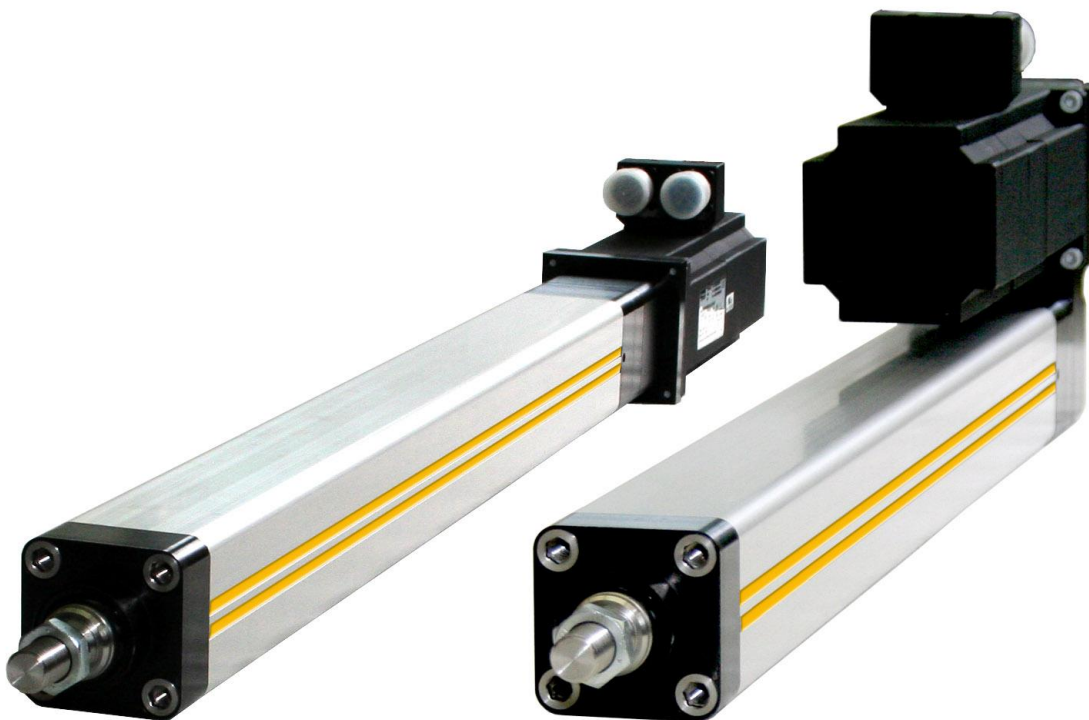


Mounting instructions

ETH Manual - Installation, Commissioning, Maintenance and Repair

ETH - Electro Cylinder Parker High Force Electro Thrust Cylinder



192-550002N2 ETH Mounting instructions

Revision: A

April 1, 2014

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nonwarranty clause

We checked the contents of this publication for compliance with the associated hard and software. We can, however, not exclude discrepancies and do therefore not accept any liability for the exact compliance. The information in this publication is regularly checked, necessary corrections will be part of the subsequent publications.

Further information:

Our product on the Internet: <http://www.parker-eme.com/eth> or
<http://www.parkermotion.com>

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1. Introduction

In this chapter you can read about:

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1.1 Device assignment

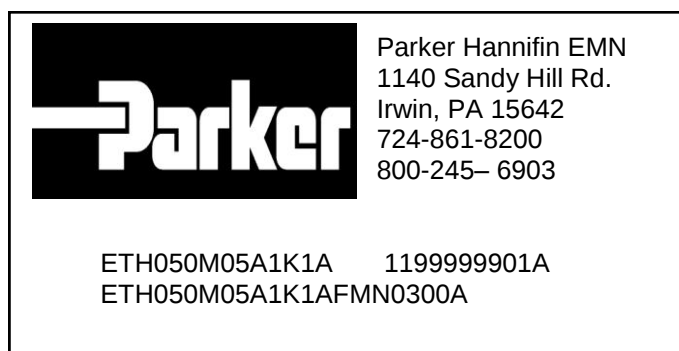
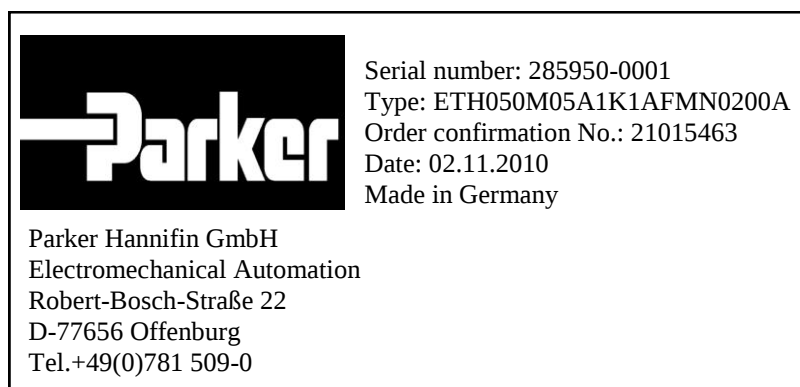
This manual is valid for the following devices:

Electro cylinder for motors and gearboxes:

- ◆ETH032
- ◆ETH050
- ◆ETH080

1.2 Type specification plate

Type specification plate (example)



1.3 Mounting explanation



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EINBAUERKLÄRUNG

DECLARATION OF INCORPORATION

ACCORDING TO EC DIRECTIVE 2006/42/EC (ANNEX II, PART 1, SECTION B) FOR PARTLY COMPLETED MACHINERIES

Dokumenten Nr.

DoI001-R 1.0

Declaration No.:

Firma / Manufacturer:

Parker Hannifin GmbH

Bevollmächtigter / Authorized person:

Jürgen Killius

Anschrift

Robert-Bosch-Straße 22

Address:

**77656 Offenburg
Deutschland**

Produkt

ETH: Parker High Force Electro Thrust Cylinder

Product:

Serien- / Typenbezeichnung

ETH032; ETH050; ETH080

Model / Type:

Seriennummer

Ab 284356-0001

Serial No.:

From 284356-0001

Baujahr

Ab November 2010

Year of manufacture:

From November 2010

Der oben genannte Hersteller / Bevollmächtigte erklärt, dass das Produkt den folgenden grundlegenden Anforderungen der Richtlinie Maschinen (2006/42/EG) entspricht:

The above mentioned Manufacturer / authorized person declare that the product is complying with the following essential requirements of the machinery directive 2006/42/EC:

Anhang I, Artikel / Annex I, Article: 1.1.1, 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.4.1, 1.5.4, 1.5.8 & 1.6.1.

Norm / Standard	Titel / Title	Ausgabe / Edition
EN ISO 12100-1	Sicherheit von Maschinen – Grundlegende, allgemeine Gestaltungsleitsätze Teil 1: Grundsätzliche Terminologie, Methodologie <i>Safety of Machinery – basic concepts. Part 1: fundamental terminology, methodology</i>	2003
EN ISO 12100-2	Sicherheit von Maschinen – Grundlegende, allgemeine Gestaltungsleitsätze Teil 2: Technische Leitsätze <i>Safety of Machinery – basic concepts, general design guideline, Part 2: Technical guidelines and specifications</i>	2003
EN ISO 14121-1	Sicherheit von Maschinen – Risikobeurteilung Teil 1: Leitsätze <i>Safety of Machinery – Risk assessment Part 1: Principle</i>	2007

Den im Produkthandbuch beschriebenen Sicherheits-, Installations- und Bedienungshinweisen muss Folge geleistet werden.

These products must be installed and operated with reference to the instructions in the Product Manual.

All instructions, warnings and safety information of the Product Manual must be adhered to.

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie Maschine 2006/42/EG entspricht.

The partly completed machinery must not be put into service until the final machinery, into which it is to be incorporated, has been declared in conformity with the provisions of directive 2006/42/EC on machinery.

Die zur Maschine gehörenden speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.

The machinery related special technical documentation according annex VII B has been created.

Der Hersteller verpflichtet sich, die speziellen Unterlagen zur unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch zu übermitteln. Die gewerblichen Schutzrechte des Herstellers der unvollständigen Maschine bleiben hiervon unberührt.

The manufacturer commits to transmit, in response to a reasoned request by the market surveillance authorities, relevant documents on the partly completed machinery electronically by our documentation department.

The intellectual rights of the manufacturer of the incomplete machine are not affected.

Offenburg, 28.10.2010

Jürgen Killius, Operations Manager

Parker Hannifin GmbH
Sitz: Bielefeld HRB 35489
USt-IdNr.: DE 122 802 922
Steuernummer: 5349 5747 1543

Commerzbank Offenburg
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IBAN DE95 6644 0084 0450 1912 00

Geschäftsführung:
Dr. Gerd Scheffél, Günter Schrank, Christian Stein, Kees Veraart
Vorsitzender des Aufsichtsrates: Hansgeorg Greuner

1.4 Safety instructions

1.4.1. General hazards

General Hazards on Non-Compliance with the Safety Instructions

The subsystem has been designed in accordance with state-of-the-art technical developments and is operationally reliable. If it is not operated by qualified, or at least trained personnel, or if it is operated improperly or not in accordance with the operating instructions, the unit may bear the risk of hazards.

Electronic, moving and rotating components can

- ◆ Danger for life and limb of the operator or third persons and / or
- ◆ cause material damage

If the linear actuator is installed in a machine plant, the safety requirements noted in the operating instructions for that machine must be combined with those described in this manual.

1.4.2. Intended use

The linear actuator has a number of uses including:

Positioning, transporting, feeding, removing, pallet handling, loading, unloading, processing and manipulating as well as testing work pieces or tools.

Since the component can be used in a very wide range of applications, the user is responsible for its use in specific applications.

Please make sure that the mounting of parts or tools will not pose a threat to persons or cause damages to any parts or devices. This also applies, for example, to the case of a broken toothed belt (if existing).

The linear actuator must only be used in areas that are not accessible to persons during operation.

If the linear actuator is used in areas accessible to people, it must be installed in such a manner that no one can be endangered during operation.

1.4.3. Identifying Residual Dangers and Hazardous Areas

If there are still residual dangers present to persons or property from the linear actuator in spite of operating it in a safe manner, the user must make reference to these residual dangers through signs and written rules requiring appropriate procedures.

The following safety signal words are used:



Danger!

Indicates that an imminent hazardous situation may lead to death or serious bodily harm if not prevented using appropriate safety measures.



Warning!

Indicates a potentially hazardous situation which, if not avoided using appropriate safety measures, could result in serious or minor injury.



Caution!

Indicates a potentially hazardous situation which, if not avoided using appropriate safety measures, may result in minor injury or material damage.



Hint

Provides important information about the product, how to handle the product or about the part of the manual to which particular attention must be paid.

1.4.4. Working safely

Heed the Instructions

The information (such as instructions and notes) contained in this manual must be heeded for all work involved in installing, commissioning, setting up, operating, changing operating conditions and modes, servicing, inspecting and repairing the unit.

The manual must be available close to the linear module during the performance of all tasks.

It is impermissible to operate the liner module if it is not in perfectly functional condition.

Operating personnel

The following jobs must only be performed by appropriately trained and authorized personnel:

- ◆ Installation and set-up tasks on the linear actuator
- ◆ Attaching safety limit switches (initiators)
- ◆ Connecting the drive and testing the motion direction

Instructions for Special Hazards

The linear module must be fixed or supported in accordance with the indications in this manual.

The operator must ensure that operation of the linear module does not cause any danger.

If the linear module moves in hazardous areas, these areas can be safeguarded with safety transmitter switches.

1.4.5. Safety Instructions for the Company Using the System

Supervisors must also become familiar with the entire chapter entitled "Safety" and handling required on the linear actuator.

Supervisors must ensure that installation and operating personnel have read and understand the chapter entitled "Safety" and the description of how to work with the machine, and that they observe the instructions.

The manual must be available close to the linear module during the performance of all tasks.

It is impermissible to operate the liner module if it is not in perfectly functional condition.

Depending on the application, the operating company must provide for a suitable separating safety fence. Access to the motion range during operation must be prevented.

The user must make sure that the work area is protected by appropriate safety devices.

1.4.6. Safety Instructions for Operating Personnel

Any work step that has a negative effect on the operating safety of the linear motor module must be omitted.

Operating and supervisory personnel are required to check the linear actuator or machine at least once per shift for externally visible damage or defects. Changes that have occurred (including the operating behavior) that could have a negative effect on the operating safety must be reported immediately.

Components and accessories are designed especially for this product. When purchasing spare and wearing parts, use only original Parker parts. We note here explicitly that we are unable to check or release spare parts or accessories that were not provided by us.

Installing and/or using such products may cause negative changes in the required design properties in some circumstances, which in turn could negatively affect the active and/or passive operating safety of the product.

The manufacturer is unable to accept any liability for damage caused by using non-original parts and accessories.

Safety and protection devices are strictly NOT to be removed or bypassed or set out of order.

Applicable requirements and national accident prevention regulations must always be observed when installing and operating our linear motor module.

1.5 Packaging, storage, transport

First check

- ◆ Check the packaging for damages.
- ◆ Remove the packaging.
Do not discard the packaging; it is strongly recommended to use the original packaging material for return deliveries.
- ◆ Depending on the storage location, metal surfaces may have a temperature of 0 °C or below. Please provide appropriate worker protection (e.g. protective gloves).
- ◆ Please ensure that the consignment does correspond to your order.
- ◆ Check the product for damages. Do never use a device which seems damaged.
- ◆ Please read the installation manual carefully before installing or commissioning the device.

Packaging material



The packaging material is inflammable, if it is disposed of improperly by burning, lethal fumes may develop.

Transport

Make sure to transport the linear module always in a safe manner and with the aid of suitable lifting equipment (Means of transport).

Storage

The linear module must be stored evenly and without any mechanical load.

The stated storage temperature must be adhered to.

Disposal

We recommend disposing of the respective materials in accordance with the respectively valid environmental laws. The following table states the materials suitable for recycling and the materials which have to be disposed of separately.

Material	suitable for recycling	Disposal
Metal	yes	no
Plastic materials	yes	no

1.5.1. Special notes on transport

Special notes on transport

Use only transport equipment with sufficient lifting capacity. When using ropes, make certain they are not twisted or knotted. If you are using more than one rope, all the ropes should be equally taut.

When transporting the ETH with a forklift, establish a condition of equilibrium and secure the load if necessary.



Never step under overhead loads - danger of being injured!
Moving parts must always be secured against slipping or moving.

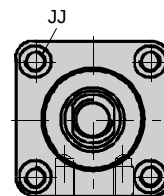
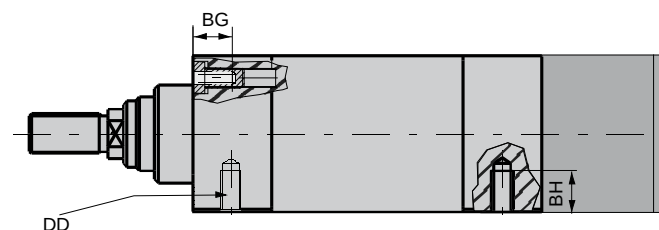
Required minimum load bearing capacity of the means of transport:

ETH032	ETH050	ETH080
130 kg	300 kg	750 kg

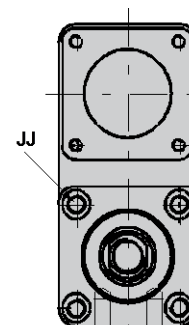
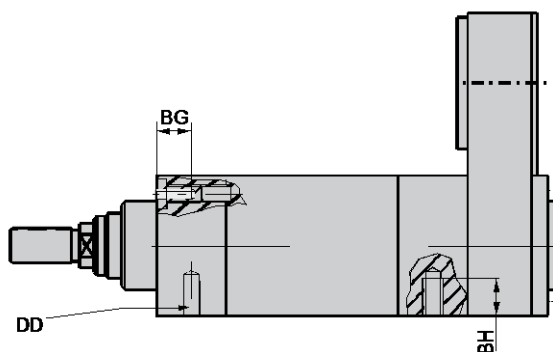
In these table values, a safety factor of S=8 is taken into consideration (motor and gearbox weight included). This means that it does **not** represent the cylinder weight.

The following threads on the cylinder can be used to mount transport or mounting equipment (for example eye bolts):

Motor inline:



Motor parallel



	ETH032	ETH050	ETH080
DD	M6x1.0	M8x1.25	M10x1.5
JJ*	M6x1.0	M8x1.25	M10x1.5
BH	9	12.7	17.5
BG	16	25	26

* screw "JJ" is not available in IP65 for the ETH32 and the ETH50!

1.6 Warranty conditions

User Conversions and Changes are Not Permitted

The linear actuator must not be changed in its design or in terms of safety without our approval. Any change as defined here made by the user excludes any liability on our part.

1.7 Conditions of utilization

General introductory notes

With the ETH electro cylinder you bought a product which was manufactured and tested before delivery with the utmost care.

Please take your time to read the following notes which you ought to follow closely during setup and operation.



Operation of the electro cylinder is only permitted within the limit values stated in this

all claims under the warranty will become void and a reduced service life or even as must be expected.

Please compare the operating data with the stated limit values especially with reference to:

- ◆ Stroke length and setting of the limit switches, those must be set so that there is a sufficient safety travel at both ends of the travel stroke



the limit switches were already mounted at our premises, they must be adapted to suitable values before operation!

- ◆ Thrust and traction force in the effective direction
- ◆ Lateral force (e.g. as a component of the effective force, but also due to own weight on horizontal mounting, especially with parallel motor mounting and long travel strokes)
- ◆ Speed
- ◆ Acceleration
- ◆ Environmental conditions (e.g. temperature, contamination)
- ◆ Please do take possible pulses caused by moved masses into consideration for the operating data. (Even small abrupt loads can cause damage, especially if they occur rather often at the same place.)

The limit values for the thrust and traction force, lateral force, speed and acceleration are partly influenced by several factors and can change depending on:

- ◆ the size of the electro cylinder
- ◆ Screw lead
- ◆ Direct or parallel drive via toothed belt transmission
- ◆ Mounting method
- ◆ Mounting orientation vertical or horizontal resp. inclined
- ◆ Travel Stroke

If the motor used with the electro cylinder should be able to exceed individual limit values of the cylinder, the respective values for the motor must be limited in the control by appropriate parameterization. The parameterization should even be reduced down to the values necessary for operation.

This would, for example provide a hint to a possible damage or to preventive maintenance if wear-induced extensive friction of the machine or cylinder would trigger an error message of the controller.



The internal end stops of the electro cylinder may under no circumstances be accessed during operation. The internal end positions may only be accessed by the cylinder in setup mode and only for determining the end positions with a low force of a few N (torque limitation if possible below 10%) and very slowly (max. 2% of the nominal speed).

The lifetime of the electro cylinder depends strongly on the degree of power exploitation and on impermissible operating states occurring - even if only for a short time.

2. Set-up

In this chapter you can read about:

Mounting	14
Electric installation	17
Motor and feedback mounting	19
Exchanging the toothed belt	24
Belt / belt tensions	24

The linear module is furnished completely mounted and mechanically ready-to-operate. If no Parker drive is provided, attach your motor-gearbox combination according to the instructions of the respective supplier.

The technical data must be respected.

See from page 6 in the catalog section (following the mounting instructions).

2.1 Mounting



Caution!

Please use only the parts offered in the Parker ETH catalog for the following mounting components:

- ◆ Rear Eye Mounting (order code E)
- ◆ Rear Clevis (order code C) with bearing pedestal

Standard parts in accordance with the ISO flange standard cannot be used for these accessories, as they are not sufficiently stable.

Please Note:

- ◆ The cylinder housing must be mounted without tension or contorsion.
- ◆ The cylinder housing must be precisely aligned to the load direction of motion.
- ◆ Occurring lateral forces on the cylinder must be taken into consideration.

2.1.1. Mounting with mounting threads on the cylinder

The easiest and most economic method of mounting is using the available mounting threads on the cylinder body. Make sure that the mounting surface is level and that the cylinder is mounted without tension and contortion. This method of mounting is only possible, if the lower side of the mounting surface is accessible.

Dimensions: see in the catalog section (following the mounting instructions) on page 16.

2.1.2. Mounting with mounting accessories

Cylinder mounting with mounting plates or foot mounting brackets

If the underside of the mounting surface is not accessible, mounting plates or foot mounting brackets are available as accessories.

Mounting methods: see from page 19 in the catalog section (following the mounting instructions).

Dimensions: see in the catalog section (following the mounting instructions) on page 16.

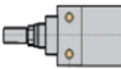
The rear mounting plate cannot be fixed with inline motor configuration.

If you fix the cylinder only at the rear end (e.g. also with a rear clevis) please respect the effective direction of the known forces. Critical are above all lateral forces in horizontal or vertical direction.

Permissible side load: See from page 13 in the catalog section (following the mounting instructions).

2.1.2.1 Screw tightening torques for the mounting of the ETH cylinder by the customer.

In order to simplify the calculation of the mounting screws for fixing the cylinder in your application, the following table gives an overview of the required screw quality resp. The required tightening torque (including additional boundary conditions). The data apply under the assumption that 100% of the permissible axial force is required. If these values are not adhered to, the screw joint might fail.

		ETH032			ETH050			ETH080			
		M05	M10	M16	M05	M10	M20	M05	M10	M32	
Option F*		M6 - 12.9			M8 - 12.9			M12 - 12.9			Screw
		15.5 (3)			47 (3)			160 (3)	160 (3) (4)	160 (3)	Screw tightening torque (1) [Nm]
		6			8			12			Minimum screw-in depth [mm]
Option F		M6 - A2 - 70			M8 - A2 - 70			M10 - A2 - 70			Screw
		7.5			16			34			Screw tightening torque (1) [Nm]
		9			9			15			Minimum screw-in depth [mm]
Option F		M6 - 8.8			M8 - 8.8			M10 - 8.8			Screw
		9			19			39			Screw tightening torque (1) [Nm]
		9			9			16			Minimum screw-in depth [mm]
Option E Option C		M6 - A2 - 70			M8 - A2 - 70			M10 - A2 - 70			Screw
		7.5			16			34			Screw tightening torque (1) [Nm]
		8			11			14			Minimum screw-in depth (2) [mm]
Option E Option C		M6 - 8.8			M8 - 8.8			M10 - 8.8			Screw
		8.5			19			37			Screw tightening torque (1) [Nm]
		9			12			15			Minimum screw-in depth (2) [mm]
Option H Option J Option N		M6 - A2 - 70			M8 - A2 - 70			M10 - A2 - 70			Screw
		7			16			31			Screw tightening torque (1) [Nm]
		8			11			14			Minimum screw-in depth (2) [mm]
Option H Option J Option N		M6 - 8.8			M8 - 8.8			M10 - 8.8			Screw
		7.5			18			35			Screw tightening torque (1) [Nm]
		9			12			15			Minimum screw-in depth (2) [mm]
Option B*		M6 - 12.9			M8 - 12.9			M12 - 12.9			Screw
		16.5			47			160 (3)	160 (3) (4)	160 (3)	Screw tightening torque (1) [Nm]
		12			12			25			Minimum screw-in depth (2) [mm]
Option G*		M6 - 12.9			M8 - 12.9			M12 - 12.9			Screw
		16.5			47			160 (3)	160 (3) (4)	160 (3)	Screw tightening torque (1) [Nm]

*For protection classes "B" and "C", we recommend for instance a GEOMET coated screw (thin layer corrosion protection), which must be in strength class 12.9

(1) torque controlled tightening

(2) when screwing into S235 JRG1 grade steel

(3) provide suitable washer under the screw head

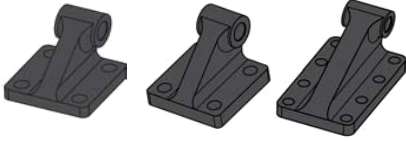
(4) Safety factor against slipping is 1.6 in this case, otherwise at least 1.6

For all mounting options applies:

- Joint area must be dry and free of grease
- We recommend to secure the screws with a liquid bold retaining compound (e.g Loctite 242)

2.1.2.2 Accessory mounting – bearing block

When mounting the bearing blocks, customers should respect the following tightening torques.

ETH032	ETH050	ETH080	
			
0112.039	0122.039	0132.039	Part number
M8 - 12.9	M10 - 12.9	M12 - 12.9	Screw
37	66	83	Screw tightening torque (1) [Nm]
15	21	27	Minimum screw-in depth (2) [mm]

(1) Torque controlled tightening

(2) When screwing into S235 JRG1 grade steel

Boundary conditions:

- Provide suitable washer under the screw head
- Joint area must be dry and free of grease
- We recommend to secure the screws with a liquid bolt retaining compound (e.g. Loctite 242)

2.1.3. Mounting notes

2.1.3.1 Side Load

Please respect the maximum permissible side loads depending on the vertical or horizontal mounting position.

Permissible side load: See from page 13 in the catalog section (following the mounting instructions).

2.1.3.2 Mounting of the payload

When mounting the payload, please make sure that no torque is applied to the thrust rod. Solution: On the cylinder rod there are spanner flats for locking, see dimension "SW" (width across flat) "Thrust rod version": see in the catalog section (following the mounting instructions).

Connect the payload always with the end of the thrust rod so that occurring lateral forces are minimized. If the payload is separately guided, even minimal deviations between this guiding system and the cylinder length axis can generate high lateral forces and reduce the service life of the electro cylinder considerably.

There are two possibilities to avoid this problem:

- ◆ Use a flexible coupling at the thrust rod end.
This coupling can compensate up to 3 mm axial offset and up to 10° angular offset.
- ◆ Use other thrust rod connection elements (accessories), which are able to compensate certain deviations such as for example rod clevis or spherical rod eye
- ◆ Use a flexible cylinder fixing device (accessories) such as for example rear clevis or center trunnion.

Thrust rod version: see from page 23 in the catalog section (following the mounting instructions).

2.2 Electric installation

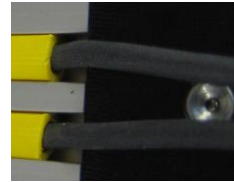
2.2.1. Sensors

All electro cylinders feature a permanent magnet in the spindle nut. It activates the limit switches which are mounted in the special mounting grooves on one side of the cylinder. Sensors and limit switches: see from page 28 in the catalog section (following the mounting instructions).

2.2.2. Sensor mounting

- ◆ Sensors can be inserted in all grooves on the ETH electro cylinder.
- ◆ If no sensors are mounted by the manufacturer (on customer request), please remove the groove protection covers. Use a pointed screwdriver to lever the ends of the covers off the grooves. Pull the entire cover out manually.
- ◆ Install the magnetic cylinder sensors. The sensors can be inserted into the grooves from above. The cable ends should lead into the drive direction. Push the sensors to their approximate positions in the grooves of the cylinder body. Tighten the fixing screws on the limit switches slightly and lead the cable along the profile groove.
- ◆ If **sensors are used as end limits** (see on page 18), do set them.

You can use the formerly removed protective covers in order to fix the sensor cables. Please cut the covers to the desired length with the aid of a pair of scissors. Please cut off an additional 5 to 10 mm, where the cables are to be lead out of the profile.

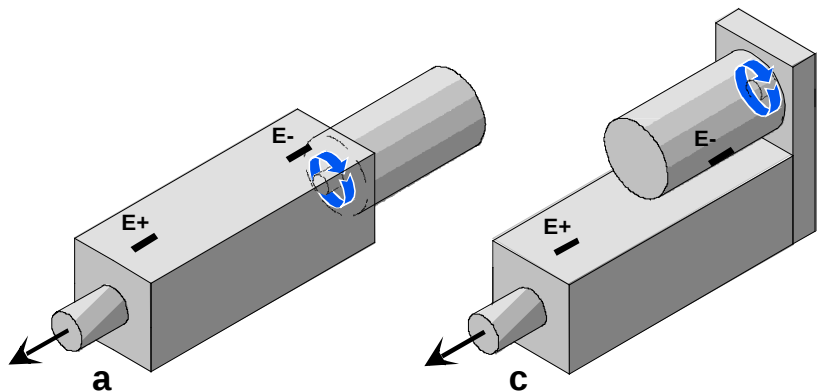


- ◆ Insert the cables into the grooves of the plastic covers and push the cover into the groove together with the cable.
 - ◆ Connect the sensors to the controller.
- Sensors and limit switches: see from page 28 in the catalog section (following the mounting instructions).

Sensor mounting example: 2 end limits with machine zero



2.2.3. Direction of the motor during extension of the cylinder



With parallel drive (drawing c), the turning direction of the motor is reversed in comparison with the direct drive configuration!

2.2.4. Setting the end limits



The steps described below can be best executed with energized drive. Therefore, they may only be performed by trained and authorized personnel.

Do only travel at very low speed (<10 mm/s) and reduce the drive torque to a minimum.

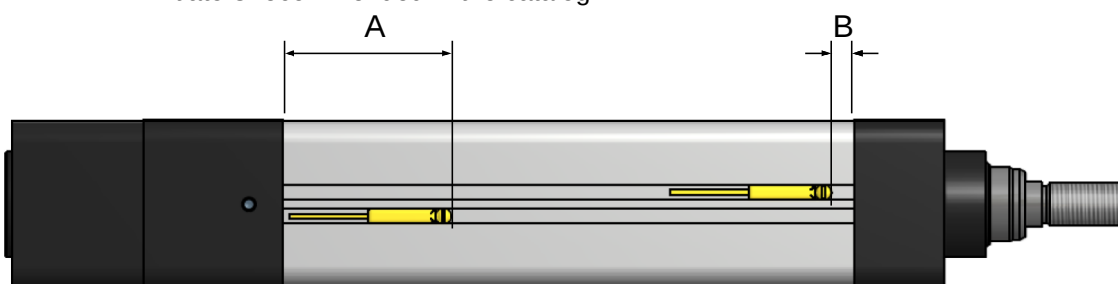
Ensure that there are no persons in the hazardous area.



The setting of the end limits depends on the application.

No sensor is to be mounted in the area of the central lubrication port (option).

The following activation positions at the mechanical end limits result from the initiators recommended in the catalog.



ETH		A [mm]	B [mm]
032	M05	68	0
	M10	77	0
	M16	81	0
050	M05	71	0
	M10	77	0
	M20	89	0
080	M05	85	0
	M10	103	0
	M32	133	0



Caution!

Please add the respective safety travels to the values mentioned above”

Stroke, usable stroke and safety travel: see in the catalog section (following the mounting instructions) on page 14.

Sensors and limit switches: see from page 28 in the catalog section (following the mounting instructions).

Adjusting the machine zero proximity switch

The correct position for the home switch (machine zero switch) depends on the application

It is recommended to set the machine zero at or near the end of the travel - this saves time, as it minimizes the chance that the machine zero is searched for in the wrong direction. In some cases it is possible to use one of the limit switches as machine zero, this method provides however a reduced precision, as the resulting position can normally not be and-linked with the encoder index pulse.

2.3 Motor and feedback mounting

In this chapter you can read about:

Motor / gearbox mounting with inline motor configuration.....	20
Motor / gearbox mounting with parallel motor configuration	21

Notes on motor wiring



In order to adhere to the EMC directive, it is necessary to mount the motor if ever possible unchanged. If you require a longer cable, the entire line should be replaced with the same or a similar cable.

If you mount a connector on the new cable, please make sure that the 360 ° motor cable shielding is maintained and that there is no connection to earth via the connector housing.

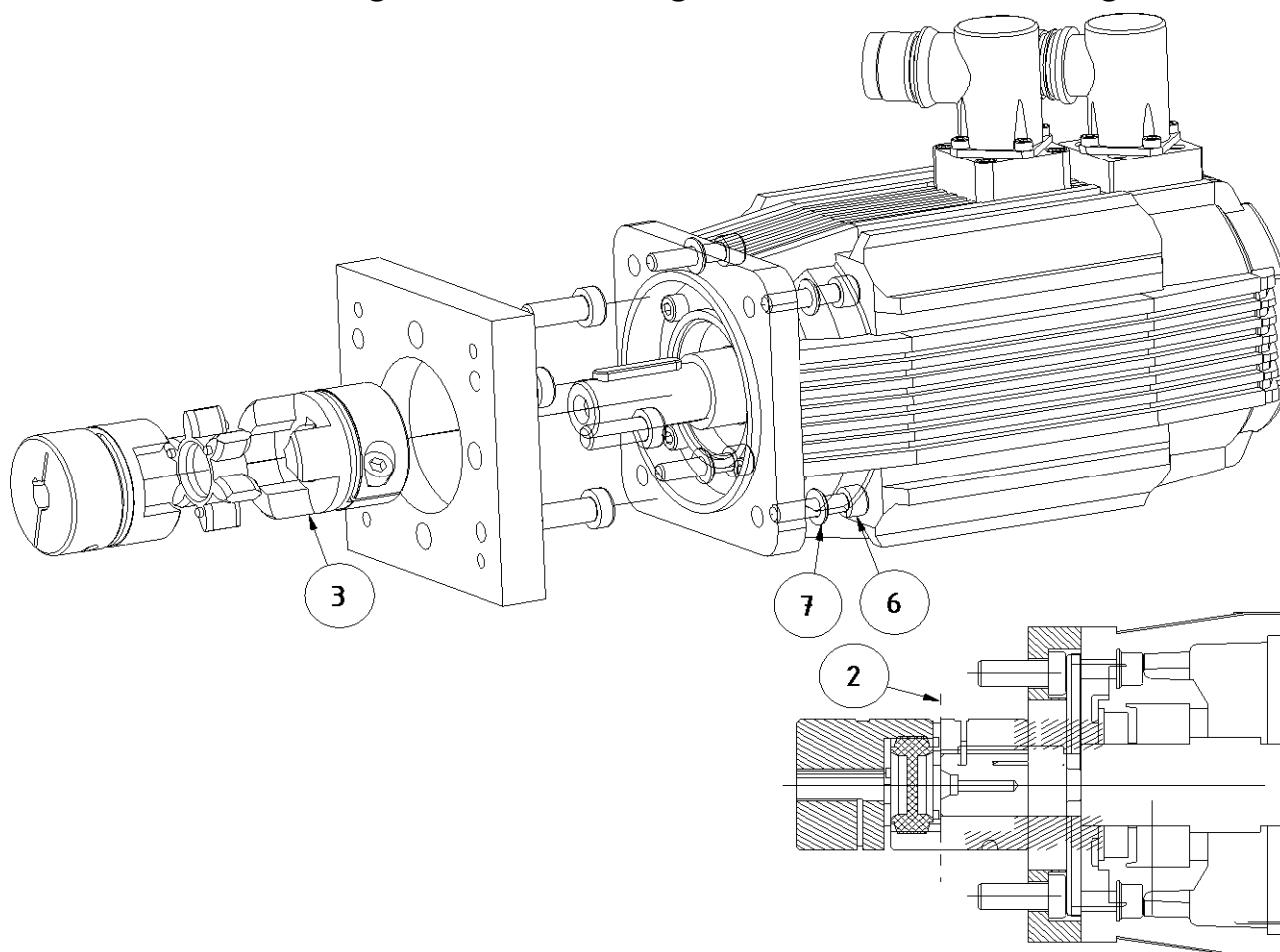
The motor must be grounded with a separate PE protective lead (green/yellow, cross-section at least 2.5 mm²).



This cable must be connected to the available motor-ground connector or - if there is none available - with a mounting screw. In the latter case, the coloring under the head of the screw must be removed.

If the axis is mounted upright, it must be secured against moving out!

2.3.1. Motor / gearbox mounting with inline motor configuration



Motor / gearbox dismantling

- ◆ Remove motor connector
- ◆ **ATTENTION:** Respect the safety instructions!
- ◆ If you use a gearbox, we recommend to dismount the motor from the gearbox first for reasons of weight.
- ◆ Loosen screws (Pos. 6).
- ◆ Remove motor / gearbox including mounted coupling half with caution.
- ◆ Loosen clamping screw of the coupling half (Pos. 3).
- ◆ Remove coupling half from the motor / gearbox shaft.

Mount motor / gearbox

- ◆ Loosen clamping screw of the coupling half (Pos. 3).
- ◆ Slip the coupling half onto the motor / gearbox shaft and align to be flush with the shaft if not stated otherwise by Parker (Pos. 2). **See page 23 for North American coupling spacing.*
- ◆ Tighten clamping screw of the coupling half:

Coupling size	Tightening torque
GS12 (Outer diameter: 25 mm)	1.4 Nm
GS14 (Outer diameter: 30 mm)	1.4 Nm
GS19 (Outer diameter: 40 mm)	10.5 Nm

- ◆ Slip motor / gearbox onto the mounted flange.
- ◆ **Attention:** Slip on motor / gearbox with a slight pivoting movement, so that the coupling halves interlock.
- ◆ Arm screws (Pos. 6) with washers (Pos. 7) and tighten.

2.3.2. Motor / gearbox mounting with parallel motor configuration

In this chapter you can read about:

Re-apply toothed belt pre-tension (reinsert the same toothed belt)..... 22
 Resetting the toothed belt pre-tension (new toothed belt)..... 23

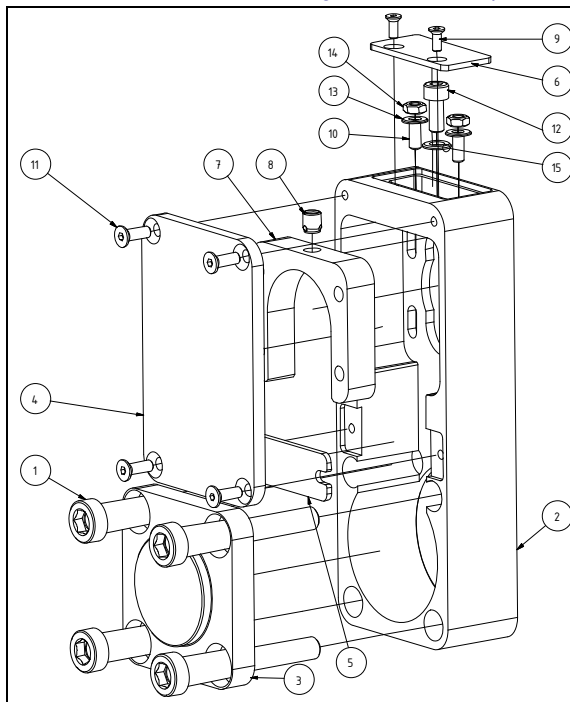
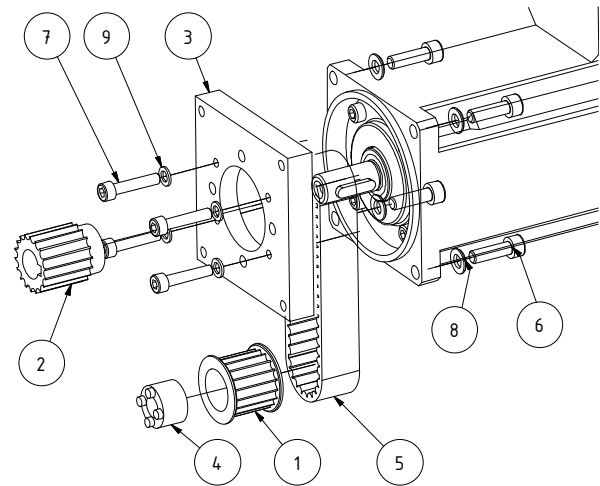


Figure 1: Parallel housing



Note: Standard North American supplied ETH parallel drives will be supplied with a bearing support placed between the parallel housing and motor.

Figure 2: Parallel motor

Motor / gearbox dismantling

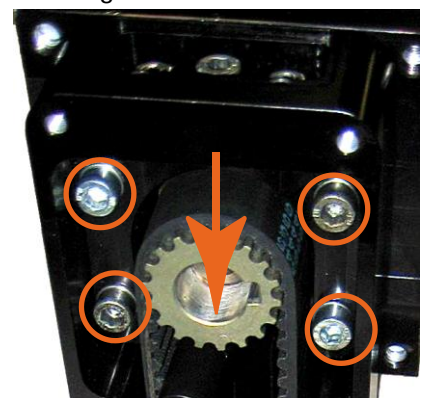
- ◆ Remove motor connector



Caution!

Respect the safety instructions!

- ◆ Remove lid (Fig. 1 Pos. 6) and screws (Fig. 1 Pos. 9).
- ◆ Remove lid (Fig. 1 Pos. 4) and screws (Fig. 1 Pos. 11).
ATTENTION: Keep all screws and lids for later mounting.
- ◆ Release toothed belt tension:
 - ◆ Slightly loosen 4 screws (Fig. 2 Pos. 7) by 1 or 2 turns (see figure on the right).
ATTENTION: Do not remove the screws entirely!
 - ◆ Loosen central toothed belt tensioning screw (Fig. 1 Pos. 12).
 The drive unit must lower slightly when the tensioning screw is loosened.
 - ◆ Loosen tightening screw (Fig. 1 Pos. 12) until the drive unit is not lowered any further.



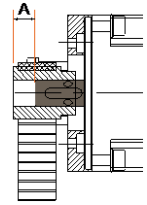
- ◆ Remove 4 screws (Fig. 2 Pos. 7) completely. First at the bottom, then at the top.



Caution!

Secure drive unit against dropping. We recommend to place a support pad between motor and cylinder profile.
Make sure not to insert your fingers between motor / gearbox and electro cylinder!

- ◆ Remove drive unit with mounted toothed pulley from the parallel housing with caution.
- ATTENTION:** Make sure that the toothed belt is not stuck in the parallel housing.
- ◆ Dismount motor / gearbox flange (Fig. 2 Pos. 3) by loosening the screws (Fig. 2 Pos. 6).
- ◆ Measure and note depth "A" from toothed pulley to motor / gearbox shaft before dismounting the toothed pulley (see figure on the right).
- ◆ Remove threaded pin(s) from the toothed pulley.
- ◆ Pull off toothed pulley with the aid of a pull-off tool,



Motor / gearbox mounting

- ◆ Fit toothed pulley and set dimension "A".
Dimension "A" is provided by Parker. If the drive was exchanged, please set the dimension "A" noted before. **See page 24 for North American "A" dimension.*
- ◆ Screw in the toothed pulley threaded pins.
- ◆ Mount motor / gearbox flange (Fig. 2 Pos. 3) with the screws (Fig. 2 Pos. 6 and Pos. 8).
- ◆ Insert drive unit with mounted toothed pulley into the parallel housing with caution. We recommend to place a support pad between motor and cylinder profile.
- ATTENTION:** Please make sure that the toothed belt is correctly geared in the pulley toothing.
- ◆ Screw in 4 screws (Fig. 2 Pos. 7) until the motor flange fits. Do not yet tighten.



Caution!

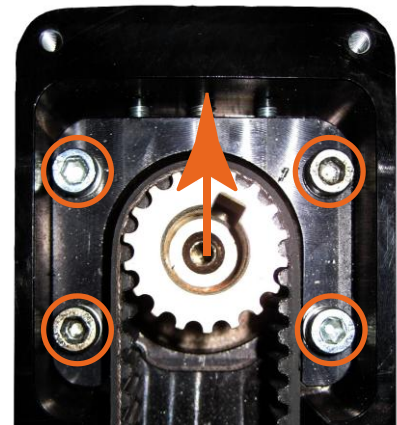
Make sure not to insert your fingers between motor /gearbox and electro thrust cylinder!

- ◆ Setting the toothed belt pre-tension:
 - ◆ For **the used toothed belt** (see on page 22).
 - ◆ For **a new toothed belt** (see on page 23).
- ◆ Mount lid (Fig. 1 Pos. 6) with screws (Fig. 1 Pos. 9).
- ◆ Mount lid (Fig. 1 Pos. 4) with screws (Fig. 1 Pos. 11).

2.3.2.1 Re-apply toothed belt pre-tension (reinsert the same toothed belt)

If the motor / gearbox is exchanged and the toothed belt is still in good condition, the pre-tension can be reset without measuring device:

- ◆ First check, if the belt toothing is geared into the upper and lower toothed pulley.
- ◆ The screws (Fig. 2 Pos. 7) must be inserted (but not tightened), so that the drive unit can be lifted.
- ◆ Tighten central toothed belt tensioning screw (Fig. 1 Pos. 12).
The drive unit must lift when tightening the screw. Lift the unit until it touches the 2 internal stops (fig. 1 Pos. 10). This is made by tightening the central tightening screw.



- ◆ Tighten 4 screws (Fig. 2 Pos. 7) with the given tightening torque.

ETH032	ETH050	ETH080
3 Nm	5 Nm	10 Nm

- ◆ Reaffix both lids (Fig. 1 Pos. 4 & 6) with the respective screws (Fig. 1 Pos. 11 & 9).

2.3.2.2 Resetting the toothed belt pre-tension (new toothed belt)

For a new toothed belt, we recommend to re-set the toothed belt pretension:

- ◆ Check if the belt toothing is geared into the upper and lower toothed pulley.
- ◆ The screws (Fig. 2 Pos. 7) must be inserted (but not tightened), so that the drive unit can be lifted.
- ◆ Loosen both lock nuts (Fig. 1 Pos. 14) (do not remove entirely).
- ◆ Unscrew both threaded pins (Fig. 1 Pos. 10) until they are almost level with the inside of the parallel housing.
- ◆ Tighten central toothed belt tensioning screw (Fig. 1 Pos. 12) until the toothed belt is noticeably pretensioned.
- ◆ Measure toothed belt tension with a suitable device.
We recommend: Gates: „Sonic 507c" or Hilger&Kern: „Trummeter"
- ◆ Tighten screw lightly and repeat measurement.
- ◆ Repeat this procedure until the required **toothed belt pretension** (see on page 23, see on page 24) is set.



Caution! Only a correctly set toothed belt pretension ensures fail-safe operation of the cylinder.

- ◆ Screw in both threaded pins (Fig. 1 Pos. 10) until they touch the inner bracket.
Tighten pins slightly.
- ◆ Retighten lock nuts (Fig. 1 Pos. 14).
- ◆ Tighten 4 screws (Fig. 2 Pos. 7) with the given tightening torque.

ETH032	ETH050	ETH080
3 Nm	5 Nm	10 Nm

- ◆ Reaffix both lids (Fig. 1 Pos. 4 & 6) with the respective screws (Fig. 1 Pos. 11 & 9).

2.4 Exchanging the toothed belt

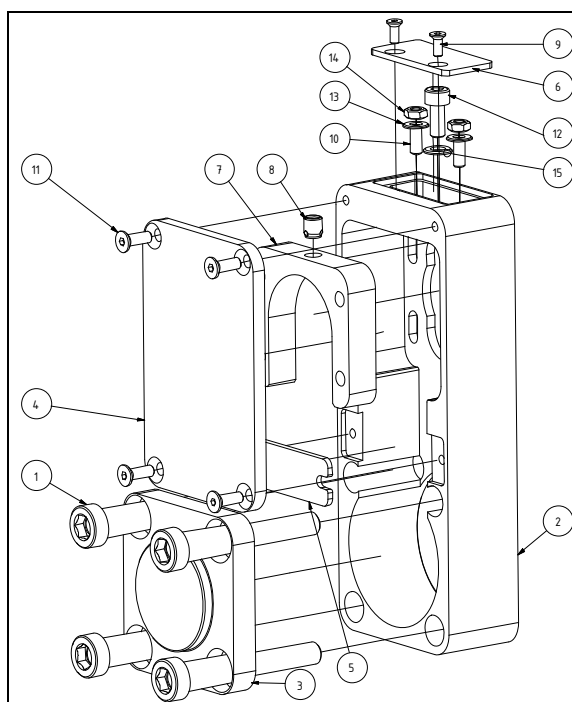
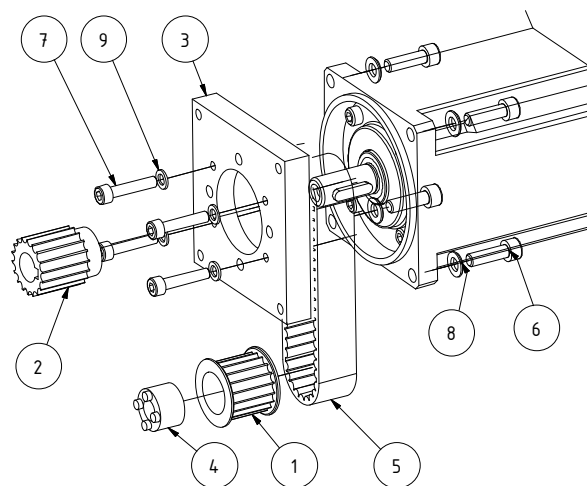


Figure 1: Parallel housing



Note: Standard North American supplied ETH parallel drives will be supplied with a bearing support placed between the parallel housing and motor.

Figure 2: Parallel motor

Dismounting the motor (see on page 19)

- ◆ Loosen and remove 4 screws (Fig. 1 Pos. 1).
- ◆ Remove lid (Fig. 1 Pos. 3).
- ◆ Remove bar (Fig. 1 Pos. 5).
- ◆ Remove old toothed belt and insert new belt.
- ATTENTION:** Please make sure that the toothed belt is correctly geared in the pulley toothing.
- ◆ Insert bar (Fig. 1 Pos. 5).
- ◆ Fit lid (Fig. 1 Pos. 3).
- ◆ Apply screw adhesive "Loctite 242 or Wiko 02K43 medium" to 4 screws (Fig. 1 Pos. 1) and tighten slightly.
- ◆ Align housing (Fig. 1 Pos. 2) with the electro cylinder.
- ◆ Tighten 4 screws (Fig. 1 Pos. 1) with the given tightening torque.

ETH032	ETH050	ETH080
9 Nm	20 Nm	40 Nm

- ◆ **Mounting the motor** (see on page 19) Setting the toothed belt pre-tension:
- ◆ For the used toothed belt (see on page 22).
- ◆ For a new toothed belt (see on page 23).
- ◆ Mount lid (Fig. 1 Pos. 6) with screws (Fig. 1 Pos. 9).
- ◆ Mount lid (Fig. 1 Pos. 4) with screws (Fig.. 1 Pos. 11).

2.5 Belt / belt tensions

	ETH032	ETH050	ETH080
Art. No. Belt	0111.013	0121.013	0131.013
Belt pre-tension	210 N ± 7 N	230 N ± 7 N	450 N ± 14 N
Trum Frequency*	438 Hz ± 14 Hz	306 Hz ± 10 Hz	236 Hz ± 8 Hz
Belt mass	0.060 kg/m	0.080 kg/m	0.120 kg/m
Center distance	67.5 mm	87.5 mm	130 mm

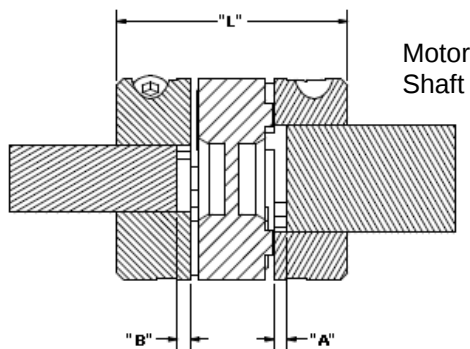
*Alternatively, the frequency for setting the pre-tension can be used.

2.6 North American Inline Coupling Placement Guide

ETH32			
Motor Option	"A" mm (MTR)	"B" mm (TBL)	"L" mm
KCB	1.3	1.9	34.2
KBB	0.1	-2.3	34.2
KCA	0	0.7	34.2
KEA	1.1	1.7	34.2
KBC	-1.3	-0.3	34.2
KAA	-0.2	-0.3	34.2
KEB	-0.2	-0.3	34.2
XPC	0.1	-2.3	34.2
XPD	0.1	-2.3	34.2
XPG	-1.3	-0.3	34.2
XPH	-1.3	-0.3	34.2
PAN	0	-0.3	34.2
PCN	-3.5	1.7	34.2
PDN	-2.9	-0.3	34.2
NBA	NA	0	34.2
NCA	NA	0	34.2
NDA	NA	0	34.2
NEA	NA	0	34.2
NHA	NA	0	34.2
NJA	NA	0	34.2
NKA	NA	0	34.2
NLA	NA	0	34.2
NMA	NA	0	34.2
NNA	NA	0	34.2
NJB	-1.3	0	34.2
NKC	3.7	0	34.2
NMD	0.7	0	34.2
NLE	0.7	0	34.2
NMF	-0.3	0	34.2
NMH	-0.3	0	34.2
NNJ	-0.3	0	34.2

ETH50			
Motor Option	"A" mm (MTR)	"B" mm (TBL)	"L" mm
KCA	1.1	2.2	34.2
KBB	0.1	-0.3	34.2
KBC	0.7	-1.3	34.2
KAA	-0.2	0.7	34.2
KEB	-0.2	-0.3	34.2
KAB	0	6.9	65
XPC	0.1	-0.3	34.2
XPD	0.1	-0.3	34.2
XPG	0.7	-1.3	34.2
XPH	0.7	-1.3	34.2
XPL	4.9	6.9	65
XPM	4.9	6.9	65
XPN	-0.9	-1.3	34.2
XPP	-0.9	-1.3	34.2
XPQ	4.9	6.9	65
XPR	4.9	6.9	65
XPS	-0.9	-1.3	34.2
XPT	-0.9	-1.3	34.2
PAN	1.4	0.7	34.2
PBN	9.9	6.9	65
PCN	0.5	5.9	34.2
PDN	-0.9	-1.3	34.2
NBA	NA	0	34.2
NCA	NA	0	34.2
NDA	NA	0	34.2
NEA	NA	0	34.2
NHA	NA	0	34.2
NJA	NA	0	34.2
NKA	NA	0	34.2
NLA	NA	0	34.2
NMA	NA	0	34.2
NNA	NA	8	65
NPA	NA	8	65
NQA	NA	8	65
NKC	4.2	0	34.2
NMD	2.2	0	34.2
NLE	2.7	0	34.2
NMF	-4.3	0	34.2
NPG	10.1	8	65
NMH	2.2	0	34.2
NNJ	0.1	8	65
NPJ	0.1	8	65
NPK	0.1	8	65

ETH80			
Motor Option	"A" mm (MTR)	"B" mm (TBL)	"L" mm
KBC	9.5	4	76.5
KAA	8.7	4	76.5
KAB	8.7	4	76.5
KAC	8.7	4	76.5
XPG	9.5	4	76.5
XPH	9.5	4	76.5
XPL	8.7	4	76.5
XPM	8.7	4	76.5
XPN	7.9	4	76.5
XPP	7.9	4	76.5
XPQ	8.7	4	76.5
XPR	8.7	4	76.5
XPS	7.9	4	76.5
XPT	7.9	4	76.5
XPU	8.7	4	76.5
XPV	8.7	4	76.5
XPW	8.7	4	76.5
XPX	8.7	4	76.5
XPY	8.7	4	76.5
XPZ	8.7	4	76.5
XP1	8.7	4	76.5
XP2	8.7	4	76.5
PBN	8.7	4	76.5
PJN	8.7	4	76.5
PDN	7.9	4	76.5
PEN	1.6	11	76.5
NDA	NA	4	76.5
NEA	NA	4	76.5
NFA	NA	4	76.5
NGA	NA	4	76.5
NLA	NA	4	76.5
NMA	NA	4	76.5
NNA	NA	4	76.5
NPA	NA	4	76.5
NQA	NA	4	76.5
NRA	NA	4	76.5
NSA	NA	4	76.5
NAA	NA	NA	76.5
NAG	NA	NA	76.5
NAJ	NA	NA	76.5
NAK	NA	NA	76.5
NAL	NA	NA	76.5
NAM	NA	NA	76.5
NPG	-0.5	4	76.5
NNJ	1.5	4	76.5
NPJ	1.5	4	76.5
NPK	1.5	4	76.5
NSL	1.5	4	76.5
NSM	-1.5	4	76.5



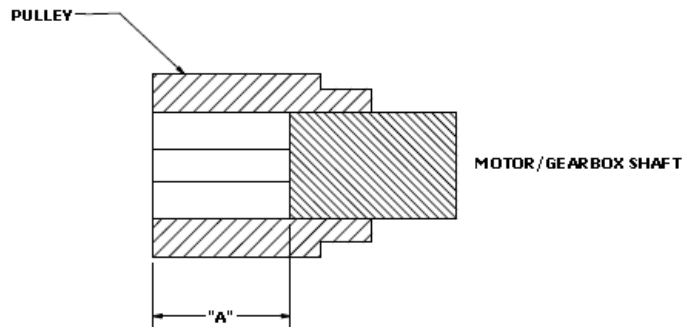
Note:

"A" and "B" are positive if shaft does not protrude through coupling.

"A" and "B" are negative if shaft protrudes through coupling.

For more information see www.parkermotion.com

2.7 North American Parallel Pulley Placement Guide



ETH32	
Motor Option	"A" mm
KCB	14.5
KBB	14.5
KCA	14.5
KEA	14.5
KBC	14.5
KAA	14.5
KEB	14.5
XPC	14.5
XPD	14.5
XPG	14.5
XPH	14.5
PAN	14.5
PDN	6.5
NJB	14.5
NKC	14.5
NMD	14.5
NLE	14.5
NMF	14.5
NMH	14.5
NNJ	14.5

ETH50	
Motor Option	"A" mm
KCA	15.5
KBB	15.5
KBC	3.5
KAA	3.5
KEB	3.5
KAB	3.5
XPC	15.5
XPD	15.5
XPG	3.5
XPH	3.5
XPL	3.5
XPM	3.5
XPN	11.7
XPP	11.7
XPQ	3.5
XPR	3.5
XPS	11.7
XPT	11.7
PAN	15.5
PDN	11.7
NKC	15.5
NMD	15.5
NLE	3.5
NMF	3.5
NNJ	3.5
NPJ	3.5
NPK	3.5

ETH80	
Motor Option	"A" mm (MTR)
KBC	18.5
KAA	18.5
KAB	18.5
KAC	10.5
XPG	18.5
XPH	18.5
XPL	18.5
XPM	18.5
XPN	18.5
XPP	18.5
XPQ	18.5
XPR	18.5
XPS	18.5
XPT	18.5
XPU	10.5
XPV	10.5
XPW	10.5
XPX	10.5
XPY	10.5
XPZ	10.5
XP1	10.5
XP2	10.5
PBN	18.5
PJN	10.5
NPG	18.5
NNJ	18.5
NPJ	18.5
NPK	18.5
NPL	10.5
NPM	10.5

For more information see www.parkermotion.com

3. Maintenance

In this chapter you can read about:

Lubricating intervals and amount of lubricant	27
Greasing via central lubrication port (standard)	27
Relubrication via central lubrication port (option)	28

The ballscrew drive must be relubricated within given intervals.

The 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.

In short-stroke applications, a lubrication run must be performed after max. 10000 movement cycles.

Lifetime: see from page 10 in the catalog section (following the mounting instructions).

In the event of small loads and if the application is impact and vibration free, the lubrication intervals can be increased. 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.**

3.1 Lubricating intervals and amount of lubricant

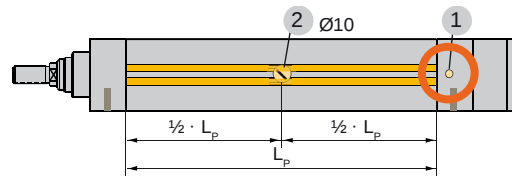
	Screw	Interval	Amount of lubricant
ETH032	M05	300 km	1.3 cm ³
	M10	600 km	1.6 cm ³
	M16	960 km	2.1 cm ³
ETH050	M05	300 km	1.6 cm ³
	M10	600 km	1.9 cm ³
	M20	1200 km	2.7 cm ³
ETH080	M05	300 km	3.1 cm ³
	M10	600 km	4.4 cm ³
	M32	1500 km	7.8 cm ³

Lubricant



Only use "Klüber NBU15" lubricating grease for standard cylinders!

3.2 Greasing via central lubrication port (standard)



1: Central lubrication (standard)

2: Central lubrication (Option)

- ◆ Make sure that all external stops are removed.
- ◆ Retreat thrust rod completely so that it touches the rear stop.
- ◆ Pass internal buffer by 0.5 mm.

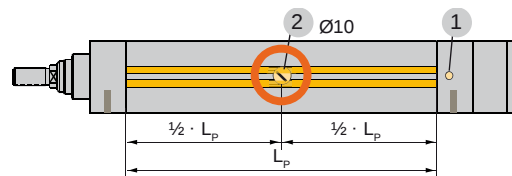


ATTENTION!

Ensure by means of control, that the internal buffer is not passed by more than 0.5 mm!

- ◆ This is the lubricating position.
- ◆ Use a suitable pipe for the funnel type lubricating nipple, Type D1a4 DIN3405: Beaked nozzle.
- ◆ Place the pipe orthogonally onto the lubricating nipple.
- ◆ Use the **defined amount of lubricant** (see on page 27).
- ◆ The amount of lubricant applied can be defined by the number of pump strokes. Pump the stated amount of grease onto a balance, while counting the pump strokes.

3.3 Relubrication via central lubrication port (option)



1: Central lubrication (standard)

2: Central lubrication (Option)

- ◆ Loosen lubrication port screw.
- ◆ Move the cylinder slowly to the lubricating position until the lubricating port becomes visible.
- ◆ The lubricating ports have a diameter of 2.5 mm. Therefore you need a beaked nozzle insert for your lubricating gun.
- ◆ Use a stable pipe (no hose).
- ◆ Insert the nozzle into the hole in the cylinder profile and place it orthogonally onto the lubricating port.
- ◆ Use the **defined amount of lubricant** (see on page 27).
- ◆ The amount of lubricant applied can be defined by the number of pump strokes. Pump the stated amount of grease onto a balance, while counting the pump strokes.

4. Repair

In the event of a damage or a mechanical defect, the entire unit must be returned for repair (**Parker Hannifin** (see on page 2)). The repair must be made by trained Parker personnel.

User Conversions and Changes are Not Permitted

The linear actuator must not be changed in its design or in terms of safety without our approval. Any change as defined here made by the user excludes any liability on our part.

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