ETH Mounting Instructions

Mounting instructions

ETH Manual - Installation, Commissioning, Maintenance and Repair

ETH Electro Cylinder
Parker High Force Electro Thrust Cylinder

We reserve the right to make technical changes. The data correspond to the current status at the time of printing.
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non-warranty clause

We checked the contents of this publication for compliance with the associated hardware 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.

German Master created.

Further information:

Our product on the internet: http://solutions.parker.com/eth_support

About this manual

This manual contains notes and safety instructions, information about commissioning, service and maintenance. For information on project development (technical data, dimensions, accessories, options, dimensioning aids and order code) please refer to ETH catalogue (solutions.parker.com/ETH_support).
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1. Introduction

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1.1 Device assignment

This manual is applies for the following devices:
Electro cylinder for motors and gearboxes:

- ETH032
- ETH050
- ETH080
- ETH100
- ETH125

1.2 Type identification plate

Type specification plate (example)

<table>
<thead>
<tr>
<th>Manufacturer address</th>
<th>Serial number</th>
<th>Unambiguous identification number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type:</td>
<td>Order Code</td>
</tr>
<tr>
<td></td>
<td>Order confirmation</td>
<td>Customer Order Number</td>
</tr>
<tr>
<td></td>
<td>Date:</td>
<td>Delivery date</td>
</tr>
</tbody>
</table>
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.
Declaration No.: DoI001-R 3.0

Firma / Manufacturer:
Parker Hannifin GmbH & Co KG

Jürgen Killius

Anschrift:
Robert-Bosch-Straße 22
77656 Offenburg
Deutschland

Produkt:
ETH: Parker High Force Electro Thrust Cylinder

Serien- / Typenbezeichnung:
ETH032; ETH050; ETH080; ETH100; ETH125

Seitenzahl / Seite:
ETH032 bis -125: Ab 35410387-0001
ETH032 till -125: As of 35410387-0001

Baunummer / Serial No.:
ETH032 bis -125: Ab Juli 2014
ETH032 till -125: As of July 2014

Year of manufacture:
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.

<table>
<thead>
<tr>
<th>Norm / Standard</th>
<th>Ausgabe / Edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN EN ISO 12100:2011</td>
<td>2011-03</td>
</tr>
</tbody>
</table>

Sicherheit von Maschinen – Allgemeine Gesamtanweisungen. Risikobewertung und Risikominderung
Safety of Machinery – General principles for design, risk assessment and risk reduction

Den in 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 Maschinen 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.

Offenburg, 23.5.2014
Jürgen Killius, Operations Manager

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USt.-ID-Nr.: DE 12 802 922
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BLZ: 964 400 84
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Dr. Gerhard Schöbel, Günter Schremz, Ilse Raabe, Kees Versait
Vorstand der Anteilsreiter: Hans-Georg Greuser
1.4  Applications in accordance with the Regulations

The incomplete machine can only be set in operation if it is sure that the machine in which the incomplete machine shall be mounted is conform to the 2006/42/EG machine directives.

Without further measures the product is not suitable for safety-oriented tasks. 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.

The described safety, installation and operating instructions must be adhered to.

General functioning consists in converting a rotational movement in a linear movement without slip within the product related load limits.

Can be found in the catalogue http://www.Parker.com/Literature/Electromechanical Europe/Literature/190_550017_ETH_katalog.pdf.

Its applications are in industry and trade.

The linear actuator is used for: 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.

1.4.1.  Applications not in accordance with the intended use

For risks of applications not in accordance with the intended use, the user shall bear the sole responsibility. Parker Hannifin does not accept any liability for damages caused by applications not in accordance with the intended use of the product.

1.5  For Safety Use

1.5.1.  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, however, the unit may bear the risk of hazards.

Electronic, moving and rotating components can

• cause 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.

1.5.2.  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.

- **NOTICE** 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.
1.5.3. Working safely

**NOTICE**
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**
Only qualified expert personnel is permitted to perform works on the linear actuator. All the applicable regulations and provisions must be heeded (IEC, EN, national accident prevention regulations etc.). Qualified persons as the term is used in this manual are persons who:
- persons who, by virtue to their training, experience and instruction, and their knowledge of pertinent norms, specifications, accident prevention regulations and operational relationships, have been authorized by the officer responsible for the safety of the system to perform the required task and in the process are capable of recognizing potential hazards and avoiding them (definition of skilled persons in accordance with VDE015 or IEC364)
- Persons who have a knowledge of first-aid techniques and the local emergency rescue services.
- Persons who have read and will observe the safety instructions.

**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 must be safeguarded with safety transmitter switches.

1.5.4. Safety Instructions for the Company Using the System

**WARNING**
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.
1.5.5. Safety Instructions for Operating Personnel

**WARNING** 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 effect the active and/or passive operating safety of the product.

Depending on the operating conditions (rotation speed, load, etc.) increased surface temperature in the area of the drive may occur. When touching it during operation slight injuries from burning may occur. Don't touch the product during operation. At maintenance, service and repair always take care that the product is cooled off before starting work.

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.

1.6 Packaging, storage, transport

**First check**
- Check the packaging for damages.
- Remove all items from 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**

**WARNING** 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.

For a storage period longer than 1 year, the linear module must be relubricated before commissioning, see lubricating intervals and relubrication quantity.
Disposal
We recommend to dispose 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.

<table>
<thead>
<tr>
<th>Material</th>
<th>suitable for recycling</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Plastic materials</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

1.6.1. Special notes on transport
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 cylinder with a forklift, establish an equilibrium and secure the load if necessary.

⚠️ WARNING
Never step under overhead loads danger of being injured!
Use only transport equipment with sufficient lifting capacity. Take care of structural safety when using lifting equipment!
Moving parts must always be secured against slipping or moving.

Maximum weight of the ETH Electro Thrust Cylinder with Parker drive

<table>
<thead>
<tr>
<th>ETH032</th>
<th>ETH050</th>
<th>ETH080</th>
<th>ETH100</th>
<th>ETH125</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 kg</td>
<td>40 kg</td>
<td>100 kg</td>
<td>220 kg</td>
<td>490 kg</td>
</tr>
</tbody>
</table>

The weights mentioned are max. values. They contain the max. stroke, the heaviest options and the largest drives.

The following threads on the cylinder can be used to fix transport or mounting appliances (e.g. eye bolts):

Motor inline: ETH032 ... ETH080

Figure 1: Motor inline: ETH032... ETH080

Motor parallel: ETH032 ... ETH080

Figure 2: Motor parallel: ETH032... ETH080
Note the following points:

- Please make sure that at least two eye bolts are used and that the load on all eye bolts is evenly distributed.
- Full load of the eye bolts in a maximum angle of 45° (please refer to Figure 4).
- Don't use lateral traction (please refer to Figure 5).
- Before use the eyes bolts must be checked that they are firmly seated and not damaged.
- The eye bolts are level and grid with the surface.
- Deformed eye bolts should not be used and screwed anymore.
- Supplied eye bolts are not made of stainless material and must therefore be removed after installation of IP65 or VA-option.
- In case the cylinder is dismounted from the machine at a later time, new eye bolts must be used due to safety reasons!

![Figure 3: Eye bolt](image3.png)

![Figure 4: Maximum angle eye bolt](image4.png)

![Figure 5: Eye bolt without rope pull](image5.png)

**Motor inline: ETH100&125**

![Figure 6: Transport instructions ETH100&125 inline](image6.png)

Area A: Front cap  
Area B: Inline coupling housing  
Thread TA and TB: on all four sides

**WARNING**

From frame size ETH 100 on, the provided M12 threads (please refer to Figure 6 and Figure 7) must be used together with M12 external thread eye bolts in accordance with DIN 580.
Motor parallel: ETH100&125

![Figure 7: Transport instructions ETH100&125 parallel](image)

Area A: Front cap  
Area C: Parallel housing  
Thread TA: on all four sides  
Thread TB: also on the opposite side, but not on the underside

<table>
<thead>
<tr>
<th>Unit</th>
<th>ETH100</th>
<th>ETH125</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inline</td>
<td>parallel</td>
</tr>
<tr>
<td>a1</td>
<td>mm</td>
<td>32</td>
</tr>
<tr>
<td>a2</td>
<td>mm</td>
<td>32</td>
</tr>
<tr>
<td>b1</td>
<td>mm</td>
<td>64</td>
</tr>
<tr>
<td>b2</td>
<td>mm</td>
<td>64</td>
</tr>
<tr>
<td>c1</td>
<td>mm</td>
<td>--</td>
</tr>
<tr>
<td>c2</td>
<td>mm</td>
<td>--</td>
</tr>
<tr>
<td>TA</td>
<td>mm</td>
<td>M12x12</td>
</tr>
<tr>
<td>TB</td>
<td>mm</td>
<td>M12x12</td>
</tr>
<tr>
<td>TC</td>
<td>mm</td>
<td>--</td>
</tr>
</tbody>
</table>
1.7 Terms of guarantee / warranty

These operating instructions are subject to changes including changes in technical details with respect to the information and figures contained herein.

Parker Hannifin Manufacturing Germany GmbH & Co. KG grants no quality or durability guarantees nor any guarantees as to the suitability for specific purposes. Such guarantees must be expressly agreed upon in writing.

Public statements, recommendations or advertising do not in any way represent quality specifications.

The warranty rights of the user imply that he reports any fault immediately and describes it precisely in his notice of defects. Parker Hannifin Manufacturing Germany GmbH & Co. KG is not responsible under any circumstances for damage to the product itself or any consequential damage caused by the product resulting from improper handling of the product. If Parker-Hannifin Manufacturing Germany GmbH & Co. KG is responsible for a defect, Parker-Hannifin Manufacturing Germany GmbH & Co. KG shall be authorized, at its discretion, to undertake improvements or deliver replacements.

In compliance with ISO 9000, all products are equipped with a type plate and a note of care that are bound to the device. The type plate must not be removed or damaged under any circumstances.

Parker Hannifin Manufacturing Germany GmbH & Co. KG shall not be held liable, regardless of any legal basis, except for cases of intent or gross negligence; injuries to life, body or health; or defects of malicious nondisclosure or whose absence was expressly guaranteed in writing.

Furthermore, if there is compulsory liability under the Product Liability legislation for personal injury and property damage to privately used objects, in the event of negligent breach of significant contractual obligations, Parker Hannifin Manufacturing Germany GmbH & Co. KG shall also be liable for cases of ordinary negligence; however, this is limited to damages that are contractually typical and foreseeable.

Further claims are hereby excluded.

The warranty shall lapse in the event of non-compliance with these operating instructions, the relevant statutory provisions and other information provided by the supplier.

In particular, we are not responsible for failures caused by modifications made by the customer or other parties. In such cases, the normal repair costs will be calculated. These costs will likewise be calculated for a check of the unit if no fault can be determined on the unit.

This regulation also applies during the warranty period.

No claims exist as to the availability of previous versions or to the retrofitting capacity of the units delivered to adapt them to the respectively current model version.

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.

1.8 Conditions of utilization

General introductory notes

With the 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.

The operation of the electro cylinder is only permitted within the limit values stated in this manual.

Unless, all claims under the warranty will become void and a reduced service life or even damages 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
**NOTICE**

Even if the limit switches were already mounted at our premises, they must be adapted according 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

**Note on cylinder mounting**

**DANGER**

Do always use all available mounting possibilities and respect the requirements listed in chapter "Screw tightening torques for the mounting of the ETH cylinder by the customer". (see page 16)

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.

**CAUTION**

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 resp. for relubrication 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.

**CAUTION**

Depending on the operating conditions (rotation speed, load, etc.) increased surface temperature in the area of the drive may occur. When touching it during operation slight injuries from burning may occur. Don't touch the product during operation. At maintenance, service and repair always take care that the product is cooled off before starting work.
2. Commissioning

In this chapter you can read about:

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Electrical installation ........................................... 21
Motor/ gear assembly ........................................... 23

Read safety instructions (see page 7) before taking into operation!
The product 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.

Depending on the application, the operating company must provide for a suitable
separating safety fence. The access to the motion area of the ballscrew and
piston rod should be prevented during operation.

Before commissioning Safety instructions (see page 7) must be read!
The sound may vary from cylinder to cylinder. It depends on the motor/gearbox,
different drive options or on the production series due to different production lots.
Different sounds do not provide any hint as to the lifetime of the cylinder.

Depending on the operating conditions (rotation speed, load, etc.) increased
surface temperature in the area of the drive may occur. When touching it during
operation slight injuries from burning may occur. Don't touch the product during
operation.

2.1 Mounting

In this chapter you can read about:

Mounting with mounting threads on the cylinder .............................................................. 15
Mounting with mounting accessories ............................................................................... 16
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Do only use the appropriate mounting parts offered in the Parker product
catalogue for the respective mounting methods. These mounting parts are
especially designed for the ETH.

Please note:
The cylinder housing must be mounted without tension or contortion.
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.

ETH100&125 does not have a mounting thread at the bottom of the cylinder.
Dimensions: please refer to ETH catalogue.

For cylinders in IP version, the cylinder is enclosed in a protective coating with
possibly not constant layer thickness. Therefore it can happen that when using
the front or rear mounting surfaces (only for parallel motor mounting) the
alignment of the cylinder deviates from the ideal 90° position.
2.1.2. Mounting with mounting accessories


2.1.2.1 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.

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.

2.1.2.2 Screw tightening torques for the mounting of the customer’s ETH cylinder

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), under the assumption that 100 % of the permissible axial force are required.

Additionally, take care that no other loads act on the screws.

If these specifications are not adhered to, the screw joint might fail.

The failure of screw joint may lead to severe injuries.

<table>
<thead>
<tr>
<th>Option</th>
<th>Screw tightening torque (1) [Nm]</th>
<th>Minimum screw-in depth [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>F*</td>
<td>M6 - 12.9</td>
<td>15.5 (3)</td>
</tr>
<tr>
<td></td>
<td>M8 - 12.9</td>
<td>47 (3)</td>
</tr>
<tr>
<td></td>
<td>M12 - 12.9</td>
<td>160 (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>160 (3)</td>
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<tr>
<td></td>
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<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
</tr>
<tr>
<td>F</td>
<td>M6 - A2-70</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>M8 - A2-70</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>M10 - A2-70</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
</tr>
<tr>
<td>F</td>
<td>M6 - 8.8</td>
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<td></td>
<td>M8 - 8.8</td>
<td>19</td>
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<tr>
<td></td>
<td>M10 - 8.8</td>
<td>39</td>
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<td></td>
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<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
</tr>
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<td>C</td>
<td>M6 - 8.8</td>
<td>8</td>
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<tr>
<td></td>
<td>M8 - 8.8</td>
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<td>Screw tightening torque (1) [Nm]</td>
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<tr>
<td>H</td>
<td>M6 - A2-70</td>
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</tr>
<tr>
<td>Option J</td>
<td>M8 - A2-70</td>
<td>16</td>
</tr>
<tr>
<td>Option N</td>
<td>M10 - A2-70</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
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<td>H</td>
<td>M6 - 8.8</td>
<td>7.5</td>
</tr>
<tr>
<td>Option J</td>
<td>M8 - 8.8</td>
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<td>Option N</td>
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<td>B*</td>
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<tr>
<td></td>
<td>M8 - 12.9</td>
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<tr>
<td></td>
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<td>160 (3)</td>
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<td>160 (3)</td>
</tr>
<tr>
<td></td>
<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
</tr>
<tr>
<td>G*</td>
<td>M6 - 12.9</td>
<td>16.5</td>
</tr>
<tr>
<td></td>
<td>M8 - 12.9</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>M12 - 12.9</td>
<td>160 (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>160 (3)</td>
</tr>
<tr>
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<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
</tr>
<tr>
<td>R</td>
<td>M6 - 8.8</td>
<td>9</td>
</tr>
<tr>
<td>(5)</td>
<td>M8 - 8.8</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>M10 - 8.8</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Screw tightening torque (1) [Nm]</td>
<td>Minimum screw-in depth [mm]</td>
</tr>
<tr>
<td>Option</td>
<td>ETH100 M10/M20</td>
<td>ETH125 M10/M20</td>
</tr>
<tr>
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<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>F*</td>
<td>not possible</td>
<td>not possible</td>
</tr>
<tr>
<td></td>
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<tr>
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<td>M20 – 8.8</td>
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<td>80</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>F</td>
<td>M16 – A2-70</td>
<td>M20 – A2-70</td>
</tr>
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<td>180</td>
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<td></td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>E</td>
<td>M16 – 8.8</td>
<td>M20 – 8.8</td>
</tr>
<tr>
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<td>H</td>
<td>M16 – 8.8</td>
<td>M20 – 8.8</td>
</tr>
<tr>
<td>J</td>
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<td>180</td>
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<tr>
<td>N</td>
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<td>25</td>
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<tr>
<td>H</td>
<td>M16 – A2-70</td>
<td>M20 – A2-70</td>
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<td>180</td>
</tr>
<tr>
<td>N</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>B*</td>
<td>M16 – 10.9</td>
<td>M20 – 8.8</td>
</tr>
<tr>
<td></td>
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<td>330</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>G*</td>
<td>M16 – 10.9</td>
<td>M20 – 8.8</td>
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<td>330</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

* 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. For the ETH100&125, no GEOMET coated screw is required. (as the bracket is not available in stainless steel).
(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 1.8
(5) for power transmission from rod guide to your application please use the dowel pins

For all mounting options the following applies:

- 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)

⚠️ WARNING ⚠️

With mounting option F, H and J, do not mount the cylinder horizontally on one side as in this case the bolted connections are improperly high burdened due to pitching torques and cross forces. In this case always support the cylinder!

With ETH032-080 the mounting thread F* on the underside of the cylinder can be used as support.

With ETH100&125 the transporting thread (see page 10) can be used as support. For this a screw M12x1.25, quality 8.8 must be used. Furthermore, a minimum screw-in depth of 15 mm must be adhered to. Tighten screw with tightening torque 30 Nm.
2.1.2.3 Accessory mounting - bearing block

Tightening torques for the bearing block to be provided by the customer.

<table>
<thead>
<tr>
<th>ETH</th>
<th>Part number</th>
<th>Pitch</th>
<th>Screw tightening torque (1) [Nm]</th>
<th>Minimum screw-in depth (2) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>032</td>
<td>0112.039</td>
<td>M8-12.9</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>0122.039</td>
<td>M10-12.9</td>
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<td>21</td>
</tr>
<tr>
<td></td>
<td>0132.039</td>
<td>M12-12.9</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>0142.039</td>
<td>M16 – 8.8</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>0152.039</td>
<td>M20 – 8.8</td>
<td>66</td>
<td>66</td>
</tr>
</tbody>
</table>

(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)

2.1.2.4 Mounting of force sensors

**NOTICE**

For mounting the force sensor please observe the attached operating instructions respective for the force sensors!

2.1.2.5 Mounting - Fixing of accessories - Rear clevis with force sensor

Customer’s screw tightening torques for the force sensor with rear clevis.

<table>
<thead>
<tr>
<th>ETH</th>
<th>Pitch</th>
<th>Part number</th>
<th>Screw tightening torque (1) [Nm]</th>
<th>Minimum screw-in depth (2) [mm]</th>
<th>Deflection angle α [°]</th>
</tr>
</thead>
<tbody>
<tr>
<td>032</td>
<td>M05</td>
<td>0112.034-01</td>
<td>M6x20</td>
<td>9</td>
<td>3.5</td>
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<tr>
<td></td>
<td>M10</td>
<td>0112.034-01</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M16</td>
<td>0112.034-02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>050</td>
<td>M05</td>
<td>0122.034-01</td>
<td>M8x20</td>
<td>12</td>
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<td></td>
<td>M10</td>
<td>0122.034-02</td>
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</tr>
<tr>
<td></td>
<td>M20</td>
<td>0112.034-03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>080</td>
<td>M05</td>
<td>0132.034-01</td>
<td>M10x25</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>M10</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>M32</td>
<td>0132.034-03</td>
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</tr>
<tr>
<td>100</td>
<td>M10/M20</td>
<td>0142.034-01</td>
<td>M16x50</td>
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<td>4</td>
</tr>
<tr>
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<td>M10/M20</td>
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<td>M20x60</td>
<td>18</td>
<td>4</td>
</tr>
</tbody>
</table>

(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)
2.1.2.6 **Mounting the rod guide (option R)**

The rod guide is only available for frame sizes ETH032 ... ETH080!

![Figure 8: Mounting the rod guide](image)

Place the cylinder on a suitable installation surface. For the following steps, the piston rod of the cylinder must be retracted.

- Unwrap the rod guide and remove the transportation lock between the rod guide module (see Figure 8 Pos. 1) and the front panel (see Figure 8 Pos. 3).

- Pull out the front plate with the guide rods from the rod guide module and set them aside.

- Slide the rod guide module (see Figure 8 Pos. 1) onto the centering collar of the ETH cylinder. Please note: with the relubrication option in the centre of the profile, the lubrication opening in the profile can be concealed by the guide rods.

- Screw together the rod guide module with the screws supplied (see Figure 8 Pos. 2) and the required tightening torque. For tightening torques see chapter 2.1.2.2 screw tightening torques for the mounting of the ETH cylinder on the customer's side, option F.

- Loosen the screw (see Figure 8 Pos. 5) thus the lock nut (see Figure 8 Pos. 4) can move freely.

- Slide the front panel with the guide rods back into the rod guide module.

- Turn the lock nut on the piston rod of the ETH cylinder and lock it with the hexagon nut (see Figure 8 Pos. 6).

- Clamp the lock nut with the front panel by tightening the screw (see Figure 8 Pos. 5) with the required tightening torque. To avoid damaging the cylinder, the lock nut must be used to hold the cylinder in place. Tightening torques: ETH032 = 6,5 Nm, ETH050 = 16 Nm, ETH080 = 29 Nm.

For power transmission from the rod guide module to your application please use dowel pins. We recommend to secure the screws with a liquid bolt retaining compound (e.g. Loctite242)
2.1.3. Mounting Instructions

2.1.3.1 Side Load
Please respect the maximum permissible side loads depending on the vertical or horizontal mounting position.
Permissible lateral force: please refer to ETH catalogue
http://www.Parker.com/Literature/Electromechanical Europe/Literature/190_550017_ETH_katalog.pdf,

2.1.3.2 Mounting of the payload
When mounting the payload, please make sure that no torque is applied to the thrust rod. Use the flat on the thrust rod to apply counter pressure, see indication “SW" "Cylinder Rod Version": please refer to ETH catalogue.

![Figure 9: Mounting of the payload](image)

⚠️ CAUTION

When fixing the load on the thrust rod end, do always apply counter pressure on the respective flat, KV (SW) with an appropriate tool!
Otherwise, the internal anti-rotation protection might be damaged.

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.

The 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 rod clevis or spherical rod eye
- Use a flexible cylinder fixing device (accessories) such as rear clevis or center trunnion.

⚠️ WARNING

Do only use the rod ends supplied by Parker.
Only use the nut delivered with the rod end option M as counter screw.
The connection provided from the customer is always screwed in the thread of option M.

"Cylinder Rod Version": please refer to ETH catalogue.
2.2   Electrical installation

In this chapter you can read about:
Direction of the motor during extension of the cylinder .................................................... 21
Sensors........................................................................................................................... 21
Setting the end limits....................................................................................................... 22
................................................................................................................................. 23

2.2.1. Direction of the motor during extension of the cylinder

Figure 10: Direction of the motor during extension of the cylinder

With parallel drive (please refer to Figure 10) the turning direction of the motor is reversed in comparison to the direct drive configuration!

2.2.2. Sensors

All electro cylinders feature a permanent magnet in the spindle nut. It activates the sensors which are mounted in the special mounting grooves on one side of the cylinder.
Sensors and limit switches: see ETH catalogue (solutions.parker.com/ETH_support).

2.2.2.1 Sensor mounting

- Sensors can be inserted into 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 sharp screwdriver to lever the ends of the covers off the grooves. Pull the entire covers out manually.
- Install the sensors. The sensors can be inserted into the grooves from above. The cable ends should lead into the motor 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 page 22), 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. A pair of scissors may be used. Please cut off an additional 5 to 10 mm, where the cables are to be lead out of the profile (please refer to Figure 12).
- Insert the cables into the grooves of the plastic covers and push the cover into the groove together with the cable.
- Please observe the Operating Instructions of the manufacturer when commissioning the sensors.
- Connect the sensors to the controller.
  Sensors and limit switches: see ETH catalogue (solutions.parker.com/ETH_support).
2.2.3. Setting the end limits

**WARNING**
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.

**NOTICE**
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.

The given positions "A" and "B" are estimated recommendations and may vary. We therefore recommend to adjust the final sensor position during the initial start up.

<table>
<thead>
<tr>
<th>ETH</th>
<th>Pitch</th>
<th>A [mm]</th>
<th>B [mm]</th>
</tr>
</thead>
<tbody>
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<td>032</td>
<td>M05</td>
<td>68</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>M10</td>
<td>77</td>
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<td></td>
<td>M16</td>
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</tr>
<tr>
<td></td>
<td>M20</td>
<td>274</td>
<td>6</td>
</tr>
</tbody>
</table>
Please add the respective safety travels to the mentioned values!
Stroke, Usable Stroke and Safety Travel: see ETH catalogue (solutions.parker.com/ETH_support).

Sensors and limit switches: see ETH catalogue (solutions.parker.com/ETH_support).

**Adjusting the machine reference initiator**
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/ gear assembly

**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.

**DANGER**
Improper wiring may lead to severe injuries or death.
A wiring must always be made from a skilled electrician.
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 non available - with a mounting screw. In the latter case, the coloring under the head of the screw must be removed.

**WARNING**
The internal ballscrew is not self-locking!
Always take care, especially in vertical position of the ETH cylinder that the piston rod must be safeguarded!

**In case of non respect severe injuries may occur.**

**In this chapter you can read about:**
- Motor / gear assembly with inline motor configuration ..................................................... 24
- Motor / gearbox mounting with parallel motor configuration ............................................. 26
- IP65 motor mount........................................................................................................... 33
2.3.1. Motor / gear assembly with inline motor configuration

ETH032 ... ETH080

Figure 14: Motor / gear assembly ETH032 ... ETH080 inline

ETH100&125

Dismantle motor / gearbox

- Remove motor connector.
- If you use a gearbox, we recommend to dismantle the motor from the gearbox first for reasons of weight.
- Loosen screws (please refer to Figure 14).
- Remove motor / gearbox including mounted coupling half with caution.
Loosen clamping screw(s):

- ETH032, ETH050, ETH080: loosen radial clamping screw of the coupling half.

- ETH100&125:
  loosen all clamping screws (please refer to Figure 15 Pos.E2) equally (approx. 3 mm) and screw in two of the screws in the open threaded holes. Now tighten screws evenly until the clamp collar (please refer to Figure 16 Pos. 4) is released from the coupling hub (please refer to Figure 15 Pos. 2) and can be freely moved.

Remove coupling half from the motor / gear shaft.

Motor / gear assembly

Please make sure that the clamping screw(s) of the coupling half is/are released and that the clamp collar (please refer to Figure 15Pos. 4) and the coupling hub ((please refer to Figure 15 Pos. 2) are pulled apart.

Slip the coupling half onto the motor / gearbox shaft and align to be flush with the shaft.

ATTENTION!
Shafs and bores of the hubs must be free of burrs, dirt and grease.

- ETH032, ETH050, ETH080: tighten radial clamping screw with tightening torque (see Table 1).

- ETH100&125:
  Tighten the fixing screws (please refer to Figure 17 Pos. E2) crosswise with a torque wrench in 3 turns with 1/3, 2/3 and full tightening torque (please refer to Table 1) until the final tightening torque is attained and the clamp collar touches the coupling half. The dead stop (please refer to Figure 18 Pos. 1) on the coupling half (please refer to Figure 18 Pos. 2) prevents too high pretension of the conical clamp collar and ensures high rotational accuracy.

Place Elastomer crown on the coupling

Joining with the Elastomer crown requires an axial mounting force. This force can be reduced by cleaning and lightly greasing the spider element and the contact surfaces.

ATTENTION!
Oils and greases containing molybdenum disulfide or other high pressure additives as well as sliding grease paste may not be used.

Place motor/gearbox on the mounted flange, so that the coupling halves intermesh.

⚠️ CAUTION ⚠️
Secure motor/gearbox against dropping.
Eye bolts must be used with suitable lifting devices for motors and gearboxes with eyes bolts.

Equip screw with washer and tighten (please refer to Figure 14 Pos.6 , Pos. 7).
2.3.2. Motor / gearbox mounting with parallel motor configuration

With parallel motor configuration, increased running noises are possible due to the belt until it has run in.

In this chapter you can read about:
- Parallel mounting ETH032 ... ETH080 standard .............................................................. 26
- Parallel mounting ETH032 ... ETH080 with Ex - Motor .................................................... 28
- Parallel mounting ETH100 & ETH125 ............................................................................. 30
- Re-apply toothed belt pre-tension (reinsert the same toothed belt, all ETH sizes) ............ 32
- Re-adjust toothed belt pretension (new toothed belt, all ETH sizes) .............................. 32

2.3.2.1 Parallel mounting ETH032 ... ETH080 standard

ETH032 ... ETH080
(valid for all mounting options)

ETH032 ... ETH080
(not valid for mounting Parker EX motors)

* All clamping screws of the coupling halves must be secured (medium strength) by a screw lock.

Table 1: Tightening torques with motor / gearbox assembly

<table>
<thead>
<tr>
<th>ETH</th>
<th>Coupling size/model</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>032</td>
<td>GS12 (outer diameter: 25 mm)</td>
<td>1.4 Nm</td>
</tr>
<tr>
<td>050</td>
<td>GS14 (Outer diameter: 30 mm)</td>
<td>1.4 Nm</td>
</tr>
<tr>
<td>080</td>
<td>GS19 (Outer diameter: 40 mm)</td>
<td>10.5 Nm</td>
</tr>
<tr>
<td>100</td>
<td>EK6-300, screws ISO4762 M6</td>
<td>12 Nm</td>
</tr>
<tr>
<td>125</td>
<td>EK6-450, screws ISO4762 M8</td>
<td>35 Nm</td>
</tr>
</tbody>
</table>

Figure 19: Parallel housing  
Figure 20: Parallel drive
Motor / gearbox dismantling (ETH032 ... ETH080) (valid for all mounting options)

- Remove connectors from motor.
- Dismantle lid (please refer to Figure 19 Pos.6) and screws (please refer to Figure 19 Pos. 9).
- Dismantle lid (please refer to Figure 19 Pos.4) and screws (please refer to Figure 19 Pos. 11).

**ATTENTION!** Keep all screws and lids for later mounting.

- Release toothed belt tension:
  - Slightly loosen 4 screws (please refer to Figure 20 Pos.7), by 1 to 2 turns (please refer to Figure 21).
  - **ACHTUNG!** Do not remove the screws entirely!
  - Loosen central toothed belt screw (please refer to Figure 19 Pos.12). The drive unit must lower slightly when the tensioning screw is loosened.
  - Loosen tightening screw (please refer to Figure 19 Pos.12) until the drive unit is not lowered any further.

- Remove 4 screws completely (please refer to Figure 20 Pos. 7). First at the bottom, then at the top.

**WARNING**
The internal ballscrew is not self-locking!
Always take care, especially in vertical position of the ETH cylinder that the piston rod must be safeguarded!

**CAUTION**
Make sure not to insert your fingers between motor / gearbox and electro cylinder!
We recommend to place a support pad between motor and cylinder profile.

- 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.
- Dismantle motor / gearbox flange (please refer to Figure 20 Pos.3) by loosening the screws (please refer to Figure 20 Pos.6).
- Measure and note depth "A" from toothed pulley to motor / gearbox shaft before dismounting the toothed pulley (please refer to Figure 22).
- Remove threaded pin(s) from the toothed pulley.
- Pull off toothed pulley with the aid of a pull-off tool.

Motor / gearbox mounting (ETH032 ... ETH080) (not valid for mounting Parker EX motors)

- 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.
- Screw in the toothed pulley threaded pin(s) and secure (medium strength) by screw lock.
- Mount motor / gearbox flange (please refer to Figure 20 Pos.3) with the screws (please refer to Figure 20 Pos.6 & 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 (please refer to Figure 20 Pos.7) until the motor flange fits. Do not yet tighten.

⚠️ **CAUTION**

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

We recommend to place a support pad between motor and cylinder profile.

• Setting the toothed belt pretension:
  • For the same toothed belt (see page 32).
  • For a new toothed belt (see page 32)

• Mount lid (please refer to Figure 19 Pos.6) with screws (please refer to Figure 19 Pos.9).

• Mount lid (please refer to Figure 19 Pos.4) with screws (please refer to Figure 19 Pos.11).

2.3.2.2 Parallel mounting ETH032 ... ETH080 with Ex - Motor

![Figure 23: Disassembly of an EX-motor](image)

**EX-Motor dismantling (ETH032 ... ETH080)**

The ETH032, 050 and 080 Electro cylinders for parallel mounting of the EX motor (ETH032 motor flange option K1B, ETH050 motor flange option K1D, ETH080 motor flange option K1J) are furnished with tensioned belt. When dismantling the motor, the belt must NOT be detensioned.

• Remove connectors from motor
• Remove cover plate (please refer to Figure 23 Pos. 3) and loosen screws (please refer to Figure 23 Pos. 4)

⚠️ **WARNING**

The internal ballscrew is not self-locking!

Always take care, especially in vertical position of the ETH cylinder that the piston rod must be safeguarded!

Secure motor/gearbox against dropping.

Eye bolts must be used with suitable lifting devices for motors and gearboxes with eyes bolts.

• Loosen motor fixing screws (please refer to Figure 23 Pos. 5)
• Remove motor from the hollow shaft. **ATTENTION!** Secure motor against dropping!
Mounting the EX-motor (ETH032... ETH080)

The ETH032, 050 and 080 Electro cylinders for parallel mounting of the EX motor (ETH032 motor flange option K1B, ETH050 motor flange option K1D, ETH080 motor flange option K1J) are furnished with tensioned belt. When dismantling the motor, the belt must NOT be detensioned.

- Clean contact surfaces of motor, motor shaft, motor flange, hollow shaft bore, clamping ring (please refer to Figure 23 Pos. 1)) and spacer sleeve (please refer to Figure 23 Pos. 2).
- Shaft, bore, clamping ring (please refer to Figure 23 Pos. 1) and spacer sleeve (please refer to Figure 23 Pos. 2) must be free from burrs, dirt and grease. Push the spacer sleeve (please refer to Figure 23 Pos. 2) in the hollow shaft bore up to its stop.

- Put the clamp collar (please refer to Figure 23 Pos. 1) onto the hollow shaft and shift it up to the stop.
- Align the slot of the clamping ring (please refer to Figure 23 Pos. 1) and the spacer sleeve (please refer to Figure 23 Pos. 2) to the slot of the hollow shaft.
- Align the hollow shaft so that the clamping screw (please refer to Figure 24 Pos. 4) stands over the opening of the flange.
- Place cylinder upright, with the hollow shaft bore on top.
- Push the motor vertically, with the motor shaft down, into the hollow shaft up to the stop. Please take care that the motor connectors are on the right side.

**NOTICE**

For the next steps, leave ETH cylinder and motor in this position.

- Insert and tighten motor fixing screws slightly (please refer to Figure 23 Pos. 5).
- Insert and tighten clamping screws slightly (please refer to Figure 23 Pos. 4).
- Tighten motor fixing screws.
- Tighten clamping screw (please refer to Figure 23 Pos. 4) with the respective tightening torque.
- Close the opening in the motor flange with the lid (please refer to Figure 23 Pos. 3)

**Tightening torques clamping screw:**

<table>
<thead>
<tr>
<th>Clamping screw</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH032 M4x16</td>
<td>3.5 Nm</td>
</tr>
<tr>
<td>ETH050 M5x20</td>
<td>7.2 Nm</td>
</tr>
<tr>
<td>ETH080 M6x26</td>
<td>11.8 Nm</td>
</tr>
</tbody>
</table>
2.3.2.3 Parallel mounting ETH100 & ETH125

**ETH100&125**

Figure 25: ETH1xx: Motor/gear assembly parallel

Figure 26: ETH1xx: Motor/gear assembly parallel with K1M-option

**Motor / gearbox mounting (ETH100&125)**

The ETH100&125 electro cylinder is furnished with tensioned belt. When dismantling the gearbox / motor, the belt must NOT be detensioned.

- Remove connectors from motor
- Dismantle lid (please refer to Figure 25 Pos.4) and screws (please refer to Figure 25 Pos.11).
- Loosen all tensioning screws of the clamping bushing (see Figure 25 Pos. 20) (approx. 3 mm).
  - with K1M drive option: loosen tensioning element (please refer to Figure 26Pos.20a) via flange sided mounting hole. For this, first loosen the lock screw (please refer to Figure 26 Pos. 16) and then the adjusting screw of the tensioning element.

**WARNING**

The internal ballscrew is not self-locking!

Always take care, especially in vertical position of the ETH cylinder that the piston rod must be safeguarded!

Secure motor/gearbox against dropping.

Eye bolts must be used with suitable lifting devices for motors and gearboxes with eyes bolts.

- Loosen motor fixing screws (please refer to Figure 25 Pos.6).
The clamping unit should (after loosening the tensioning screws) be loose. If not, knock slightly on the loosened screws with a hammer in order to push back the rear taper ring (not with K1M drive option).

Remove motor / gearbox from the hollow shaft.

**ATTENTION!** Secure motor/gearbox against dropping!

Remove clamping unit (please refer to Figure 25 Pos.20a & Figure 26 Pos 20a).

**Motor / gearbox mounting (ETH100&125)**

The ETH100&125 electro cylinder is furnished with tensioned belt. When mounting the gearbox / motor, the belt must NOT be detensioned or retensioned.

- Dismantle lid (please refer to Figure 25 Pos.4) and screws (please refer to Figure 25 Pos.11).
- Clean contact surfaces of motor / gearbox shaft and hollow shaft bore. Shaft and bores must be free of burrs, dirt and grease.
- Insert motor / gearbox into hollow shaft. with K1M drive option: Insert clamping element (please refer to Figure 26 Pos. 20a) in the hollow shaft on the motor side and slide it up to the exterior stop. Adjust tensioning element so that the adjusting screw can be tightened via flange sided mounting holes.

**WARNING**

The internal ballscrew is not self-locking!

Always take care, especially in vertical position of the ETH cylinder that the piston rod must be safeguarded!

Secure motor/gearbox against dropping.

Eye bolts must be used with suitable lifting devices for motors and gearboxes with eyes bolts.

- Insert and tighten motor fixing screws slightly.
- Insert clamping bushing (please refer to Figure 25 Pos.20) into hollow shaft and slide it up to the inner stop (not with K1M drive option).
- Tighten screws crosswise until the inner ring touches the shaft and the outer ring touches the hub (not with K1M drive option). Secure screws (medium strength) with locking compound.
- Tighten motor fixing screws.
- Afterwards tighten tensioning screws of the clamping bushing (please refer to Figure 25 Pos.20, please refer to Figure 26Pos.20a) crosswise step by step (in three turns with 1/3, 2/3 and full tightening torque), until the screw tightening torque (please refer to Table 2) is reached.

You can apply counter pressure with the aid of a hook wrench, which can be inserted into the bores on the toothed pulley.

- Mount lid (please refer to Figure 25 Pos.4) and screws (please refer to Figure 25 Pos.11).

**Tightening torque of motor flange/clamping bushing**

<table>
<thead>
<tr>
<th>Motor flange option</th>
<th>Screw tightening torques Clamping bushing (Pos. 20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH100 K1H, K1J, K1K, K1L, P1C, P1D, P1J</td>
<td>Hexagon socket SW: 5 mm M6, 15 Nm</td>
</tr>
<tr>
<td>ETH125 K1L, P1C, P1D, P1K</td>
<td>Hexagon socket SW: 5 mm M6, 15 Nm</td>
</tr>
<tr>
<td>K1M</td>
<td>Hexagon socket SW: 8 mm M16, 21 Nm</td>
</tr>
</tbody>
</table>

*Table 2: Tightening torques motor flanges/ clamping bushing*
2.3.2.4  Re-apply toothed belt pre-tension (reinsert the same toothed belt, all ETH sizes)

ETH032 ... ETH080
If the motor / gearbox is exchanged and the toothed belt is still in good condition, the pre-tension can be reset without measuring device.

✦ Remove the upper cover, please refer to Figure 19 Pos 6
    ✦ First check whether the toothed belt with its toothing is located in the upper and lower pulley.
    ✦ Screw in the screws (please refer to Figure 27 Pos.7) without torque, so that the drive unit can be lifted upwards
      **Recommendation:** Screw in the screws completely and then loosen again about half a turn.
    ✦ Tighten central toothed belt tensioning screw (please refer to Figure 19 Pos.12). The drive unit must lift when tightening the screw. Lift the unit until it touches the 2 internal stops (please refer to Figure 19 Pos. 10). This is made by tightening the central tightening screw.

✦ Tighten 4 screws (please refer to Figure 27 Pos.7) with the given tightening torque (please refer to Table 3).
✦ Refix both lids (please refer to Figure 19 Pos.4 & 6) with the respective screws (please refer to Figure 19 Pos.11 & 9).

**ETH100&125**
The ETH100&125 electro cylinder is furnished with tensioned belt. When dismantling the gearbox / motor, the belt must **NOT** be detensioned. Therefore, this chapter is usually not valid for the ETH100&125.

**Screw tightening torques belt tensioning option**

<table>
<thead>
<tr>
<th>ETH032</th>
<th>ETH050</th>
<th>ETH080</th>
<th>ETH100</th>
<th>ETH125</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Nm</td>
<td>5 Nm</td>
<td>20 Nm</td>
<td>70 Nm</td>
<td>115 Nm</td>
</tr>
</tbody>
</table>

**Table 3: Screw tightening torques belt tensioning option**

2.3.2.5  Re-adjust toothed belt pretension (new toothed belt, all ETH sizes)

After installing a new toothed belt, the toothed belt pre-tension must be readjusted.

✦ Make sure that the screws
  ETH032...ETH080: see Figure 27, Pos 7
  ETH100 & ETH125: see Figure 28, Pos 7 are provided with a medium strength screw lock (e.g. type Wiko 02K43) and are fully screwed in. Only screw in screws without torque, do not tighten completely:
  **Recommendation:** Screw in the screws completely and then loosen again about half a turn.
✦ ETH032...ETH080: For this sizes, the motor/ gearbox is already mounted.
✦ ETH100 & ETH125: For this sizes, the motor/ gearbox can be installed after belt tensioning. Furthermore, it must be take care the the lower bearing cover is already mounted (see Figure 38 Pos 3, screws Pos 1 with medium strength screw locking, eg type Wiko 02K43).
✦ Check, if the belt toothing is geared into the upper and lower toothed pulley.
The screws (please refer to Figure 27 Pos.7 ETH100&125; see Figure 28, Pos7) must be screwed in without torque, so that the drive unit can be lifted upwards.

Loosen both lock nuts (please refer to Figure 19 Pos.14; ETH100&125) (do not remove entirely).

Unscrew both threaded pins (please refer to Figure 19 Pos.10; ETH100&125) until they are almost level with the inside of the parallel housing.

Tighten central toothed belt tensioning screw (please refer to Figure 19 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 tension screw slightly and measure again.

Repeat this procedure until the required toothed belt pretension (see page 42) is set.

CAUTION

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

Screw in both threaded pins (please refer to Figure 19 Pos.10) until they touch the inner bracket. Tighten pins slightly.

ETH100 & ETH125 Motor/gearing installation: Now the motor/gearbox (see page 30) must be installed. In this case, the screws, Figure 28, Pos7 still have to be loosened easily. After the motor/gear assembly and before the gradual final tightening of the clamping bushing (see Figure 25Pos 20; Figure 26Pos 20a) the four screws, see Figure 28 Pos7, must be fully tightened (screw tightening torques see Table 3).

ETH032…ETH080: Completely tighten the four screws (please refer to Figure 27 Pos.7. screw tightening torques and Table 3.)

Reassemble the vocer ETH032…ETH080: please see Figure 19 Pos 4 & 6 with screws Pos 11 & 9 ETH100 & ETH125: please see Figure 38 Pos 4 & 6 screws Pos 11 & 9.

2.3.3. IP65 motor mount

For the IP65 option, we generally recommend to have the motor mounted by Parker. If the motor is not mounted by Parker, please respect the following instructions to achieve the best possible sealing effect.

2.3.3.1 Motor mounting for IP65 inline

The cylinder is furnished with mounted coupling housing and motor flange. Before mounting the motor to the flange, it must be sealed as follows.

Apply silicone sealing compound to the motor flange pilot (e.g. Sista Silicone F109 Universal).

Screw motor to motor flange (see chapter “Motor and gear assembly” (see page 23)).

Note the additional mounting steps (see chapter “Motor and gear assembly” (see page 23)).
2.3.3.2 IP65 motor mount parallel

The cylinder is furnished with mounted parallel housing. The housing as well as the motor flange which is fixed to the housing, must be sealed.

- Apply silicone sealing compound to the motor flange pilot (e.g. Sista Silicone F109 Universal).

- Screw motor to motor flange
  (see chapter “Motor and gear assembly” (see page 23)).

- Apply silicone sealing compound around bores of the parallel housing

- Mount motor with motor flange to parallel housing
  (see chapter “Motor and gearbox mounting” (see page 23)).

- Tension toothed belt
  (see “Exchange or tension toothed belt” (see page 42)).

- Place seal (furnished with the cylinder).

- Place lid (furnished with the cylinder).

- Fix lid and seal to parallel housing

- Note the additional mounting steps
  (see chapter “Motor and gear assembly” (see page 23)).
3. Maintenance and service

In this chapter you can read about:

- ............................................................................................................ 35
- ............................................................................................................ 35
- ............................................................................................................ 35
- Maintenance schedule ........................................................................ 36
- Lubricating intervals and amount of lubricant .................................... 36
- Toothed belt ........................................................................................ 39
- Belt / belt tensions ............................................................................. 42

**NOTICE**

Read safety instructions (see page 7) before taking into operation!

Before performing any maintenance work, turn the power switch to the '0' setting and secure it with a padlock against manipulation. If the unit needs to be operable for specific repair works, you have to be especially cautious. Please make sure that there are no persons in the hazardous area - if needs be, secure this area by additional enclosures or barriers against access.

**DANGER**

If set-up, repair or maintenance works require that safety installations be dismounted, these must be reinstalled immediately after the respective works have been completed. The unit must be shut down before any of the safety installations are dismounted.

**CAUTION**

Depending on the operating conditions (rotation speed, load, etc.) increased surface temperature in the area of the drive may occur. When touching it during operation slight injuries from burning may occur. Don't touch the product during operation. At maintenance, service and repair always take care that the product is cooled off before starting work.

**Maintenance measures ETH**

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. 10 000 movement cycles.

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 Maintenance schedule

<table>
<thead>
<tr>
<th>WHEN</th>
<th>WHAT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>After commissioning</td>
<td>Spindle</td>
<td>The cylinder is furnished completely lubricated. If the cylinder was held on stock at your premises for more than 1 year, it must be relubricated before commissioning. see lubricating intervals and amount of lubricant (see page 36)</td>
</tr>
<tr>
<td>Depending on the mileage, see table Lubricating intervals and amount of lubricant (see page 36)</td>
<td>Leas screw</td>
<td>Relubricating the screw. see lubricating intervals and amount of lubricant (see page 36)</td>
</tr>
<tr>
<td>Annually</td>
<td>Electro Cylinder</td>
<td>Visual inspection for external damages of the actuator. If externally caused damages are visible on the thrust rod or on the profile, please contact Parker.</td>
</tr>
<tr>
<td>Annually</td>
<td>Fixings provided by the customer</td>
<td>Check screw tightening torque. see mounting tightening torques ETH (see page 16)</td>
</tr>
<tr>
<td>Annually, or every 6000 hours of operation</td>
<td>Toothed belt (with parallel configuration)</td>
<td>In general, the high performance toothed belts used in the ETH are maintenance free. Visual inspection of the timing belt is however required. Please check the toothed belt for the following aspects: • Wear at the teeth • Cracks in the tooth root surface • Fractures in the belt back If you find signs of wear, the toothed belt must be exchanged (see page 40).</td>
</tr>
</tbody>
</table>

3.2 Lubricating intervals and amount of lubricant

The lubrication intervals depend on the operating conditions (series, 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. 10 000 movement cycles. 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. Lubrication is always required if the cylinder will not be used for a longer period of time or when operation is interrupted! The lubricant used is supplied by Klüber, it is available worldwide.

Normal operating conditions:
• Medium Speed: 0.5 x \( v_{\text{max}} \)
• Application factor \( f_a = 1.0 \)
• No impacts and vibrations
• Load ration \( F_m/F_{\text{max}}: \) 20 %
The given lubrication intervals apply.

<table>
<thead>
<tr>
<th></th>
<th>Lead screw</th>
<th>Interval</th>
<th>Amount of lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH032</td>
<td>M05</td>
<td>240 km</td>
<td>1.3 cm³</td>
</tr>
<tr>
<td></td>
<td>M10</td>
<td>480 km</td>
<td>1.6 cm³</td>
</tr>
<tr>
<td></td>
<td>M16</td>
<td>760 km</td>
<td>2.1 cm³</td>
</tr>
<tr>
<td>ETH050</td>
<td>M05</td>
<td>240 km</td>
<td>1.6 cm³</td>
</tr>
<tr>
<td></td>
<td>M10</td>
<td>480 km</td>
<td>1.9 cm³</td>
</tr>
<tr>
<td></td>
<td>M20</td>
<td>960 km</td>
<td>2.7 cm³</td>
</tr>
<tr>
<td>ETH080</td>
<td>M05</td>
<td>240 km</td>
<td>3.1 cm³</td>
</tr>
<tr>
<td></td>
<td>M10</td>
<td>480 km</td>
<td>4.4 cm³</td>
</tr>
<tr>
<td></td>
<td>M32</td>
<td>1530 km</td>
<td>7.8 cm³</td>
</tr>
<tr>
<td>ETH100</td>
<td>M10</td>
<td>280 km</td>
<td>14 cm³</td>
</tr>
<tr>
<td></td>
<td>M20</td>
<td>570 km</td>
<td>17 cm³</td>
</tr>
<tr>
<td>ETH125</td>
<td>M10</td>
<td>280 km</td>
<td>20 cm³</td>
</tr>
<tr>
<td></td>
<td>M20</td>
<td>570 km</td>
<td>48 cm³</td>
</tr>
</tbody>
</table>


**Lubricant**

*Notice* Do only use "Klüber NBU15" lubricating grease for standard cylinders!

For applications in food related areas, "Klübersynth UH1 64-62" grease is used (customized version).

After relubrication, a lubricating run must be performed. This ensures an even distribution of the lubricating agent.

Please make sure that the entire length is traveled in both directions at a speed of approx. 20 mm/s.

After this, the cylinder is ready for setup.

### 3.2.1. Relubrication via central lubrication port (standard)

*Figure 34: Relubrication via central lubrication port (standard)*

1. Central lubrication (standard)
2. Central lubrication (Option)

Make sure that all external stops are removed.

- Retreat Electro Cylinder completely so that it touches the rear stop.
- Move the cylinder by 0.5 mm into the internal buffer.

**Caution** Ensure by means of control/controller 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 (Part No.: 180-006043).
- Place the pipe orthogonally onto the lubricating nipple and press.
- Use the defined amount of lubricant (see page 36).
- 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.
3.2.2. **Relubrication via central lubrication port (option)**

![Figure 35: Relubrication via central lubrication port (option)](image)

1: Central lubrication (standard)
2: Central lubrication (Option)

**Lubrication port position**

Depending on the cylinder size and the selected stroke, the relubrication hole is located in the mid of the profile or in the mid of the stroke.

- Stroke ≥ Stroke limit: $L_2 = L/2$
- Stroke < Stroke limit: $L_2 = stroke / 2 + Offset$

<table>
<thead>
<tr>
<th>Pitch</th>
<th>Stroke limit [mm]</th>
<th>Offset [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH032</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M05</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>M10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETH050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M05</td>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>M10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETH080</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M05</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>M10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETH100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M10</td>
<td>160</td>
<td>22</td>
</tr>
<tr>
<td>M20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETH125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M10</td>
<td>240</td>
<td>25</td>
</tr>
<tr>
<td>M20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The below mentioned distances from the rear stop (on the motor side) to the central lubrication port in the profile are only reference values.

**Start-up position of relubrication port**

Assumption: Position = 0 at the rear buffer (lead screw completely retracted)

<table>
<thead>
<tr>
<th>Pitch</th>
<th>Position of center lubrication option [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>Stroke ≤ stroke limit [mm]</td>
</tr>
<tr>
<td>ETH032</td>
<td>M05</td>
</tr>
<tr>
<td></td>
<td>M10</td>
</tr>
<tr>
<td></td>
<td>M16</td>
</tr>
<tr>
<td></td>
<td>M20</td>
</tr>
<tr>
<td>ETH080</td>
<td>M05</td>
</tr>
<tr>
<td></td>
<td>M10</td>
</tr>
<tr>
<td></td>
<td>M20</td>
</tr>
<tr>
<td>ETH125</td>
<td>M10</td>
</tr>
<tr>
<td></td>
<td>M20</td>
</tr>
</tbody>
</table>
Loosen lubrication port screw.
Move the cylinder slowly to its lubricating position until the lubricating port becomes visible.
With frame sizes ETH032, ETH050 and ETH080 the lubrication ports have a diameter of 2.5 mm.
With frame sizes ETH100 and ETH125 the lubrication nipple is integrated.
For all sizes you need a beaked nozzle (Part No.: 180-006043) for your grease 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 page 36).
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 Toothed belt

#### 3.3.1 Checking the toothed belt

In general, the high performance toothed belts used in the ETH are maintenance free.
Visual inspection of the timing belt is however required. Please check the toothed belt for the following aspects:
- Wear at the teeth
- Cracks in the tooth root surface
- Fractures in the belt back
If you find signs of wear, the toothed belt must be exchanged (see page 40).
For visual inspection, you must only remove the (upper) lid with the four screws (see Figure 36 & Figure 38 Pos.4+11).
**ATTENTION!** Do not remove the screws of Pos.11 entirely.

**WARNING** Do not forget to refix the lid after the inspection!
3.3.2. Exchanging the toothed belt (ETH032 ... 080)

**ETH032 ... ETH080**
(valid for all mounting options)

**ETH032 ... ETH080**
(not valid for mounting Parker EX motors)

---

**Figure 36: Parallel housing (2)**

**Figure 37: Parallel drive (2)**

Dismantle the motor (see page 23)
- Loosen and remove 4 screws (please refer to Figure 36 Pos.1).
- Remove cover (please refer to Figure 36 Pos.3).
- Remove bar (please refer to Figure 36 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 (please refer to Figure 36 Pos.5).
- Replace cover (please refer to Figure 36 Pos.3).
- Apply screw lock "Wiko 02K43 medium" to 4 screws (please refer to Figure 36Pos.1) and tighten slightly.
- Align gearbox (please refer to Figure 36 Pos.2) with the electro cylinder.
- Tighten 4 screws (please refer to Figure 36 Pos.1) with the given tightening torque.

<table>
<thead>
<tr>
<th>ETH032</th>
<th>ETH050</th>
<th>ETH080</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Nm</td>
<td>20 Nm</td>
<td>40 Nm</td>
</tr>
</tbody>
</table>

- Mounting the motor (see page 23)
- Setting the toothed belt pretension:
  - For the same toothed belt (see page 32).
  - For a new toothed belt (see page 32)
- Mount lid (please refer to Figure 36 Pos.6) with screws (please refer to Figure 36 Pos.9).
- Mount lid (please refer to Figure 36 Pos.4) with screws (please refer to Figure 36 Pos.11).
3.3.3. Exchanging the toothed belt (ETH100&125)

ETH100&125

Dismantle the motor (see page 23)

The internal ball screw is not self-locking!
Always take care, especially in vertical position of the ETH cylinder that the piston rod must be safeguarded!

Toothed belt detensioning

- Slightly loosen 4 screws (please refer to Figure 38 Pos.7) by 1 or 2 turns.
  
  **ATTENTION!** Do not remove the screws entirely!

- Loosen central toothed belt tensioning screw (please refer to Figure 38 Pos.12).
  The drive unit must lower slightly when the tensioning screw is loosened.

- Loosen tightening screw (please refer to Figure 38 Pos.12) until the drive unit is not lowered any further.

- Loosen 5 screws (please refer to Figure 38 Pos.1) and remove lid (please refer to Figure 38 Pos.3). If the lid cannot be removed easily (please refer to Figure 38 Pos.3), try to remove it with a slightly pivoting movement.

- Remove middle bar (please refer to Figure 38 Pos.5) with seal.

- Loosen 4 screws (please refer to Figure 38 Pos.8) of the upper bearing flange (please refer to Figure 38 Pos.16) (do not remove entirely).

- Unscrew 4 screws (please refer to Figure 38 Pos.7) and remove motor flange (please refer to Figure 38 Pos.17).

- Completely unscrew toothed belt tensioning screw (please refer to Figure 38 Pos.12).

  **ATTENTION!** Secure upper bearing unit (please refer to Figure 38 Pos.18) against falling.

  **CAUTION!** Danger of crushing: Do not place your hands or fingers between upper bearing unit and parallel housing.

- Remove upper bearing unit with toothed belt (please refer to Figure 38 Pos.18).

- Loosen four screws (please refer to Figure 38 Pos.8) of the upper bearing flange and remove bearing flange (please refer to Figure 38 Pos.16) from the bearing (please refer to Figure 38 Pos.19).

- Remove hollow shaft with the two bearings (please refer to Figure 38 Pos.19) from the bearing housing (please refer to Figure 38 Pos.18).

Now, the toothed belt can be removed and the new belt can be inserted.

⚠️ **DANGER**

We recommend to place a support pad between motor and cylinder profile.

⚠️ **CAUTION**

Figure 38: Exchanging the tooth belt ETH1xx
Please make sure that the toothed belt is correctly geared in the pulley toothing.

Do only use the toothed belt specified by Parker.
Do only use the toothed belts with mentioned part number.

* Mounting in reverse order.
* (please refer to Figure 38 Pos.2,3 and 4) must be sealed with Atomsit.

Please respect the screw tightening torques.

* Setting the toothed belt pre-tension (see page 32)

### Tightening torques: Toothed belt change ETH100&125

<table>
<thead>
<tr>
<th>Position</th>
<th>Screw tightening torques</th>
<th>Screw locking compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pos.1</td>
<td>110 Nm</td>
<td>Loctite 242 / Wiko02K43</td>
</tr>
<tr>
<td>Pos.7</td>
<td>70 Nm</td>
<td>Loctite 242 / Wiko02K43</td>
</tr>
<tr>
<td>Pos.8</td>
<td>70 Nm</td>
<td>Loctite 242 / Wiko02K43</td>
</tr>
<tr>
<td>ETH125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pos.1</td>
<td>250 Nm</td>
<td>Loctite 242 / Wiko02K43</td>
</tr>
<tr>
<td>Pos.7</td>
<td>115 Nm</td>
<td>Loctite 242 / Wiko02K43</td>
</tr>
<tr>
<td>Pos.8</td>
<td>115 Nm</td>
<td>Loctite 242 / Wiko02K43</td>
</tr>
</tbody>
</table>

### 3.4 Belt / belt tensions

<table>
<thead>
<tr>
<th>ETH032</th>
<th>ETH050</th>
<th>ETH080</th>
<th>ETH100</th>
<th>ETH125 (1)</th>
<th>ETH125 (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part No.</td>
<td>0111.913</td>
<td>0121.913</td>
<td>0131.913</td>
<td>0141.913-02</td>
<td>0151.913</td>
</tr>
<tr>
<td>Belt pre-tension</td>
<td>210 N ±7 N</td>
<td>230 N ±7 N</td>
<td>450 N ±14 N</td>
<td>3500 N ±19 N</td>
<td>4900 N ±36 N</td>
</tr>
<tr>
<td>Trun Frequency</td>
<td>438 Hz ±14 Hz</td>
<td>306 Hz ±10 Hz</td>
<td>236 Hz ±8 Hz</td>
<td>370 Hz ±2 Hz</td>
<td>272 Hz ±2 Hz</td>
</tr>
<tr>
<td>Belt mass</td>
<td>0.060 kg/m</td>
<td>0.080 kg/m</td>
<td>0.120 kg/m</td>
<td>0.2065 kg/m</td>
<td>0.33 kg/m</td>
</tr>
<tr>
<td>Belt width</td>
<td>15 mm</td>
<td>20 mm</td>
<td>30 mm</td>
<td>50 mm</td>
<td>62 mm</td>
</tr>
<tr>
<td>Center distance</td>
<td>67.5 mm</td>
<td>87.5 mm</td>
<td>130 mm</td>
<td>176 mm</td>
<td>224 mm</td>
</tr>
</tbody>
</table>

1) Toothed belt inside is black
2) Toothed belt inside is yellow (installed till beginning of 2016)

### 4. Supply repair

In the event of a damage or a mechanical defect, the entire unit must be returned for repair (Parker Hannifin (see 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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