

Mounting instructions

LCB Manual - Installation, Commissioning, Maintenance and Repair

LCB - Compact Linear Actuator



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Sizes LCB040 and LCB060

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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.com/eme/lcb>

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1. Introduction

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1.1 Device assignment


This manual is valid for the following devices:

Linear actuator: LCB040

Linear actuator: LCB060

1.2 Type specification plate

Type specification plate (example)

	<p><i>Parker Hannifin GmbH</i> <i>Electromechanical Automation</i> <i>Robert-Bosch-Straße 22</i> <i>D-77656 Offenburg/Germany</i> <i>Tel.+49(0)781 509-0</i></p>	<p>Identification No.: 312707 0002 Art. No.: LCB060MG00600SRN Type: LCB060MG00600SRN Order confirmation No.: 21015463 Date: 2013/02/21 Made in Germany</p>
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Type specification plate explanation

Left:	Manufacturer address
Right:	Identification number
on No.:	Unambiguous identification number
Art. No.:	Order Code
Type:	Product designation
Order	Customer Order No.:
confirmati	
on No.:	
Date:	Delivery date

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. <i>Declaration No.:</i>	DoI005-R 1.0
Firma / <i>Manufacturer:</i> Bevollmächtigter / <i>Authorized person:</i>	Parker Hannifin GmbH Jürgen Killius
Anschrift <i>Address:</i>	Robert-Bosch-Straße 22 77656 Offenburg Deutschland
Produkt <i>Product:</i>	LCB: Parker kompaktes Linearmodul
Serien- / Typenbezeichnung <i>Model / Type:</i>	LCB040, LCB060
Seriennummer <i>Serial No.:</i>	Ab 287893-0001 From 287893-0001
Baujahr <i>Year of manufacture:</i>	Ab 2010 From 2010

Der oben genannte Hersteller / Bevollmächtigte erklärt, dass das Produkt den folgenden grundlegenden Anforderungen der Maschinen-Richtlinie (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 / <i>Standard</i>	Titel / <i>Title</i>	Ausgabe / <i>Edition</i>
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 Maschinen-Richtlinie 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, 01.12.2010

Jürgen Killius, Operations Manager

Parker Hannifin GmbH
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Dr. Gerd Scheffel, Günter Schrank, Christian Stein, Kees Verraat
Vorsitzender des Aufsichtsrates: Hansgeorg Greuner

1.4 Safety instructions

In this chapter you can read about:

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Intended use	6
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Safety Instructions for the Company Using the System.....	7
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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, however, 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 effect 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** (see on page 9)).

Storage

The linear module must be stored evenly and without any mechanical load. The stated storage temperature must be adhered to.

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.

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.

*By wrapping several turns of strong adhesive tape around the sliding carriage, which if possible is in the centre of the profile, for example.



Note	<p>Danger when transporting long actuators. Because the actuator bends under its own weight, guiding accuracy may deteriorate significantly. In addition, the shape of the profile may change and the travel behavior of the (sliding) carriage may be negatively affected.</p> <p>Additional information on transport: (see on page 8)</p>
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In general no means of transport are needed for the LCB. The linear actuator can be carried, depending on the size, by one or two persons.

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 this linear actuator 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 linear actuator is only permitted within the range of 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



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

- ◆ Speed
- ◆ Acceleration
- ◆ Environmental conditions (e.g. temperature, contamination)
- ◆ Please do take possible pulses caused by moved masses into consideration for the operating data.



Note on the installation of the linear actuator

Do always use all available mounting possibilities and respect the requirements listed in chapter "**Preparations for substructure** (see on page 11)", "**Fitting/mounting** (see on page 12)".

If the motor used with the linear actuator should be able to exceed individual limit values, 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.



The externally mounted end stops of the linear module may under no circumstances be accessed during operation. The end stops are only intended for safety purposes.

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

2. Commissioning

In this chapter you can read about:

Preparations for substructure.....11
 Fitting / mounting.....12

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.

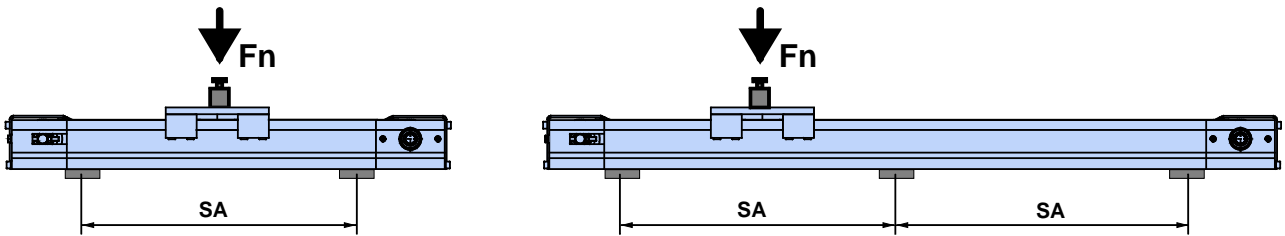
Technical data: See in the catalog section (following the mounting instructions).

2.1 Preparations for substructure

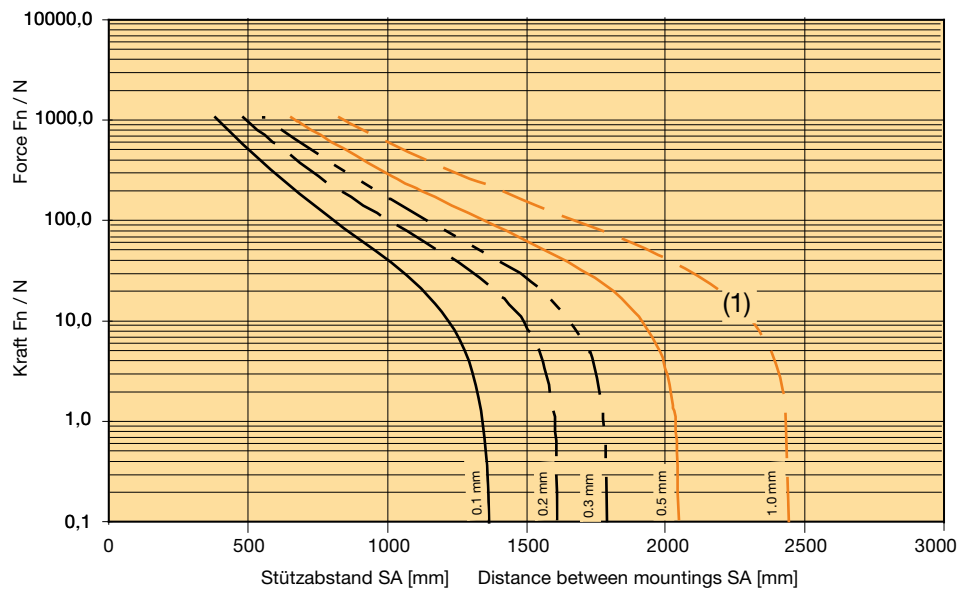
Each holding point must be even with a flat parallelism of 0.2 mm. All holding points must be aligned with parallelism to each other of better than 0.5 mm.

To simplify installation and adjustment, the holding points for the linear actuator can also consist of adapter plates. They can be aligned with tightening and pressure screws.

Deflection vs. distance between mountings and payload

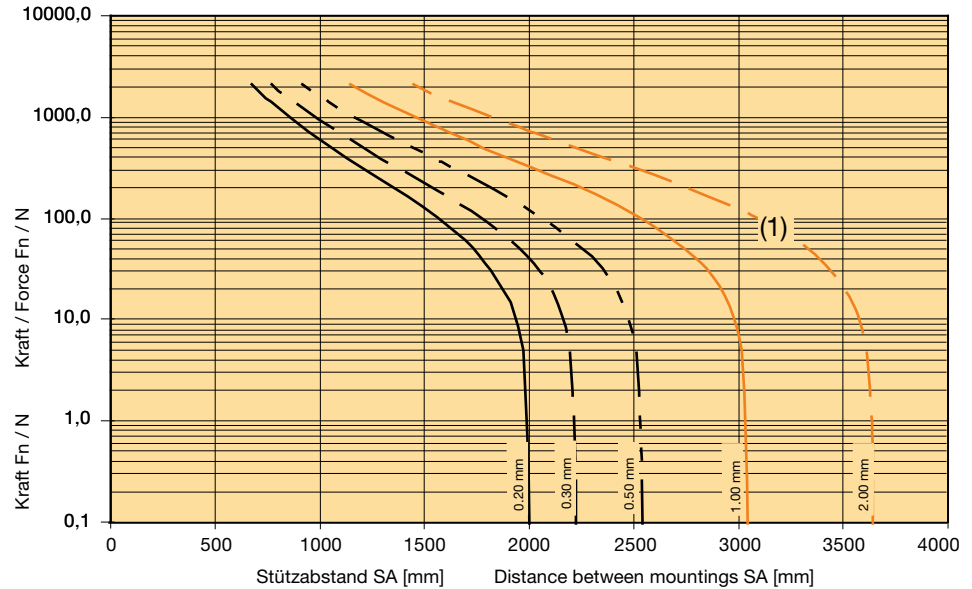


LCB040



(1): Maximum permitted deflection

LCB060



(1): Maximum permitted deflection

2.2 Fitting / mounting

2.2.1. Installation of a single actuator



Note	Danger when transporting long actuators. Because the actuator bends under its own weight, guiding accuracy may deteriorate significantly. In addition, the shape of the profile may change and the travel behavior of the (sliding) carriage may be negatively affected. Additional information on transport: (see on page 8)
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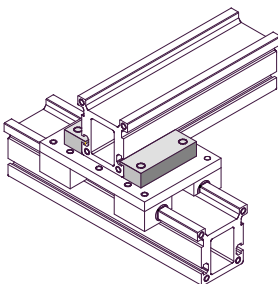


Note	When fitting the LCB into your system, please make sure that the deflection station and the sliding carriage are accessible for maintenance! (Provide enough space behind the deflection station so that the sliding blocks or the sliding carriage can be removed).
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- ◆ Take the linear module out of the shipping crate.
- ◆ Place it on the leveled holding points (water level, leveling device).
- ◆ Fix the module (LCB mounting methods)
- ◆ Fasten the connection parts in place.
- ◆ Removing the protective covering (adhesive tape).



Note	There are two ways to fasten the LCB in place.
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- ◆ Mounting with clamping profiles or
- ◆ With T slot bolts/nuts that are guided into the grooves of the aluminum profile.

Mounting accessories: see in the catalog section (following the mounting instructions).



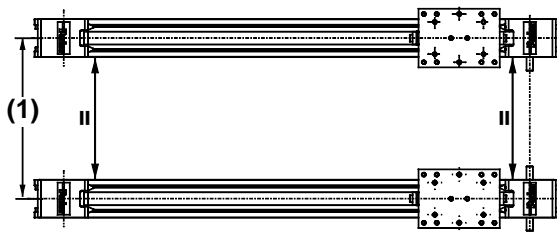
Note	The standard installation position is horizontal with the sliding carriage up. Optionally (after consultation with the manufacturer) a horizontal installation position with the sliding carriage on the side or at the bottom or vertical installation are also possible.
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2.2.2. Installation of a double-axis actuator

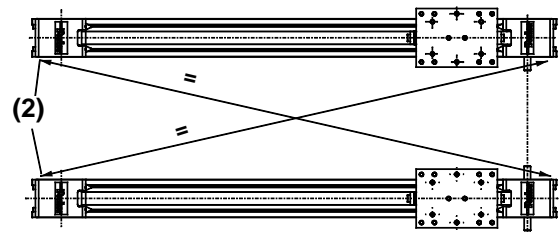
- ◆ Taking the linear actuator out of the shipping crate.
- ◆ Place it on the leveled holding points (water level, leveling device).
- ◆ Fix the module (LCB mounting methods)
- ◆ Place second actuator and fix slightly.
- ◆ Measuring the parallelism (measure tape).
- ◆ Measure both diagonals in order to verify rectangularity (measuring tape). Correct diagonal measure by parallel movement of the second linear actuator, if necessary.
- ◆ Verify the horizontal alignment of the linear actuators (water level, leveling device) and correct if needs be.
- ◆ Fix the second actuator permanently.
- ◆ Fasten the connection parts in place.
- ◆ Removing the protective covering (adhesive tape).
- ◆ If the sliding carriages of the two linear actuators are to be linked mechanically, please take care that the system is mounted non distortedly with respect to the guiding and the drive train. In order to avoid torsional stress, loosen and refasten the couplings of the shaft kit if needs be.

Alignment of a double-axis actuator

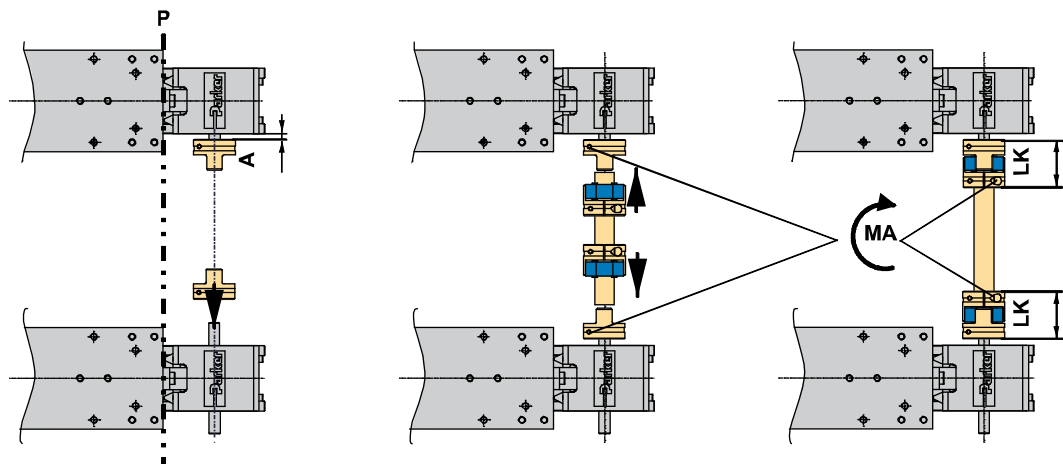
(1) Axis distance



(2) Measure to profile end



Installation of a shaft kit



- ◆ The sliding carriages of the two linear actuators must stand on the same position P (Recommendation: Push both actuators to the same stop).
- ◆ Place half-coupling for small shaft diameter on the free shaft ends with distance A and tighten clamping screw with torque MA. Insert plastic part.
- ◆ Slide the two other coupling halves on to the connection shaft.
- ◆ Position connection shaft between the free shaft ends and push the respective coupling halves towards each other. Caution! Do not push to block - coupling package must have total length LK.
- ◆ Tighten clamping screws on both coupling halves on the connection shaft with torque MA.

	Unit	LCB040	LCB060
A Distance coupling / drive station	[mm]	8	14
MA Tightening torque of clamping screws	[Nm]	1.4	10.5
LK Length of coupling package	[mm]	35	66

2.2.3. Setting the end limits

The software end limits (programmable end limits) can be used to define the maximum travel path in the positive and negative direction. The machine zero initiator (home switch) must always be within the software end limits. The switch must be mounted so that the sliding carriage can under no circumstances travel beyond (the switch should ideally be mounted in proximity of the drive station or the deflection station. Switching distance 2 - 4 mm) if needs be an additional external buffer must be fitted.



Caution	The software end limits are not preset. For this reason, they must be defined and entered into the control system before the unit is placed in service.
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Note	Recommendation: The actual zero point of your controller should be the same as the machine zero point.
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2.2.4. Attachment of Motor or Gearbox

If you ordered the LCB together with a coupling kit, the coupling housing with the half-coupling is already mounted on the drive shaft of the linear actuator. In this case please proceed with step 2, if not start with step 1.

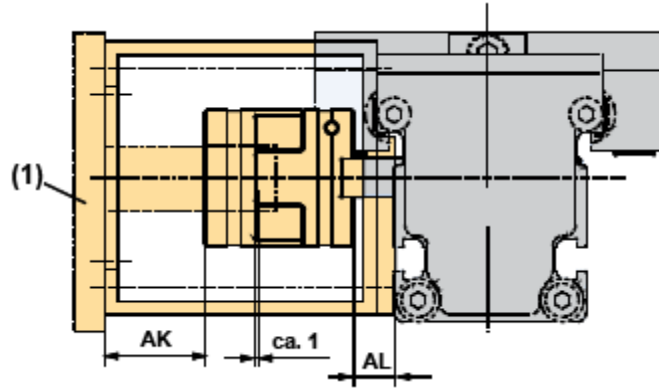
(1) If the coupling housing and the half-coupling are not pre-assembled, please proceed as follows:

- ◆ Place half-coupling for small shaft diameter on the drive shaft (with distance AL to LCB) and tighten clamping screw with torque MA.
- ◆ Insert plastic part.
- ◆ Mount coupling housing

(2) Coupling housing and half coupling are pre-assembled:

- ◆ Place the other half-coupling on the gear- or motor shaft and fix with distance AK to the flange surface of the drive unit with torque MA.
- ◆ Fix gearbox and motor to the coupling housing (the gearbox shaft must be exactly centered with respect to the drive shaft of the linear actuator!)
- ◆ There should be only an air gap of about 0.5 - 1 mm between the half-coupling on the gearbox- or motor shaft and the other half-coupling.

Drawing without lateral cover



		Unit	LCB040			LCB060		
Drive Option			L (PTN060)	U (SMH60)	N (SY56)	M (PTN080)	W (SMH100)	P (SY107)
AK	Distance between flange surface of the coupling housing and the coupling	[mm]	23	4.5	40	15	13.5	54
MA	Tightening torque of clamping screws	[Nm]	1.4			10.5		
AL	Distance between flange surface of the coupling housing and the drive station	[mm]	8			14		

Details and dimensions on "coupling kits" and "drive options" can be found under: Accessories and options: see in the catalog section (following the mounting instructions).

3. Maintenance and service

In this chapter you can read about:

Safety Instruction.....	16
Maintenance schedule.....	17
Check free movement of the sliding carriage	17
Replacement interval for wearing parts.....	17
Checking / exchanging / tensioning toothed belt	20

Use only authentic spare parts.

Improper or unprofessional repair will lead to an expiry of any warranty.

If you encounter problems, please contact:

Service Dept.

Phone: +49 (0)781 509-700

Fax: +49 (0)781 / 509-98316

3.1 Safety Instruction

Before performing any maintenance or repair 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. Ensure by all means that no persons are in the hazardous area. If required, safeguard the hazardous area with additional barriers or gratings against unauthorized persons. Repair jobs must only be performed by qualified specialists or employees of Parker.

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 person responsible for the safety of the system to perform the required task and are capable of recognizing potential hazards and avoiding them (definition of technical personnel according to 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.

If set-up, repair or maintenance works require that safety installations be dismantled, 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 dismantled.

3.2 Maintenance schedule



Note	Please take special care during all maintenance and repair that the guiding surface remains intact!
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WHEN	WHAT	ACTION
After commissioning	Sliding carriage	Check free movement of the sliding carriage by manually moving the sliding carriage. (Check) (see on page 17)
every 4 weeks or every 1000 km*	Sliding carriage	Check sliding carriage play and replace sliding blocks if necessary. (Exchange wearing parts) (see on page 17) Check free movement of the sliding carriage by manually moving the sliding carriage. (Check) (see on page 17)
semi-annually or every 5000 km	Toothed belt	Visual inspection of the toothed belt for wear. Change toothed belt if necessary. (Check toothed belt) (see on page 20)

*With the first set of sliding blocks (new LCB) please check the sliding carriage play weekly or every two weeks, as an increased wear can be expected during the initial break-in phase.

3.3 Check free movement of the sliding carriage

Move the sliding carriage manually over the entire stroke distance after assembly or setup. The sliding carriage must move easily and with constant force. If the sliding carriage does not move easily or rather "joltily", please check the following:

- ◆ Make a visual inspection of the guiding. Check for visual wear and for smoothness of the guiding surface. If necessary, replace profile. If the force needed to move the sliding carriage changes continually (increases or decreases continually), an alignment error of the double-axis actuator could be the case. **New alignment of double axis** (see on page 13).
- ◆ Possibly too high deflection of the guiding profile. If needs be, **reduce distance between supports** (see on page 11).
- ◆ If the causes mentioned above do not apply, please check the sliding carriage play (**check sliding play**) (see on page 18).

3.4 Replacement interval for wearing parts

Check sliding carriage / play of sliding carriage

The diagrams "Bearing capacity of sliding carriage / wear" show the wear of the sliding blocks in an ideal case of load on the sliding carriage. The wear can differ from the indicated curves in a specific application.

Depending on the load and the distance traveled, the sliding blocks in the sliding carriage wear down and the sliding carriage play will increase accordingly. If the increased sliding carriage play does not have a negative influence on the application, the sliding blocks can be operated up to the wear limit (0.5 mm wear for LCB040 and 1.0 mm wear for LCB060).



The wear limit given in the diagrams may under no circumstances be exceeded - this could damage the surface of the guiding irreversibly!

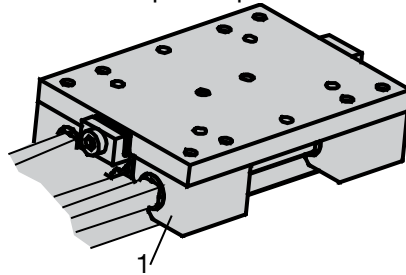


Check sliding play (LCB)

Use a feeler gauge stock to determine the current wear as shown in the photograph on the left. Lift sliding carriage plate for measurement.

Exchange sliding block (LCB)

The sliding block is a wearing part. You need 4 pieces per linear actuator .



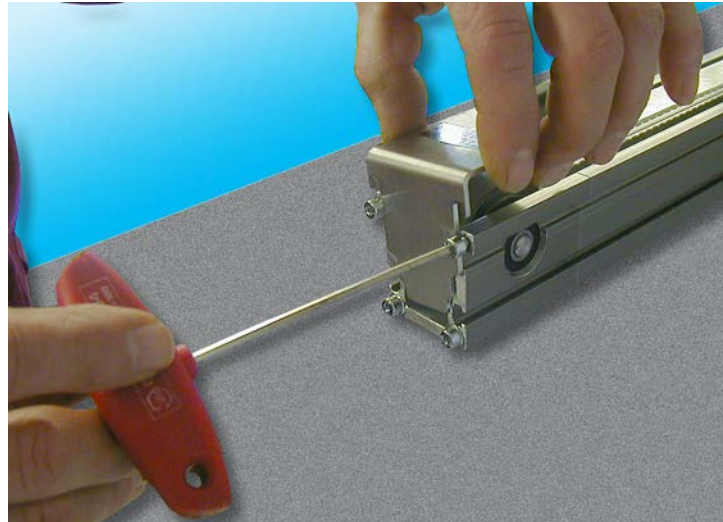
1: Sliding block

We recommend to have at least 4 sliding blocks on stock.

Accessories and options: see in the catalog section (following the mounting instructions).

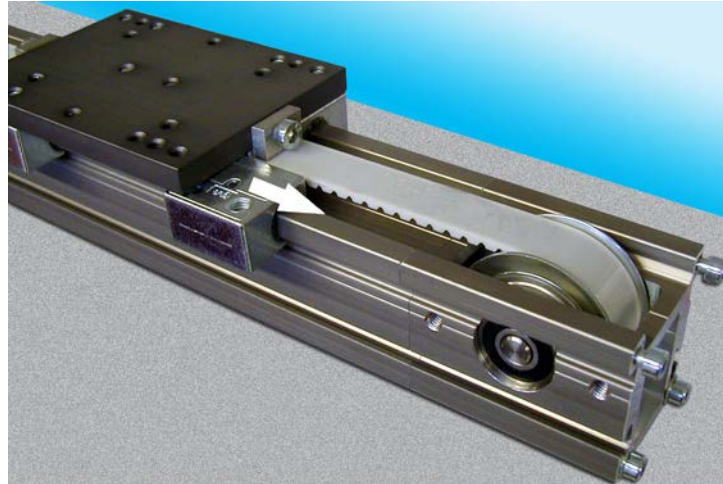
We recommend to drive or to push the sliding carriage to the deflection station for changing the sliding blocks.

Remove/mount covers:



Unscrew only the two upper screws of the cover at the deflection station (unscrew for about 1.3mm, not more as they do not only fix the cover but also the deflection station itself).

Remove cover in upwards direction



Unscrew the two fixing screws at all four sliding blocks entirely and remove sliding blocks.

Mount new sliding blocks in reverse order. Tighten screws only slightly. Move sliding carriage forwards and backwards several times (so that the sliding blocks are aligned) and then tighten screws.

Check sliding carriage again for free movement.

3.5 Checking / exchanging / tensioning toothed belt

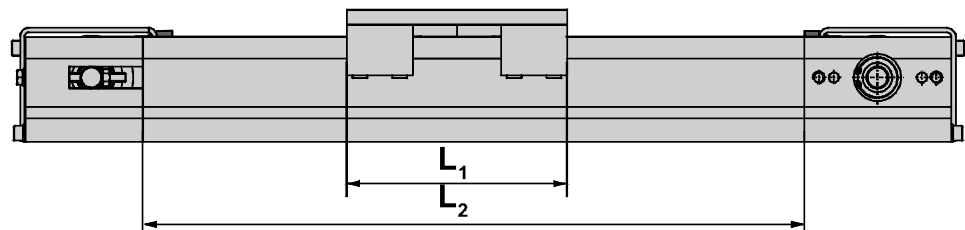
Causes for abnormal toothed belt wear

A certain sign of wear may have different causes so that it is not always possible, to determine the exact cause. The following table shows possible causes for typical damages:

Kind of error	possible cause	Action
Abnormal wear of loaded tooth flanks of the belt	Faulty belt pre-tension	Exchange toothed belt, set pre-tension.
	Overload	Exchange toothed belt, set pre-tension. Check, if the load is in the admissible range.
Abnormal wear at the tooth root surface of the belt	Pre-tension too high	Exchange toothed belt, set pre-tension.
	Drive torque too high	Verify drive dimensioning.
Abnormal wear at the side flank of the belt	Faulty alignment of toothed belt	Exchange toothed belt, set pre-tension.
	Twisted edge of the roller / pulley	Please contact us.
Sheared off belt teeth	Pre-tensioning too weak Overload (by collision)	Exchange toothed belt, set pre-tension.
Splits at the belt teeth	Faulty belt pre-tension	Exchange toothed belt, set pre-tension.
	Overload	Exchange toothed belt, set pre-tension. Check, if the load is in the admissible range.
	Aging of the toothed belt material	Exchange toothed belt, set pre-tension.
Breaking of the toothed belt	Faulty belt pre-tension	Exchange toothed belt, set pre-tension.
	Overload	Exchange toothed belt, set pre-tension. Check, if the load is in the admissible range.
Softening of the toothed belt material	Operating temperature too high	Exchange toothed belt, set pre-tension. Lower operating temperature.
	Contact with solvent	Exchange toothed belt, set pre-tension. Do not clean belt with solvents.
Skipping of teeth, loss of machine zero	Pre-tension too low Wrong motor position (below) with vertical application	Set pre-tension correctly. If possible move drive upwards Alternatively: Increase pre-tension or reduce load in lengthwise direction.

3.5.1. Ordering the toothed belt

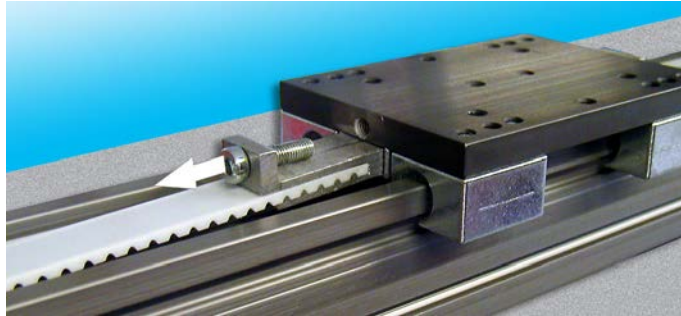
Type	Designation	desired length	Art. No.
LCB040	Toothed belt	L ₁ : Length of carriage or L ₂ : Length of profile must be stated	420-000004
LCB060	Toothed belt	L ₁ : Length of carriage or L ₂ : Length of profile must be stated	420-000016



L₁: Length of sliding carriage
L₂: Length of profile

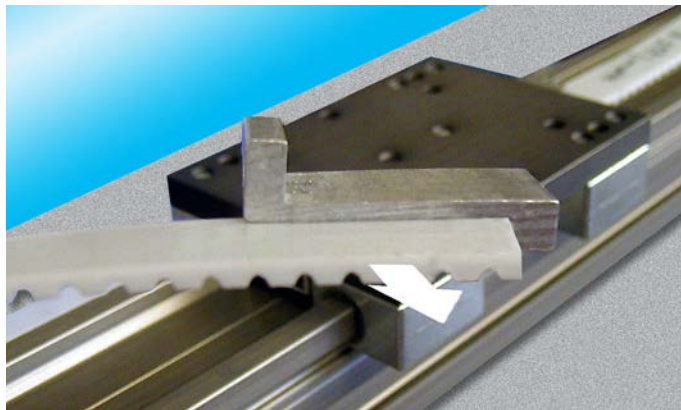
3.5.2. Dismantling the toothed belt

We recommend to remove the covers at the drive station and the deflection station before dismantling the toothed belt ("**Remove covers** (see on page 18)).



- ◆ Unscrew tensioning bracket on both sides of the sliding carriage and remove from support in the sliding carriage plate.

(Caution! Make sure not to lose the small distance plate of the LCB040! Unless you can no longer set the original belt tension!)



- ◆ Push toothed belt sideward out of the clamping bracket.

3.5.3. Insert new toothed belt

- ◆ Remove old toothed belt (**Dismantling** (see on page 21)) and mount new belt.
- ◆ The new toothed belt must have exactly the same length and pitch as the old toothed belt!
- ◆ In the case of a long axis it may be helpful to connect the new belt to the old one (e.g. with tape) in order to insert the new belt while removing the old one.
- ◆ Insert ends of belt cautiously into both clamping brackets.
- ◆ On the LCB040, first screw the clamping bracket to the sliding carriage on the side of the drive station (as the toothed belt of the LCB040 is tensioned on the other side of the sliding carriage).

LCB040 Tension belt

- ◆ On the LCB040, first screw the clamping bracket to the sliding carriage on the side of the drive station (as the toothed belt of the LCB040 is tensioned on the other side of the sliding carriage).
- ◆ Fix the clamping bracket on the opposite side of the sliding carriage (side towards the deflection station) and place the original small distance distance plates. The belt has now its originally preset tension.
- ◆ If you dispose of a **belt tension measuring device** (see on page 22), you may use this to tension the belt to a value of 220 N.

LCB060 Tension belt

- ◆ The belt of a LCB060 must be tensioned to a value of 760 N.
- ◆ Please use a suitable **RSM belt tension measuring device** (see on page 22) for measuring and setting this value.

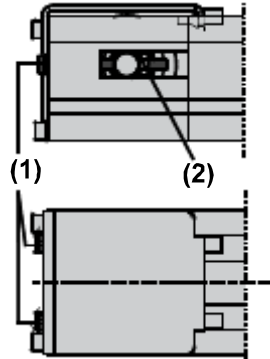
Belt tension measuring device RSM



The RSM belt tension measuring device determines the tension of the belt on the basis of preset data (specific mass of belt, freely oscillating length of belt) and the oscillating frequency of the belt.

The belt tension measuring device can be purchased at Parker (Part-No. 037-000202).

An operating manual with a description of the measuring procedure comes with the device.



(1) toothed belt tensioning screws

(2) counter screws

- ◆ The belt is tensioned with the aid of the tensioning screws at the tensioning station (loosen lock nut during tensioning process and re-fasten afterwards).
- ◆ After tensioning, the belt must be aligned.
 - ◆ An exact alignment is only possible during movement of the (sliding) carriage. With correct adjustment, the toothed belt always oscillates from left to right (in the driving direction).
- ◆ In order to keep the pre-tension of the belt, please turn the tensioning screws only in very small steps.
- ◆ If necessary, check belt tension again after the alignment.

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