

Linear transfer system
Type LFA - LFAS
Translation of
original Operating instruction

Version 1.0.3 |
2019-02-22

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1 About these Operating Instructions

These Operating Instructions describe the partly completed machinery Linear transfer system. The partly completed machinery Linear transfer system is referred to below as 'the machine'.

Purpose of these Operating Instructions

The Operating Instructions are intended to help you to:

- work efficiently
- ensure quality
- find information quickly
- avoid danger

Table of contents

The Operating Instructions have a table of contents at the front. This gives you an overview of all the sections in the document.

Headings and page numbers

The chapters are numbered sequentially. The sections within each chapter are numbered sequentially.

Safety information

Any safety information is placed before the descriptions of actions that may pose a risk. You will find a detailed description of the safety information in the chapter entitled Safety.

Text, symbols, figures

Instructions for performing various activities and other information are presented in small, discrete sections.

The information is presented using a combination of text, symbols and figures.

Instructions for performing action are described in the appropriate sequence and numbered accordingly.

Instructions for action

For the sake of clarity the instructions for action have been broken down into individual steps:

- ▶ Introductory text...
 - ⇒ Instruction result

Lists

Any lists which do not include individual operating steps are indicated as follows:

- Lists...
 - Sub-items in lists

Figures

Figures, dimensions and technical data presented in these Operating Instructions may be Subject to change.

Cross-references

Cross-references point you to additional descriptions within the Operating Instructions. (Chapter number/page number).

Third-party components

Refer to the Operating Instructions of the relevant manufacturers for information on operation and maintenance of third-party components fitted in the system.

Additional documentation

To complement the information in these Operating Instructions, please read the following regulations and directives:

- safety regulations and accident prevention regulations
- instruction sheets, instruction booklets
- work instructions provided by the statutory accident insurance provider
- generally accepted occupational health regulations

Manufacturer

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Technical information

The technical information, figures and data contained in these Operating Instructions are correct at the time of printing.

Our products undergo continuous further develop.

We therefore reserve the right to make any changes and improvements that we deem appropriate.

However, this does not, imply any obligation to apply such changes retrospectively to equipment already supplied.

1.1.1 Published by

TAKTOMAT GmbH
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Printed in the Federal Republic of Germany
Pöttmes, 02/2019

Document revision

Version	Date	Comment	Name
Version 1.0.3	22.02.2019	Initial publication	

1.2 Continuative documents

Read the following documents according to the provided components before you use these machine with Operating instruction.

Designation	Manufacturer	Version / Revision / Date	Number
Translation of the original Operating instructions Rotary indexing table type RT-TT	Taktomat	2.0.4/10.07.2017	
Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49_._4_ Sizes 01 to 3; EAS® synchronous/overload clutch Type 4_._03_ EAS®-overload clutch Type 4_._14_	Mayr	20/07/2015 TK/NU/GC/GF	
Installation and Operational Instructions for ROBA®-DS couplings Type 95 . _ _ _ (disk pack HF) Sizes 16 – 2200	Mayr	19/09/2017 TK/GH/HH/GC/SU	
Assembly and Operating Instructions Gear unit series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W	SEW	Edition 05/2015; Version 14; ID 117093590918839435	21932786
Operating Instructions AC Motors	SEW	Version 10; ID 81064793821256459	21927189
Operating Instructions CMP40 – CMP112, CMPZ71 – CMPZ100	SEW	Edition 07/2015; Version 8; ID 63050397671999115	21923582
Installation and Operating Instructions for RLK	RINGSPANN		
Operating instructions inductive Sensors	Balluff		

1.3 **Excerpt of Declaration of Incorporation**

Translation of Declaration of Incorporation
in accordance with the EC Machinery Directive 2006/42/EC, Annex II (1) (B) for partly completed machinery



<p>Manufacturer TAKTOMAT GmbH Rudolf-Diesel-Str. 14 DE – 86554 Pöttmes</p>	<p>A person established within the community who is authorised to compile the relevant technical documents TAKTOMAT GmbH Fa. TAKTOMAT GmbH Rudolf-Diesel-Str. 14 DE – 86554 Pöttmes</p>
<p>Description and identification of the partly completed machinery</p>	
Product	Linear transfer system
Type	LFA
Code	, - - - -
Serial number	R R -
Project number	PRJ-2017-01-19-0001
Order	changing
Function	Parts are mounted on chain links of the Linear transfer system. The Linear transfer system has a flexible or fixed division (for an exact design see data sheet). The Linear transfer system is inside a safety enclosure or is installed in another work equipment. The safety enclosure or assembly is realized by the integrator. This also applies to the electrical connection and control.

A declaration is made that the following basic requirements of the Machinery Directive 2006/42/EC are met:

1.12, 1.1.3, 1.1.5, 1.1.6, 1.2.3, 1.2.5, 1.3., 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.4, 1.5.1, 1.5.4, 1.6.1, 1.6.3, 1.6.4, 1.7.1.1, 1.7.1.2

A further declaration is made that the special technical documents were created in accordance with Appendix VII Part B.

It is expressly stated that the partly completed machinery complies with all relevant provisions of the following EC directives or regulations:

2006/42/EG	Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast) (1)
------------	--

Reference to the harmonized standards applied in compliance with Article 7(2):

EN ISO 12100:2010-11	Safety of machinery - basic concepts - risk assessment and risk mitigation (ISO 12100:2010)
EN 349:1993+A1:2008	Safety of machinery – Minimum gaps to avoid crushing of parts of the human body

The manufacturer or authorized person undertakes to transmit, in response to a reasoned request by the national authorities, relevant information on the partly completed machinery. This transmission shall be made in:
Data form

Intellectual property rights remain unaffected by this!

Important note! 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 this Directive, where appropriate.

Place, date

Signature
Norbert Hofstetter
Managing Director

2 Safety information













General information

This document contains important information on the safe use of the machine. This information is intended to ensure personal safety and prevent damage to the machine. The information is intended for the operator and for properly trained, qualified and instructed staff responsible for operating and servicing the machine.





Additional task-specific safety information is included in the relevant sections on the different phases during the service life of the system.

2.1 Explanation of the symbols used

2.1.1 Warnings

	
	<p>DANGER! This combination of symbol and alert word indicates an inherently dangerous situation which can be fatal or cause serious injury if it is not avoided.</p>
	
	<p>WARNING! This combination of symbol and alert word indicates a potentially dangerous situation which can be fatal or cause serious injury if it is not avoided.</p>
	
	<p>CAUTION! This combination of symbol and alert word indicates a potentially dangerous situation which can cause minor injury.</p>
	
	<p>NOTICE! This combination of symbol and alert word indicates a potentially dangerous situation which can cause damage to property or harm the environment if it is not avoided.</p>

2.1.2 Prohibition signs

	IT IS NOT PERMITTED TO CARRY METAL PARTS OR WATCHES!
	PROHIBITION FOR PERSONS WITH PACEMAKERS!
	PROHIBITION FOR PERSONS WITH METALL IMPLANTS!
	SWITCHING PROHIBITED!

2.1.3 Warning signs



WARNING OF HAZARDOUS ELECTRICAL VOLTAGE!



WARNING DANGER DUE TO HOT SURFACE!



WARNING MAGNETIC FIELD!



WARNING CRUSHING OF HANDS!



WARNING VOR COUNTERROTATING ROLLERS!

2.1.4 MANDATORY SIGNS



REFER TO INSTRUCTION MANUAL/BOOKLET!

This symbol signifies that the instruction manual/booklet of the component supplier must be read.



WEAR HEAD PROTECTION!

This symbol signifies that head protection must be worn.



WEAR EYE PROTECTION!

This symbol signifies that eye protection must be worn.



WEAR SAFETY FOOTWEAR!

This symbol signifies that safety footwear must be worn.



WEAR PROTECTIVE GLOVES!

This symbol signifies that protective gloves must be worn.

2.2 Intended use

The machine is intended for installation in a surrounding construction, thus integrating it to form part of an overall system. The machine is controlled by the overall system. The functions of the protective equipment are also connected to the machine via the controller. The machine may only be operated as part of a CE-compliant system. The intended use of the Linear transfer system type LFA is to transport components mounted on a workpiece carrier that need to be transported from one processing station to another in an overall system.

Any use that deviates from the intended use is regarded as inappropriate use.

This includes:

- any use outside the permitted operating limits
- any use in conjunction with foodstuffs

- any use in conjunction with aggressive materials (such as acids)
- transporting the system using the designated lifting points or eye bolts

The manufacturer shall not be liable for any damage resulting from such use. Intended use also includes observance of all the information in these instructions.

2.3 Foreseeable misuse

Any use beyond or other than the intended use is regarded as misuse.

2.3.1 Guarantee conditions

Changes to the structure of the materials used in the machine, e.g. the drilling of additional holes, can result in damage to the components. This is not regarded as intended use and may lead to loss of warranty or liability claims as a consequence.

2.4 Directives, statutory provisions and standards

The following statutory provisions and standards were applied:

Machine Directive	2006/42/EG, Annex I
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
Safety of machinery - basic concepts - risk assessment and risk mitigation	DIN EN ISO 12100
Safety of machinery - minimum gaps to avoid crushing of parts of the human body	EN 349:1993+A1:2008
Safety of machinery - safety related parts of control systems	DIN EN ISO 13849
Electrical Equipment of Machines	DIN EN 60204-1

2.5 Technical condition of the machine

Do not use the machine if it is not in sound condition technically. If the machine is used when it is not in a sound condition technically, there is a risk of death or injury to staff and a risk of damage to property.

2.5.1 Make no changes in the safety provisions

The manufacturer has made safety provisions. No liability will be accepted if the operator of the machine makes any changes in the safety provisions without express permission.

2.6 General hazards

This section lists risks associated with the machine that remain even when it is operated according to its intended use.

In order to reduce the risk of personal injury or damage to property, and to avoid potentially dangerous situations, the safety information provided here and in the other sections of these Operating Instructions must be observed.

2.6.1 Risk of death by electrocution

⚠ DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched. Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

2.6.2 Risk of injury from moving parts

⚠ WARNING



Risk of injury from moving parts!

Moving parts can cause serious injury.

- ▶ Do not reach into moving parts or carry out work on moving parts while the system is in operation.
- ▶ Never open any covers while the system is in operation.

2.7 Responsibility of the operator

The machine is to be used commercially according to its intended use. The operator of the machine is therefore subject to statutory occupational health and safety provisions.

In addition to the general safety information contained in this document, any further safety, accident prevention and environmental regulations applicable to the field of application of the machine must also be observed.

In particular, operators have the following obligations:

- They must always be fully informed of the most recent occupational safety regulations and perform a risk assessment to identify any additional hazardous locations and places resulting from the specific working conditions at the place of use. They must document any such findings in the form of operating instructions (work instructions, work descriptions, etc.) for use during operation.
- During the entire service life of the machine, they must check whether the operating instructions they have written are compliant with current regulations and make any necessary adjustments.
- They must unambiguously regulate and define who is responsible for carrying out installation, operation, maintenance and cleaning.
- They must ensure that the staff deployed have the necessary qualifications for the work they are instructed to perform.
- They must ensure that all staff who work on the machine have read and understood all the documents relevant for its operation (Operating Instructions, maintenance regulations, safety guidelines).
- They must provide training for the staff at regular intervals and inform them of potential dangers.
- They must bear the responsibility for personal injury and damage to property arising from manipulation of the machine. For this reason, the machine and its safety equipment must be inspected at regular intervals to ensure that they are in sound condition and functioning properly, and the results of this inspection must be suitably documented.
- They must ensure that the machine is always in a sound condition technically.

2.7.1 Preventive measures

It is recommended that the operator take the following preventive measures:

- Only allow qualified, trained and properly instructed staff to work on the machine.
- Unambiguously define the responsibilities of operating and service personnel.
- Supplement these Operating Instructions with
 - stipulations deriving from national and regional labor and environmental regulations
 - adjust information covering specific operational aspects (workflows, supervisory obligations, reporting obligations, fire alarm equipment, etc.)
- Occasionally check to confirm that the Operating Instructions are being used and that such use is correct, and when necessary repeat the instruction process.
- Ensure that all documentation is permanently available in a readable form and easily accessible at the point of use.
- Observe any periodic checks and inspections that are required (by law) or specified in this document.
- Replace in good time any components indicated in these documents as being crucial for safety.
- Regularly inspect the machine to ensure that the safety equipment operates correctly.
- Make sure that safety information and hazard warnings on the machine and in the working area are always legible.
- Take steps to ensure that the machine is regularly inspected for visible damage and defects.

2.8 Staff qualification

The various activities described in these Operating Instructions require different qualifications of the staff entrusted with these duties.



! WARNING

Danger if staff are insufficiently qualified!

Persons who are inadequately qualified are unable to assess the risks associated with working on the machine and expose themselves and others to the risk of serious or fatal injury.

- ▶ Ensure that all work is performed only by suitably qualified persons.
- ▶ Keep insufficiently qualified persons at a safe distance from the working area.

2.8.1 Qualified staff

For the purposes of these Operating Instructions, qualified staff are understood to be

- Operators who have been specially trained and instructed in working with the machine.
- Installation and service staff who have appropriate expertise in setting up and maintaining the machine and who are familiar with the safety information.
- The qualified staff must have read and understood the contents of the Operating Instructions before the machine is taken into service and must have been informed of the risks associated with working with the machine by the machine operator.
- A knowledge of first aid is required.

2.8.2 Competent specialists

Competent specialists are persons whose specialist training and experience have given them sufficient knowledge with respect to using this machine and who are sufficiently familiar with the relevant statutory occupational health regulations, accident prevention regulations, directives, and generally approved technical practice that they are able to assess whether the condition of the machine allows it to be used safely.

2.8.3 Auxiliary staff

Work on or in the vicinity of this machine which is not associated with the actual operation of the machine (e.g. cleaning, transport, material provisioning, etc.) can be performed by other persons. Before the machine is taken into service, the qualified staff of the machine operator must instruct such persons with regard to the nature of the work to be performed and the risks associated with working on the machine. Take special care when instructing persons who cannot read or write, and instruct them separately!

2.8.4 Servicing, repairing and maintaining the machine

Service, repair and maintenance work on the machine may only be carried out by service engineers of the manufacturer or by qualified staff authorized by Taktomat GmbH. When carrying out such work, always cordon off the working area carefully!

2.8.5 Personal protective equipment

Personal protective equipment is intended to protect individuals from safety and health risks at work.

When performing certain tasks on and with the machine, staff must wear personal protective equipment. This is explicitly indicated in the relevant sections of these Operating Instructions.



! WARNING

Risk of injury from moving parts!

Exposed jewellery and long hair can be trapped by moving parts and lead to serious injury.

- ▶ Always remove exposed jewellery such as chains, rings and watches before starting work.
- ▶ Protect long hair with a hair net.

3 Product description

3.1 Construction of Linear transfer system



Fig. 1 Construction of Linear transfer system LFA without drive unit

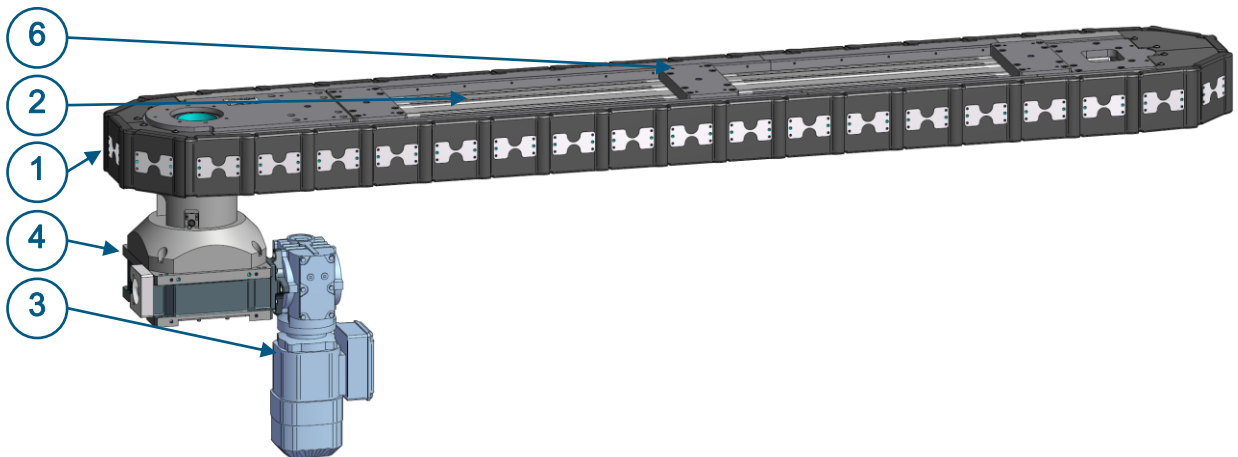


Fig. 2 Construction of Linear transfer system LFA with drive unit rotary indexing table type RT - TT

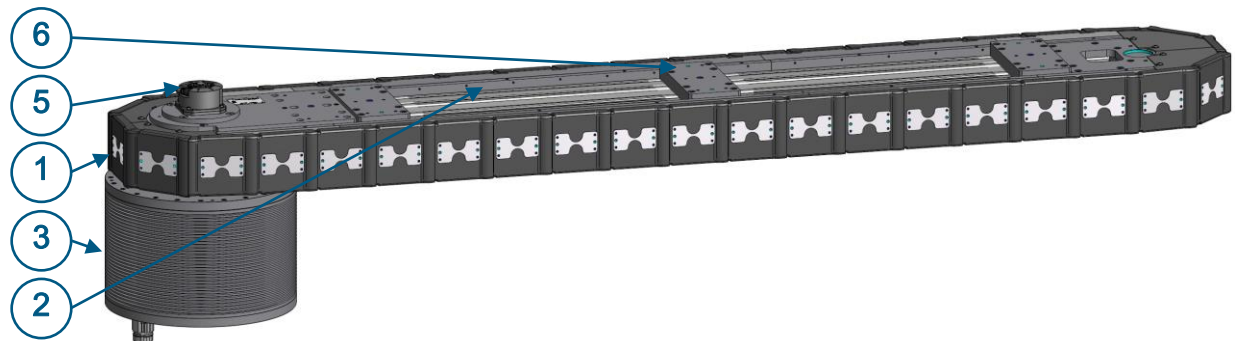


Fig. 3 Construction of Linear transfer system LFA with direct drive unit TQMSI

No.	Designation	No.	Designation
1	Endless chain	7	
2	Base frame aluminium profile	8	
3	Drive unit / Direct drive unit TQMSI	9	
4	Rotary indexing table	10	
5	Rotary encoder	11	
6	Intermediate plate	12	

3.2 Function

The Linear transfer system type LFA is used wherever components mounted on a workpiece carrier need to be transported from one processing station to another.

Das Linear transfer system LFA can be divided into 3 categories:

- I. Linear transfer system LFA without drive unit
 - a. The movement of the endless chain is via external drive components such as a bevel drive, belt drive or other form of drive
- II. Linear transfer system LFA with drive unit rotary indexing table type RT or TT
 - a. The indexed movement is via a rotary indexing table type RT or TT with a complete drive unit. Fixed steps are specified by the rotary indexing table
- III. Linear transfer system LFA with direct drive via a type TQMSI torque motor
 - a. The movement is dynamic via a type TQMSI torque motor. The steps are not fixed and can be freely selected

The Linear transfer system is available in 2 versions LFA and LFA **S**.

S stands for synchronous. Das Linear transfer system LFA **S**ynchronous version is designed to ensure that synchronisation of the chain in the load and return strand is achieved.

The Linear transfer system works as follows:

The Linear transfer system has a base frame **(2)** made from aluminium profiles.

The workpiece carriers are connected to the individual links of the endless chain **(1)** at intervals corresponding to the distance between the processing stations.

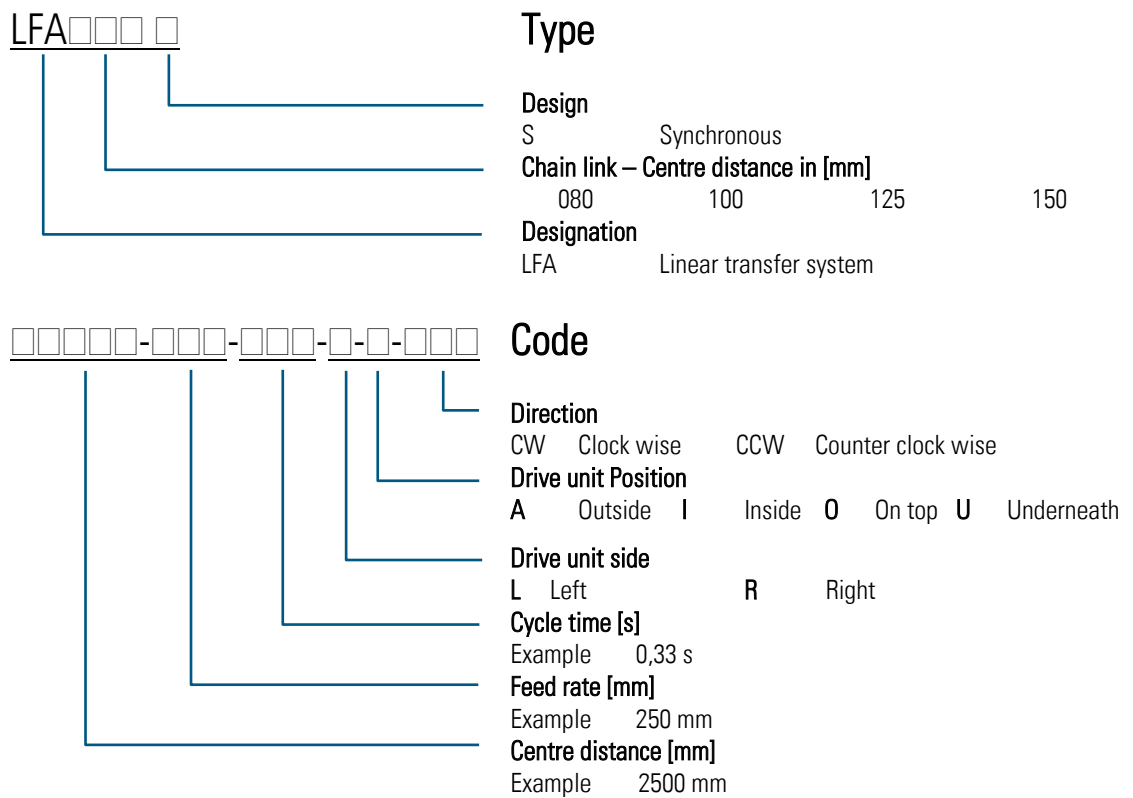
The complete drive unit **(3)** drives the rotary indexing table **(4)**. The rotary indexing table **(4)** converts the uniform input movement to an indexed, reduced output movement. The Linear transfer system converts the indexed output movement of the rotary indexing table **(4)** to an indexed movement of the endless chain **(1)**. The Linear transfer system is fastened to the intermediate plates **(6)** with screws. The number and position of the intermediate plates **(6)** can be varied.

3.3 Nameplate



Example
 Type: LFA125 S
 Code: 2500 – 250 – 0,33 – L - A
 Serial number: L2F25 - 100012
 Year of manufacture: 2017

Fig. 4 Example of the nameplate



3.3.1 Position of the nameplate

There is a nameplate attached to the machine:



Fig. 5 Nameplate (1) Nameplate position LFA

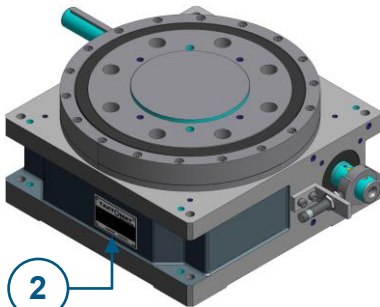


Fig. 6 Nameplate (2) Nameplate positions RT



Fig. 7 Nameplate (1) Nameplate position LFA with Torque – drive

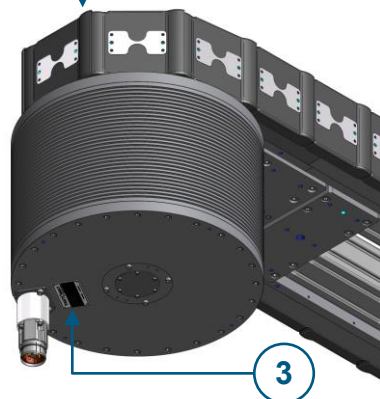


Fig. 8 Nameplate (1) Nameplate position Torque – Drive TQMSI

3.4 Nameplate Torque – drive unit

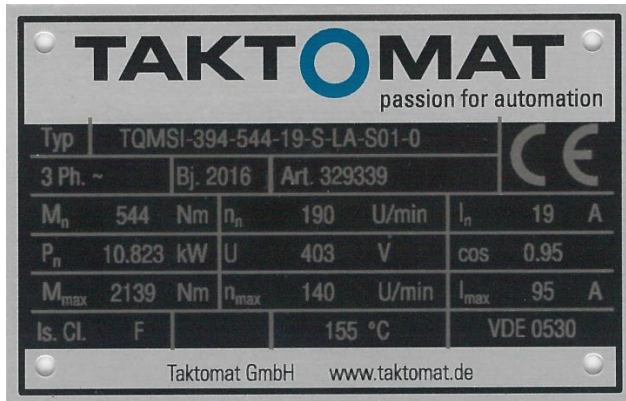


Fig. 9 Example nameplate

TQMSI- □□□-□□□-□□-□-□□-□□□-□

Bj.	Year of manufacture	20□□
Art.	Item No.	□□□□□□
n_n	Rated speed	□□□ RPM
P_n	Rated output	□□.□□□ kW
U	Voltage	□□□ V
cos	Performance factor	□.□□□
M_{max}	Maximum torque	□□□□ Nm
n_{max}	Maximum speed	□□□ RPM
I_{max}	Maximum current	□□□ A
Is. Cl.	Isolation class	F

Design

0 Standard

Connection of drive and sensors

- 000 No Terminal box
- K01 Terminal box 0° - CCW
- K02 Terminal box 90° - CCW
- K03 Terminal box 180° - CCW
- K04 Terminal box 270° - CCW
- L02 Drive- and sensor cable 2 m
- L05 Drive- and sensor cable 5 m
- L10 Drive- and sensor cable 10 m
- S01 Plug 0° - CCW
- S02 Plug 90° - CCW
- S03 Plug 180° - CCW
- S04 Plug 270° - CCW

Surface

- 00 No coating
- LK Coated: customer specific paint
- LA Coated: Taktomat-standard paint (RAL7016)
- ET Anodized: Taktomat-standard paint (RAL7016)
- ES Anodized: black
- EN Anodized: nature
- EK Anodized: customer specific paint
- BR Browned
- NI Nickel plated
- CR Chromed

Material Stator - housing

- A Aluminium
- S Steel

I_n = Rated current 0 - 99 A

M_n Nominal torque 0 - 999 Nm

Outer diameter 0 - 999 mm

3.4.1 Detailed construction of the Linear transfer system type LFA

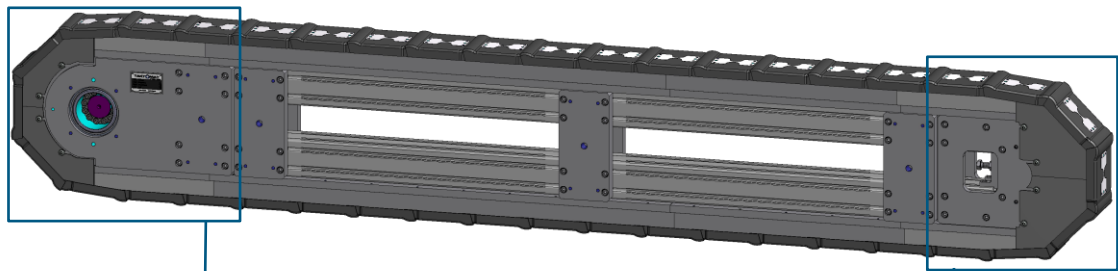


Fig. 10 Detailed construction of the Linear transfer system type LFA

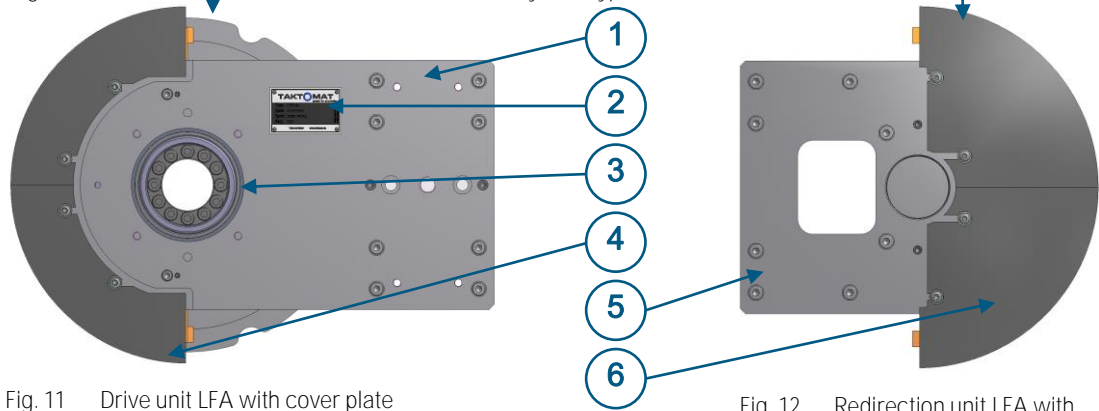


Fig. 11 Drive unit LFA with cover plate

Fig. 12 Redirection unit LFA with cover plate

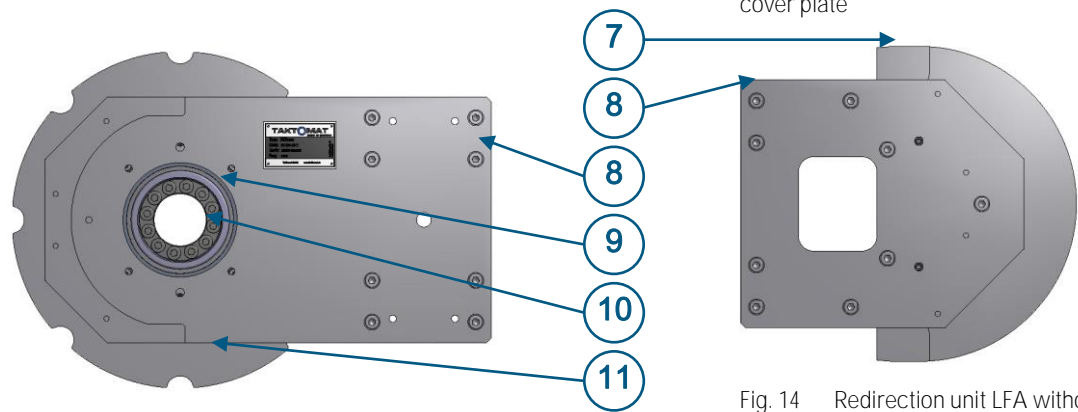


Fig. 13 Drive unit LFA without cover plate

Fig. 14 Redirection unit LFA without cover plate

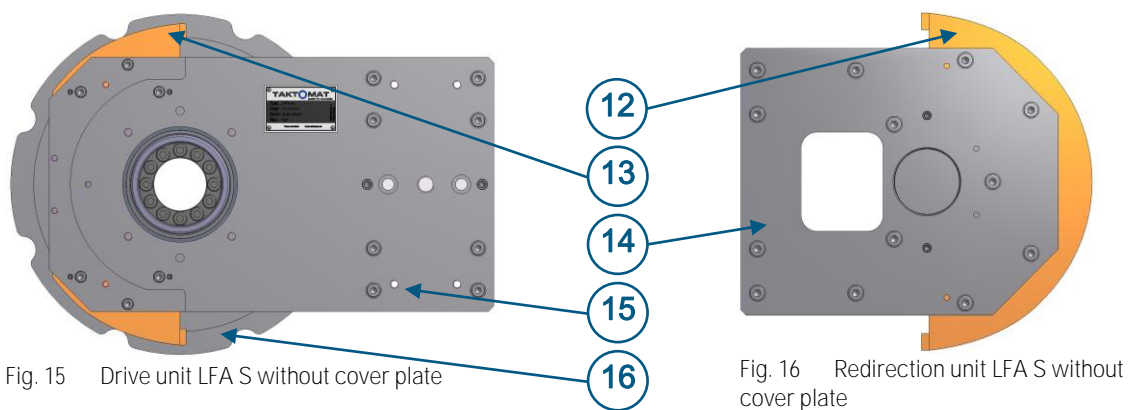


Fig. 15 Drive unit LFA S without cover plate

Fig. 16 Redirection unit LFA S without cover plate

Item	Designation
1	Side part of drive unit LFA
2	Nameplate
3	Roller bearing
4	Drive cover plate LFA
5	Side part of deflection unit LFA
6	Cover plate of the deflection unit LFA
7	Curve part of deflection unit LFA
8	Cylinder head screw of frame fixation

Item	Designation
9	Hub LFA
10	Cone clamping element
11	Step wheel LFA
12	Curve part of deflection unit LFA S
13	Curve part of drive unit LFA S
14	Side part of deflection unit LFA S
15	Side part of drive unit LFA S
16	Step wheel LFA S

3.4.1.1 Construction of drive unit LFA

Standard construction of the drive unit LFA consists of the following components:

Components of the drive unit LFA

Item	Designation
1	2x Side part Drive unit LFA
2	1x Nameplate
3	2x Roller bearing
4	4x Cover plate Drive unit LFA
8	16x Cylinder head screw of frame fixation
9	1x Hub LFA
10	1x Cone clamping element
11	2x Step wheel LFA
	1x Bushing LFA
	1x Spacer LFA

Deviating components of the drive unit LFA S to LFA

Item	Designation
13	2x Curve part of drive unit LFA S
15	2x Side part of drive unit LFA S
16	2x Step wheel LFA S

3.4.1.2 Construction of deflection unit LFA

Standard construction of the deflection unit LFA consists of the following components:

Components of the deflection unit LFA

Item	Designation
5	2x Side part of deflection unit LFA
6	4x Cover plate of deflection unit LFA
7	2x Curve part Deflection unit LFA
8	12x Cylinder head screw of frame fixation
	Hub of deflection unit LFA

Deviating components of the deflection unit LFA S to LFA

Item	Designation
12	2x Curve part of deflection unit LFA S
14	2x Side part of deflection unit LFA S

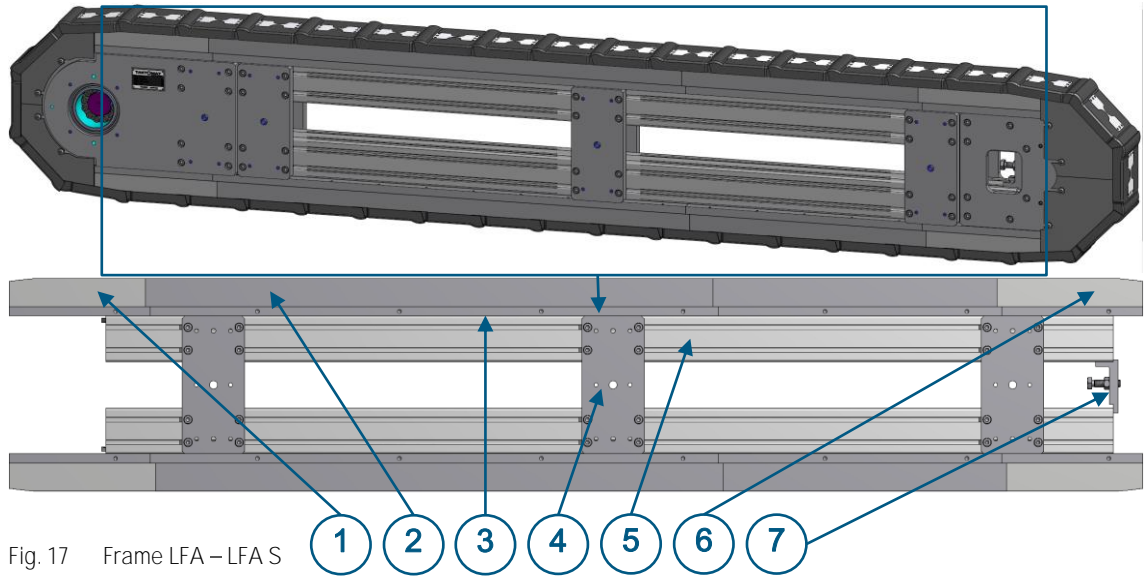


Fig. 17 Frame LFA – LFA S

3.4.1.3 Construction Frame LFA

Standard construction of the frame LFA consists of the following components:

Components Frame LFA

Item	Designation	Item	Designation
1	4x Track LFA drive side		
2	Track LFA - variable number		
3	Base plate LFA - variable number		
4	Intermediate plate LFA - variable number		
5	2x Aluminium Profile		
6	4x Track LFA Deflection		
7	1x Chain tensioner		
	Track - variable number		

3.4.2 Detailed construction Linear transfer system type LFA with rotary indexing drive type RT – TT and synchronous coupling

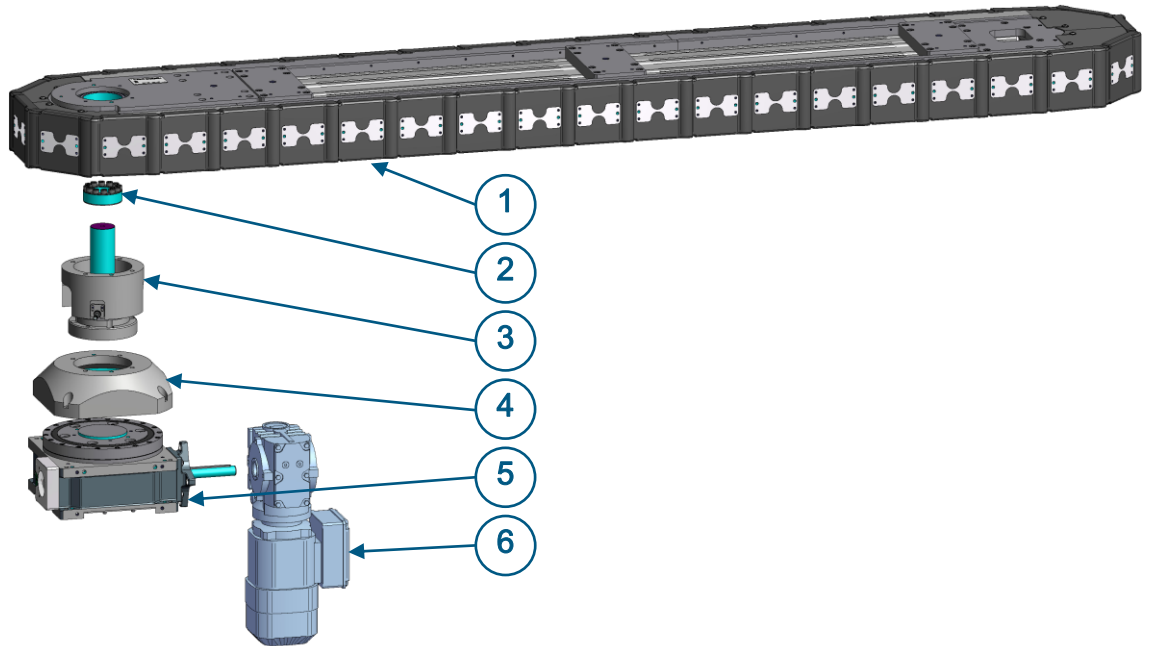


Fig. 18 Detailed construction Linear transfer system type LFA with rotary indexing drive type RT – TT and synchronous coupling

Item Designation

1	Linear transfer system LFA without drive
2	Conus clamping element
3	Synchronous coupling
4	Bell housing
5	Rotary indexer RT-TT
6	Drive unit

3.5 Operating modes

The machine has the following operating modes:

3.5.1



CAUTION

- ▶ The manufacturer of the overall system is responsible for the operating modes of the linear transfer system.

All operating modes are implemented using only the controller of the overall system.

The linear transfer system is designed for the following operating modes:

- Normal operation
 - Intermittent operation
 - Continuous operation
- Inching mode using a suitable controller, e.g. TIC (Taktomat Indexing Controller)
- Emergency stop



NOTICE

**Damage arising from operation without an appropriate machine controller!
Improper control of the machine can cause serious material damage.**

- ▶ Do not operate in inching mode without an appropriate universal machine controller.
- ▶ Use an appropriate universal machine controller.

3.5.2 Normal operation

During normal operation, the chain links are stepped from one stop position to the next.

3.5.3 Intermittent operation

Operation is divided into different phases:

- The drive is stopped during the dwell phase. The dwell time is variable. External assembly processes can be performed during this period.
- During the indexing phase, the endless chain is stepped to the next stop position.

3.5.4 Inching mode

In inching mode, the drive shaft is moved between two dwell positions in small steps.

The barrel cam is unable to accelerate and decelerate the load gently.

This places stress on the hardware, because the acceleration forces that arise during inching mode are far higher than those that arise during normal operation. Inching mode must not be used without a suitable controller that makes it possible to accelerate and decelerate the load gently so as to protect the gearing.

3.5.5 Emergency-Stop

Emergency stop is comparable with the stopping in inching operation. Frequent emergency-stop situations should be avoided.

3.6 Technical Data Linear transfer system

3.6.1 Main dimensions Linear transfer system LFA - LFAS

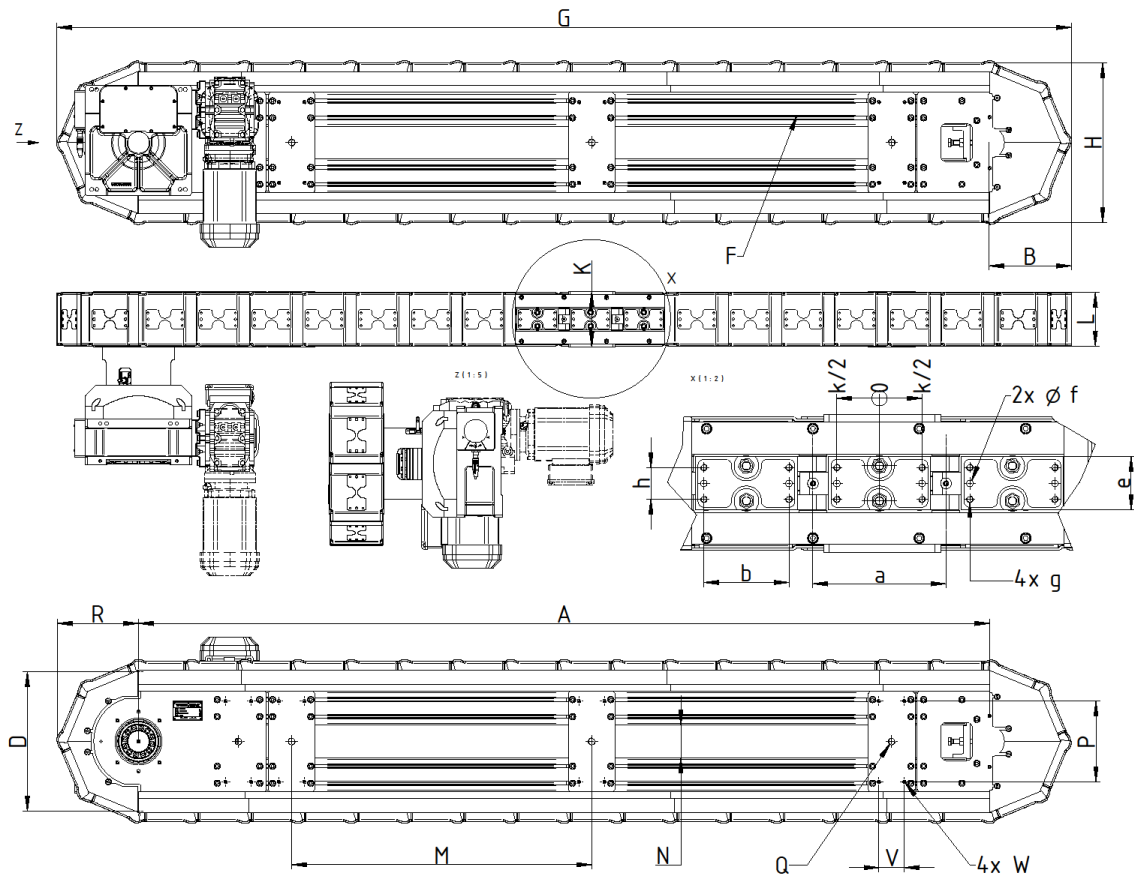


Fig. 19 Main dimensions Linear transfer system LFA - LFAS

Main dimensions Linear transfer system LFA - LFAS body

Designation	Unit	LFA080	LFA100	LFA125	LFA150
A Center distance	[mm]	See DWG	See DWG	See DWG	See DWG
B Length	[mm]	See DWG	See DWG	See DWG	See DWG
D Sprocket spacing (special spacing)		8 (6, 10, 12,16)	8 (6, 10, 12,16)	8 (6, 10, 12,16)	8 (6, 10, 12,16)
F Profile-system		Profile 8 80x40	Profile 8 80x80	Profile 8 80x80	Profile 8 80x80
G Total length	[mm]	See DWG	See DWG	See DWG	See DWG
H Distance btw. links (height) LFA LFA S	[mm]	259,1 262	315,3 320	376,6 382	454 460
K Linear transfer system width	[mm]	33	130	130	170
L Distance between tracks	[mm]	115	115	115	163,2
M Intermediate plate distance		See DWG	See DWG	See DWG	See DWG
N Media duct distance	[mm]	39	11,3	76,6	128
P Attachment thread(s) bore spacing	[mm]	90	135	190	200
Q Lifting point thread(s)		M16	M16	M16	M20
V Attachment thread(s) bore spacing	[mm]	50	50	60	80
W Attachment thread(s)		M8 (4x)	M10	M8 (4x)	M12 (4x)

Main dimensions Linear transfer system chain link (KG)

Designation	Unit	LFA080	LFA100	LFA125	LFA150
a Chain link centre distance	[mm]	80	100	125	150
b WC fastening bore spacing	[mm]	37	55	80	85

Designation	Unit	LFA080	LFA100	LFA125	LFA150
e Chain link width	[mm]	50	50	50	80
f Pilot hole H7 diameter	[mm]	6 (2x)	6 (2x)	6 (2x)	8 (2x)
g WC fastening thread(s)		M6 (2x)	M6 (4x)	M6 (4x)	M8 (4x)
h WC fastening bore spacing	[mm]	33	30	30	60

3.6.2 Ambient conditions

Following ambient conditions apply to all Linear transfer system described in this operating manual.



NOTICE

Deviating ambient conditions can cause material damage.

Do not operate in deviating ambient conditions.

- ▶ Adhere to the given operating – and storage conditions.
- ▶ Other ambient condition only in consultation with Taktomat.

3.6.3 Operating conditions

Area of application	Inside
Temperature range [°C]	+10 to + 40
Relative humidity [%]	max 40 to 70
Media	do not expose the system to any aggressive agents

3.6.4 Storage conditions

Area of application	Inside
Lighting [Lux]	min. 300
Temperature range [°C]	-22 to + 50
Relative air humidity [%]	max. 40 to 70
Media	do not expose the system to any aggressive agents
Storage period > 6 month	coat the machine with corrosive protection

3.6.5 Noise emission

The direct noise emission from the machine depends upon the ambient conditions. Deduced from these conditions there must be further acoustic pressure measurements performed on the installation location of the machine.

4 Transport

4.1 Safety information

NOTICE



Damage arising from improper transport!
Improper transport can cause significant damage to property.

- ▶ Take care and take note of the symbols on the packaging when unloading the machine on delivery and when transporting it on the premises.

4.2 Transport inspection

Immediately on receipt, check to make certain that the delivery is complete and has not been damaged during transport:

Proceed as follows if there are visible signs of damage during transport:

- ▶ Do not accept the delivery or only do so conditionally.
- ▶ Record the extent of the damage on the transport documentation or on the associated delivery note.
- ▶ Immediately report any damage to the manufacturer of the machine.

! DANGER



Risk of fatal injury from suspended loads and falling parts!
Parts can fall during transport and cause serious or fatal injury.

- ▶ Do not walk under suspended loads.
- ▶ Keep people clear of the danger zone.
- ▶ Always use lifting gear with a sufficient load capacity.
- ▶ Always use forklift trucks or pallet trucks with a sufficient load capacity and fork length.
- ▶ Do not leave the load suspended if you leave the working area.

4.3 Packaging, handling, unpacking

The machine is packed in plastic sheeting or cardboard packaging and secured to a pallet for transportation.

NOTICE



Damage arising from improper transport!
Improper transport can cause significant damage to property.

- ▶ The machine must not be allowed to become wet while it is being transported.
 - ▶ Take the machine out of the packaging just before installation
- ▶ Remove the packaging carefully and dispose of it with due regard to environmental considerations.

4.4 Modes of Transport

The Linear transfer system will be packaged and transported horizontal **H** or vertical **V** depending on the installation position planned by the customer.

4.4.1 Upright transportation

The Linear transfer system is transported in an upright position using transport cradles.

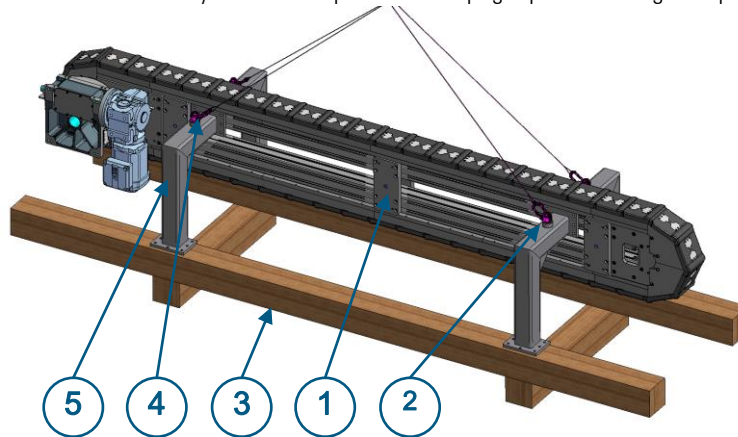


Fig. 20 Linear transfer system upright with lifting gear

- (1) Linear transfer system
- (2) Lifting point (thread M16)
- (3) Wooden support
- (4) Lifting gear (e.g. chain, strap, load stand, eye bolt)
- (5) Transport cradle

4.4.2 Using lifting gear for transport

Staff **Protective equipment**

Qualified staff



For the correct function and attachment of the lifting gear, follow the instructions of the component supplier.

- ▶ The lifting gear (see illustration) must be fitted at the lifting points (see table and dimensional drawing) as shown in the illustration and checked for function

Transport the machine with lifting gear as follows:

Lifting instructions

The quantity of lifting gear and number of transport cradles depends on the centre distance A of the linear transfer system.

NOTE



Risk of damage due to improper transport.

Improper transport can result in considerable damage to property.

- ▶ When unloading the machine, during delivery and during in-house transport, handle it carefully and note the symbols on the packaging.
- ▶ When transporting, use lifting gear with sufficient load capacity.
- ▶ Align the lifting eyes in the direction of load.
- ▶ The angle between the vertical and the chain or strap must be between 0° and 45°, otherwise the maximum permitted load for the lifting gear will be exceeded.
- ▶ Follow the operating instructions for the lifting gear.

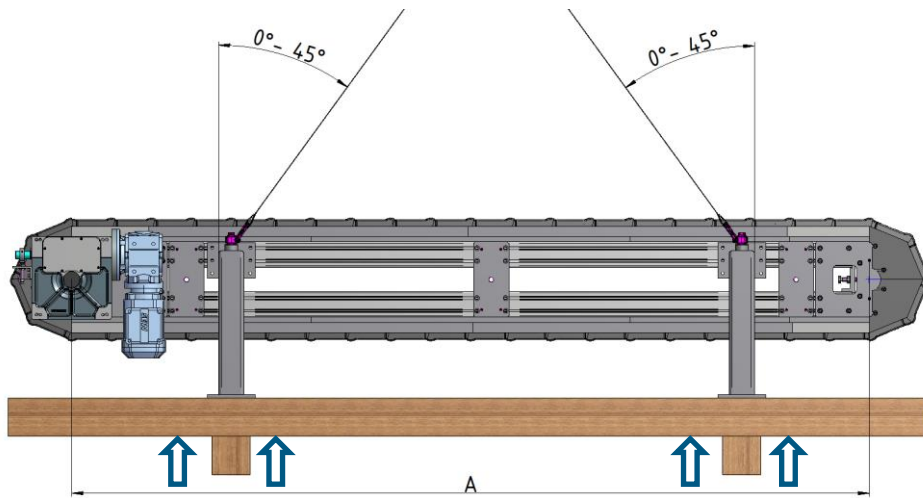


Fig. 21 Linear transfer system LFA, tilt angle specification $\beta \Rightarrow 0^\circ - 45^\circ$

Transport with industrial truck only at the marked attachment points (see Figure)

Lifting gear table:

For the Linear transfer system type LFA , the use of lifting gear with transport cradles is recommended.

Recommended lifting gear:

Linear transfer system	Center distance [mm]	Lifting gear number [qty]	Lifting gear	Screw size
LFA; LFA S	< 3000	4	VLBG 1,5t M16	M16
LFA; LFA S	> 3000 – 6000	≥ 6	VLBG 1,5t M16	M16
LFA; LFA S	> 6000	≥ 8	VLBG 1,5t M16	M16

4.4.3 Transport on the side

The linear transfer system is transported on its side using lifting gear.

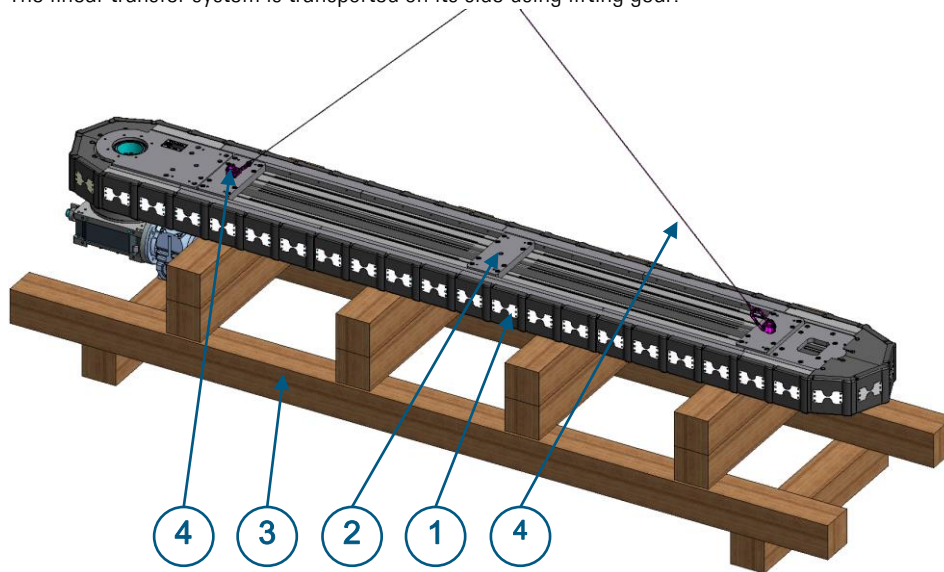


Fig. 22 Linear transfer system with lifting gear

- (6) Linear transfer system
- (7) Lifting point (thread see table)
- (8) Wooden support
- (9) Lifting gear (e.g. chain, strap, load stand, eye bolt)

4.4.4 Using lifting gear for transport

Staff **Protective equipment**

Qualified staff



For the correct function and attachment of the lifting gear, follow the instructions of the component supplier.

- ▶ The lifting gear (see illustration) must be fitted at the lifting points (see table and dimensional drawing) as shown in the illustration and checked for function

Transport the machine with lifting gear as follows:

The quantity of lifting gear depends on the centre distance A of the linear transfer system.

NOTE



Risk of damage due to improper transport!

Improper transport can result in considerable damage to property.

- ▶ When unloading the machine, during delivery and during in-house transport, handle it carefully and note the symbols on the packaging.
- ▶ When transporting, use lifting gear with sufficient load capacity.
- ▶ Align the lifting eyes in the direction of load.
- ▶ The angle between the vertical and the chain or strap must be between 0° and 45°, otherwise the maximum permitted load for the lifting gear will be exceeded.
- ▶ Follow the operating instructions for the lifting gear.

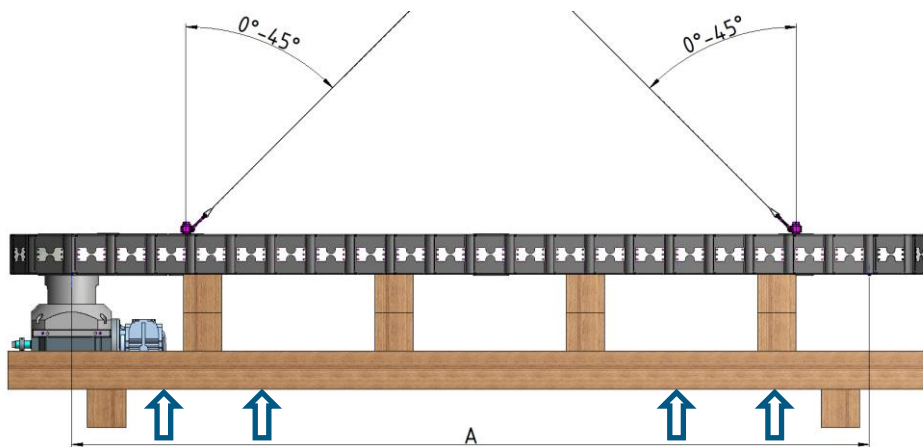


Fig. 23 Linear transfer system tilt angle specification $\beta \Rightarrow 0^\circ-45^\circ$

Lifting gear table:

For the Linear transfer system type LFA, lifting gear with quantity is recommended.

Table for attachment points:

Suitable threaded holes are provided on the Linear transfer system type LFA to accommodate slinging equipment. Please refer to the dimensions sheet in the technical data for the thread sizes.

Recommendation sling equipment for horizontal transport:

Type	Center distance	Number of sling points	Recommendation sling equipment	Thread size
LFA080 - LFA080S	< 3000	2	VLBG 1,5t	M16
LFA080 - LFA080S	> 3000 – 6000	≥4	VLBG 1,5t	M16
LFA080 - LFA080S	> 6000	≥8	VLBG 1,5t	M16
LFA100 – LFA100S	< 3000	2	VLBG 1,5t	M16
LFA100 – LFA100S	> 3000 – 6000	≥4	VLBG 1,5t	M16
LFA100 – LFA100S	> 6000	≥8	VLBG 1,5t	M16
LFA125 – LFA125S	< 3000	2	VLBG 1,5t	M16
LFA125 – LFA125S	> 3000 – 6000	≥4	VLBG 1,5t	M16
LFA125 – LFA125S	> 6000	≥8	VLBG 1,5t	M16
LFA150 – LFA150S	< 3000	2	VLBG 2,5t	M20
LFA150 – LFA150S	> 3000 – 6000	≥4	VLBG 2,5t	M20
LFA150 – LFA150S	> 6000	≥8	VLBG 2,5t	M20

5 Assembly

5.1 Installation position Linear transfer system

Linear transfer system - The installation position for the complete drive unit cannot be changed without prior consultation after Taktomat has completed planning.

NOTE



A different installation position can lead to property damage.
Do not operate the machine if the installation position changes.

- ▶ Keep to the installation position.
- ▶ Before using the machine, contact TAKTOMAT. Different installation positions must be inspected.

5.2 Linear transfer system installation position with drive RT - TT vertical installation

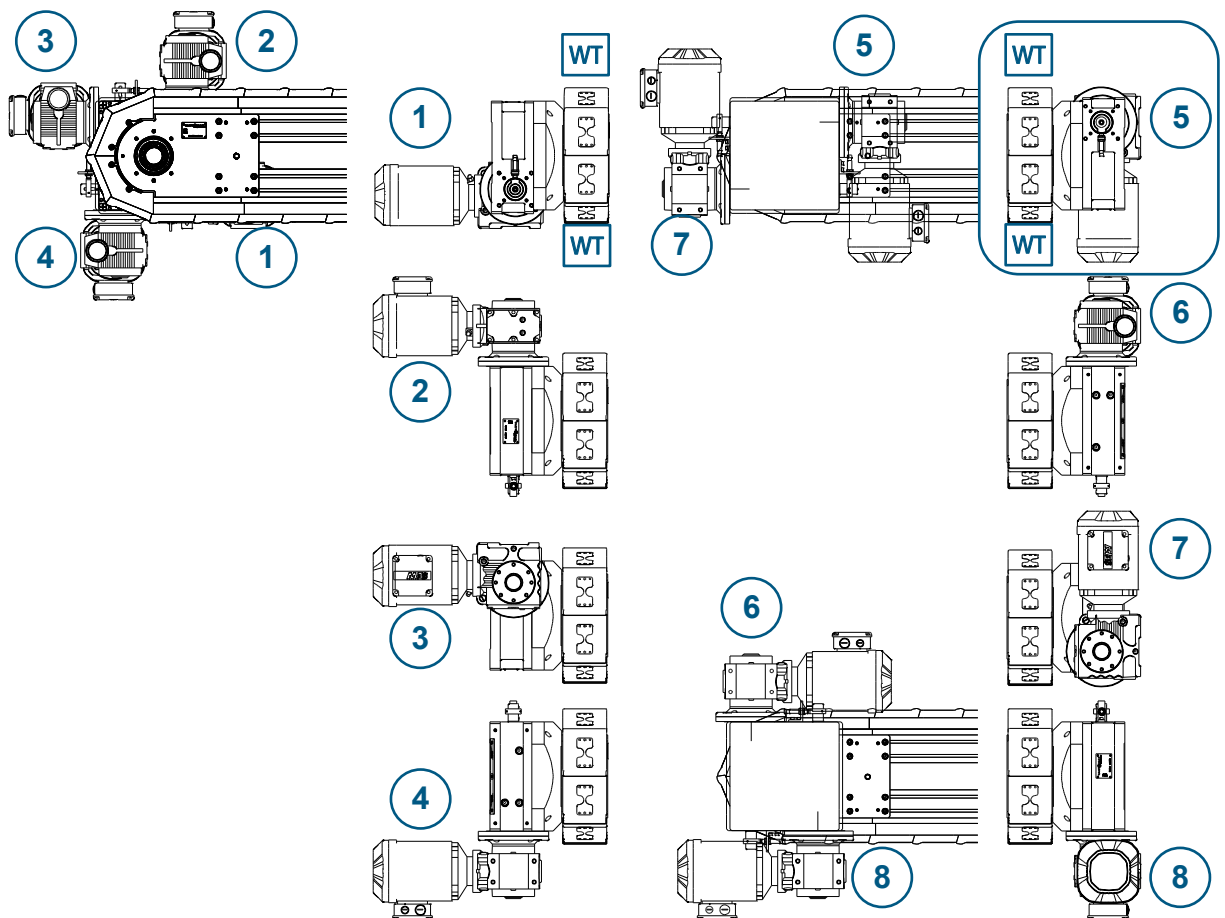


Fig. 24 Linear transfer system vertical; Standard => Marking square frame

1 = Side 1, Top view output flange right; 2 = Side 2, Top view output flange left; WC = Workpiece carrier

LFA	RT	KKL	LFA	RT	KKL	Drive position side	Drive position
① R-I	1-SL-180	0-270	⑤ L-I	1-SL-90	0,180,270	L=> Left	O=> Outside
② R-O	1-SL-180	0-270	⑥ L-O	1-SL-90	0,180,270	R=> Right	I=> Inside
③ R-A	1-SL-180	0-270	⑦ L-A	1-SL-90	0,180,270		O=> Top
④ R-U	1-SL-180	0-270	⑧ L-U	1-SL-90	0,180,270		U=> Bottom

5.3 Linear transfer system installation positions with drive RT - TT horizontal installation

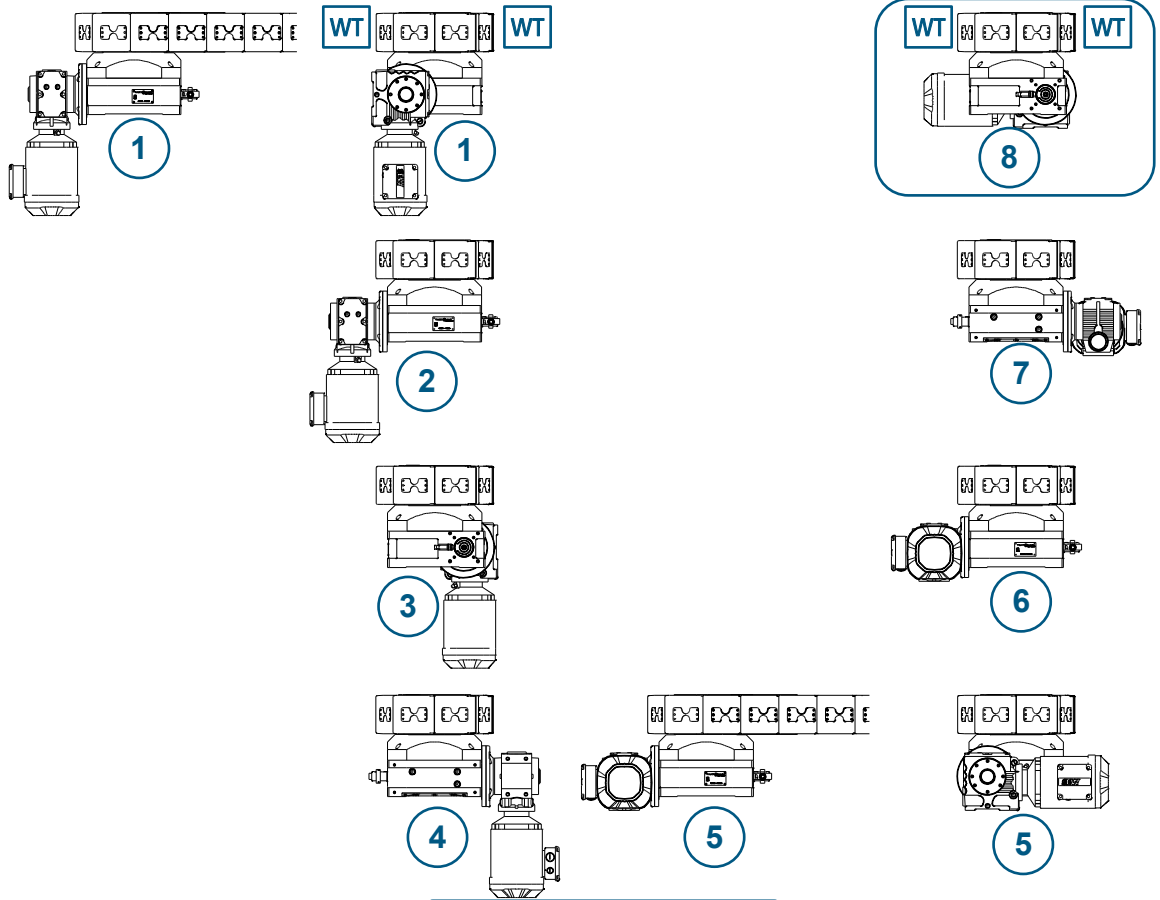


Fig. 25 Linear transfer system horizontal Standard => Square frame marking

1 = Side 1, Top view output flange right; 2 = Side 2, Top view output flange left; WC = Workpiece carrier

LFA	RT	KKL	LFA	RT	KKL	Drive position side	Drive position
① U - A	1 - SL - 180	0-270	⑤ U - A	1 - SL - 90	0,180,270	0 => Top	A => Outside
② U - R	1 - SL - 180	0-270	⑥ U - R	1 - SL - 90	0,180,270	U => Bottom	I => Inside
③ U - I	1 - SL - 180	0-270	⑦ U - L	1 - SL - 90	0,180,270		R => Right
④ U - L	1 - SL - 180	0-270	⑧ U - I	1 - SL - 90	0,180,270		L => Left

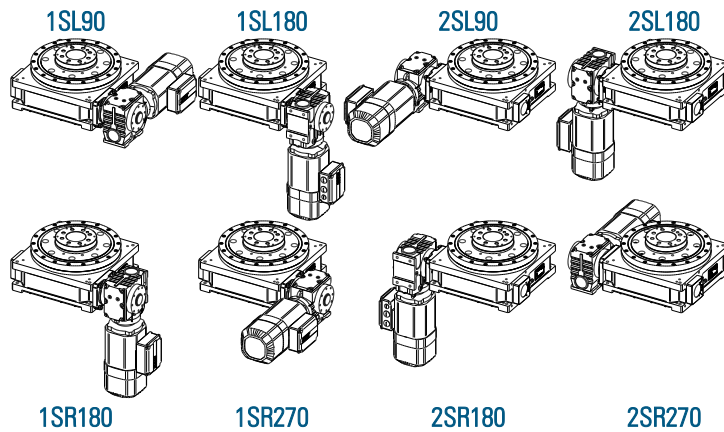


Fig. 27 Installation positions RT drive unit

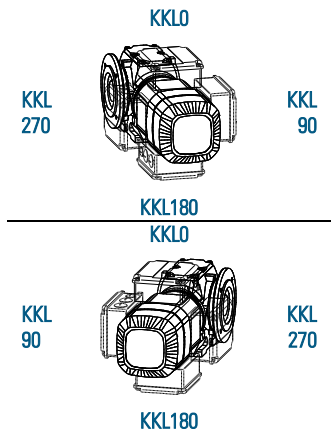


Fig. 26 Pos. Terminal box

5.4 Installation and commissioning

Safety information

 **DANGER**



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched.

Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

5.5 Assembly of the Linear transfer system

Staff Protective equipment

Qualified staff

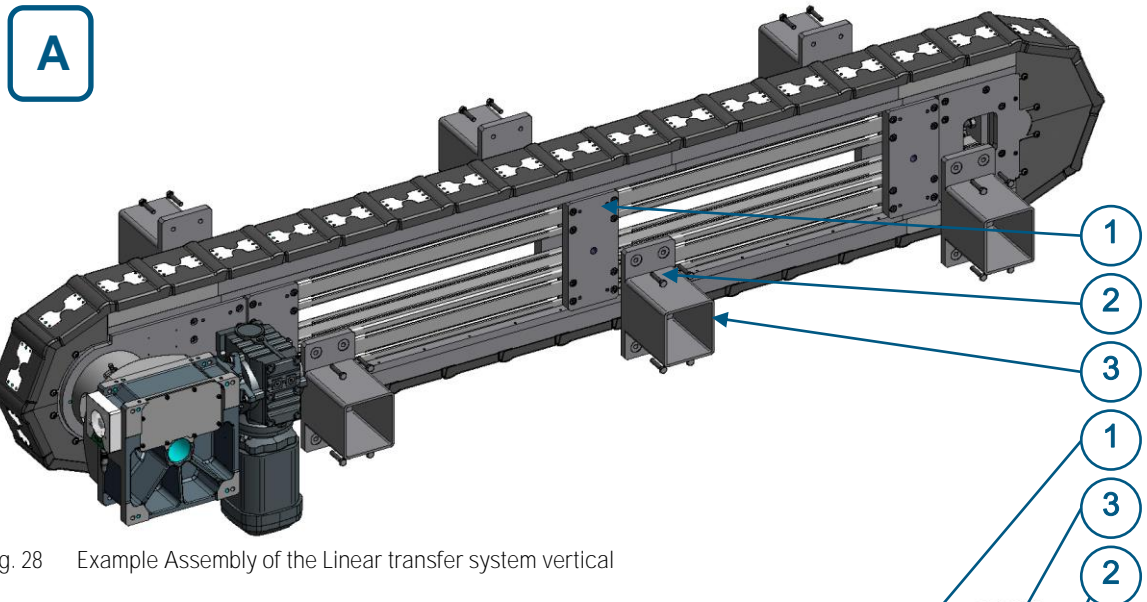


Fig. 28 Example Assembly of the Linear transfer system vertical

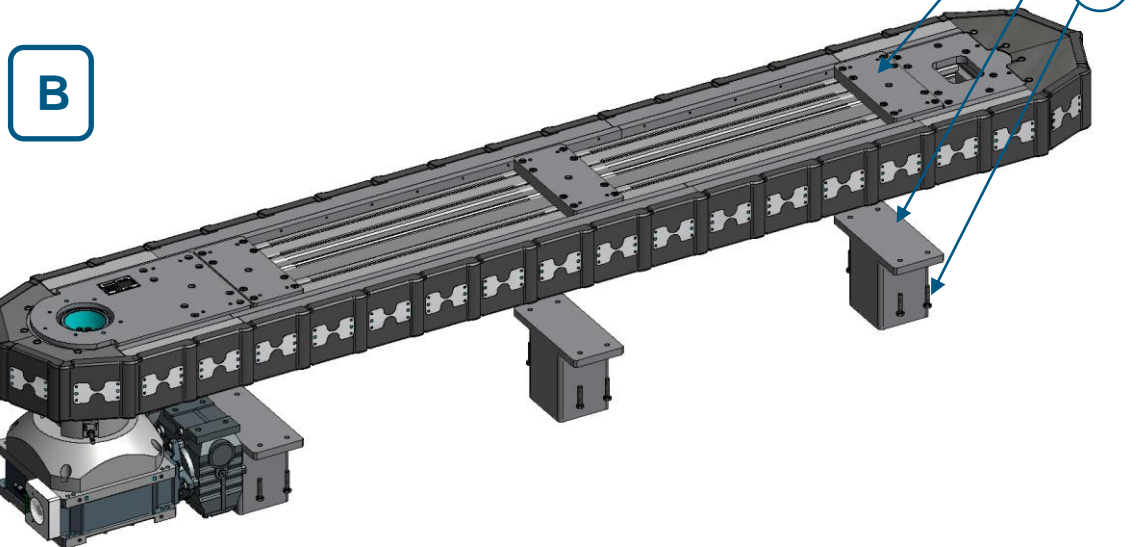


Fig. 29 Example Assembly of the Linear transfer system horizontal

Item	Designation
1	Intermediate plate (number dependant from center distance)
2	Screw
3	Example support

The linear transfer system LFA can be installed upright (A) or on its side (B). The linear transfer system is packaged and transported depending on the installation position planned by the customer.

For installation in a system, Taktomat recommends fastening the LFA linear transfer system with brackets (3). The brackets are firmly attached to the intermediate plates (1) with screws (2).

For the thread sizes for fixing the brackets, please refer to the table Main dimensions of linear transfer system LFA - LFA S body.

For a wide or protruding rotary indexing table, a supporting structure for the rotary indexing table is also recommended.

- ▶ The mounting surface must be level.
- ▶ Clean the mounting surface.
- ▶ Place Linear transfer system LFA on the mounting surface.
- ▶ Fix Linear transfer system LFA with screws as specified in the dimension table (see technical data).
- ▶ Ground the housing of the Linear transfer system LFA with a sufficient cross-section.

Chain link attachments

For attachments/workpiece carriers (WC) on the chain link, note the following:

- ▶ Maximum mass moved (as per Taktomat planning).
- ▶ Minimum time until positioning (as per Taktomat planning).
- ▶ Maximum overhang (tilting moment) (as per Taktomat planning).
- ▶ Max tightening torque for mounting holes.

5.6 Initial start-up

Staff

Qualified staff

Protective equipment



- ▶ Remove obstacles from the indexing area of the link chain.
- ▶ Ensure freedom of movement.

6 Overload protection (optional)

Staff Protective equipment

Qualified staff



To protect the linear transfer system in overload situations, an optional safety clutch can be installed. In the event of an overload, the safety clutch disconnects the rotary indexing table from the linear transfer system, preventing major damage to the system.

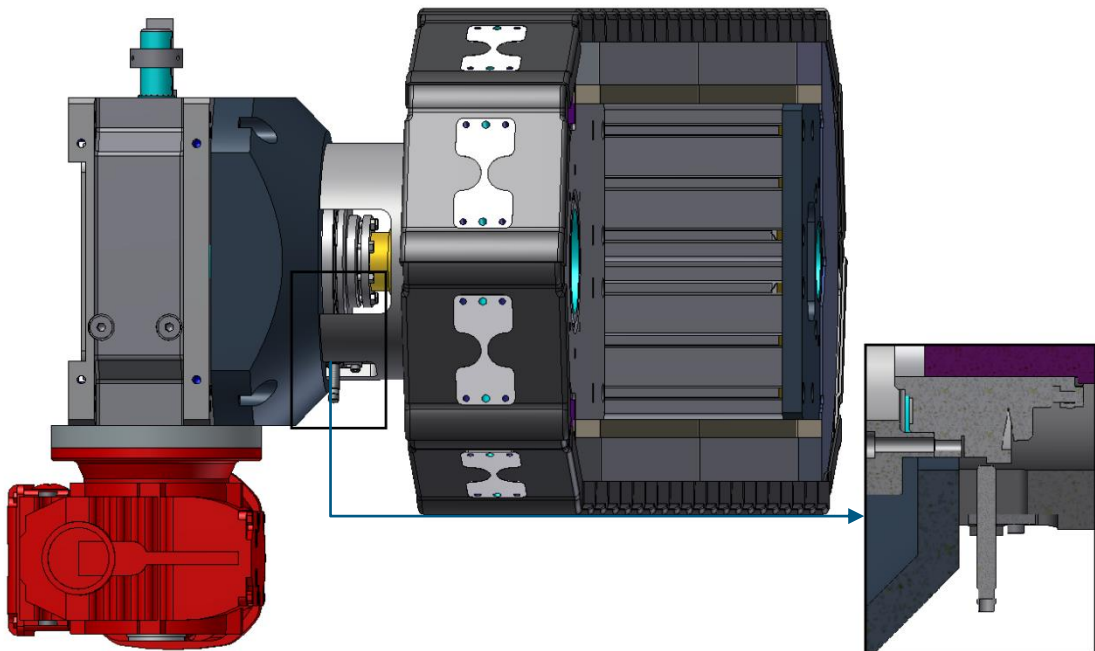


Fig. 30 Safety clutch overview

A limit switch is installed to monitor the clutch. The limit switch is mounted on a sensor holder attached to the spacer (see Figure: Safety clutch overview).

The limit switch is set and sealed by Taktomat.

To monitor the clutch, the limit switch signal can be processed directly by the motor controller or by a controller (PLC).

During operation, the limit switch indicates the clutch in the engaged state. In an overload situation, the LED is not illuminated!

7 Product changeover (Option)

Staff

Qualified staff

Protective equipment



Linear transfer system type LFA, equipped with an electromagnetic brake in combination with a torque limiting clutch, there is the possibility for a product changeover.

Precondition for product changeover from product A to B is, that a bigger stroke than one chain link is possible. If there are two different products A and B mounted on the chain links a product changeover may be performed.

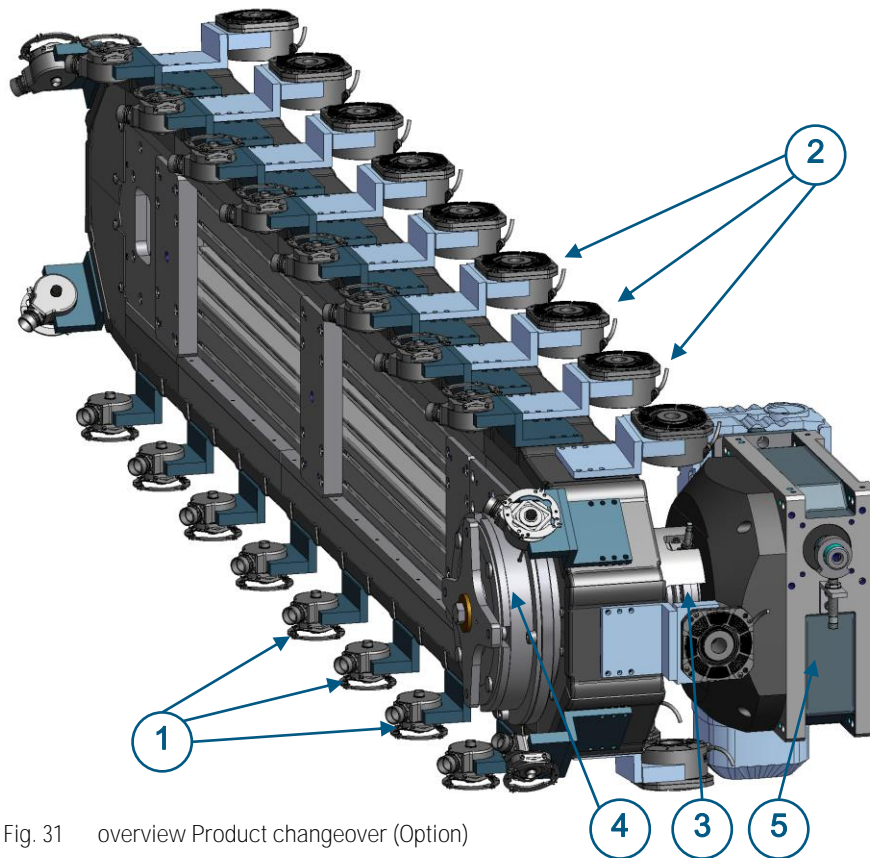
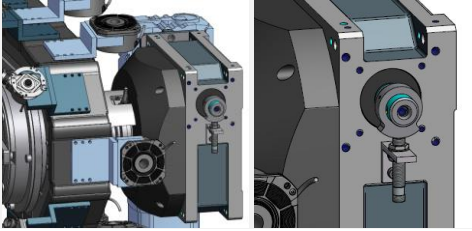


Fig. 31 overview Product changeover (Option)

Pos. Designation

- | | |
|---|------------------------|
| 1 | Product A |
| 2 | Product B |
| 3 | Torque limiting clutch |
| 4 | Electromagnetic brake |
| 5 | Rotary indexer |

Follow the steps below to switch the Linear transfer system type LFA from product A to B:

Step	Action
1	<ul style="list-style-type: none"> ▶ The Linear transfer system type LFA is in dwell position (Dwell position = switch cam position Nockenposition see Fig.) 
2	<ul style="list-style-type: none"> ▶ Activate electromagnetic (4) brake (energise)
3	<ul style="list-style-type: none"> ▶ Clock the rotary indexer (5) according to the requested product
4	<ul style="list-style-type: none"> ▶ Torque limiting clutch (3) disengages and the overall system must not be put back into operation until the torque limiting clutch have been reengaged (Sensor switched)
5	<ul style="list-style-type: none"> ▶ Switch off electromagnetic brake (4) (deenergise).
6	<ul style="list-style-type: none"> ▶ Operate overall system in normal operation.

8 Service and maintenance

The machine is designed to be largely maintenance-free. Necessary maintenance is intended to keep the machine fit for service. The intervals will depend on the operating conditions.

Note:

The maintenance intervals given are minimum recommendations based on use across three shifts. Failure to observe the maintenance stipulations and any changes will make the guarantee null and void and release the manufacturer from any liability.

Make sure that you observe any statutory requirements, stipulations and national regulations in respect of occupational health and environmental protection.

The maintenance stipulations only apply in conjunction with the operating instructions of the manufacturer concerned. The contents are subject to change without notice.

8.1 Safety information in respect of maintenance



! WARNING

Danger if staff are insufficiently qualified!

Persons who are inadequately qualified are unable to assess the risks associated with working on the machine and expose themselves and others to the risk of serious or fatal injury.

- ▶ Ensure that all work is performed only by suitably qualified persons.
- ▶ Keep insufficiently qualified persons at a safe distance from the working area.

8.1.1 Qualified staff required

The operator must unambiguously specify who is responsible for cleaning, maintenance and servicing and how such work is to be performed.

Only allow qualified, trained and properly instructed staff to work on the machine.

8.1.2 Maintenance tasks

If servicing work is to be performed in-house, the appropriate tools and equipment for such work must be provided. Follow the procedures laid down in the Operating Instructions for switching the system on and off when performing any maintenance and cleaning work.

Observe the stipulations laid down in the Operating and Maintenance Instructions with respect to adjustment, maintenance and servicing activities, including details on replacing components and equipment.

Where necessary, cordon off the area in which maintenance is being carried out at a safe distance.

8.1.3 Cleaning

Make sure that all handles, steps, handrails, platforms, ladders are clean.

Compressed air must not be used for cleaning.

Before starting maintenance work, clean any oil, fuel or cleaning agents from the machine, and particularly from connections and screwed joints. Do not use aggressive cleaning agents. Use lint-free cloths.

After cleaning, check all supply lines to ensure that they do not leak, that no connections have come loose, and that they show no signs of abrasion or damage. Immediately rectify any faults.

Concluding work

Always tighten any screw connections that have been released during maintenance and service work. If safety equipment has to be removed during setup, maintenance or repairs, the safety equipment must be replaced and tested immediately work has been completed.

Dispose of service fluids, process materials, cleaning agents and used parts safely and in an environmentally friendly manner. Follow the manufacturer's instructions when dealing with hazardous substances.

Replacement parts

Replacement parts must comply with the technical requirements laid down by the manufacturer. This is guaranteed with original replacement parts.



Environmental protection

Take note of the following environmental protection information when carrying out maintenance work:

- ▶ Remove excess grease or oil from the lubrication points and dispose of it in accordance with local regulations.

8.2 Maintenance tasks

8.2.1 Maintenance plan

Interval	Maintenance activity	Staff
Weekly	General visual and acoustic inspection	Operator
Monthly	Clean the chain links and guide rails where accessible. Remove dust and deposits.	Operator
Quarterly	Check the electromagnetic brake for wear (optional).  To check the wear of the electromagnetic brake correctly, follow the instructions of the component supplier! Check the electrical wiring for damage.	Operator
Yearly	Check the rotary indexing table for play in the dwell position.  To check the play of the rotary indexing table correctly, follow the instructions of the component supplier!	Qualified staff
Yearly	Check chain tension and re-tension if necessary, see section "Checking and adjusting the chain tension".	Qualified staff

8.3 Checking and adjusting the chain tension

Staff Protective equipment

Qualified staff

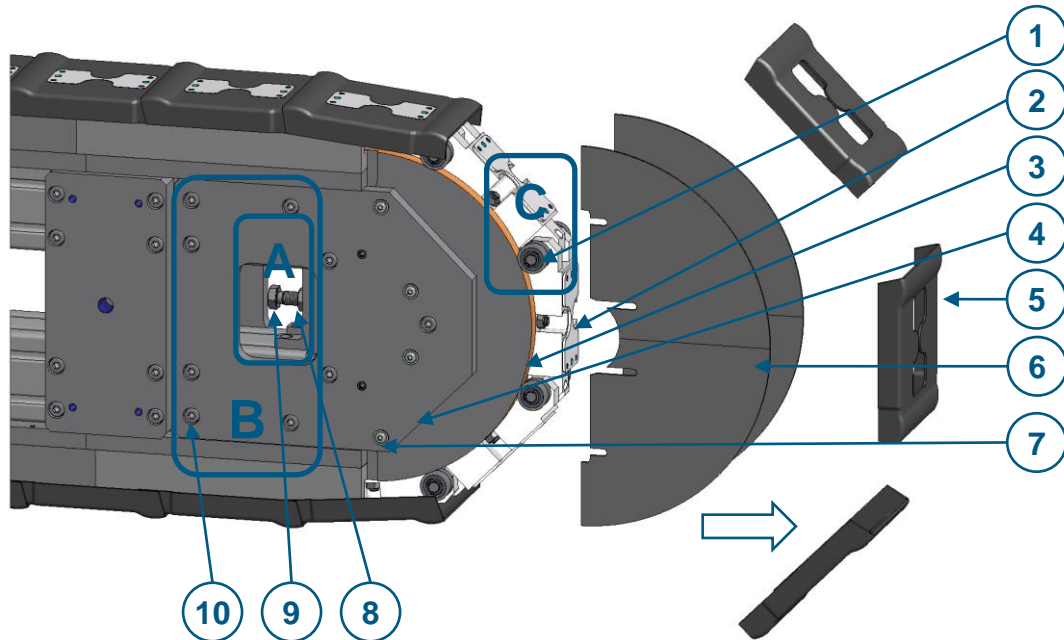


Fig. 32 Detailed view of chain tensioner (deflection unit)

Working areas

Item	Description
A	Set screw chain tensioner Consisting of: Hexagon screw, hexagon nut
B	Side panel clamp 6 cylinder head screws (both sides)
C	Chain link bearing

Components

Item	Description
1	Deep groove ball bearing, 4 per chain link
2	Chain link
3	Deflection wheel
4	Side panel
5	Protective cover
6	Cover plate
7	Flanged screw
8	Hexagon nut
9	Hexagon screw
10	6 cylinder head screws (both sides)


⚠ DANGER


Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched. Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

The chain tension can only be checked and adjusted at the deflection unit.

Check the chain tension as follows:

Step	Activity
1	 <ul style="list-style-type: none"> ▶ Disconnect all power supplies to the Linear transfer system. ▶ Remove attachments on the chain links only at the deflection unit. ▶ Remove protective cover (5). ▶ Loosen 4 flanged screws (7) on both sides with ¼ turn of Allen wrench in the counterclockwise direction. ▶ Remove 4 cover plates (6) from the side panels (4) in the direction of the arrow. ▶ Turn each deep groove ball bearing (1), 4 per chain link (2), alternately on the circumference of the deflection wheel. <p>⇒ If all deep groove ball bearings (1) can be turned equally tightly, the chain tension is correct.</p>

8.3.1 Re-tensioning the chain

Recommended tools:

- I. Allen key size 6
- II. Ring spanner size 19
- III. Open-end spanner size 19

Step	Activity
1	▶ Use an Allen key to loosen 6 cylinder head screws (10) on the clamp B on the side panel (4) on both sides with ¼ turn (12 screws in total).
2	▶ Slacken chain tensioner A by loosening the hexagon nut (8) and screwing the hexagon screw (9) back.
3	▶ Set chain tension by gradually turning the hexagon head screw (9) in the clockwise direction while checking the pretension of the deep groove ball bearing (1) at bearing C on both sides.
4	▶ Check the 16 deep groove ball bearings (1) for correct pretension on the entire circumference of the deflection wheel (3). The pretension is correct when the deep groove ball bearings (1) can be turned tightly by hand.
6	▶ Tighten 6 cylinder head screws (10) on the clamp B on the mounting plate (4) to 28 Nm on both sides (12 screws in total).
7	▶ Repeat step 4. ▶ If the pretension for the deep groove ball bearings (1) is not correct, start again at step 1.
8	▶ Tighten hexagon screw (9) against twisting and tighten hexagon nut (5) while holding with ring spanner.

8.4 Replacing the limit switch (optional)

Staff Protective equipment

Qualified staff



NOTE



Damage arising from improper / no functional test of the safety clutch!

Improper / no functional test of the safety clutch can result in considerable damage to property.

- ▶ Before the function test of the clutch, always read the operating instructions.
- ▶ Use only original spare parts.
- ▶ Note switching distance of limit switch

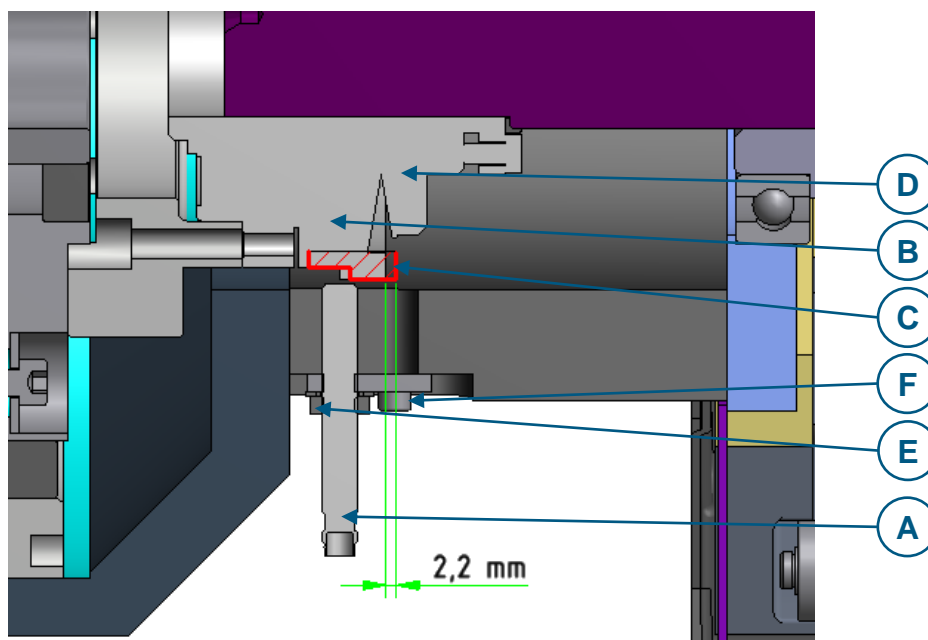


Fig. 33 Detailed view of clutch drive unit

Components

Item	Description
A	Limit switch (sensor PNP, NO, 10-30V DC)
B	Pressure disk
C	Pressure disk in disengaged position
D	Clutch
E	Counter nut
F	Cylinder head screws

In the event of overload, the pressure disk (B) for the clutch (D) shifts in the axial direction to the right (see Figure: Detailed view of clutch drive unit). The clutch (D) disengages and disconnects the drive from the linear transfer system.

8.4.1 Setting the limit switch distance

NOTE



Damage due to improper replacement of the limit switch!

Improper replacement of the limit switch can result in considerable damage to property.

- ▶ When installing the limit switch, always follow the operating instructions.
- ▶ Cable connections must be freely accessible.
- ▶ Tighten counter nut for limit switch with torque wrench.
- ▶ Set the exact switching distance of the limit switch.

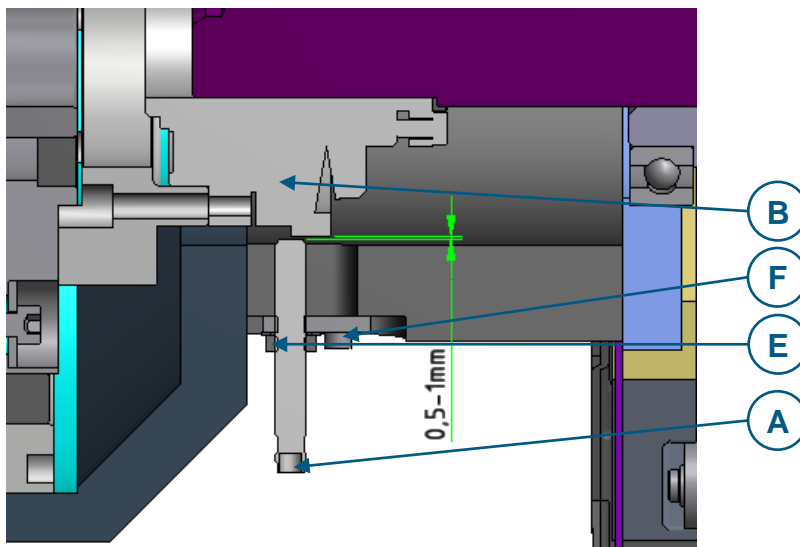



Fig. 34 Detailed view of limit switch distance

The limit switch (A) is installed at a distance of 0.5 mm from the pressure disk (B) and positioned so that the limit switch (A) is always switched in the operating state (clutch engaged). See Figure: "Detailed view of limit switch distance"

If you want to carry out the replacement yourself, proceed as follows:

Step	Activity
1	 <ul style="list-style-type: none"> ▶ Disconnect all power supplies to the system and secure it against being switched back again. ▶ Remove cable from defective limit switch (A). ▶ Loosen counter nut (E) with open-end spanner. ▶ Screw out limit switch (A).
2	<ul style="list-style-type: none"> ▶ Replace limit switch (A) with new limit switch. ▶ Carefully screw limit switch (A) to stop (clutch). ▶ Unscrew limit switch (A) a half turn. ▶ Set exact distance of 0.5-1 mm with feeler gauge. ▶ Use a torque wrench to tighten counter nut to max 6 Nm.
3	<ul style="list-style-type: none"> ▶ Engage clutch. ▶ LED at limit switch (A) lights up.

8.4.2 Clutch operating states

The following table shows operating states for the clutch and the sensor signal depending on the load on the drive.

Drive	Clutch	Signal sensor
Normal operation	Engaged	High (logical 1)
Overload	Disengaged	Low (logical 0)

8.4.3 Troubleshooting

The following table lists error descriptions, possible causes, and the measures that result from them:

	Problem	Causes	Measures
1	No signal from limit switch	Limit switch positioned incorrectly	Reposition limit switch.
2		Distance between limit switch and pressure switch too large	Set distance between limit switch and pressure switch to 0.5-1 mm with clutch engaged.
3		Limit switch is not connected	Check whether limit switch is connected.
4		Limit switch cable is defective	Check limit switch cable for damage.
5		Limit switch power supply not available	Check limit switch power supply.
6		Limit switch is defective	Connect another limit switch of same type.
7	Limit switch high signal continues when clutch disengaged	Limit switch positioned incorrectly	Reposition limit switch.
8		Short circuit of limit switch signal line to non-floating line	Check limit switch cable for damage.
9		Limit switch is defective	Connect another limit switch of same type.

8.5 Lubrication

8.5.1 Requirements for lubricants

General

To ensure safe operation and a long service life, it is necessary to lubricate the machine carefully. The specified oil and grease must be applied to all lubrication points.

Carefully clean dirty lubrication points using a suitable agent and then lubricate them with new lubricant. After lubrication, any excess lubricant must be removed and properly disposed of.

The oil and grease used must be silicone-free.

Lubricating oil

Use only lubricating oil compliant with DIN 51 517 (ISO VG 460)

Recommended gear oil

Manufacturer	Designation
Mobil	Mobilgear 600 XP 460
BP	Energol GR-XP 460
SHELL	Omala 460
LIQUI MOLY	meguin Getriebeöl CLP 460
Zeller+Gmelin	Divinol ICL ISO 460
Klüber	Klüberoil GEM 1 N

Lubricating grease

Use only lubricating grease compliant with DIN 51 825-KP 2K.

Recommended lubricating grease:

Manufacturer	Designation
Mobil	Mobilux EP2
BP	
SHELL	
LIQUI MOLY	
Zeller+Gmelin	Divinol Fett EP 2
Klüber	-
THK	THK lubricant AFA

Note:

Only use lithium soap based grease for lubrication. The use of greases based on different materials causes gummy deposits, decomposes the grease and destroys its lubricating properties.

9 Troubleshooting

DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched. Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

WARNING



Risk of injury from improper troubleshooting!

Improper troubleshooting can cause serious injury to staff and material.

- ▶ Before starting work ensure that there is sufficient room to carry out the work.
- ▶ Pay attention to tidiness and cleanliness in the working area! Loose parts and tools which are piled up or lying around are sources of accidents.

Fault	Possible cause	Remedy
Drive does not turn	<ul style="list-style-type: none"> • No supply voltage • Drive contactor malfunction • Drive protection switch triggered • Brake not released 	<ul style="list-style-type: none"> ▶ Check power supply ▶ Change contactor ▶ Let the the drive cool down; latch the protection switch of the drive ▶ Incorrectly connected or worn brake ▶ Check sensor settings at the switching cam. ▶ Check sensor cable at the sensor.
Drive turns, but chain link does not move and chain link is free of play.	<ul style="list-style-type: none"> • Worm gear malfunction • Safety coupling overload / disengaged • Cam followers tear off due to massive overload • Levers broken • Cone clamping element not correctly mounted 	<ul style="list-style-type: none"> ▶ Contact TAKTOMAT ▶ Remove outside blockade / latch the safety coupling ▶ Contact TAKTOMAT ▶ Contact TAKTOMAT ▶ Mount cone clamping element correctly according to operating instruction of manufacturer
Drive turns, but chain link does not move, chain link is not free of play.	<ul style="list-style-type: none"> • Cam follower tear off due to overload • Chain link shaft tear off due to massive overload 	<ul style="list-style-type: none"> ▶ Contact TAKTOMAT
Drive turns with strong humming noise	<ul style="list-style-type: none"> • Drive operates on 2 phases 	<ul style="list-style-type: none"> ▶ Check fuse or drive contactor ▶ Measure current on all 3 phases; voltage measurement is not enough
No signal from sensor	<ul style="list-style-type: none"> • Sensor not activated / not fully activated • Cable defective • Sensor defective • No supply voltage 	<ul style="list-style-type: none"> ▶ Remove blockage ▶ Check cable, exchange if necessary ▶ Exchange sensor ▶ Check supply voltage

10 Disposal

At the end of its service life, the machine must be disassembled and disposed of in accordance with environmental protection requirements.

WARNING



Risk of environmental damage caused by improper disposal!

Improper disposal of components can cause environmental damage to persons and environment.

- ▶ Disposal of the components in accordance with the applicable local rules
- ▶ Environmentally compatible disposal of auxiliary substances such as chemicals, paints, acids, alkalis, adhesives
- ▶ Essentially components of the machine consists of following materials: copper (drive unit, electrical lines) Steel, aluminium and grey cast iron (housing, structures, shaft, bearings,...) Plastics (tooth belt, isolation, components of bearings).

DANGER



Risk of death by electrocution!

There is an immediate risk of fatal injury due to electric shock if live components are touched.

Damage to the insulation or to individual components can cause fatal injury.

- ▶ Only allow work on the electrical system to be carried out by qualified electrical engineers.
- ▶ In the event of damage to the insulation, immediately shut off the power supply and initiate a repair.
- ▶ Before starting work on active parts of the electrical system or equipment, ensure that it is completely powered down and cannot be switched on again.

Before starting disassembly:

- ▶ Disconnect all power supplies to the machine, ensure that it cannot be reconnected and verify that the circuit is de-energized
- ▶ Wait 15 Minutes, until all live parts are full discharged
- ▶ Disassemble assemblies and components, observing any local environmental protection regulations.

11 Spare part and wear part

Spare part must meet the manufacturer's technical specifications. This is always ensured if original Spare parts are used.

11.1 Spare part and wear part type LFA

Spare part and wear part of the product Linear transfer system are basically order specific. To accelerate the order process of the Spare part and wear part, we need the following information which is located on the nameplate: Serial number of the machine.

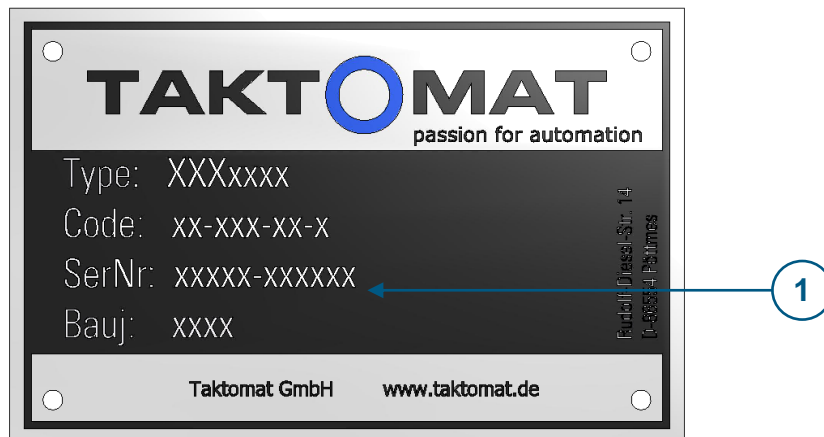


Fig. 35 Example nameplate

Position (1) Serial number

NOTICE



Damage arising from contamination with silicon!
Improper handling of spare parts and wear parts can cause significant damage to property.

- ▶ Keep spare parts and wear parts free from silicon!

Spare part and wear part

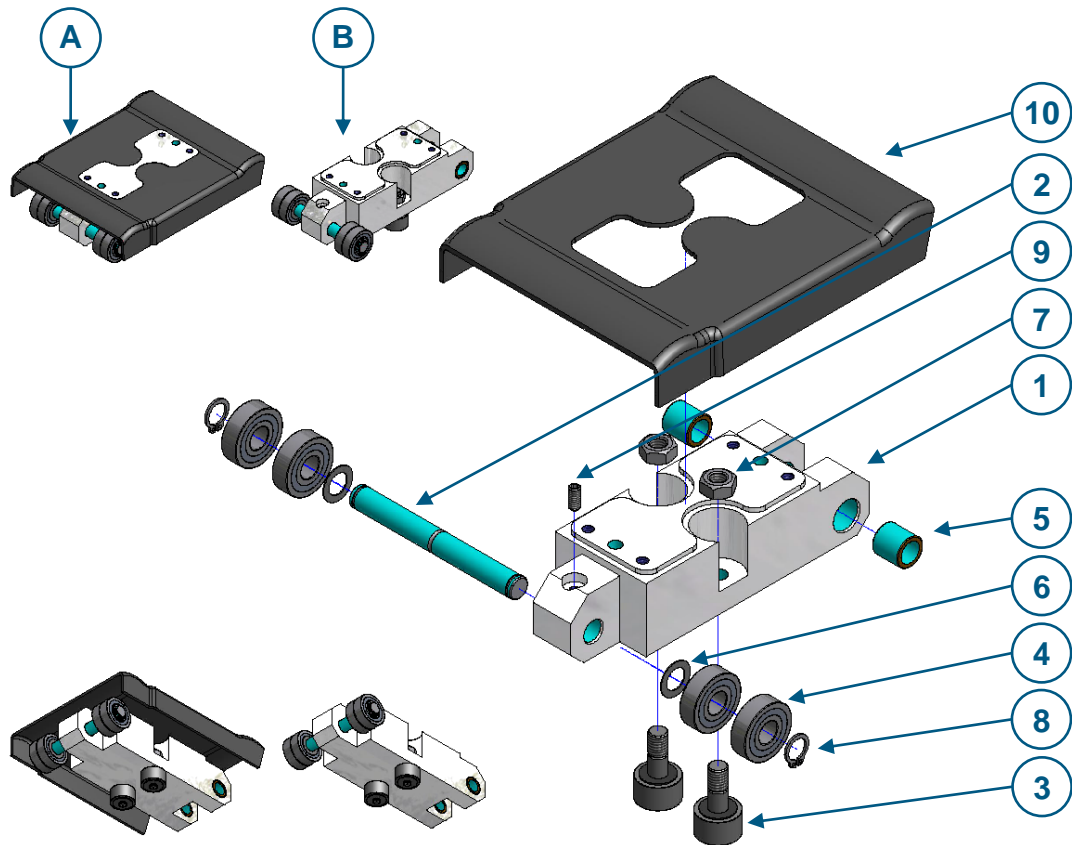


Fig. 36 Overview Spare part and wear part type LFA080-LFA150

11.1.1 Spare and wear parts list chain link type LFA080 –LFA150

11.1.1.1 Chain link LFA

Pos.	Quantity	Designation	Item No. LFA080	Item No. LFA100	Item No. LFA125	Item No. LFA150	Spare part (SP)	Wear part (WP)
A	1	Chain link LFA with protective cover	324662	324657	324661	324002	SP	
B	1	Chain link LFA without protective cover	327237	326583	326724	327465	SP	

11.1.1.2 Chain link LFA parts

Pos.	Quantity per Chain link	Designation	Item No. LFA080	Item No. LFA100	Item No. LFA125	Item No. LFA150	Spare part (SP)	Wear part (WP)
1	1	Chain link LFA	324659	324653	324658	323966	SP	
2	1	Shaft LFA	324652	324652	324652	312200		WP
3	2	Cam follower	306543	306543	306543	306543		WP
4	4	Deep-groove ball bearing	300299	300299	300299	312206		WP
5	2	Needle bush	313771	313771	313771	321587		WP
6	2	Shim ring	306948	306948	306948	312212	SP	
7	2	Hexagonal nut	305340	305340	305340	305340	SP	
8	2	Retaining ring for shafts	303575	303575	303575	300789	SP	
9	1	Threaded stud	323660	323660	323660	300335	SP	
10	1	Protective cover LFA	319575	318295	319811	319679		WP

12 Annex

12.1 Safety data sheets

Item	Description
1	EP 2 Grease Data Sheet HI