8.27)	254 (10.00)	60 (2.36)	505 (19.88)	565 (22.24)
190	96.5 (3.799)	92.1 (3.63)	26 (1.02)	38.1 (1.50)	25 (0.98)	260 (10.24)	304.8 (12.00)	62 (2.44)	603 (23.74)	665 (26.18)

Rear Trunnion Mount — Inline

Order Code

T

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	E	G	J	TJ	Ø TD_{f8}	TL	TE	TM	WF	Add Stroke LB	Add Stroke XJ	Add Stroke ZJ
075	76.2 (3.00)	22 (0.87)	62 (2.44)	74.5 (2.93)	20 (0.787)	16 (0.63)	112 (4.41)	80 (3.15)	38 (1.50)	205.5 (8.09)	169 (6.65)	243.5 (9.59)
090	88.9 (3.50)	25 (0.98)	74 (2.91)	89 (3.50)	25 (0.984)	20 (0.79)	135 (5.32)	95 (3.74)	40 (1.57)	248 (9.76)	199 (7.83)	288 (11.34)
115	114.3 (4.50)	30 (1.18)	91 (3.58)	111 (4.37)	32 (1.260)	25 (0.98)	170 (6.69)	120 (4.72)	45 (1.77)	293 (11.54)	227 (8.94)	338 (13.31)
140	139.7 (5.50)	35 (1.38)	108 (4.25)	132 (5.20)	40 (1.575)	32 (1.26)	209.4 (8.244)	145.4 (5.72)	45 (1.77)	348 (13.70)	261 (10.28)	393 (15.47)
165	165.1 (6.50)	40 (1.57)	123 (4.84)	152 (5.98)	50 (1.969)	40 (1.57)	250 (9.84)	170 (6.69)	60 (2.36)	417 (16.42)	325 (12.80)	477 (18.78)
190	190.5 (7.50)	50 (1.97)	152 (5.98)	188 (7.40)	63 (2.480)	50 (1.97)	295.4 (11.63)	195.4 (7.69)	62 (2.44)	503 (19.80)	377 (14.84)	565 (22.24)

Motor/Gearhead

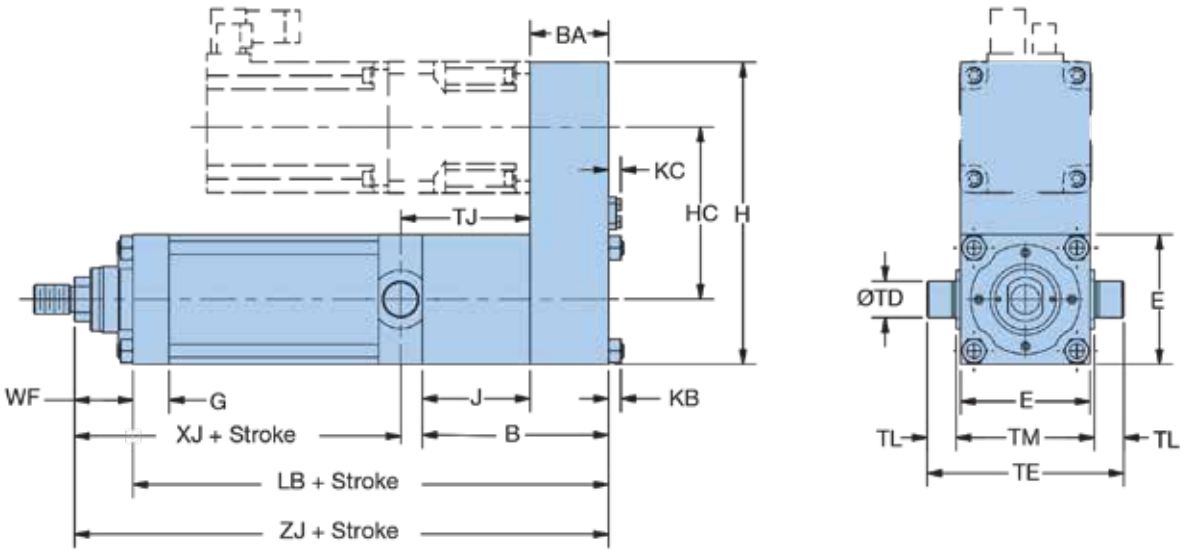
XFC Size	Dimension CA PS090	PS115	PS142	PS180	PS220	MPP115	MPP142	MPP190	MPP270
075	113 (4.45)	115 (4.53)	—	—	—	98 (3.86)	109 (4.29)	—	—
090	115 (4.53)	117 (4.61)	—	—	—	100 (3.94)	111 (4.37)	—	—
115	—	130 (5.12)	158 (6.22)	—	—	—	113 (4.45)	136 (5.35)	—
140	—	—	161 (6.34)	190 (7.48)	—	—	—	139 (5.47)	—
165	—	—	164 (6.46)	193 (7.60)	—	—	—	—	183 (7.20)
190	—	—	—	194 (7.64)	—	—	—	—	214 (8.43)

Rear Trunnion Mount — Parallel

Order Code

T

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	B	BA	E	G	H	HC	J	KB	KC
075	106 (4.17)	44 (1.73)	76.2 (3.00)	22 (0.87)	174.2 (6.86)	98 (3.86)	62 (2.44)	6.5 (0.26)	6.93 (0.27)
090	128 (5.04)	54 (2.13)	88.9 (3.50)	25 (0.98)	206.9 (8.15)	118 (4.65)	74 (2.91)	8 (0.31)	8.65 (0.34)
115	154 (6.06)	63 (2.48)	114.3 (4.50)	30 (1.18)	271 (10.67)	156 (6.14)	91 (3.58)	10 (0.39)	10.15 (0.40)
140	180 (7.09)	72 (2.83)	139.7 (5.50)	35 (1.38)	332.2 (13.08)	192.5 (7.58)	108 (4.25)	13 (0.51)	13.65 (0.54)
165	211 (8.31)	88 (3.46)	165.1 (6.50)	40 (1.57)	379.1 (14.93)	224 (8.82)	123 (4.84)	18 (0.71)	13.65 (0.54)
190	252 (9.92)	100 (3.94)	190.5 (7.50)	50 (1.97)	455.5 (17.93)	265 (10.43)	152 (5.98)	18 (0.71)	17.18 (0.68)

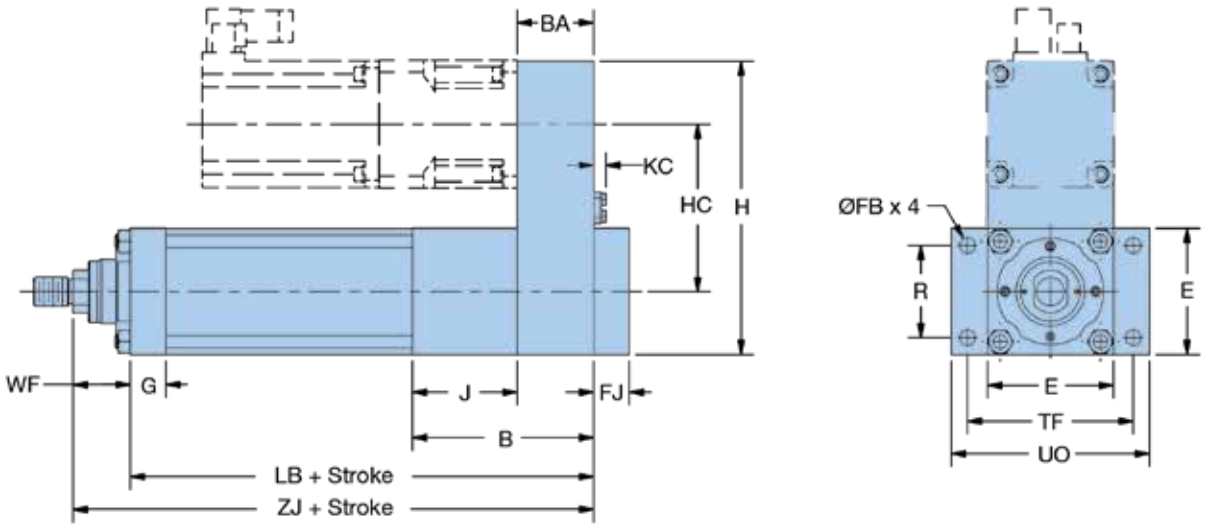
XFC Size	TJ	Ø TD_{f8}	TL	TE	TM	WF	Add Stroke LB	Add Stroke XJ	Add Stroke ZJ
075	74.5 (2.93)	20 (0.787)	16 (0.63)	112 (4.41)	80 (3.15)	38 (1.50)	249.5 (9.82)	169 (6.65)	287.5 (11.32)
090	89 (3.50)	25 (0.984)	20 (0.79)	135 (5.32)	95 (3.74)	40 (1.57)	302 (11.89)	199 (7.83)	342 (13.46)
115	111 (4.37)	32 (1.260)	25 (0.98)	170 (6.69)	120 (4.72)	45 (1.77)	356 (14.02)	227 (8.94)	401 (15.79)
140	132 (5.20)	40 (1.575)	32 (1.26)	209.4 (8.244)	145.4 (5.72)	45 (1.77)	420 (16.54)	261 (10.28)	465 (18.31)
165	152 (5.98)	50 (1.969)	40 (1.57)	250 (9.84)	170 (6.69)	60 (2.36)	505 (19.88)	325 (12.80)	565 (22.24)
190	155 (6.10)	63 (2.480)	155 (5.315)	300 (11.81)	253 (9.96)	62 (2.44)	603 (23.74)	377 (14.84)	665 (26.18)

Rear Flange Mount — Parallel Only

Order Code

H

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	B	BA	E	Ø FB	FJ	G	H	HC
075	106 (4.17)	44 (1.73)	76.2 (3.00)	9 (0.35)	12 (0.47)	22 (0.87)	174.2 (6.86)	98 (3.86)
090	128 (5.04)	54 (2.13)	88.9 (3.50)	11 (0.43)	14 (0.55)	25 (0.98)	206.9 (8.15)	118 (4.65)
115	154 (6.06)	63 (2.48)	114.3 (4.50)	14 (0.55)	16 (0.63)	30 (1.18)	271 (10.67)	156 (6.14)
140	180 (7.09)	72 (2.83)	139.7 (5.50)	18 (0.71)	20 (0.79)	35 (1.38)	332.2 (13.08)	192.5 (7.58)
165	211 (8.31)	88 (3.46)	165.1 (6.50)	21 (0.83)	25 (0.98)	40 (1.57)	379.1 (14.93)	224 (8.82)
190	252 (9.92)	100 (3.94)	190.5 (7.50)	22 (0.87)	30 (1.18)	50 (1.97)	455.5 (17.93)	265 (10.43)

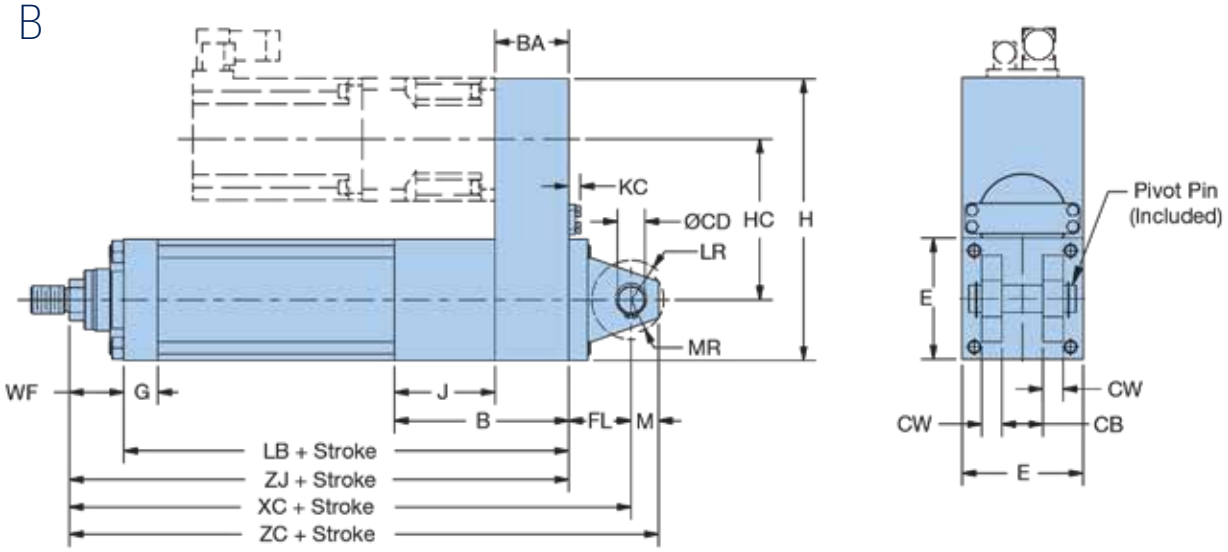
XFC Size	J	KC	R	TF	UO	WF	Add Stroke LB	Add Stroke ZJ
075	62 (2.44)	6.93 (0.27)	52 (2.05)	105 (4.13)	125 (4.92)	38 (1.50)	249.5 (9.82)	287.5 (11.32)
090	74 (2.91)	8.65 (0.34)	65 (2.56)	117 (4.61)	139.7 (5.50)	40 (1.57)	302 (11.89)	342 (13.46)
115	91 (3.58)	10.15 (0.40)	83 (3.27)	149 (5.87)	175 (6.89)	45 (1.77)	356 (14.02)	401 (15.79)
140	108 (4.25)	13.65 (0.54)	107 (4.21)	172 (6.77)	210 (8.27)	45 (1.77)	420 (16.54)	465 (18.31)
165	123 (4.84)	13.65 (0.54)	120 (4.72)	215 (8.46)	260 (10.24)	60 (2.36)	505 (19.88)	565 (22.24)
190	152 (5.98)	17.18 (0.68)	155 (6.10)	253 (9.96)	300 (11.81)	62 (2.44)	603 (23.74)	665 (26.18)

Rear Clevis Mount — Parallel Only

Order Code

B

FIRST ANGLE VIEW PROJECTION



Dimensions — mm (in)

XFC Size	B	BA	CB	Ø CD_{H9}	CW	E	FL	G	H	HC
075	106 (4.17)	44 (1.73)	20 (0.79)	14 (0.551)	10 (0.39)	76.2 (3.00)	31 (1.22)	22 (0.87)	174.2 (6.86)	98 (3.86)
090	128 (5.04)	54 (2.13)	30 (1.18)	20 (0.787)	15 (0.59)	88.9 (3.50)	46 (1.81)	25 (0.98)	206.9 (8.15)	118 (4.65)
115	154 (6.06)	63 (2.48)	30 (1.18)	20 (0.787)	15 (0.59)	114.3 (4.50)	48 (1.89)	30 (1.18)	271 (10.67)	156 (6.14)
140	180 (7.09)	72 (2.83)	40 (1.57)	28 (1.102)	20 (0.79)	139.7 (5.50)	59 (2.32)	35 (1.38)	332.2 (13.08)	192.5 (7.58)
165	211 (8.31)	88 (3.46)	50 (1.97)	36 (1.417)	25 (0.98)	165.1 (6.50)	79 (3.11)	40 (1.57)	379.1 (14.93)	224 (8.82)
190	252 (9.92)	100 (3.94)	60 (2.36)	45 (1.772)	30 (1.18)	190.5 (7.50)	87 (3.43)	50 (1.97)	455.5 (17.93)	265 (10.43)

XFC Size	J	KC	LR	M	MR	WF	Add Stroke LB	XC	ZC	ZJ
075	62 (2.44)	6.93 (0.27)	17 (0.67)	14 (0.55)	17 (0.67)	38 (1.50)	249.5 (9.82)	318.5 (12.54)	332.5 (13.09)	287.5 (11.32)
090	74 (2.91)	8.65 (0.34)	29 (1.14)	20 (0.79)	25 (0.98)	40 (1.57)	302 (11.89)	388 (15.28)	408 (16.06)	342 (13.46)
115	91 (3.58)	10.15 (0.40)	29 (1.14)	20 (0.79)	25 (0.98)	45 (1.77)	356 (14.02)	449 (17.68)	469 (18.46)	401 (15.79)
140	108 (4.25)	13.65 (0.54)	34 (1.34)	28 (1.10)	34 (1.34)	45 (1.77)	420 (16.54)	524 (20.63)	552 (21.73)	465 (18.31)
165	123 (4.84)	13.65 (0.54)	50 (1.97)	36 (1.42)	45 (1.77)	60 (2.36)	505 (19.88)	644 (25.35)	680 (26.77)	565 (22.24)
190	152 (5.98)	17.18 (0.68)	53 (2.09)	45 (1.77)	54 (2.13)	62 (2.44)	603 (23.74)	752 (29.61)	797 (31.38)	665 (26.18)

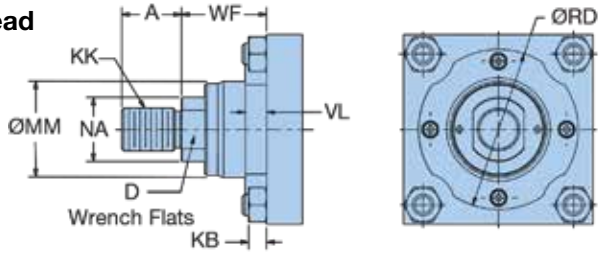
Male Rod End

Order Code

FIRST ANGLE VIEW PROJECTION

A **Metric Thread**

B **Imperial Thread**



Dimensions — mm (in)

XFC Size	A	D	KB	KK A	KK B	ØMM	NA	$ØRD_{f8}$	VL	WF
075	22 (0.87)	19 (0.75)	6.5 (0.26)	M16x1.5	5/8-18	36 (1.42)	24 (0.94)	65 (2.558)	10 (0.39)	38 (1.50)
090	28 (1.10)	24 (0.94)	8 (0.31)	M20x1.5	3/4-16	45 (1.77)	30 (1.18)	75 (2.952)	10 (0.39)	40 (1.57)
115	36 (1.42)	32 (1.26)	10 (0.39)	M27x2	1-14	56 (2.20)	40 (1.57)	95 (3.739)	12 (0.47)	45 (1.77)
140	45 (1.77)	39 (1.54)	13 (0.51)	M33x2	1 1/4-12	70 (2.76)	49 (1.93)	110 (4.329)	12 (0.47)	45 (1.77)
165	56 (2.21)	48 (1.89)	18 (0.71)	M42x2	1 1/2-12	90 (3.54)	60 (2.36)	135 (5.313)	14 (0.55)	60 (2.36)
190	63 (2.48)	55 (2.17)	18 (0.71)	M48x2	1 3/4-12	110 (4.33)	70 (2.76)	155 (6.101)	16 (0.63)	62 (2.44)

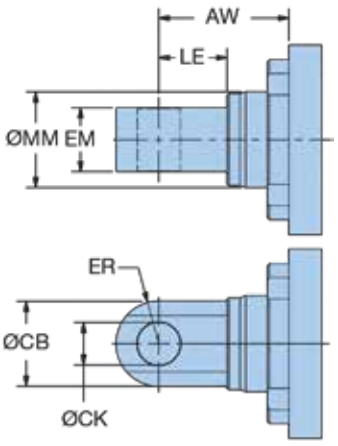
Rod Eye

Order Code

C

Dimensions — mm (in)

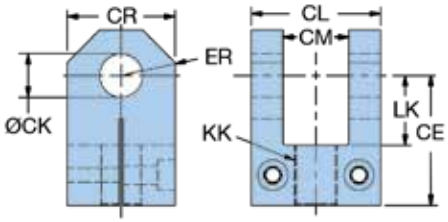
XFC Size	AW	ØCB	$ØCK_{H9}$	EM_{h13}	ER_{MAX}	LE	ØMM
075	48 (1.89)	32 (1.26)	14 (0.551)	20 (0.787)	16 (0.63)	19 (0.75)	36 (1.42)
090	61 (2.40)	40 (1.57)	20 (0.787)	30 (1.181)	20 (0.79)	32 (1.26)	45 (1.77)
115	66 (2.60)	45 (1.77)	20 (0.787)	30 (1.181)	23 (0.89)	32 (1.26)	56 (2.20)
140	73 (2.87)	60 (2.36)	28 (1.102)	40 (1.575)	30 (1.18)	39 (1.53)	70 (2.76)
165	99 (3.90)	80 (3.15)	36 (1.417)	50 (1.969)	40 (1.57)	54 (2.13)	90 (3.54)
190	104 (4.09)	100 (3.94)	45 (1.772)	60 (2.362)	50 (1.97)	57 (2.24)	110 (4.33)



Mounting Accessories

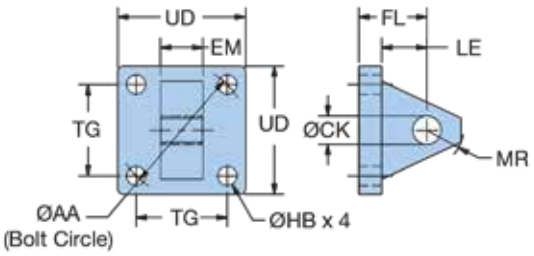
FIRST ANGLE VIEW PROJECTION

Dimensions — mm (in)



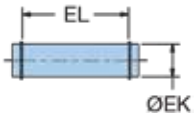
Rod Clevis

XFC Size	Part No.	CE	CL	CM_{A16}	$ØCK_{H9}$	CR	LK_{MIN}	ER_{MAX}	KK	Load Rating kN (lb)
075	0950250075	41 (1.61)	40 (1.57)	20 (0.787)	14 (0.551)	30 (1.18)	19 (0.75)	15.53 (0.61)	M16x1.5	20 (4,500)
090	0950250090	60 (2.36)	60 (2.36)	30 (1.181)	20 (0.787)	50 (1.97)	32 (1.26)	25.32 (1.00)	M20x1.5	34 (7,500)
115	0950250115	68 (2.68)	60 (2.36)	30 (1.181)	20 (0.787)	50 (1.97)	32 (1.26)	25.71 (1.01)	M27x2	54 (12,000)
140	0950250140	84 (3.31)	83 (3.27)	40 (1.575)	28 (1.102)	60 (2.36)	39 (1.54)	32.50 (1.28)	M33x2	80 (17,500)
165	0950250165	110 (4.33)	103 (4.06)	50 (1.969)	36 (1.417)	76 (2.99)	54 (2.13)	41.04 (1.62)	M42x2	120 (26,500)
190	0950250190	120 (4.72)	123 (4.84)	60 (2.362)	45 (1.772)	101.5 (4.00)	57 (2.24)	51.83 (2.04)	M48x2	178 (40,000)



Clevis Bracket

XFC Size	Part No.	ØAA	Ø CK_{H9}	EM	FL	ØHB	LE_{MIN}	MR_{MAX}	TG	UD
075	1448100000	59 (2.32)	14 (0.551)	20 (0.79)	29 (1.14)	9 (0.35)	19 (0.75)	17 (0.67)	41.7 (1.64)	64 (2.52)
090	1448110000	74 (2.91)	20 (0.787)	30 (1.18)	48 (1.89)	13.5 (0.53)	32 (1.26)	29 (1.14)	52.3 (2.06)	75 (2.95)
115	1448120000	91 (3.58)	20 (0.787)	30 (1.18)	48 (1.89)	13.5 (0.53)	32 (1.26)	29 (1.14)	64.3 (2.53)	90 (3.54)
140	1448130000	117 (4.61)	28 (1.102)	40 (1.58)	59 (2.32)	17.5 (0.69)	39 (1.54)	34 (1.34)	82.7 (3.26)	115 (4.53)
165	1448140000	137 (5.39)	36 (1.417)	50 (1.97)	79 (3.11)	17.5 (0.69)	54 (2.13)	50 (1.97)	96.9 (3.82)	127 (5.00)
190	1448150000	178 (7.01)	45 (1.772)	60 (2.36)	87 (3.43)	26 (1.02)	57 (2.24)	53 (2.09)	125.9 (4.96)	165 (6.50)



Pivot Pin

Part No.	Ø EK_{f8}	EL
1434790000	14 (0.551)	45 (1.77)
1434800000	20 (0.787)	66 (2.60)
1434800000	20 (0.787)	66 (2.60)
1434810000	28 (1.102)	87 (3.43)
1434820000	36 (1.417)	107 (4.21)
1434830000	45 (1.772)	129 (5.08)

OPTIONS & ACCESSORIES

Motors, Gearheads & Adapter Plates

Motor and gearhead selection is critical to the performance of the XFC electromechanical cylinder and must be sized based on the application requirements.

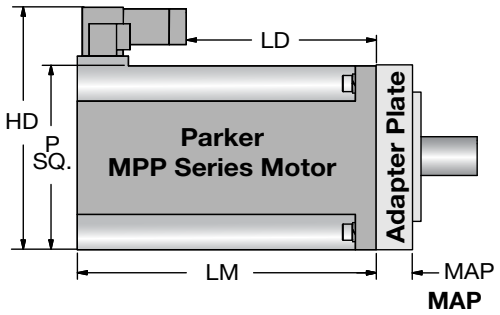
The tables below and on the next page provide information on Parker MPP motors or PS Series gearheads that are appropriate with the XFC.

A motor-only selection is typically used in high-speed/low-force applications, whereas a motor/gearhead combination is beneficial for slow speed/high force.

Standard configurations are available if a number is listed in the adapter plate columns (MAP, LAP). This number represents the adapter plate width and corresponds to the appropriate size motor and gearhead.

If the number is zero, the motor or gearhead combination is possible, but an adapter plate is not required. A dash indicates that a suitable combination is not available as a standard configuration.

Consult the factory to inquire about other options or configurations.



MPP Series Motors

Dimensions — mm (in)

MPP Motor Size	Length	LM	LD	HD	P	Inline 075	Inline 090	Inline 115	Inline 140	Inline 165	Inline 190	Parallel 075	Parallel 090	Parallel 115	Parallel 140	Parallel 165	Parallel 190
115	2	152.4 (6.00)	89.2 (3.51)	159.0 (6.26)	113.0 (4.45)	0.0	0.0	—	—	—	—	12 (0.47)	12 (0.47)	—	—	—	—
	3	177.8 (7.00)	115.2 (4.54)					—	—	—	—			—	—	—	—
	4	203.2 (8.00)	140.2 (5.52)					—	—	—	—			—	—	—	—
142	2	172.9 (6.81)	109.9 (4.33)	188.8 (7.43)	142.7 (5.62)	16 (0.63)	16 (0.63)	16 (0.63)	—	—	—	—	16 (0.63)	16 (0.63)	—	—	—
	4	223.7 (8.81)	160.8 (6.33)						—	—	—	—			—	—	—
	6	274.5 (10.81)	211.9 (8.34)						—	—	—	—			—	—	—
	8	325.3 (12.81)	261.9 (10.31)						—	—	—	—			—	—	—
190	4	224.0 (8.82)	110.3 (4.34)	260.1 (10.24)	184.9 (7.28)	—	—			—	—	—	—			—	—
	6	275.0 (10.83)	161.3 (6.35)			—	—	25 (0.98)	25 (0.98)	—	—	—	—	25 (0.98)	25 (0.98)	—	—
	8	325.3 (12.81)	211.3 (8.32)			—	—			—	—	—	—			—	—
270	6	293.3 (11.55)	175.3 (6.90)	335.9 (13.22)	266.7 (10.50)	—	—	—	30 (1.18)	30 (1.18)	—	—	—	—	—	30 (1.18)	—
	8	344.1 (13.55)	255.5 (10.06)			—	—	—			—	—	—	—	—		—

Note: Make sure the output torque on the motor is sufficient for the application. MPP torque information can be found at www.parkermotion.com

Motor Brake Option

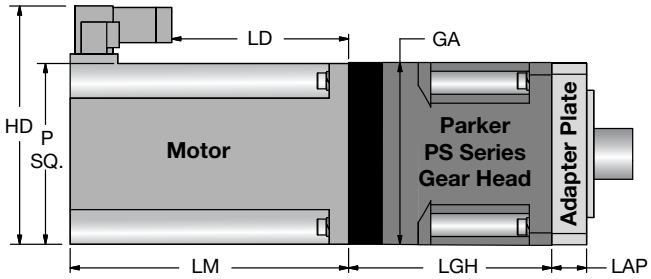
For vertical applications, a static brake should be used to resist back-driving the screw mechanism. A motor brake increases the overall length of the motor as indicated in the chart.

Brake Option Additional Motor Length

Motor size	092	100	115	142	190	270
LM and LD Increase by:	34.5 (1.36)	48.5 (1.91)	48.5 (1.91)	51.6 (2.03)	89.0 (3.50)	127.0 (5.00)

For specific motor holding torque, refer to MPP motor data at www.parkermotion.com

PS Series Gearheads



Dimensions — mm (in)

Gear size	MPP Motor Size	Length	LM	LD	HD	P	GA	LGH	LAP[1] 075	090	115	140	165	190
PS90	092	1	127.2 (5.01)	64.2 (2.53)	136.4 (5.37)	88.8 (3.50)	90 (3.54)	89.5 (3.52)	19 (0.75)	0.0	—	—	—	—
		2	152.6 (6.01)	90.2 (3.55)							—	—	—	—
		3	178.0 (7.01)	115.2 (4.52)							—	—	—	—
	100	2	149.1 (5.87)	86.2 (3.39)	143.8 (5.66)	97.8 (3.85)		98 (3.86)			—	—	—	—
		3	174.5 (6.87)	111.2 (4.38)							—	—	—	—
PS115	092	1	127.2 (5.01)	64.2 (2.53)	136.4 (5.37)	88.8 (3.50)	115 (4.53)	114.2 (4.50)	24 (0.94)	22 (0.87)	0.0	—	—	—
		2	152.6 (6.01)	90.2 (3.55)								—	—	—
		3	178.0 (7.01)	115.2 (4.52)								—	—	—
	100	2	149.1 (5.87)	86.2 (3.39)	143.8 (5.66)	97.8 (3.85)						—	—	—
		3	174.5 (6.87)	111.2 (4.38)								—	—	—
	115	2	152.4 (6.00)	89.2 (3.51)	159.0 (6.26)	113.0 (4.45)						—	—	—
		3	177.8 (7.00)	115.2 (4.54)								—	—	—
		4	203.2 (8.00)	140.2 (5.52)								—	—	—
PS142	100	2	149.1 (5.87)	86.2 (3.39)	143.8 (5.66)	97.8 (3.85)	142 (5.59)	133.7 (5.26)	—	—	29 (1.14)	5.0 (0.20)	5.0 (0.20)	—
		3	174.5 (6.87)	111.2 (4.38)					—	—				—
	115	2	152.4 (6.00)	89.2 (3.51)	159.0 (6.26)	113.0 (4.45)			—	—				—
		3	177.8 (7.00)	115.2 (4.54)					—	—				—
		4	203.2 (8.00)	140.2 (5.52)					—	—				—
	142	2	172.9 (6.81)	109.9 (4.33)	188.8 (7.43)	142.7 (5.62)			—	—				—
		4	223.7 (8.81)	160.8 (6.33)					—	—				—
		6	274.5 (10.81)	211.9 (8.34)					—	—				—
		8	325.3 (12.81)	261.9 (10.31)					—	—				—
PS180	115	2	152.4 (6.00)	89.2 (3.51)	159.0 (6.26)	113.0 (4.45)	182 (7.17)	148.5 (5.85)	—	—	—	24 (0.94)	24 (0.94)	0.0
		3	177.8 (7.00)	115.2 (4.54)					—	—	—			
		4	203.2 (8.00)	140.2 (5.52)					—	—	—			
	142	2	172.9 (6.81)	109.9 (4.33)	188.8 (7.43)	142.7 (5.62)		151 (5.95)	—	—	—			
		4	223.7 (8.81)	160.8 (6.33)					—	—	—			
		6	274.5 (10.81)	211.9 (8.34)					—	—	—			
		8	325.3 (12.81)	261.9 (10.31)					—	—	—			
	190	4	224.0 (8.82)	110.3 (4.34)	260.1 (10.24)	184.9 (7.28)		192.5 (7.58)	—	—	—			
		6	275.0 (10.83)	161.3 (6.35)					—	—	—			
		8	325.3 (12.81)	211.3 (8.32)					—	—	—			
PS220	190	4	224.0 (8.82)	110.3 (4.34)	260.1 (10.24)	184.9 (7.28)	220 (8.66)	212 (8.35)	—	—	—	—	—	36 (1.42)
		6	275.0 (10.83)	161.3 (6.35)					—	—	—	—	—	
		8	325.3 (12.81)	211.3 (8.32)					—	—	—	—	—	
	270	6	293.3 (11.55)	175.3 (6.90)	335.9 (13.22)	266.7 (10.50)		252 (9.92)	—	—	—	—	—	
		8	344.1 (13.55)	255.5 (10.06)					—	—	—	—	—	

[1] LAP dimension is required for parallel mounting only; 0.0 means no adapter plate required. Inline configurations do not require adapter plates.

Note: Make sure the output torque on the gear head is sufficient for the application. PS torque information can be found at www.parkermotion.com

Compax3 Drive/Controller

Compax3 Power Range

Compax3 Device	Current A_{RMS} I_{cont}	I_{peak}(<5s)	Supply Voltage
S025V2	2.5	5.5	1Ø 230/240VAC
S063V2	6.3	12.6	
S100V2	10	20	3Ø 230/240VAC
S150V2	15	30	
S038V4[1]	3.8	9.0	3Ø 400/480VAC
S075V4[1]	7.5	15	
S150V4[1]	15	30	
S300V4[1]	30	60	
H050V4[1]	50	75	3Ø 400/480VAC
H090V4[1]	90	135	
H125V4[1]	125	187.5	
H155V4[1]	155	232.5	

[1]Rated at 400 VAC

Standard Features

- **Power range of 1kW…75kW**
- **8 digital inputs, 4 digital outputs**
- **Available with ETHERNET Powerlink, and EtherCat**
- **RS232 / RS485 – interfaces**
- **2 analog inputs (+/-10V, 14 bits)**
- **2 analog outputs (+/-10V, 8 bits)**
- **Encoder input or output**
- **Motors supported:**
  - **Synchronous servo motors**
  - **Asynchronous motors**
  - **Linear motors**
  - **Torque motors**
- **Position sensing at the motor shaft via:**
  - **Resolver**
  - **Rotary/linear encoder**
  - **Sine-cosine feedback**
  - **Hiperface interface**
  - **EnDat 2.2 interface**
  - **Compatible with most feedback systems**
- **Support for SSI feedback**

Extensions

- **Real-time bus for axis coupling**
- **Scalable technology and control functions**
- **Integrated or external controls**

Functions (summary)

- **Programmable according to IEC61131-3**
- **Reg-related positioning, electronic gearing, dynamic positioning (motion superimposition) and torque-force control**
- **Cam – modular, with coupling and decoupling functions, cam switching mechanism**

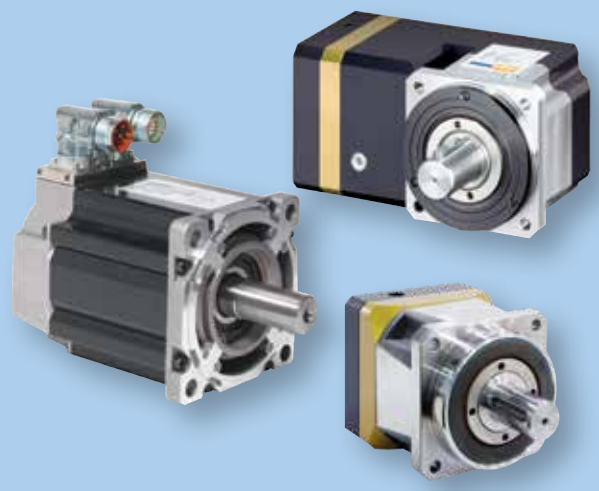
Technologies

- **T10: Step/Direction and Analog Command Input**
- **T11: Positioning indexer**
- **T30: IEC61131-3 Positioning with function modules according to PLCopen**
- **T40: IEC61131-3 Positioning plus Cam function modules**

For further information on Compax3 Drive/Controllers or assistance with sizing and selection, please consult parkermotion.com, or consult the factory

Complementary Parker Products

Parker offers HMI solutions for any application from simple push button replacement through sophisticated networking, multimedia and data logging requirements. Products range from entry level embedded displays through full Windows-based Industrial PC solutions.



Parker offers a broad family of motors with unparalleled performance, a torque range of 1.2 in-lbs to 4000 in-lbs and complete customization capabilities. For higher torque requirements, Parker's Stealth gearheads are the perfect solution.

Solid State Switches

Global Drop-In Solid State Switches

Specifications

Switch Classification	Standard PNP or NPN
Type	Electronic
Output Function	Normally Open/Closed
Switch Output	PNP/NPN
Operating Voltage	10 - 30VDC
Continuous Current	100 mA max.
Response Sensitivity	28 Gauss min.
Switching Frequency	5 KHz
Power Consumption	10 mA max.
Voltage Drop	2.5 VDC max.
Ripple	10% of Operating Voltage
Hysteresis	1.5 mm max.
Repeatability	0.1 mm max.
EMC	EN 60 947-5-2
Short-circuit Protection	Yes
Power-up Pulse Suppression	Yes
Reverse Polarity Protection	Yes
Enclosure Rating	IP68
Shock and Vibration Stress	30g, 11 ms, 10 to 55Hz, 1 mm
Operating Temperature Range	-25°C to +75°C (-13°F to +167°F)
Housing Material	PA 12 Black
Connector Cable	PVC
Connector	PUR

Global solid state switch outputs may be influenced by an external magnetic field. Care must be taken to avoid external magnetic field exposure.

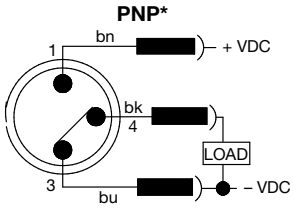
Solid State Switch Ordering Information

	PNP*		NPN	
	Nomally Open	**Normally Closed**	**Normally Open**	**Normally Closed**
3 m Flying Leads	P8S-GPFIX	P8S-GQFIX	P8S-GNFIX	P8S-GMFIX
10 m Flying Leads	P8S-GPFTX	—	P8S-GNFTX	—
0.3 m Lead with 8 mm connector	P8S-GPSHX	P8S-GQSHX	P8S-GNSHX	P8S-GMSHM
1 m Lead with 8 mm connector	P8S-GPSCX	—	P8S-GNSCX	—
Compax3 Compatible	Yes	Yes	No	No

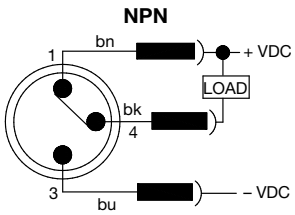
*PNP needed for Compax3 Servo Drive.

Wiring Connection

Flying Lead or 8 mm Connector (shown)

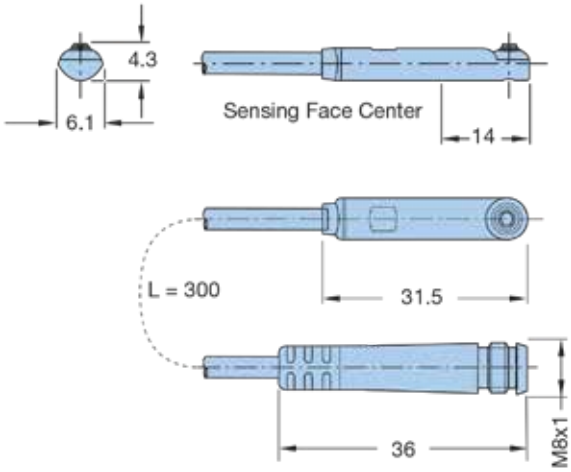


**PNP needed for Compax3 Servo Drive*



Pin	Wire	Function
1	Brown	Operating Voltage (+VDC)
4	Black	Output signal (N.O.)
3	Blue	–VDC

Dimensions — mm



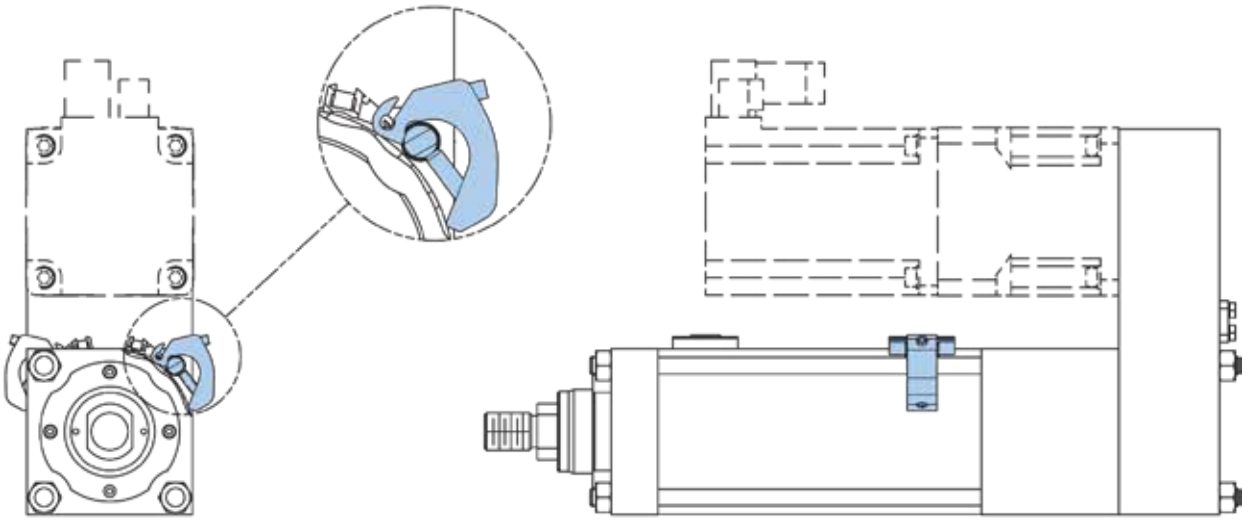
8 mm Threaded Cord Set to Flying Leads

086620T002	2 meter
086620T005	5 meter

Tie Rod Bracket Assembly

Global switch bracket fits XFC 075 – 115 cylinders. Global switches and bracket assemblies must be ordered separately.

P8S-TMA0X	Tie Rod Bracket Assembly



ORDERING INFORMATION

XFC

Select an order code from each of the numbered fields to create a complete XFX model order number. Include hyphens and non-selective characters as shown in example below.

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩		⑪	⑫		⑬	⑭	⑮		⑯
Order Example:	XFC	075	LA	05	J	N	A	A	N	XXXX	–	A	03	–	A09A	A	1	–	A

① Series

XFC Extreme Force Cylinder

② Frame Size

075 75 mm
090 90 mm
115 115 mm
165 165 mm
190 190 mm

③ Configuration

Inline Motor

LA Mounting Position A*
LB Mounting Position B*
LC Mounting Position C*
LD Mounting Position D*

Parallel Motor

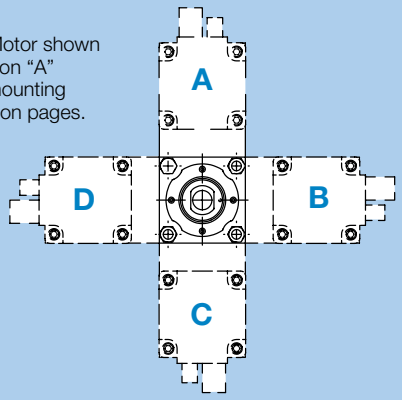
PA Mounting Position A*
PB Mounting Position B*
PC Mounting Position C*
PD Mounting Position D*

④ Screw Lead

05 5 mm Lead (XFC075, 090, 115, 140)
10 10 mm Lead (XFC075, 090, 115, 140, 165, 190)
20 20 mm Lead (XFC165 & 190)

*** Motor Mounting and Port Positions**

Note: Motor shown in position "A" for all mounting dimension pages.



⑤ Primary Mount
⑥ Secondary Mount

Inline Motor Configuration

C Foot Mount
J Front Flange Mount
K Extended Tie Rod Mount (Front)
T Rear Trunnion Mount
N No Secondary Mount

Parallel Motor Configuration

B Rear Clevis
C Foot Mount
H Rear Flange
J Front Flange Mount
K Extended Tie Rod Mount (Front)
L Extended Tie Rod Mount (Rear)
M Extended Tie Rod Mount (Front & Rear)
T Rear Trunnion Mount
N No Secondary Mount

⑦ Rod End

A Metric Thread – Male End
B Imperial Thread – Male End
C Rod Eye
X Special

⑧ Lubrication

A Oil Filled Port Position A*
B Oil Filled Port Position B*
C Oil Filled Port Position C*
D Oil Filled Port Position D*
E Grease Filled (required for vertical applications)

*Refer to illustration at left. For parallel configurations, the oil fill port position and the motor mount position cannot be the same.

⑨ Options

A Prepped for Limit Switches*
B Fluorocarbon Seals
C Fluorocarbon Seals and Limit Switch Ready*
N None

*Options A and C are only available with XFC 075, 090 and 115 with grease-filled lubrication

⑩ Stroke Length — mm

XXXX	50 – 2000 mm (See Specifications for max stroke by bore size. For stroke <50 or >2000 please consult factory)

⑪ Gearhead Frame Size [1]

A	PS90 Frame for Size XFC075 & 090
B	PS115 Frame for Size XFC075, 090 & 115
C	PS142 Frame for Size XFC115, 140 & 165
D	PS180 Frame for Size XFC140, 165 & 190
E	PS220 Frame for Size XFC190
X	Special
N	No Gearhead (Motor only)

⑫ Gearhead Ratio

00	No Gearhead
03	Gearhead with 3:1 ratio
04	Gearhead with 4:1 ratio
05	Gearhead with 5:1 ratio
07	Gearhead with 7:1 ratio
10	Gearhead with 10:1 ratio
XX	Custom Gear Ratio

⑬ Motor Selection* [1]

240 VAC		460 VAC	
A09A	MPP0921C	**A09B**	MPP0921R
A09C	MPP0922D	**A09D**	MPP0922R
A09E	MPP0923D	**A09F**	MPP0923R
A10A	MPP1002D	**A10B**	MPP1002R
A10C	MPP1003C	**A10D**	MPP1003R
A11A	MPP1152D	**A11B**	MPP1152R
A11C	MPP1153C	**A11D**	MPP1153R
A11E	MPP1154B	**A11F**	MPP1154P
A14A	MPP1422C	**A14B**	MPP1422R
A14C	MPP1424C	**A14D**	MPP1424R
A14E	MPP1426B	**A14F**	MPP1426P
—	**—**	**A14G**	MPP1428Q
—	**—**	**A19A**	MPP1904P
A19B	MPP1906B	**A19C**	MPP1906P
—	**—**	**A19D**	MPP1908P
	—	**A27A**	MPP2706P
—	**—**	**A27B**	MPP2708N
X00X	Special	**X00X**	Special

*Refer to Motors, Gearheads & Adapter Plates in Options & Accesories for motor pairing options by bore size.

⑭ Motor Feedback [2]

A	2000 Count Encoder (1E)
B	2000 Count Encoder – Serial Interface (3E)
C	Single Speed Resolver (41)
D	Multi-Turn Absolute Encoder (6S)
E	Single-Turn Absolute Encoder (9S)
N	No Motor or Special Motor

⑮ Motor Options* [2]

1	No Brake
2	24 VDC Brake (B)
3	Shaft Seal (V)
4	24 VDC Brake (B) and Shaft Seal (V)
0	No Motor or Special Motor

*Brake required for vertical applications

⑯ Revision Identifier

A	Standard Cylinder
B	Anti-rotation Option (When selecting anti-rotation option, grease filled option must also be selected [Option "E" from ⑧ Lubrication section]. Consult factory for rotation torque greater than stated catalog values in Specifications)

1) Includes proper mounting surface for selected gearhead and motor.
2) For customer supplied motors, not provided by Parker, select option "N" for **Motor Feedback** and "0" for **Motor Options.**

Free sizing and selection support from Virtual Engineer at parker.com/VirtualEngineer