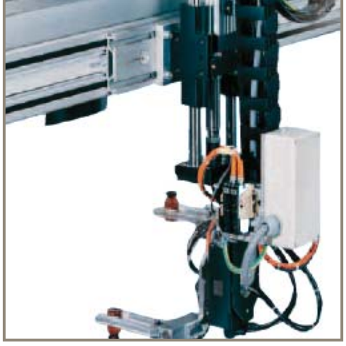

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ETH Electric Cylinder

Parker High Force Electric Thrust Cylinder

Parker

ENGINEERING YOUR SUCCESS.

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Parker Hannifin has more than 40 years experience in the design and manufacturing of drives, controls, motors and mechanical products. With dedicated global product development teams, Parker draws on industry-leading technological leadership and experience from engineering teams in Europe, North America and Asia.

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Electromechanical Worldwide Manufacturing Locations

Europe
Littlehampton, United Kingdom
Dijon, France
Offenburg, Germany
Filderstadt, Germany
Milan, Italy

Asia
Wuxi, China
Chennai, India

North America
Rohnert Park, California
Irwin, Pennsylvania
Charlotte, North Carolina
New Ulm, Minnesota

Offenburg, Germany

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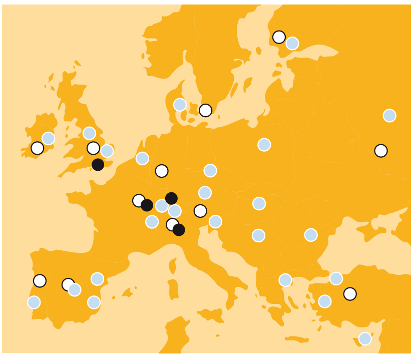
Parker provides sales assistance and local technical support through a network of dedicated sales teams and authorized technical distributors throughout Europe.

For contact information, please refer to the Sales Offices on the back cover of this document or visit www.parker.com

Milan, Italy

Littlehampton, UK



- Electromechanical Manufacturing
- Parker Sales Offices
- Distributors

Dijon, France

High Force Electric Thrust Cylinder - ETH

Overview

Description

The ETH electric cylinder closes the gap between pneumatic and hydraulic actuators; it is suitable to replace those in many applications and simultaneously increase the reliability of the production process. Taking the costs for air and oil into consideration, you will find that 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 a wide variety of fields.

Typical areas of application

- Material handling and feed systems
  - wood and plastic working industry
  - vertical actuators for loading machine tools
  - in the textile industry for tensioning / gripping textile fabrics
  - in the automotive industry for transporting and feeding components
- Testing equipment and laboratory applications
- Valve and flap actuation
- Pressing
- Packaging machinery
- Process automation in the food and beverage industry

Features

- Unrivaled power density - high forces and small frame sizes
- Cabling can be concealed in the profile
- Accessories with integrated force sensors help to allot and even to control forces precisely
- Optimized for safe handling and simple cleaning
- High service life
- Reduced maintenance costs thanks to lubricating access in the cylinder flange
- Easy replacement due to pneumatic ISO flange norm (DIN ISO 15552:2005-12) conformity
- Integrated anti-rotation device
- Reduced noise emission
- All from one source
  We offer the complete drive train: Drive controllers, motors and gearboxes to match the Electric Cylinder

Technical Characteristics - Overview

Type	ETH Electric Cylinder
Frame sizes	ETH032 / ETH050 / ETH080 / ETH100 / ETH125
Screw lead	5, 10, 16, 20, 32 mm
Stroke	up to 2000 mm
Traction/thrust force	up to 114 000 N
Speed	up to 1.7 m/s
Acceleration	up to 15 m/s²
Equivalent dynamic axial force at a lifetime of 2500 km	up to 49 600 N
Efficiency	up to 90 %
Repeatability	up to ± 0.03 mm
Protection classes	IP54 IP54 with stainless screws IP65
Drive	Inline: Axial drive or parallel drive with high performance toothed belt
Directives	2011/65/EC: Conform to RoHS (RoHS)
	94/9/EC: ATEX Equipment group II Category 2 Please contact Parker for details
Classification	II 2G Ex c IIC T4 EPS 13 ATEX 2 592 X (ETH032 / ETH050)
	II 2G Ex c IIB T4 EPS 13 ATEX 2 592 X (ETH080 / ETH100)

We also offer customized solutions:

If your application requires a special version of the ETH cylinder, please contact your local Parker Distributor.

- Oil splash lubrication
- Customized mountings and rod ends
- Mounting of customer motors
- Preparation of the cylinder for use under aggressive environmental conditions
- Overlong thrust rod
- Polished thrust rod
- Thrust rod hard-chrome plated
- .....

Parker High Force Electric Thrust Cylinder

ETH IP54 (Standard)

ETH IP65

Product Design

Screw support bearing (front end)

The front screw support bearing is supported by a polymer sliding bearing. This eliminates vibration and run-out. The result is quieter, smoother motion with better precision, longer screw life, and increased dynamic performance.

Ballscrew

A high-quality precision class 7 ballscrew in accordance with ISO 3408 is used. The ball bearings between screw and nut ensure a low frictional resistance. This ensures an especially smooth operation over the entire speed range, high service life and excellent efficiency.

Piston Rod Anti-rotation Guidance

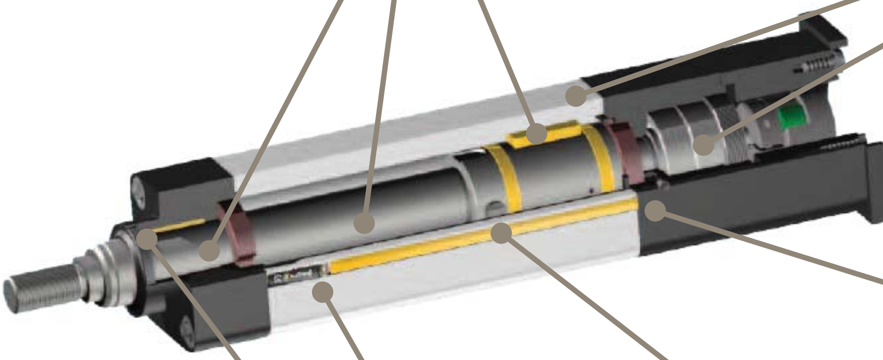
One of the unique design changes in the ETH is a new anti-rotation device. The high quality, maintenance free polymer bushing offers robust guidance preventing the piston rod from twisting as the rod extends and retracts.

Extruded cylinder body

The extrusion design reduces the number of slots or grooves for a cleaner overall design. The only slots are there for sensor mounting and are easily covered to eliminate any area for debris to be trapped. The result is a cleaner, more environmentally friendly design.

Screw Support Bearing (motor end)

A double stacked set of angular contact bearings allows for high thrust forces in both the extend and retract directions. The result is a design with high force density and minimal clearance when changing directions of motion.



Easy Lubrication Port

The integrated lubrication fitting allows quick, simple and easy access to regrease the ball screw. In the event the rear is inaccessible the port can be located in the center of the extrusion (optional) The result is reduced down time for product maintenance yielding a higher ROI and a longer product life.

Piston Rod Support Bearing & Protection

The extra long cylinder rod bearing allows high lateral load forces. A wiper ring prevents the ingress of external contamination under normal conditions. In the event of fine dust, a high amount of dirt as well as muds and liquids, special sealing is required, which is available on request.

Sensors

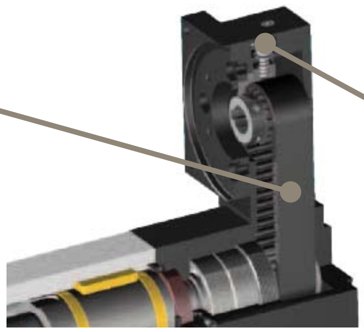
The sensors are directly integrated into the profile; avoiding projecting edges. Cabling is neatly hidden under the yellow cover (fitting sensors available as accessories).

Permanent magnet

All electro cylinders are equipped with several permanent magnets integrated into the screw nut. The permanent magnets actuate the sensors, which can be mounted in the longitudinal grooves of the cylinder body.

Toothed belt transmission

The slip and wear free toothed belt transmission for parallel drive cylinders (motor mounted parallel to the cylinder) features a high efficiency and a transmission ratio of 1:1.



Belt tensioning device

A sophisticated belt tensioning device for parallel motor mounting allows the toothed belt to be pre tensioned precisely.

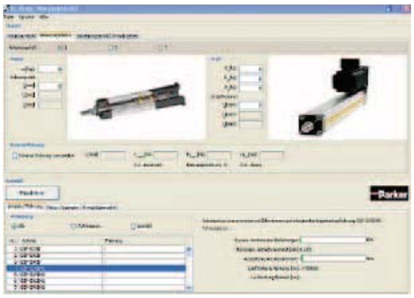
Cylinder size type		Unit	ETH100 M10	ETH100 M20	ETH125[3)] M10	ETH125[3)] M20
Screw lead		[mm]	10	20	10	20
Screw diameter		[mm]	50		63	
Travels, speeds and accelerations						
Available strokes [1) 2)]		[mm]	continuous from 100-2000 & standard strokes		continuous from 100-2000 & standard strokes	
Max. permissible speed at stroke =						
100-400 mm		[mm/s]	400	800	417	833
500 mm		[mm/s]	400	747	417	807
600 mm		[mm/s]	333	622	395	684
800 mm		[mm/s]	241	457	290	514
1000 mm		[mm/s]	185	354	224	405
1200 mm		[mm/s]	148	284	180	329
1400 mm		[mm/s]	122	235	148	275
1600 mm		[mm/s]	102	198	125	234
2000 mm		[mm/s]	76	148	94	170
Max. Acceleration		[m/s^2]	8	10	8	10
Forces						
Max. axial traction/thrust force motor inline		[N]	54 800	56 000	88 700	114 000
Max. axial traction/thrust force depending on the motor speed n Motor parallel	n < 100 min^{-1}	[N]		50 800	76 300	81 400
	100 < n < 300 min^{-1}	[N]		43 200		73 700
	n > 300 min^{-1}	[N]		35 600		61 000
Equivalent dynamic axial force at a lifetime of 2500 km		[N]	18 410	27 100	27 140	49 600
Max. transmissible torque / force constant						
Max. transmissible torque inline motor		[Nm]	100	200	150	400
Max. transmissible torque depending on the motor speed n Motor parallel	n < 100 min^{-1}	[Nm]	108	200		320
	100 < n < 300 min^{-1}	[Nm]		170		290
	n > 300 min^{-1}	[Nm]		140		240
Force constant motor inline [5)]		[N/Nm]	565	283	565	283
Force constant motor parallel [5)]		[N/Nm]	509	254	509	254
Weight						
Mass of base unit with zero stroke (incl. Cylinder rod)		[kg]	21	23	56	64
Mass of additional stroke (incl. Cylinder rod)		[kg/m]	39		62	
Weight of cylinder rod with zero stroke		[kg]	1.2		2.9	
Weight of cylinder rod - additional length		[kg/m]	7.8		14.4	
Mass moments of inertia						
Motor parallel without stroke		[kgmm^2]	5860	6240	17 050	17 990
Motor inline without stroke		[kgmm^2]	2240	2620	12 960	13 400
Parallel/inline motor per meter		[kgmm^2/m]	4270	4710	10 070	10 490
Accuracy: Bidirectional Repeatability (ISO230-2)						
Motor inline		[mm]	±0.03			
Motor parallel		[mm]	±0.05			
Efficiency						
Motor inline	the efficiency includes all friction torques	[%]	90			
Motor parallel		[%]	81			
Ambient conditions						
Operating Temperature		[°C]	-10...+70			
Ambient temperature		[°C]	-10...+40			
Storage temperature		[°C]	-20...+40			
Humidity		[%]	0...95 % (non-condensing)			
Elevation (Max.)		[m]	max. 3000			

[1)] "Order Code" (page 52), [2)] Intermediate stroke lengths may be interpolated.
[3)] ATEX on request, [5)] The efficiency factors are included in the force constants.

Technical Data apply under normal conditions and only for the individual operating and load modes. In the case of compound loads, it is necessary to verify in accordance with normal physical laws and technical standards whether individual ratings should be reduced. In case of doubt please contact Parker.

Step by Step Selection Process

The following sizing steps help you to find the suitable electric cylinder. Select an electric cylinder using estimated application data. Calculate the actually required application data following the dimensioning steps described below.
If your application's requirements exceed a maximum value, please choose a larger electro cylinder and recheck the maximum values. Perhaps, a smaller electric cylinder can also meet the requirements.

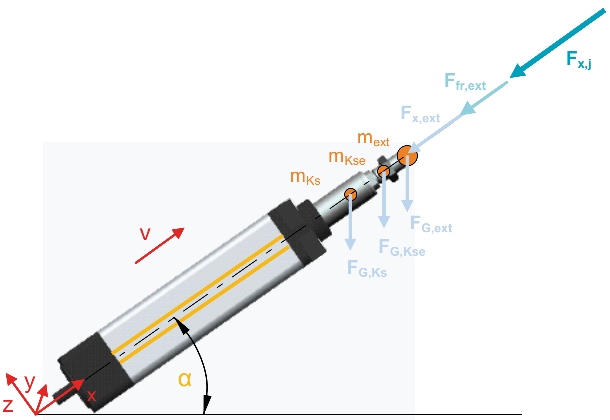


Automated dimensioning with the help of the "EL Sizing Tool"
A dimensioning tool simplifies the dimensioning process. Download under: www.parkermotion.com/eth

Step	Application data	Selection	With the aid of ...
1	Accuracy, ambient conditions	Check the basic conditions for the use of the ETH in your application.	"Technical Characteristics" (page 8)
2	Required space	Check the space available in your application and choose the motor mounting option: inline or parallel.	"Dimensions" (page 21)
3	Axial forces	Calculation of the axial forces in the individual segments of the application cycle.	"Calculating Required Axial Force" (page 11)
4	Maximum force required	Determination of the maximum required axial force (traction and thrust force)	Determination of the maximum required axial force (page 12)
		Selection of the cylinder via the maximum axial traction/ thrust force (please use the characteristics of your desired motor mounting option: inline or parallel).	"Technical Characteristics" (page 8)
5	Maximum speed	Selection of the screw lead for the desired cylinder.	"Technical Characteristics" (page 8)
6	Maximum Acceleration	Please check if the maximum acceleration is sufficient.	"Technical Characteristics" (page 8)
7	Select stroke	Selection of the desired stroke: Determine required stroke from usable stroke and safety travels select the desired stroke from the list of standard strokes or, if the desired stroke is not listed: Define the length of the usable stroke in steps of one mm. Caution! Please respect the minimum and the maximum possible stroke	"Stroke, Usable Stroke and Safety Travel" (page 19) "Order Code" (page 52) "Technical Characteristics" (page 8)
8	Permissible thrust force taking the buckling risk into consideration	Check the maximum thrust force depending on the stroke and the mounting variant. Maybe your application can also be realized with a different mounting variant allowing to attain the maximum thrust force.	"Permissible Side Load" (page 17)
9	Service life	Determining the service life with the aid of an equivalent axial force, the operational environment (application factor) and the service life diagrams.	"Lifetime" (page 13)
10	Permissible side load	Determine the lateral forces of your application and compare them to the permissible lateral forces (depending on the stroke).	Side load (page 17) Diagrams (page 17)
11	Relubricating cycle	Please check, if the required relubricating cycle is suitable for your production environment.	"Relubrication" (page 20)
12	Motor / gearbox	Calculation of the necessary torque to generate the required force at the ETH. Selection of a suitable motor.	"Motor and Gearbox Selection" (page 25)
13	Motor mounting flange	Selection of a suitable motor mounting flange.	"Motor Mounting Options" (page 22)
14	Mounting type	Selection of the electro cylinder mounting method.	"Mounting Methods" (page 26)
15	Cylinder rods	Selection of the cylinder rod end for load mounting.	"Cylinder Rod Version" (page 32)

Calculating Required Axial Force

Formulas 1 & 2 below give the mathematical equation for calculating the thrust required to extend or retract the piston rod.
With the aid of the axial forces, it is possible to check if the electro cylinder is able to provide the required forces and if the maximum buckling load is respected. The axial forces are also used as the calculation basis for the service life.



Service loading

Formula symbols (Formula 1-2)

$F_{x,a,j}$	=	Axial forces during extension in N
$F_{x,e,j}$	=	Axial forces during retraction in N
$F_{x,ext}$	=	External axial force in N
$F_{G,ext}$	=	Weight force caused by an additional mass in N
$F_{G,Kse}$	=	Weight force caused by the cylinder rod end in N
$F_{G,Ks}$	=	Weight force caused by the cylinder rod in N
m_{ext}	=	Additional mass in kg
m_{Kse}	=	Mass of the cylinder rod end in kg (see "Cylinder Rod Version" page 32)
$m_{Ks,0}$	=	Mass of the cylinder rod at zero stroke in kg (see table "Technical Data" page 8)
$m_{KS,stroke}$	=	Mass of the cylinder rod per mm of stroke in kg (see table "Technical Data" page 8)
Stroke	=	Selected stroke in m
$a_{K,j}$	=	Acceleration at the cylinder rod in m/s²
α	=	Alignment angle in °
$F_{x,max}$	=	Maximum permissible axial force in N
$F_{fr,ext}$	=	External friction force in N

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

Calculation of axial forces

Determine the axial forces occurring during each individual segment of the application cycle.

Cylinder rod extending:

$$F_{x,a,j} = F_{x,ext} + F_{fr,ext} + (m_{ext} + m_{Kse} + m_{Ks,0} + m_{Ks,Stroke} \bullet \text{Stroke}) \bullet (a_{K,j} + \sin\alpha \bullet 9.81\frac{m}{s^2})$$

Formula 1

Cylinder rod retracting:

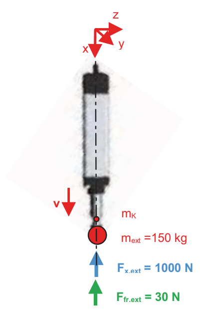
$$F_{x,e,j} = F_{x,ext} - F_{fr,ext} + (m_{ext} + m_{Kse} + m_{Ks,0} + m_{Ks,Stroke} \bullet \text{Stroke}) \bullet (-a_{K,j} + \sin\alpha \bullet 9.81\frac{m}{s^2})$$

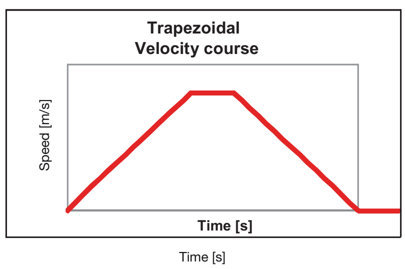
Formula 2

Sample calculation:

<u>Vertical mounting</u>

- ETH050
- 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°
- External friction force = 30 N





Thrust rod moving forth: Mass is moved downwards

Load case: Acceleration

$$F_{x,a,1} = 1000N + 30N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m}\cdot 0{,}5m\right)\cdot\left(4\frac{m}{s^2} + \sin(-90°)\cdot 9{,}81\frac{m}{s^2}\right) = 151N$$

Load case: Constant Velocity

$$F_{x,a,2} = 1000N + 30N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m}\cdot 0{,}5m\right)\cdot\left(0\frac{m}{s^2} + \sin(-90°)\cdot 9{,}81\frac{m}{s^2}\right) = -454N$$

Load case: Deceleration

$$F_{x,a,3} = 1000N + 30N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m}\cdot 0{,}5m\right)\cdot\left(-4\frac{m}{s^2} + \sin(-90°)\cdot 9{,}81\frac{m}{s^2}\right) = -1058N$$

Thrust rod moving back: Mass is moved upwards

Load case: Acceleration

$$F_{x,e,4} = 1000N - 30N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m}\cdot 0{,}5m\right)\cdot\left(-4\frac{m}{s^2} + \sin(-90°)\cdot 9{,}81\frac{m}{s^2}\right) = -1118N$$

Load case: Constant Velocity

$$F_{x,e,5} = 1000N - 30N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m}\cdot 0{,}5m\right)\cdot\left(0\frac{m}{s^2} + \sin(-90°)\cdot 9{,}81\frac{m}{s^2}\right) = -514N$$

Load case: Deceleration

$$F_{x,e,6} = 1000N - 30N + \left(150kg + 0{,}15kg + 0{,}15kg + 1{,}85\frac{kg}{m}\cdot 0{,}5m\right)\cdot\left(4\frac{m}{s^2} + \sin(-90°)\cdot 9{,}81\frac{m}{s^2}\right) = 91N$$

Selection of the Size and Screw Lead

Required maximum axial force

Determine the maximum axial force (page 11) that the electro cylinder must provide.

Preselection of the electro cylinder

Using the calculated force required, compare the actual electro cylinder specifications (page 8) to determine which profile size will produce enough force.
Once you have determined a profile size, determine that the unit will physically fit in the space allowed by the application (including parallel or inline motor mounts).

Required maximum velocity

The maximum velocity of the electro cylinder depends on the stroke.
With the profile size selected, refer to the critical speed information (page 8) to determine which screw lead works best for the application at the needed stroke length.
When the precise stroke is defined, the velocity must again be verified.

Required maximum acceleration

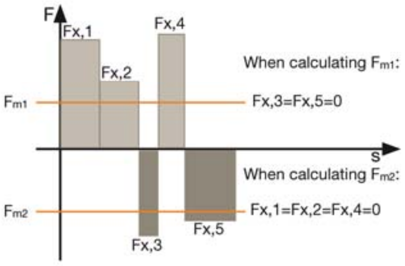
The maximum acceleration depends on the screw lead and serves as an additional selection criterion for the suitable electro cylinder. It is listed in the "Technical Data" (page 8).

Service Life

Nominal service life[1, 2]

The nominal service life of the electro cylinder can be determined with the aid of the diagrams page 14.
The forces calculated for each individual segment of the application cycle must be summarized into an equivalent axial force Fm "Calculating Required Axial Force" (page 11). If axial forces with different signs apply, two equivalent axial forces must be calculated:

- F_{m1} for all positive forces. The negative forces will convert to zero.
- F_{m2} for all negative forces. The positive forces will convert to zero.



Calculation

$$\boxed{F_{m1,2} = \sqrt[3]{\frac{1}{s_{total}} (F^3_{x,1} \bullet s_1 + F^3_{x,2} \bullet s_2 + F^3_{x,3} \bullet s_3 + \ldots)}}$$

Formula 3

With the equivalent axial forces, the nominal service life L in km can be read off the diagrams on page 14.

With **load on both sides**, the nominal service life is:

$$\boxed{L = (L_1^{-1.11} + L_2^{-1.11})^{-0.9}}$$

Formula 3.1

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 or critical side loads into consideration. These effects can however be estimated with the aid of the application factor fw.

The actual service life is calculated as follows:

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

Formula 4

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[3] (short stroke applications)	1.8	2.1	2.5	3.0

[3]After max. 10 000 movement cycles, a lubrication run must be performed (see lubrication run intervals for short stroke applications).

Boundary conditions for application factor f_w:

- Externally guided electro cylinders
- Accelerations <10 m/s²

If your application factor is <1.5, please contact Parker.
The same applies for detailed calculations or for special boundary conditions.

Lubrication run lengths for short stroke applications

	ETH100		ETH125	
	M10	M20	M10	M20
Lengths of lubrication runs [mm]	>102	>140	>122	>210

Abbreviations used (formula 3-4)

F_m = Equivalent axial force in N
$F_{x,j}$ = Resulting axial force in N (see formula 1 & formula 2, page 11
s_j = Travel given a defined force $F_{x,a,j}$ in mm
s_{total} = Total travel in mm
L = Nominal service life in km (see "Service Life" diagrams page 14
L_{fw} = Service life respecting the application factor in km
f_w = Application factor (see table "Application factor" page 13

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

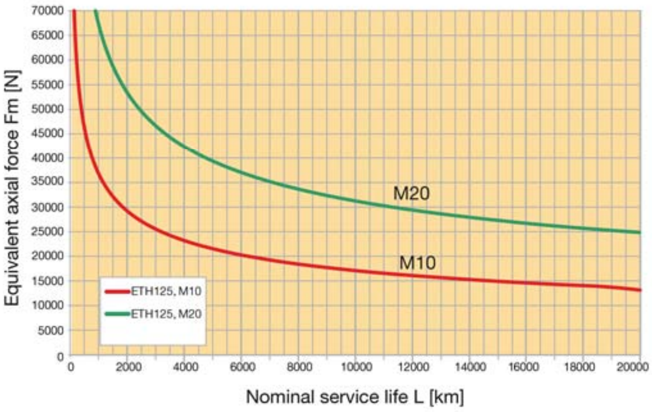
If you need the service life as the number of possible cycles, just divide the service life in kilometers by twice the stroke traveled. i.e. Standstill times are not taken into consideration when determining the equivalent axial force (F_m), as s_j=0. Caution, do always consider the stroke as well as the return stroke.

[1]The nominal service life is the service life reached by 90 % of a sufficient number of similar electro cylinders until the first signs of material fatigue occur.
[2] ATEX cylinders feature a reduced the service life. Please note the brochure on "intended use" (192-550004).

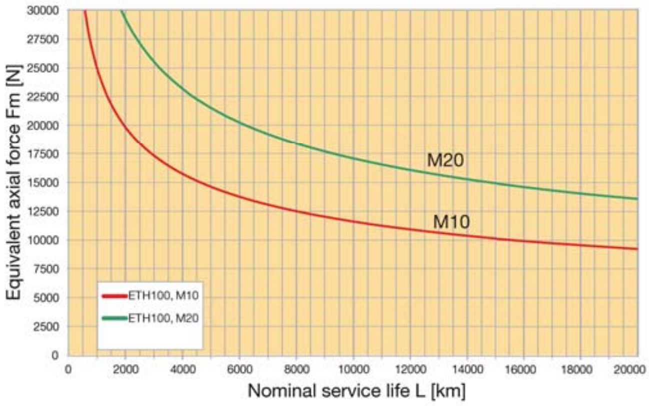
Diagrams [2]

The given values apply when adhering to the recommended lubrication intervals (see relubrication). The diagrams were established in accordance with DIN ISO 3408-5

ETH125



ETH100



Prerequisites for nominal service life

- 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.
- No external side loads
- Application factor fw = 1. In order to calculate the real service life and the corresponding application factor, please refer to chapter "Service Life" see page 13
- No high exploitation of several power features at a time (for example maximum speed or thrust force).
- No regulating oscillation at standstill.

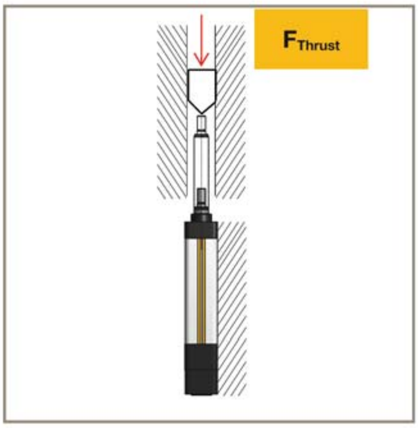
Permissible Axial Thrust Forces

Limited by the risk of buckling, depending on the stroke and the mounting method; traction forces do not pose any buckling risk.
Please check if the maximum axial force ((page 11)) is possible with the planned mounting method and for the desired stroke

Diagrams

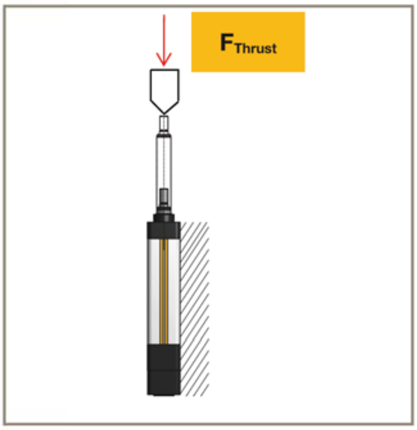
Case 1

Cylinders fixed with mounting flanges, foot mounting or mounting plates.
Cylinder always fixed at the front end as well.
Thrust rod with axial guiding.



Case 2

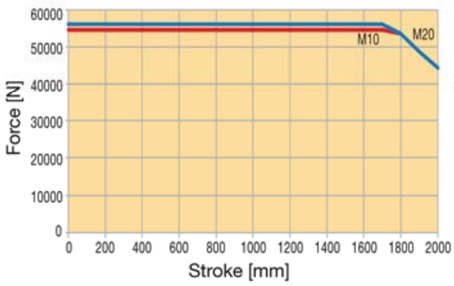
Cylinders fixed with mounting flanges, foot mounting or mounting plates.
Cylinder always fixed at the front end as well.
Thrust rod without axial guiding. External force applied axially with respect to cylinder axis.



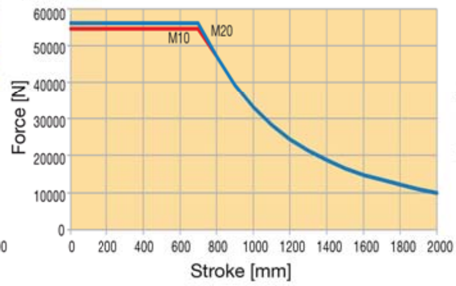
Case 3

Cylinder mounted with center trunnion, rear clevis or any other rear fixing material (e.g. rear mounting plate).
Thrust rod with axial guiding.

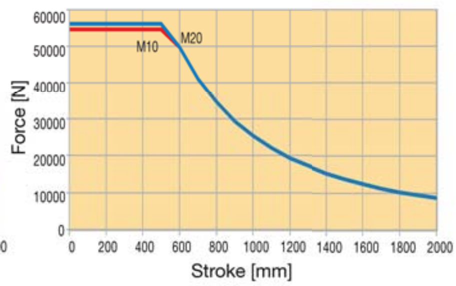
ETH100 - Case 1



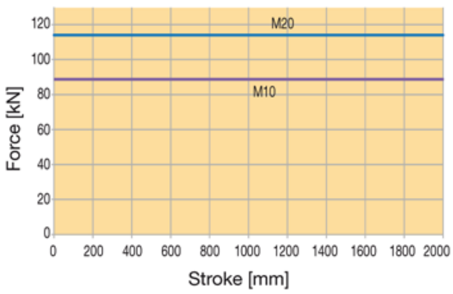
ETH100 - Case 2



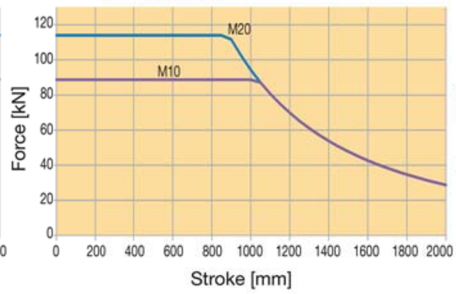
ETH100 - Case 3



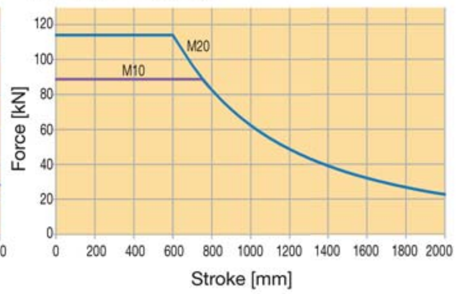
ETH125 - Case 1



ETH125 - Case 2



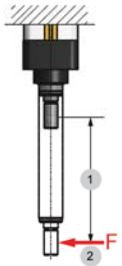
ETH125 - Case 3



Permissible Side Load 1)

The electro cylinder features a generously dimensioned cylinder rod and screw nut bearing in the form of high-quality plastic sliding elements to absorb the side load. Please note that electro 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.

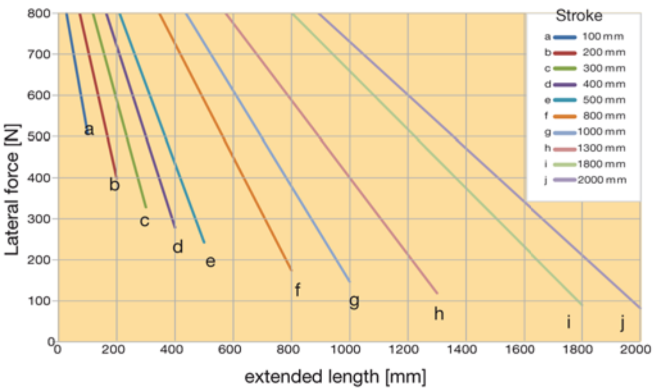
Permissible lateral forces in vertical mounting position



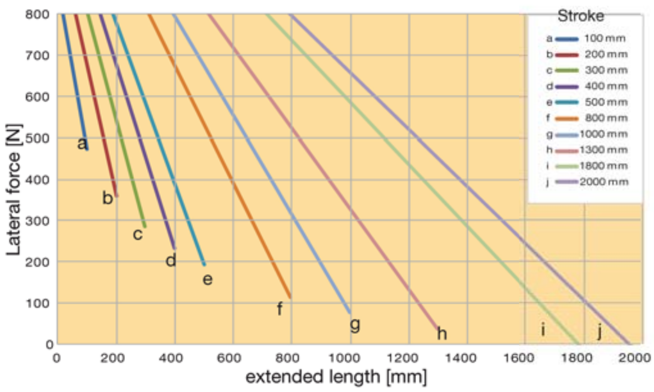
Permissible lateral forces in horizontal mounting position

1: Extended length
2: Force application - at the middle of the cylinder rod thread

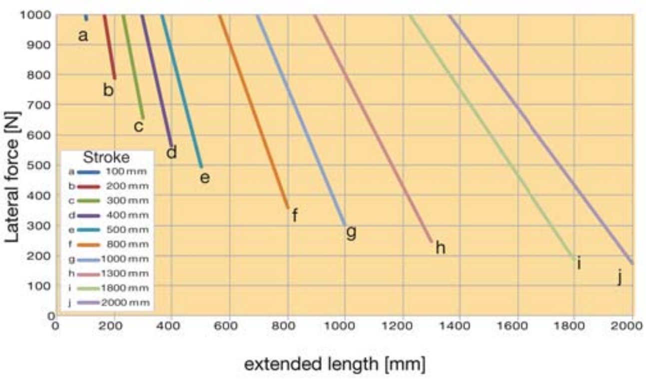
ETH100



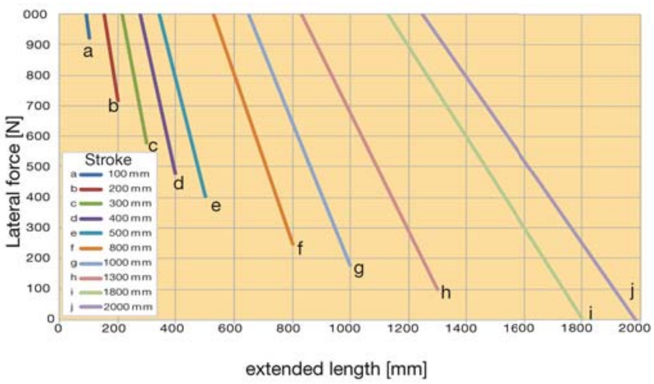
ETH100



ETH125



ETH125



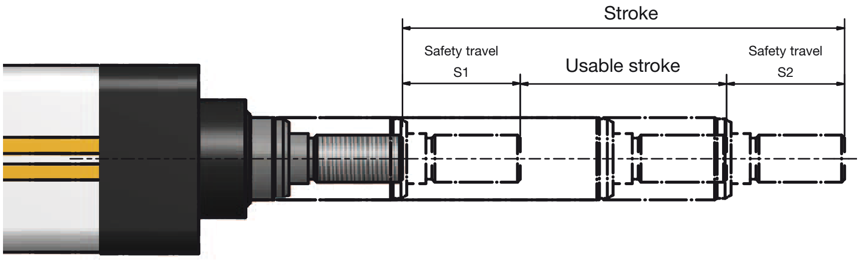
The diagrams apply for an ambient temperature of 20 °C, for all housing orientations and a medium travel speed of 0.25 m/s (ETH100, ETH125).

Stroke, Usable Stroke and Safety Travel

Calculation

Stroke:

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



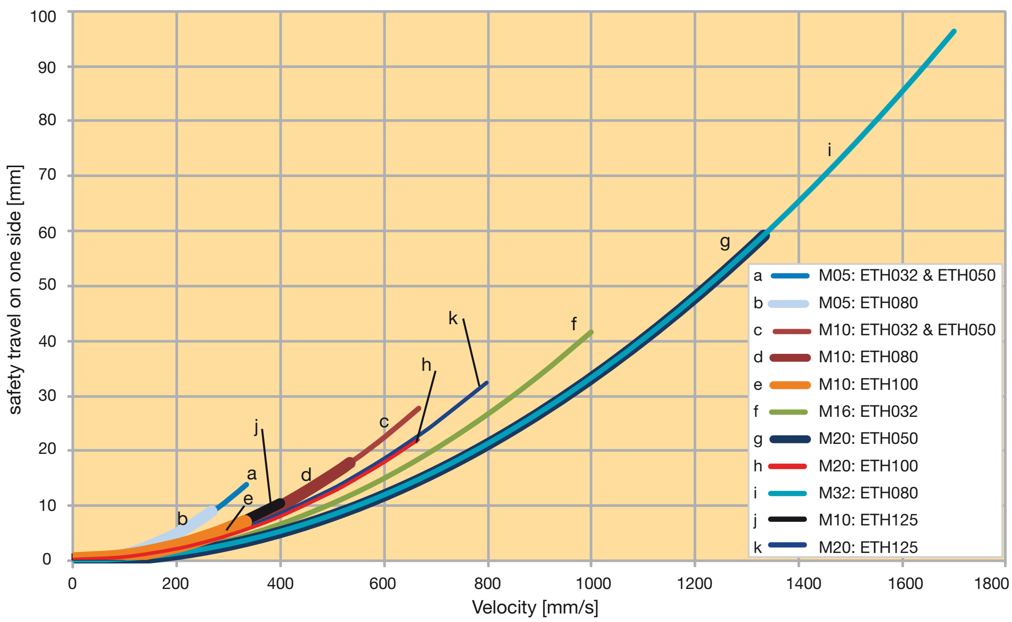
Usable stroke:

The usable stroke is the distance which you need to move in your 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).

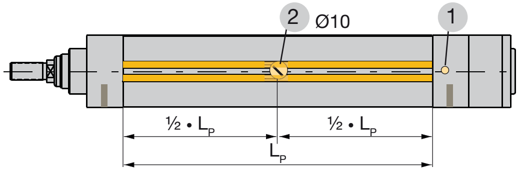
Diagram



Information: The safety travel taken from the diagram applies for one side. I.e. the diagram value must be multiplied by factor 2 in order to get the total safety travel. The diagram is based on the maximum screw acceleration / deceleration

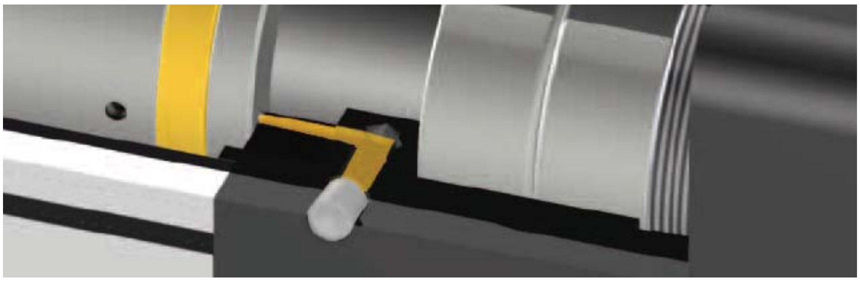
Relubrication

All frame sizes include a standard Easy lubrication port for lubricating the screw nut (designation "1" in the order code page 52).



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

Option 1: Central lubrication (standard)



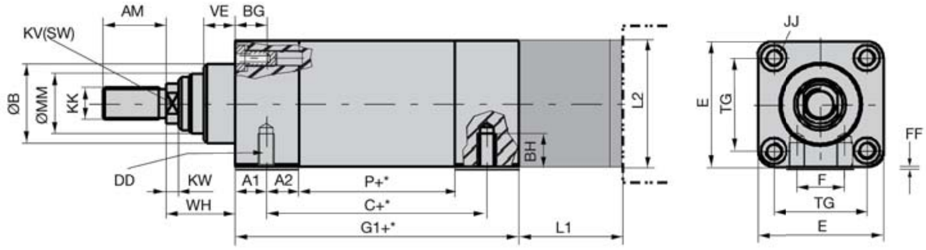
Relubrication is simple with the easy access port. Users simply perform a controlled retract of the cylinder approaching the end stop under slow speed and grease the cylinder. Central relubrification orientation is always envisaged in a 3 o'clock position.

Option 2...5: Middle lubrication via an opening in the profile

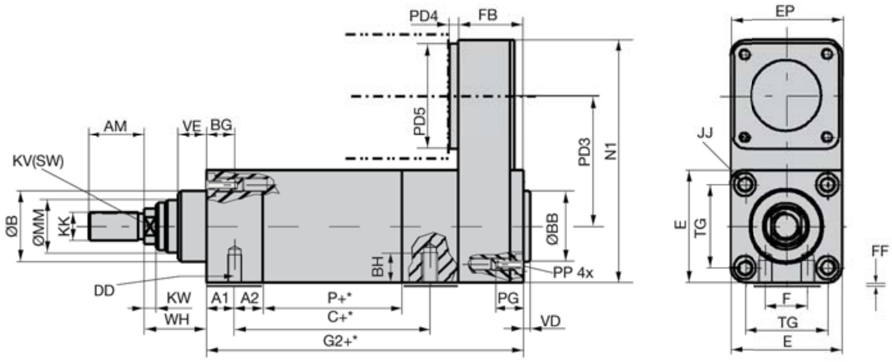
If a space constraint does not allow easy access to the standard lubrication port, other options in the part number configuration allow for a port at the center of the extrusion. Free access to this bore even after integration of the cylinder into a system can be ensured by choosing the corresponding profile orientation (see order code page 52). The bore is located exactly in the middle of the aluminum profile.

Dimensions

Electro Cylinder
prepared for inline motor mounting



Electro Cylinder
prepared for parallel motor mounting



+* =Measure + length of desired stroke

Dimensions Standard (IP-Version)

Cylinder size	Unit	ETH100		ETH125	
Screw lead		M10	M20	M10	M20
C	[mm]	- 2)		- 2)	
G1	[mm]	323 (349.5)	361 (387.5)	461 (487.5)	549 (575.5)
G2	[mm]	451 (478.0)	489 (516.0)	624 (651.0)	712 (739.0)
P	[mm]	162	200	192	280
A1	[mm]	- 2)		- 2)	
A2	[mm]	- 2)		-2)	
AM	[mm]	70		96	
BG (=BN+BS)	[mm]	32		44	
BN Usable length of thread	[mm]	22		33	
BS Depth of width across flat (without thread)	[mm]	10		11	
BH	[mm]	- 2)		-2)	
DD mount thread [1]	[mm]	- 2)		-2)	
E	[mm]	120		150	
EP		175		220	
F	[mm]	- 2)		-2)	
FF	[mm]	0		0	
JJ	[mm]	M16x2		M20x2.5	
PP	[mm]	M10x1.5		M20x2.5	
PG (Thread depth on the PA housing)	[mm]	BG (=BN+BS)		35	
KK	[mm]	M42x2		M48x2	
KV	[mm]	46		55	
ØMM h9	[mm]	70		85	
TG	[mm]	89		105	
KW	[mm]	10		10	
N1	[mm]	347		450	
FB	[mm]	128 (128.5)		163 (163.5)	
VD	[mm]	4		5	
ØBB	[mm]	90 d9		110 d8	
VE	[mm]	20		20	
WH	[mm]	51		53	
ØB	[mm]	90 d8		110 d8	

[2] ETH100, ETH125 does not have a mounting thread on the underside.

Note- For a full list of available motor pairings please contact our applications engineering department at 800-245-6903.

Motor and Gearbox 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")

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

$$M_{B,j} = \left(J_{i/p,0} + J_{i/p,Stroke} \bullet \text{Stroke}\right) \bullet \frac{1}{\eta_{ETH}} \bullet \underbrace{\frac{1}{i_G^{\,2} \bullet \eta_G} + J_G}_{\text{only with gearbox}} + J_M \Big) \bullet 10^{-3} \bullet \frac{6.28 \bullet a_{K,j}}{P_h}$$

Formula 5

The acceleration forces due to the translatory moved masses are taken into consideration in the calculation of the axial forces on (page 11).

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

$$M_{L,j} = \frac{F_{x,a/e,j}}{\text{Thrust force factor}} \bullet \underbrace{\frac{1}{i_G \bullet \eta_G}}_{\text{only with gearbox}}$$

Formula 6

The motor must therefore generate the following drive torques:

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

Formula 7

The **effective torque** can be deduced from the drive torques for all segments of the application cycle (formula 7):

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

Formula 8

Motor dimensioning

- The nominal torque of the motor must exceed the calculated effective torque (formula 8).
- The peak torque of the motor must exceed the maximum occurring drive torque (formula 7).

With the aid of the "motor mounting options" chart you can check if the respective motor is mechanically compatible to the corresponding electro cylinder.

Abbreviations used (formula 5-8)

$M_{B,j}$	= 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 "Technical Data" page 8
$J_{i/p,\ Stroke}$	= Red. rot. mass moment of inertia per mm of stroke for inline/parallel motor configuration in kgmm² see "Technical Data" page 8
Stroke	= Selected stroke in mm
η_{ETH}	= Efficiency of the electro cylinder 0.9 (inline drive configuration) 0.81 (parallel motor)
i_G	= Gearbox ratio
η_G	= Efficiency of the gearbox (see gearbox manufacturer specifications)
J_M	= Motor mass moment of inertia in kgmm² (see motor manufacturer specifications)
J_G	Gearbox mass moment of inertia in kgmm² (see gearbox 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 page 11
$M_{M,j}$	= 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

Force constant: "Technical Characteristics" see page 8.
Index "j" for the individual segments of the application cycle

Mounting Methods

Please respect the notes in the ETH Manual (19x-550002) on the permissible screws and tightening torques.

Standard

Order code

F

ETH032-ETH125

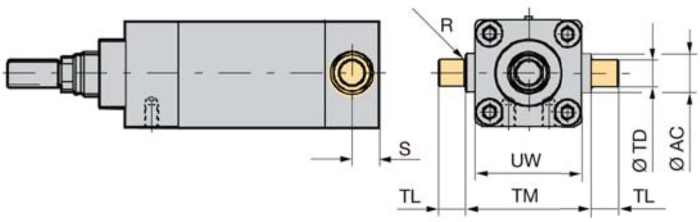
Example for parallel motor configuration

Mounting via thread on the cylinder front or end side with parallel motor configuration (ETH032-ETH125).
("Dimensions" see page 21)

Center Trunnion Mounting

Order code

D



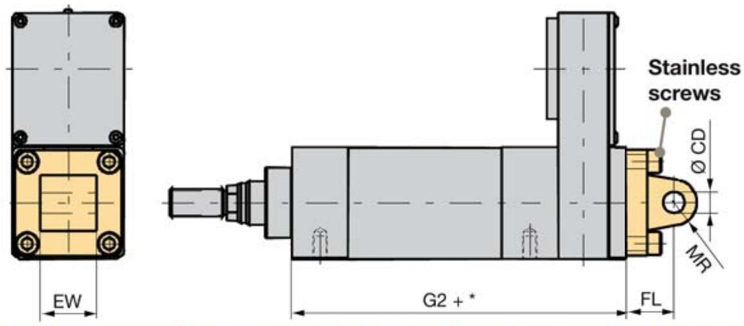
	UW	ØTD (h8)	R	TL	TM	ØAC	S
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETH100	120	40	4	40	140	70	57
ETH125	150	50	10	52	160	90	100

+" = Measure + Length of desired stroke ("Dimensions" see page 21).
Note: For relubrication option "1" (central lubrication port) please see mounting method with option "D" center trunnion always on 6 o'clock!

Rear Eye Mounting

Order code

E



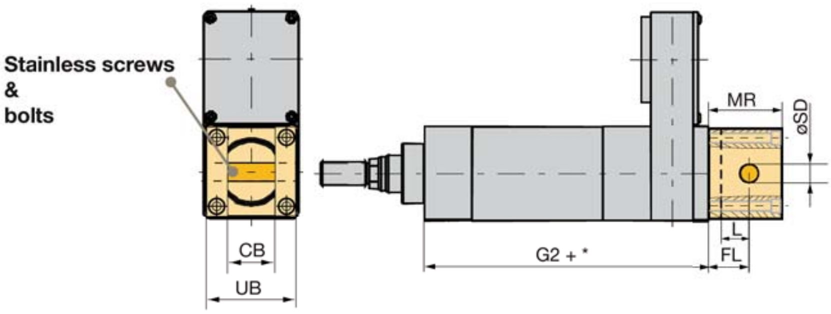
	Order no.	EW	ØCD	MR	FL ±0.2
		[mm]	[mm]	[mm]	[mm]
ETH100	0142.033	60	$30^{+0.085}_{-0.010}$	35	80
ETH125	0152.033	70	$50^{+0.110}_{-0.010}$	45	115

+* = Measure + Length of desired stroke ("Dimensions" see page 21).
Listed in the order code of the cylinder; the order number applies only for ordering spare parts.
Spare parts delivery is including screws for cylinder mounting.

Rear Clevis

Order code

C



	Order no.	UB	CB	ØSD	MR	L	FL ±0.2
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETH100	0142.031	120	60.5	30 f7	100	40	65
ETH125	0152.031	150	70.5	50 f7	145	55	90

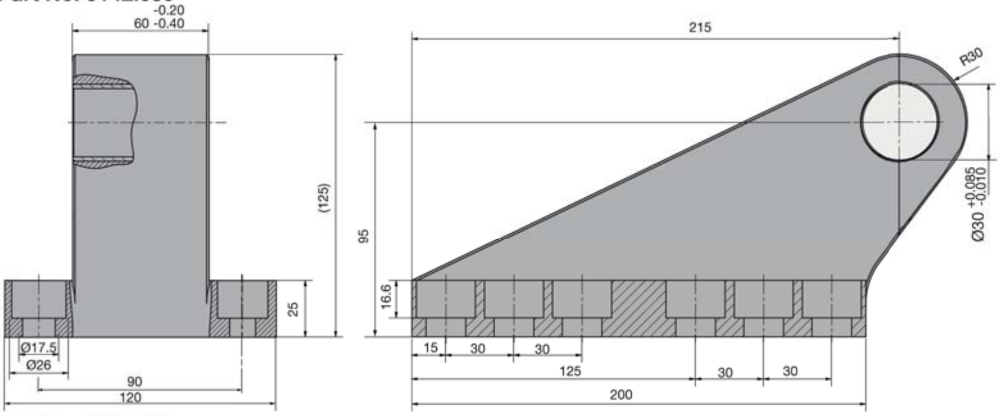
+* = Measure + length of desired stroke ("Dimensions" see page 21).
Listed in the order code of the cylinder; the order number applies only for ordering spare parts. Spare parts delivery is including screws for cylinder mounting.

Bearing Block

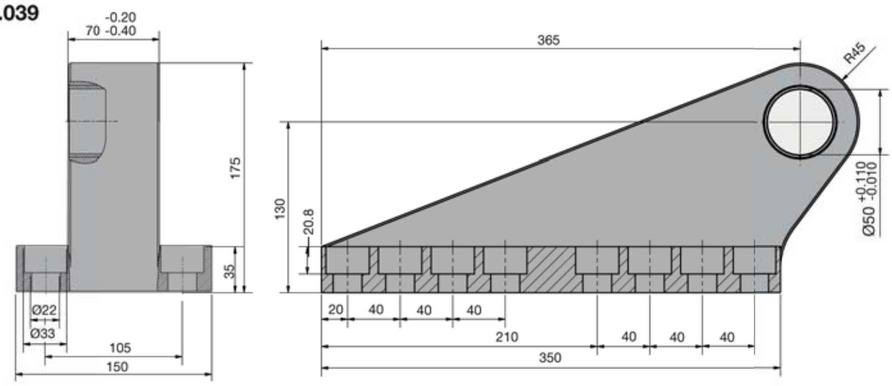
Counter piece of rear clevis. Please order separately with order no., if required

Dimensions [mm]

Bearing block for ETH100, Part No. 0142.039



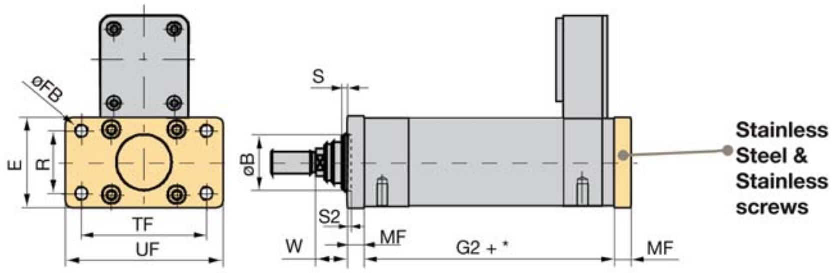
Bearing block for ETH125, Part No. 0152.039



Rear Plate

Order code

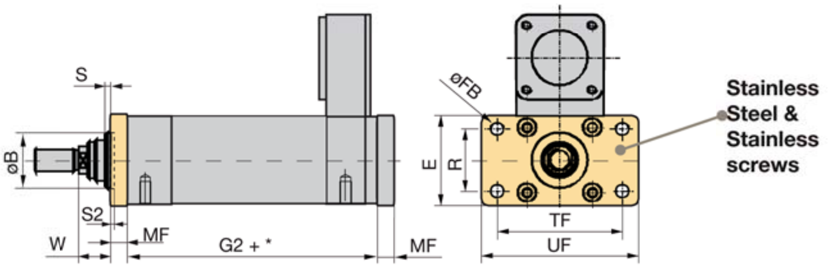
H



Front Plate

Order code

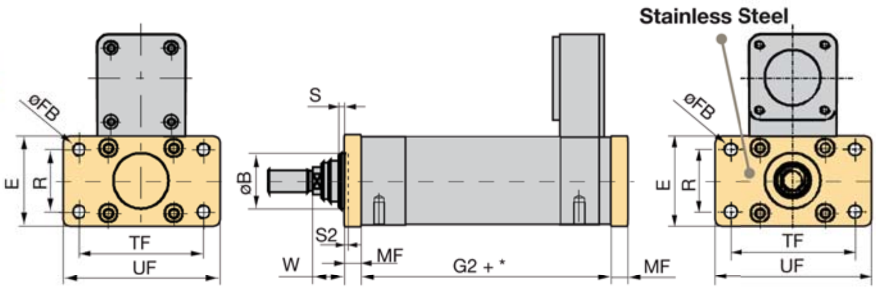
J



Front and Rear Plate

Order code

N



End plate (H) and front plate (J) dimensions

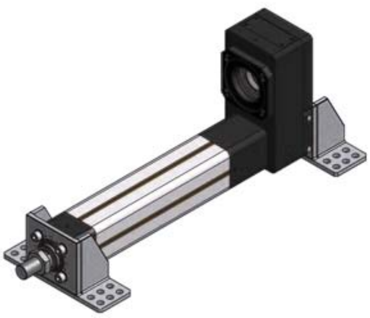
	Order no. (1 piece)	UF	E	TF	ØFB	R	W	MF	ØB Rear Plate	ØB Front plate	S	S2
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETH100	0142.918	258	120	220	17.5	80	26	25	90		-	5
ETH125	0152.918	320	150	270	21.5	100	13	40	110		-	20

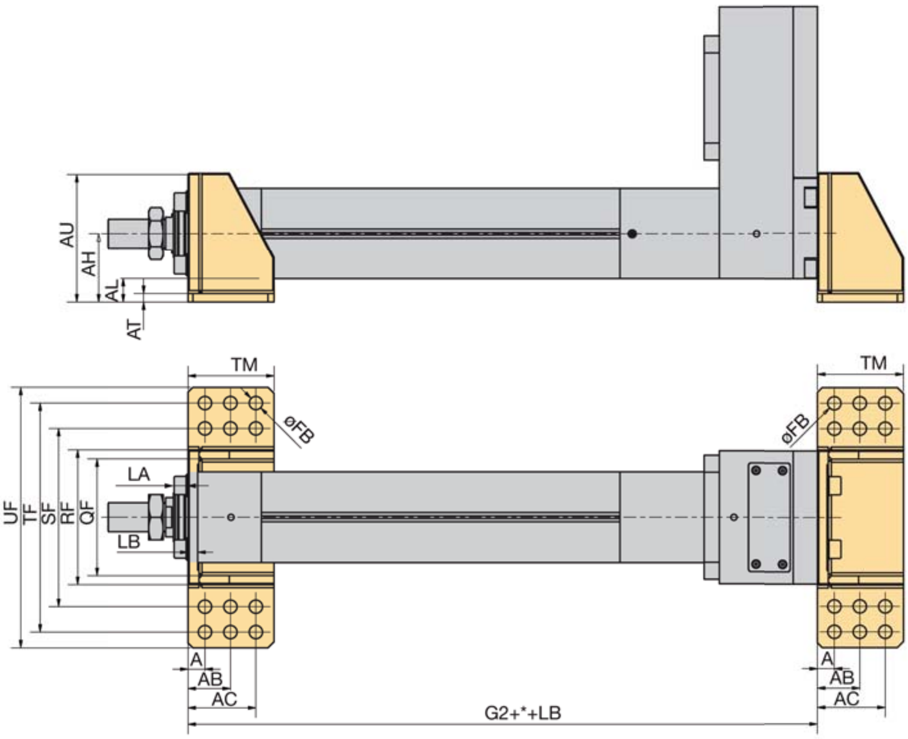
+* = Measure + Length of desired stroke ("Dimensions" see page 21).
Listed in the order code of the cylinder; the order number applies only for ordering spare parts.
Please note that front and rear plate as spare parts must be ordered separately.
Spare parts delivery is including screws for cylinder mounting.
Stainless components only available for ETH100.

Foot Mounting

Order code

B





	Order no. Front & Terminal bracket	AU	AH	AL	AT	UF	TF	SF	RF	QF	LA	LB	ØFB	TM	A	AB	AC
		[mm]															
ETH100	0142.916	164	94	34	14	290	-	246	200	170	19	13	17.5	99	16.5	49.5	81.5
ETH125	0152.916	214	114	39	14	430	378	294	223	193	23	16	22	142	28	70	112

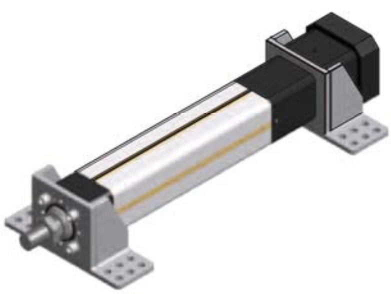
+* = Measure + Length of desired stroke ("Dimensions" see page 21).
Listed in the order code of the cylinder; the order number applies only for ordering spare parts. Spare parts delivery is including screws for cylinder mounting.

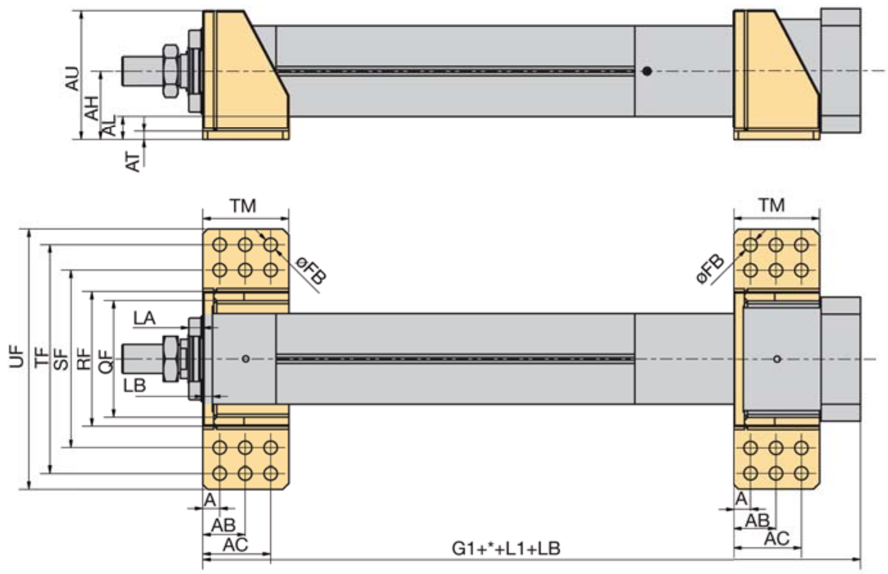
* For protection classes "B" and "C", we recommend GEOMET® coated screws (thin layer corrosion protection).

Mounting Flanges

Order code

G





	Order no.	AU	AH	AL	AT	UF	TF	SF	RF	QF	LA	LB	ØFB	TM	A	AB	AC
		[mm]															
ETH100	- 1)	164	94	34	14	290	-	246	200	170	19	13	17.5	99	16.5	49.5	81.5
ETH125	- 1)	214	114	39	14	430	378	294	223	193	23	16	22	142	28	70	112

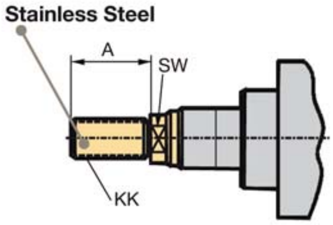
+* = Measure + Length of desired stroke ("Dimensions" see page 21).
Listed in the order code of the cylinder; the order number applies only for ordering spare parts (of ETH032-ETH080 only). Spare parts delivery is including screws for cylinder mounting.
1) Subsequent conversion can only be made in our factory.

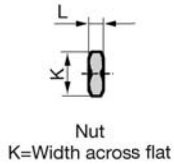
* For protection classes "B" and "C", we recommend GEOMET® coated screws (thin layer corrosion protection).

Cylinder Rod Version

External thread

Order code
M





External Thread (upon delivery)				
	Weight	**A**	**KK**	**SW[1)]**
	[kg]	[mm]	[mm]	[mm]
ETH100	2.4	70	M42x2	46
ETH125	3.7	96	M48x2	55

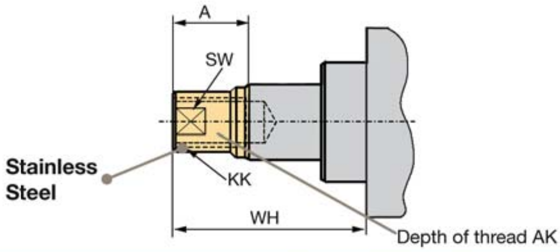
[1)] SW: Width across flat (position of the flat is not fixed)

Nut				
	Weight	**M**	**L**	**K[1)]**
	[kg]	[mm]	[mm]	[mm]
ETH100	0.27	M42x2	16	65
ETH125	0.60	M48x2	24	75

[1)] K: Width across flat
The nut is included in the delivery.

Internal Thread

Order code
F



Order code
K

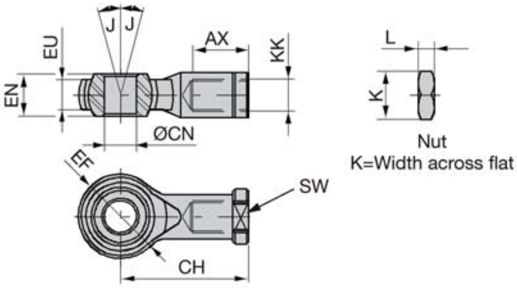
Internal Thread							
	Weight	**A**	**KK** (Option F)	**KK** (Option K)	**AK**	**WH**	**SW[1)]**
	[kg]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETH100	2.2	60	M42x2	M45x3	50	92	60
ETH125	4.3	90	M48x2	M45x3	60	123	70

[1)] SW: Width across flat (position of the flat is not fixed)

Spherical Rod Eye

Order code

S



	Order no.		Weight	KK	SW[1)]	ØCN	EN	EU	AX	CH	ØEF	J	K	L
	Standard	Stainless												
			[kg]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[°]	[mm]	[mm]
ETH100	0142.920-01	0142.920-02	2.8	M42x2	60	40 H7	49	7	60	142	90	16	65	15
ETH125	0152.920-01	not available	5.0	M48x2	65	50 H7	60	45	65	160	116	14	75	24

Listed in the order code of the cylinder; the order number applies only for ordering spare parts. Prerequisite is a cylinder rod with external thread.
[1)] SW: Width across flat (position of the flat is not fixed)

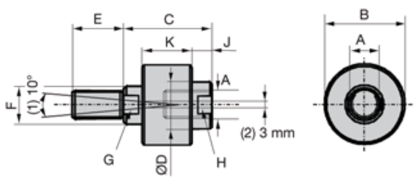
Alignment Coupler

Order code

L

For mounting at the extremity of the cylinder rod

- Balances misalignments
- Enlarges the mounting tolerance
- Simplifies the cylinder mounting
- Increases the service life of the cylinder guidings
- Compensates the offset between components and relieves the guiding from lateral force influences
- The traction/thrust force bearing capacity remains



(1): Angle offset
(2): Axial offset
E: Hole dimension for depth

	Part No.	Weight	A	B	C	ØD	E	F	G	H	J	K
		[kg]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
ETH100	-[1)]	4.5	M39x2[2)]	101.6	111.1	57.2	57.2	44.5	38	49	22.2	69.9
ETH125	0152.921	9.0	M48x2	127	142.9	76.2	76.2	57.2	49.3	67	35	85.8

Listed in the order code of the cylinder; the order number applies only for ordering spare parts. Prerequisite is a cylinder rod with external thread.
Only available in protection option A (IP54 with galvanized screws).
[1)]Subsequent conversion from rod end can only be made in our factory.
[2)] Attention: Thread M39x2 differs from the standard (M42x2).

Accessories

Force sensors[1] - Joint head with integrated force sensor with optional joint head

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 the 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 sized to pick up traction/thrust forces.

Features

- Measuring range: Traction/thrust forces up to ±114 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

Connection of the force sensors to Compax3 with Option M21 is possible.

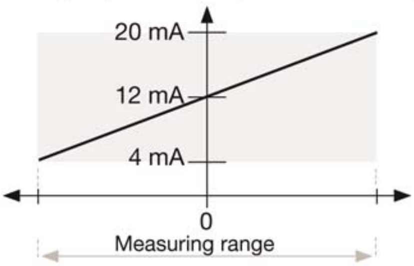
Technical Features

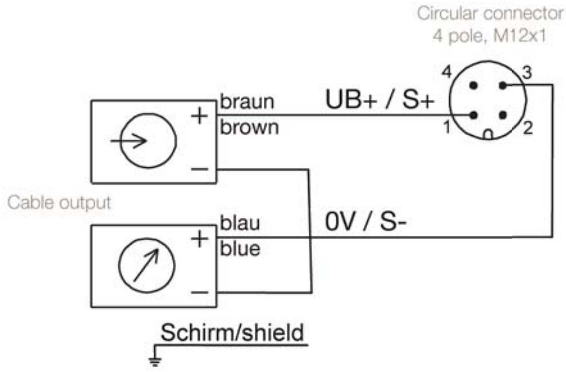
		With External Thread		
	Unit	**ETH100**	**ETH125**	
		M10/M20	M10	M20
Accuracy	[%]	1		
Material	-	Stainless steel		
Protection class	-	IP67		
Measuring range	[kN]	±56.0	±88.7	±114.0
Accuracy	[N]	1120	1774	2280
Part No.	-	0141.916	0141.917	0141.918

For ETH100, ETH125: Only possible with cylinder rod end "K".
A subsequent conversion from another rod end to M or K is generally **NOT** possible.

Electrical connection

Power supply UB = 10...30 VDC
Analog output 4...20 mA (two-wire technology)



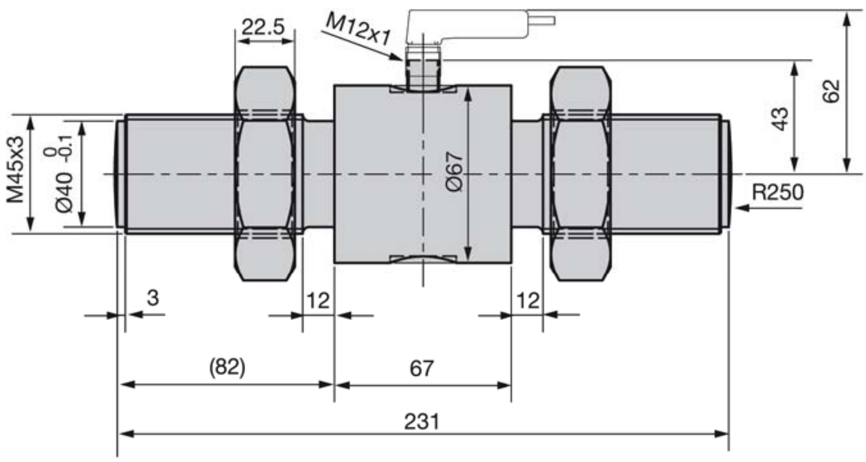


Part No.	Cable for force sensor
080-900446	Force sensor cable (PUR), straight connector, M12 with flying leads, 2 m
080-900447	Force sensor cable (PUR), straight connector, M12 with flying leads, 5 m
080-900456	Force sensor cable (PUR), angle connector, M12 with flying leads, 2 m
080-900457	Force sensor cable (PUR), angle connector, M12 with flying leads, 5 m

[1]ATEX on request

Dimensions [mm]

Version for ETH100 & ETH125



Force sensors[1] - Rear clevis with force sensor

In some force measurement applications, a force sensor on the cylinder rod is not possible or will affect the application's scope. For this case, we developed a special variant of the ETH cylinder, where the force sensor is integrated into the rear end of the cylinder. The advantage is that the sensor cable does not move with the rod.
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 ±81.4 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

Connection of the force sensors to Compax3 with Option M21 is possible.

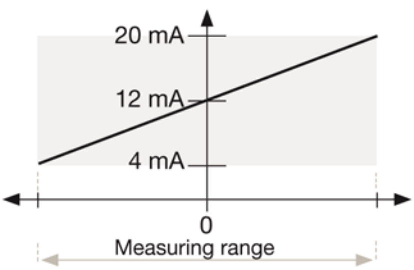
Technical Features

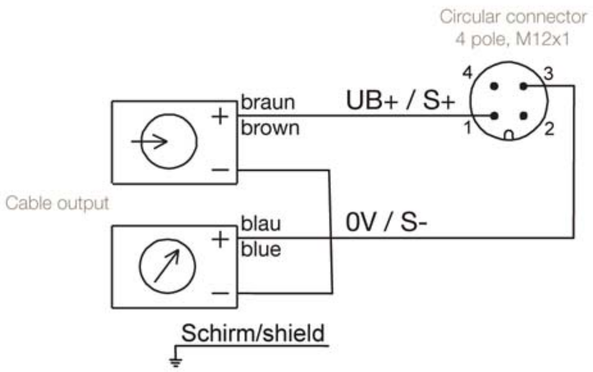
Rear clevis with force sensor for ETH...			
	Unit	ETH100	ETH125
		M10/M20	M10/M20
Accuracy	[%]	2	
Material	-	Stainless steel	
Protection class	-	IP67	
Measuring range	[kN]	±54.8	±81.4
Accuracy	[N]	2192	3256
Part No.	-	0142.034-01	0152.034-01

Only for parallel configuration and cylinders with "F" mounting option (mounting thread on the cylinder body)

Electrical connection

Power supply UB = 10...30 VDC
Analog output 4...20 mA (two-wire technology)

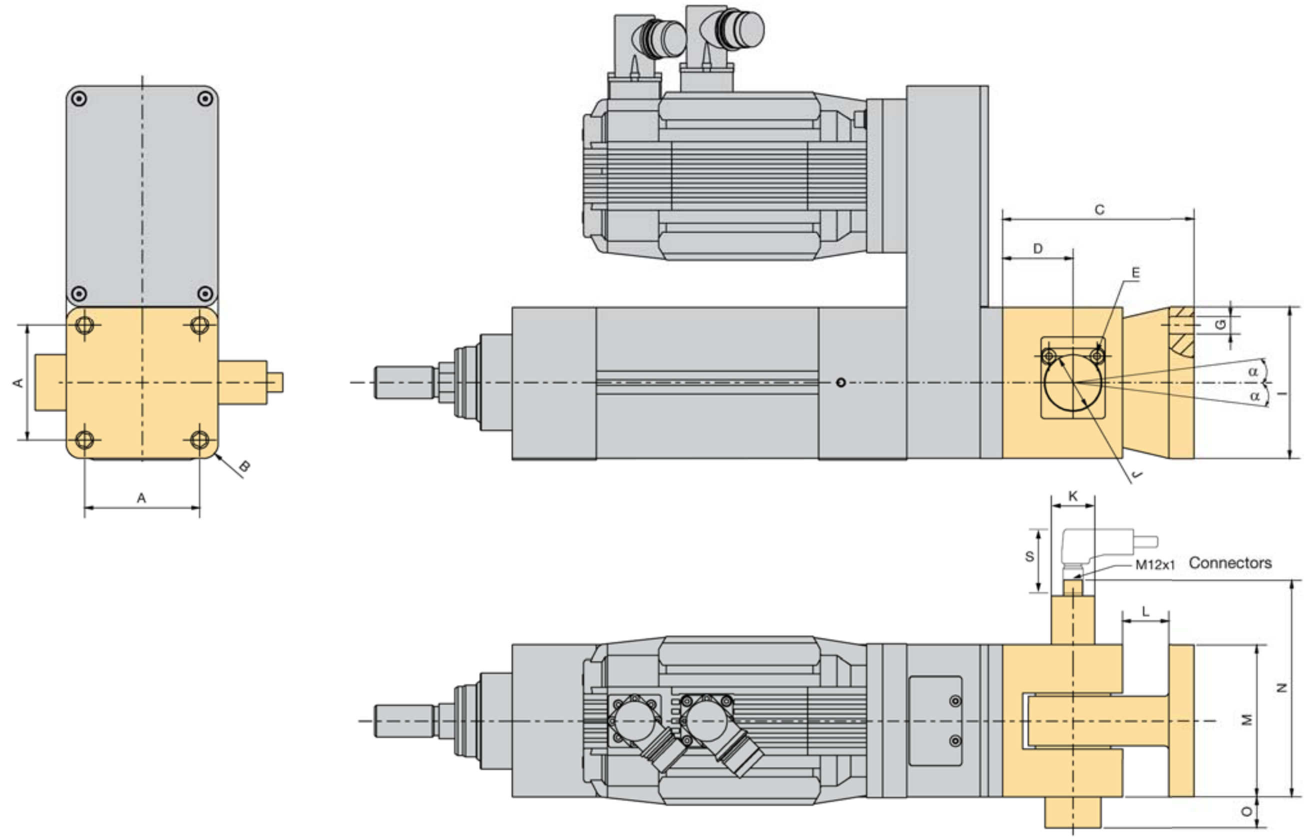




Part No.	Cable for force sensor
080-900446	Force sensor cable (PUR), straight connector, M12 with flying leads, 2 m
080-900447	Force sensor cable (PUR), straight connector, M12 with flying leads, 5 m
080-900456	Force sensor cable (PUR), angle connector, M12 with flying leads, 2 m
080-900457	Force sensor cable (PUR), angle connector, M12 with flying leads, 5 m

[1]ATEX on request

Version with fixing flange for ETH cylinder



Dimensions [mm]

Dimensions

	A	B	C	D	E[1]	G	I	ØJ	ØK	L	M	N	O	S	α
for ETH100	89	R12.5	166	70	SW6	17	120	50	27	30	120	160.8	4.2	19	±4°
for ETH125	105	R20	196	75	SW6	22	150	50	27	40	150	175.8	0	19	±4°

[1] SW: Width across flat
α: max. permissible deflection angle with reference to center axis

Please respect the notes in the ETH Manual (19x-550002) on the permissible screws and tightening torques.

Initiators / Limit Switches [1)]

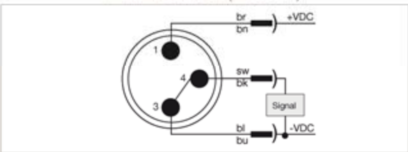
Sensors

The position sensors can be mounted in the longitudinal grooves of the cylinder body and are directly immersible in the profile; projecting edges are thus avoided. The initiator cable is hidden under the yellow cover. The permanent magnet integrated into the screw nut actuates the initiators. Fitting sensors available as accessories.

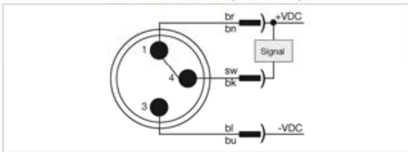
ETH032, ETH050 2 grooves each on 2 opposite sides.
ETH080, ETH100 2 grooves each on all sides.

The following initiator types are available for the ETH cylinder series:

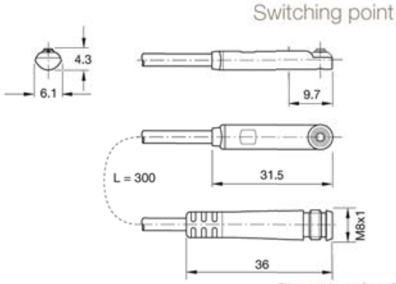
PNP Sensor (P8S-...)



NPN Sensor (P8S-...)



Switching point



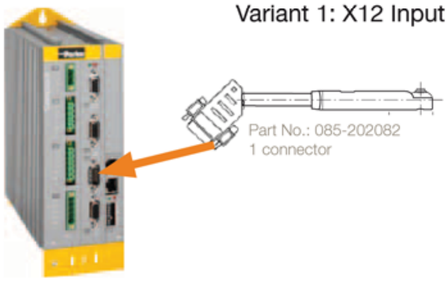
Dimensions [mm]

Info: Do only use PNP types for ETH with Compax3.

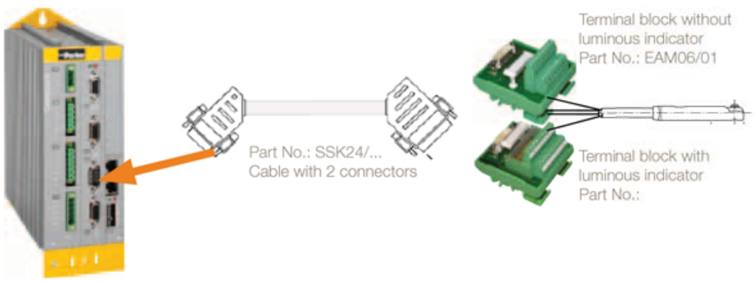
Magnetic cylinder sensors

Type	Function	LED	Logic	Cable	Continuous current	Current consumption	Supply voltage	Switching frequency	compatible with Compax3, SLVD-N, TPD-M
P8S-GPFLX	N.O.	yes	PNP	3 m	max. 100 mA	max. 10 mA	10-30 VDC	1 kHz	yes
P8S-GNFLX			NPN						No
P8S-GPSHX			PNP	0.3 m cable with M8 connector					yes
P8S-GNSHX			NPN						No
P8S-GQFLX	N.C.		PNP	3 m					yes
P8S-GMFLX			NPN						No
P8S-GQSHX			PNP	0.3 m cable with M8 connector					yes
P8S-GMSHX			NPN						No

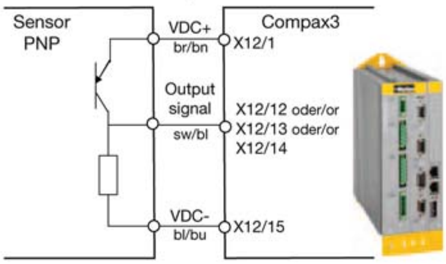
Variant 1: X12 Input - direct



Variant 2: X12 Input - via digital I/Os

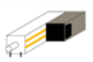
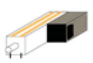


ETH with Compax3



Order Code

	1	2	3	4	5	6	7	8	9	10	11	12
Example	**ETH**	**050**	**M05**	**A**	**1**	**K1A**	**F**	**M**	**N**	**0200**	**A**	**Uxx**

1	**Series**	
	ETH	Electro Cylinder
2	**Frame size**	
	100	ISO 100
	125	ISO 125
3	**Screw lead Mxx in mm**	
	M10	for ETH100, ETH125
	M20	for ETH100, ETH125
4	**Motor mounting position, housing orientation, groove orientation [1]**	
	A 	Inline + groove for initiator 3 & 9 o'clock (standard)
	B 	Inline + groove for initiator 6 & 12 o'clock
	C 	Parallel 12 o'clock / groove for initiator 3 & 9 o'clock
	D 	Parallel 12 o'clock / groove for initiator 6 & 12 o'clock
	E 	Parallel 3 o'clock / groove for initiator 3 & 9 o'clock
	F 	Parallel 3 o'clock / groove for initiator 6 & 12 o'clock
	G 	Parallel 6 o'clock / 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 / groove for initiator 6 & 12 o'clock

5	**Relubrication option [2), 3)]** in combination with motor mounting position, housing orientation, groove orientation	
	1	No additional relubrication hole (standard) (not with 3 o'clock motor mounting)
		ETH080/ETH100/ ETH125 A, C, G, J
	2	Relubricating hole centered in the profile 12 o'clock
		ETH080/ETH100/ ETH125 A, C, E, G, J
	3	Relubricating hole centered in the profile 3 o'clock
		ETH080/ETH100/ ETH125 A, C, E, G, J
	4	Relubricating hole centered in the profile 6 o'clock
		ETH080/ETH100/ ETH125 A, C, E, G, J
	5	Relubricating hole centered in the profile 9 o'clock
		ETH080/ETH100/ ETH125 A, C, E, G, J
6	**Motor flange [4)]** **Motors always with key groove on the output shaft**	

Note- For a full list of available motor options please contact our applications engineering department at 800-245-6903.

7	Mounting type
F	Thread on the cylinder body **(standard)** (ETH100, ETH125 does not have a mounting thread on the underside)
B	Foot mounting [6), 7)] (For ETH100, ETH125 only available in protection class option A)
C	Rear Clevis [6)]
D	Centre trunnion mounting (not with motor mounting positions E, F, J, K), for lubricating option "1", the lubrication port is always in 6 o'clock position
E	Rear Eye Mounting [6)]
G	Mounting Flanges [7)] (only with motor mounting positions A, B, C, D) (For ETH100, ETH125 only available in protection class option A)
H	Rear plate [6)] (For ETH125 only available in protection class option A)
J	Front plate [7)] (For ETH125 only available in protection class option A)
N	Rear Plate & Front Plate [6), 7)] (For ETH125 only available in protection class option A)
X	customized - please contact us

8	Thrust rod
M	External thread **(standard)**
F	Internal Thread
K	Internal thread (for the reception of the force sensor with external thread) (only for ETH100, ETH125)
S	Spherical Rod Eye (stainless steel with protection class "B" and "C"; standard with protection class "A") (For ETH125 only available in protection class option A)
L	Alignment Coupler (available only in protection class option A)
X	customized - please contact us

9	Option
N	Standard

10 Stroke in mm	ETH100/ ETH125
0050	
0100	•
0150	•
0200	•
0300	•
0400	•
0600	•
1000	•
1200	
1600	•
XXXX	100...2000

11	Protection class
A	IP54 with galvanized screws
B	IP 54 stainless version with VA screws
C	IP 65 like B + protective lacquer and specially sealed

12	Optional (only customized cylinders)
Uxx	Unique Version

Here, a number for customized cylinders is assigned, please contact us

1) ETH080-ETH125 features 2 grooves each on all 4 sides (i.e. Code B=A or D=C, F=E, H=G, K=J), therefore codes A, C, E, G, J are possible for ETH080-ETH125.
2) With parallel configuration, the motor may block access to the sensors and the lubrication port.
3) When selecting the relubrication options 2-5, the standard lubrication port is without function.
4) Please check cylinder motor/gearbox combination with the aid of the table ("Motor Mounting Options" see page 22).
Order Code SMH100-B5/14: " SMH100.......ET... " (the motor shaft diameter is replaced by the term "ET")(not in the motors catalog) only with feedback: Resolver, A7
6) Not with motor mounting options A & B.
7) Not for thrust rod R, T
8) Not for ETH100, ETH125
9) Please observe the explanations "ETH - Electro Thrust Cylinder for ATEX Environment" see page 12

Software & Tools

- Actuator database
  - A special actuator database is available in the Compax3 ServoManager. You can simply enter the ETH type code for automatic controller parameterization.
- CAD-Configurator
  - Configure your electro cylinder CAD data online.
    www.parker.com/eme/eth
- Dimensioning tool "EL-Sizing"
  - A dimensioning tool simplifies the dimensioning process.
    www.parker.com/eme/eth

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Key Markets

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

Key Products

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

Climate Control

Key Markets

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

Key Products

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

Electromechanical

Key Markets

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

Key Products

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

Filtration

Key Markets

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

Key Products

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

Fluid & Gas Handling

Key Markets

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

Key Products

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

Hydraulics

Key Markets

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

Key Products

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

Pneumatics

Key Markets

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

Key Products

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

Process Control

Key Markets

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

Key Products

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

Sealing & Shielding

Key Markets

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

Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
EMI shielding
Extruded & precision-cut, fabricated elastomeric seals
High temperature metal seals
Homogeneous & inserted elastomeric shapes
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Thermal management
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