Contents

1 Safety

The Flexlift scissor lift corresponds to the valid specifications of the EG-machine guidelines (CE) and the European Standards for scissor lifts, EN 1570. Each lift table leaves after an accurate final check.

Controller errors caused by third-party controllers can not or can only partially compensated for by the Flexlift safety components.

In spite of all "built-in" safety, it should not however be forgotten, that considerable hazards for personnel, the machine itself and other material assets of the factory can occur do to faulty operation or unspecified use**.**

On this account, we would like to impress upon on you to read this manual carefully and be aware of all operation situations.

1.1 Signs in this manual

Indicates rules of conduct and dangers of property damages

Indicates dangers for people

If assembly and start-up is not carried out properly, the manufacturer rejects any and all warranty- and safety claims!

If the lift table is repaired by others than the manufacturer, warranty- and safety claims will no longer be accepted by Flexlift GmbH.

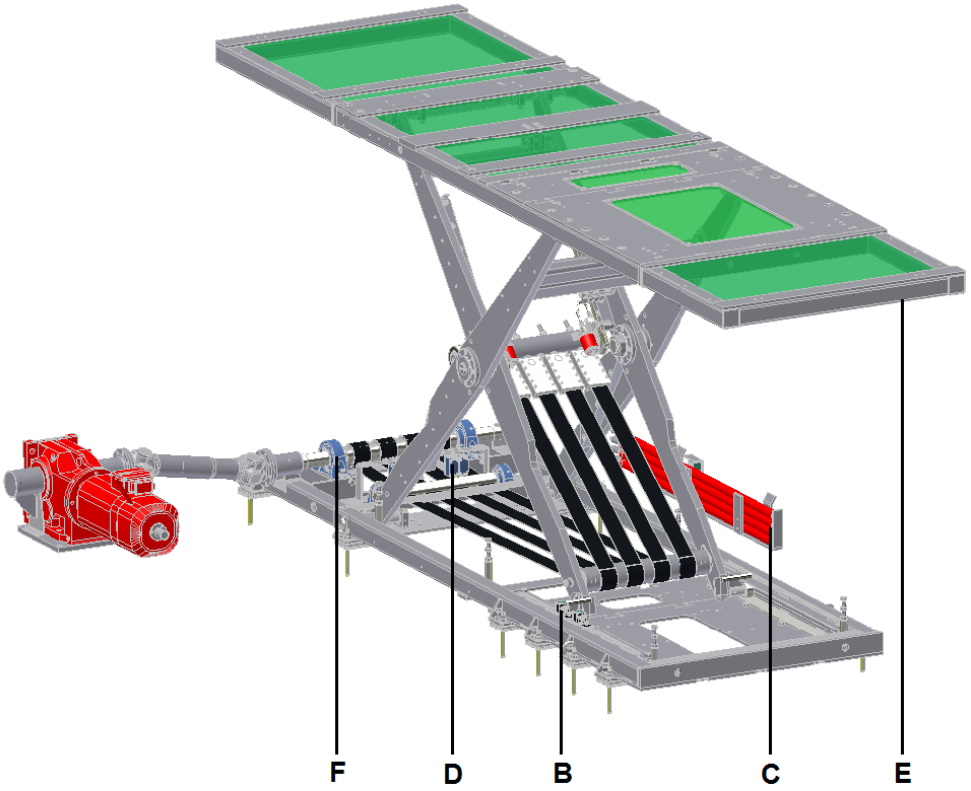
If spare parts are installed which were not delivered or approved by the manufacturer, warranty- and safety claims will no longer be accepted by Flexlift GmbH.

All the notes in this documentation do not relieve the user of the lift table from observing the Machinery Guidelines, the EN-standards (especially EN 1570) and the respective valid national machinery- and safety regulations.

1.2 Safety Devices

General safety equipment according to European Standards EN 1570 (scissor lifts)

Usually the lift table is equipped with the safety devices described in the following. Depending upon application and danger analysis the execution can deviate however.



A **<u>Main/emergency-off-switch</u>** (optional)

B **<u>Safety limit switch upper/lower position</u>**
Emergency limit switch – for stop position at top/bottom – if these positions are overtravelled significantly the lifting table may be seriously damaged.
With belt-driven lifting tables, the loose-belt limit switches can also be queried instead of the bottom limit position so that the lifting table can be lowered onto the bottom limit stops.

C1 **Maintenance supports (to be inserted between the top and base frame)**
This type of maintenance supports may only be inserted when the platform is unloaded and allow maintenance and repair tasks to be carried out on the scissor system and/or below the platform by locking the lifting table.
The maintenance supports are inserted in the pins provided therefore in the base frame and the lifting table is then lowered on to these supports.

D **Saftey limit switch in case of a belt rupture/safety limit switch bottom stroke:**
If a belt breaks this prevents the lifting platform from lowering further, i.e. the limit switch turns off all movements of the lifting platform.
This should be taken into account in the customer's control system.

E **Protection against walking under the elevating unit** (bellow)**:**
On accessible sides where it is not possible to look under the scissor lift from control stands. Generally on all sides. The customer is, however, obliged to check the clamping spaces in connection with the protruding load.

F **Insertion of the lubricating nipples into the pedestal bearing (drive shaft)**

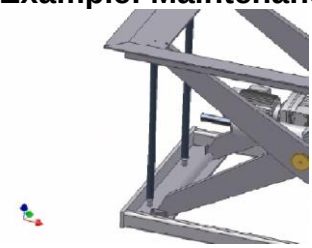
Prepared

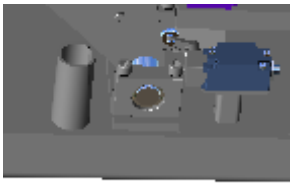
1.3 Safe servicing of the lifting table

⚠ **Works under the lifted platform may be performed only with an <u>unloaded</u> platform and with <u>both the maintenance supports or socket pins inserted.</u>**

⚠ **Insertion of the maintenance supports or socket pins should only take place without an imposed load!**

Example: Maintenance supports (to be inserted between the top and base frame)





- Raise the lifting table up to the maximum height.
- Insert the maintenance supports in the pins at the base frame and lower the lifting table.
- The lifting table is now protected mechanically against further lowering.

2 Fundamentals

2.1 Regarding this operating manual

The Flexlift-construction series "RFK" comprises scissor lifts which are driven by a flat belt drive. They are available in a wide scale of capacities, platform sizes and lifting heights, so there is a large range of possible applications.

This operating manual makes you familiar with the properties of your scissor lift and gives you the necessary information for safe use, for putting into operation, assembly, operation, maintenance and servicing of the equipment.

Every person who is entrusted with the operation, assembly, installation, servicing or repair of the lift table, must have read and understood the operating manual.

The manufacturer is not responsible for damages which can be traced back to improper, faulty or negligent use.

If any queries arise, we advise you to contact the manufacturer or supplier!

The Flexlift RFK-type scissor lift is usually applied as an individual component of a total plant (e.g. off and on feeding station in a transport plant). It must be made safe before putting into operation, corresponding to the safety requirements of the total plant to be used.

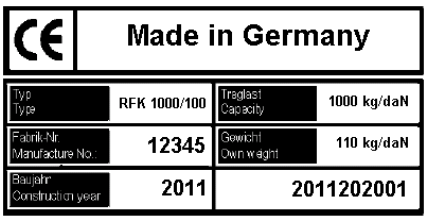
As we do not sufficiently know the application field of the scissor lift and we also have not constructed the control for these units, we can give only suggestions for the safe and EN-conform operation in this operating manual. The operating instructions for this machine must be adhered to at all times (see chapter **10** Operating instructions).

This operating manual is a constituent of the lifting equipment. If the equipment is sold on, this manual must accompany the delivery.

2.2 Serial number

Every delivered lift table receives a serial number for its clear identification. This serial number is introduced on the cover of these instructions and on the nameplate of your lift table.

In case of queries, complaints, after-sales service and ordering spare parts, always quote this number, in order to ensure prompt attention. The nameplate (serial plate) can be found on the side of the lifting scissors. (Sample)



2.3 Repairs and rebuilding

Design modifications on the lift table may only be undertaken after previous written agreement of the manufacturer. If this instruction is not observed, warranty- and safety claims will no longer be accepted by the manufacturer.

Maintenance and repair are only to be carried out by duly authorized and trained personnel. Only use original spare parts or parts that have been approved by the manufacturer for repairs. If this instruction is not observed, warranty- and safety claims will no longer be accepted by the manufacturer

2.4 Patent rights

We would like to point out that various design principles of the Flexlift lifting systems or certain mounting parts are protected by patent right. Copying and sale of these systems and passing on of documents and drawings to third parties are subject to the prior approval of the manufacturer or will be prosecuted.

3 Technical description

The scissor lift has been designed according to the principle of a frame structure whereby the scissor arms insert into another; i.e. the scissor arms have been manufactured as a distortion-proof rectangular frame from tubular profiles or flat steel and fold into one another when the platform is in the lowest position. The stability depends on the load division points which must be agreed upon with the manufacturer.

The scissor lift mainly consists of the following assemblies:

1. Top frame
2. Scissor arms
3. Base frame
4. Cam roller technology
5. Drive unit with flat belt, drive unit and gear motor
6. Electrical controls (optional)

3.1 Top frame

The top frame consists of a frame structure maybe with sheet metal cover. Two fixed bearings as rotation point for the scissor arms and 2 parallel flange-guiding profiles in which the rollers of the internal scissor arm pair roll off, are part of the frame construction.

3.2 Scissor arms

The scissor arms which fold into one another in the lowest position of the scissor lift are manufactured from distortion-free full profiles. Each two scissor arms and traverses form a surrounding frame. The drive belts which are connected to the drive shaft and the motor are hung in the bottom frame between the scissor arm pairs. When lifting the loose sides of the scissor arms are pulled towards the motor by the belts.

3.3 Base frame

The vertical forces are diverted to the support surfaces via the basic frame. It consists of a profiled frame with two fixed bearings at which the scissor arms are fulcrumed and two parallel flange profiles in which the rollers of the outer scissor arm pair roll off.
The base frame is fixed by the customer in a skillet systems , on a steel construction or on to the subsoil.

3.4 Cam roller system/Cam roller technology

The tapered roller shaft and the flange profiles for the tapered roller system are fitted in the center area of the scissors. The belts are attached to the cam roller shaft and the drive shaft. When the belts are wound around the drive shaft, the tapered roller shaft is automatically pulled into the expansion wedge of the scissors and the top frame is lifted.

This lifting concept enables a compact and open design and guarantees a uniform flow of the forces via a cam.

3.5 Drive unit with toothed belt/flat belt and gear motor

The belt-driven lifting table can be fitted with as many belts as desired (usually two) depending on the respective application. The holding torque is absorbed by a brake motor via the gear. The brake can be released mechanically for maintenance work. (Caution! A lowering faster than 2 m/min is possible).
The belts are wound up on the winding shaft, reversed on the movable side and they pull the expanding spline shaft between the scissors. The belts are fastened to the expanding spline shaft by means of adjustable clamping plates.
Each belt is individually clamped to the winding shaft and fixed with two initial windings.
The positive force transfer from the motor to the drive shaft takes place via a universal joint shaft (according to EN 1570).
The counter torque of the drive is thus introduced into the ground via the motor plate. The motor plate has thus to be securely fastened to the ground and the ground must be sufficiently resistant.
The universal joint shaft may not be bent (curved) stronger than it was designed for. Relevant in this case is the angle shown in the approval drawing. Not just the angle in the plane is to be considered but also the vertical direction.

3.6 Electrical controls (optional)

The electrical control system is constructed depending on the size of the plant according to VDE 0113 and EN 60204 and may **optionally** contain an operating keyboard, switch box with main switch, contactors, protective motor switch, transformer as necessary as well as essential limit switches.
If the lifting table is used in the plant area the electrical equipment will be wired using terminals in agreement with the user and/or entirely controlled via the customer’s control system.

4 Technical data

Comm. No:	2014207194
Ident-No:	50329
Year of manufacture:	2014
Capacity (SWL):	2000 kg distributed load
Top frame length:	4300 mm
Top frame width:	1100 mm
Base frame length:	3300 mm
Base frame width:	1100 mm
Closed Height:	285 mm
Stroke:	1500 mm
Motor power:	5,5 kW
Duty cycle:	60 cycles/hour in 3 shift operation
Supply voltage:	460 V 60 Hz, 3ph
Brake voltage:	110 V AC/80
Control voltage:	24 V
Protection grade:	IP 65
Toothed/flat belt	4 x 75F3 x 5250 mm
Weight:	2350 kg
Sound level	< 70 dB(A
Protection against walking under the elevating unit:	MS
Free fall protection device:	without
Cable length transmitter:	without
Foot protection rail	without
Lubricating nipple in the drive shaft	prepared
Perma lubrication:	without
Specialties:	With cardan shaft

frequency converter and electrical control on site of customer

5 Clamp diagram (see attachment)

6 Field of application as directed

The Flexlift RFK series comprises scissor lift tables which are driven by a flat belt with appropriate winding-up device (motor with winding- or drive shaft). They are available in a wide scale of capacities, platform sizes and lifting heights, so there is a large range of possible applications.

This operating manual makes you familiar with the properties of your scissor lift and gives you the necessary information for safe use, for putting into operation, assembly, operation, maintenance and servicing of the equipment.

Every person who is entrusted with the operation, assembly, installation, servicing or repair of the scissor lift, must have read and understood the operating manual as a whole.

Projecting or overhanging loads on the longitudinal sides of the lifting table must be agreed upon with the manufacturer and compensated with balancing weights.

Failure to observe these instructions can result in considerable damage to the bearings of the lifting table and the drive system

The manufacturer is not responsible for damages which can be traced back to improper, faulty or negligent use.

If any queries arise, we advise you to contact the manufacturer or supplier!

If the scissor lift is used as an individual component of a total plant (e.g. off and on feeding station in a transport system), the safety of the machine must be checked before commissioning and according to the safety requirements of the total plant.

The operating manual is a constituent of the scissor lift. If the equipment is sold on, this manual must accompany the delivery.

In addition we refer to the European Machinery Guideline and the EN-standards (especially EN 1570) which are to be observed by the manufacturer and the user of the lift table.

7 Safety regulations for scissor lifts

The following regulations have to be adhered to!

1) Only mature, knowledgeable and personnel appointed for this purpose, should operate the lifting table.
2) Operating personnel must take care of all movements of the Lift table so that they themselves and other people are not put in danger.
3) The lifting table should not be loaded beyond the rated load.
   If the permissible number of cycles is exceeded, this may result in malfunctions of the drive mechanism, and guarantee claims becoming null and void.
4) The lift table should be loaded only with the type of load and load distribution for which it was intended.
5) Loads should be secured on the platform against inadvertent rolling away, sliding or tipping.
6) It is not permissible to:
   - work on the load whilst the lift table is lifting or lowering
   - climb on the load or the platform (exception: skillet systems)
   - stay under the platform
   - reach inside the lift table
   - tread under the lift table or under the load, whilst the lift table is lowering
7) A person riding along the platform is not permitted.
8) In cases of malfunction and security faults, the lift table should be switched off immediately, and taken out of service.
9) The lift table should be installed only on level, horizontal ground able to support heavy loads.
10) The lift table should be made safe against unauthorized use.
11) The function of the safety devices (except catching device) must be regularly checked.
12) Corrective maintenance and service work:
    - should be carried out only by authorized technical personnel
    - should be carried out under the platform without imposed load and only when servicing supports have been properly inserted.
    - erroneous putting into operation during servicing and repair must be prevented.
    - are always to be documented in a corresponding test record

    In case of inobservance the warantee claim becomes null and void!

Independent of the points stated here, the general safety regulations, the European Machinery Guideline and the EN-standards (especially EN 1570) shall apply.

8 Transport

If assembly and start-up is not carried out properly, the manufacturer rejects any and all warranty- and safety claims!

- Prior to the transport the power supply should have to be disconnected from the scissor lift.
- The transport/loading is made by carts or crane.
- If holding means are used for crane transports these have to be connected to the scissor lift by means of the provided transport loops. Proper and tested holding means have to be used for this purpose.

- Weight of the scissor lift: *see technical data*

Staying under a suspended load is prohibited!

9 Installation and start up operation

Any errors made during the installation and start-up operation may void the warranty claims and compromise the safety of the lifting table.

Observe the safety instructions!

Never stay below the load lifting member without inserted maintenance supports!

The responsible personnel must be properly instructed and trained.

The installation and start-up of the lifting table can be carried out by the manufacturer or personnel trained by the manufacturer.

Frequency converter

The lifting table may not be operated without a suitable frequency converter if the speed exceeds 25 mm/sec.
The Electric Department of FLEXLIFT must be consulted for the acceleration and braking ramps as well as the planned frequencies in order to avoid a vibration of the lifting table during operation.

Please see the corresponding diagram attached to this documentation (*Electrical system*). A frequency of 3,000 rpm based on a SEW frequency converter was taken as basis.

Incorrectly adjusted frequency converter values and ramps might result in damage to the lifting table, which is not covered by the warranty.

Safety limit switch

Caution: Integrate safety limit switches into the controller, so that the system comes to an immediate STOP as soon as the switches are triggered.
Never connect directly to the power supply but use at least one "left-right-hand control."

The switching points of the safety limit switches must not be overrun.

The lifting table may not run against the upper mechanical limit points! After consultation, the lifting table may be lightly put down on the lower end bearings.

Setting up the lifting table

Take the lifting table to the place of installation as described.

Set down the lifting table to the ground and bring it into the correct position.

Ensure that no cables are damaged when the table is put down.

Remove sling gear from transport lugs, remove transport safety devices.

Bring the motor into the intended position and flange-mount it with the drive shaft to the winding shaft of the lifting table.

Align motor/motor plate. The permissible working angle of the drive shaft (see approval drawing) may not be exceeded! Also note the bending in the vertical direction!

Secure motor plate to the ground (stud bolt). The lifting table may not be started if the motor plate is not yet fastened!

If necessary, check existing cables on the lifting table for damage (visual inspection)

Connect motor/lifting table to the controller. Never connect the motor directly to the grid but use at minimum a manual control with a deadman’s safety system with emergency stop.

Make sure to check for the correct rotational direction of the winding shaft (see below)!

Do not bring the lifting table near the end positions for as long as the safety limit switches have not been integrated into the controller.

Operate the lifting table upwards and put down the maintenance supports.

In the event that the lifting table should crash down during start up, the driving elements and the coupling (if available) have to be checked and replaced, if damaged.

Establish the levelling.

Levelling/padding of the base frame

Caution! Proceed carefully and accurately!

- The base frame must be aligned in the horizontal position with a maximum deviation of <1 mm, since the service life of the bearings and of the drive depends on it. As measuring points we recommend the fixed bearing housing and the slide rail of the base frame.

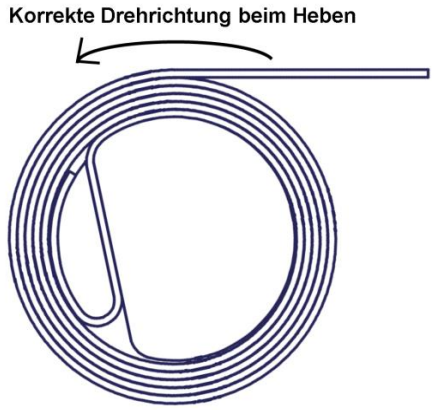
- After the alignment the base frame must be fastened with suitable mounting material (stud bolts, selection depends on the base).

- The bearing surfaces of the running pulley and the fixed points of the scissors must be padded. The fixed points of the scissors also need to be padded in the transverse direction.
  Use suitable filler plates. Alternatively, the base frame can be underpoured with non-shrink grout.

- The screw connections to the floor have to be checked and/or retightened after the first production runs.

Belt winding

Ensure the correct winding direction of the belts on the drive shaft!



If the belts are completely unwound from the winding shaft and then wound up backwards due to the wrong motor direction or because limit switches are not activated, it will lead to considerable damage due to the reverse bend (kinking over the edge of the belt clamping pieces). The belt may tear immediately or at a later time!

Belts that are wound up incorrectly have to be completely replaced even if no damage is visible from the outside!

Test run

A test run must be made in an unloaded condition.

The function of the safety limit switches installed in the base frame has to be checked prior to the start-up.

Risks and dangers

Non-compliance with these notes will lead to considerable damage and a reduced service-life of the lifting table and the warranty will become null and void.

Crashes and impacts may lead to an overload of the lifting table and its components which will exceed the designed safety factors!

The instructions in this documentation, especially the notes on assembly and start-up do not release the person responsible for mounting and start-up from contacting the manufacturer directly and settling any questions that might arise.

Notes

During the start-up phase of the lifting table there may be abrasion or chips forming in the area of the rollers and their bearing surfaces due to the surface compaction. This is a normal process.

Material discolouration or rust-like deposits may form in the area of the tapered roller due to abrasion between the profile roller and the bearing rail. The running characteristics can be improved through
lubrication (once a year).

Projecting or overhanging loads on the longitudinal sides of the lifting table must be agreed upon with the manufacturer and compensated with balancing weights.
Non-compliance may lead to substantial damage on lifting table bearings and the driving system.

Avoid impulsive loads on the lifting table.
These may cause damage to the lifting table especially on the tapered roller or the expansion wedges.

10 Operating instructions

A basic condition for the operation is the adherence to the general safety regulations (see chapter 7).

Dear Customer,

You bought a high quality scissor lift from FLEXLIFT.

As we do not sufficiently know the application field of this scissor lift and we also have not constructed the electrical controls for these units we are not in a position to provide more detailed information.

We point out that the FLEXLIFT scissor lift corresponds to the valid specifications of the EC Machinery Directive (CE) and the European Standards for scissor lifts EN 1570. Controller errors caused by third-party controllers can not or can only partially compensated for by the Flexlift safety components.

11 Maintenance

If maintenance and repair are carried out improperly, warranty and safety claims become immediately null and void and the manufacturer rejects any liability!

There is a danger of personal injury during maintenance and repair works by moving machinery parts, therefore the following points must be observed:

Only competent, trained and instructed staff may perform repair- and maintenance work.

Works under the scissor lifts may be performed only with <u>unloaded</u> platform and <u>maintenance supports or socket pins.</u>

Switch off main switch and secure against reclosing.

11.1 Regular maintenance work:

Works to be carried out	Cycle	Remark
Visual check	weekly	
Check of the safety appliance	annually	before each start-up
Pedestal bearing on the drive shaft	See chapter 11.2.1	
Cleaning of the belts	regularly	in case of heavy contamination
Check/belt tension	every 12 months	by means of a frequency meter
Exchange of the belts	every 6 years	(acc. to manufacturer instructions)
Cleaning the belt	regularly	The belts used for this lifting table/hanger must be cleaned regularly of any contamination. If there are any oil, wax or similar substances in the air which are deposited on the belts, these loose their grip on each other during winding. This can result in untidy winding packs and a significantly shortened service life. In case of special materials, compatibility with the belts must be tested and approved. Belt cleaning agent: See chapter 11.1.1
Check of the motor brake	every 12 months or after 3000 operating hours	see operating instructions of the manufacturer (SEW)

Check of the bevel gear pair	every 12 months	see operating instructions of the manufacturer (SEW)
Oil level check of the gear	every 6 months	refill oil in case of leakage
Oil change of gear	every 24 months every 36 months	**<60 cycles/h – 3-shift operation** **>60 cycles/h – 3-shift operation** Gear oil ISO VG 220 (Mobilgear 630)
Check of the cardan shaft	every 12 months	**see operating instructions of the manufacturer (Elso Elbe)**
Check of the centre bearing *DU sleeves (maintenance-free)*	every 6 months	check, exchange when black dust formation
Check of the cam roller shaft **Wear part**	every 6/12 months automatic lubrication via Perma sleeve every 6/12 months	exchange the lubricator *Staburags® NBU 12 (make. Klüber)* lubricate the profile roller *Staburags® NBU 12 (make Klüber)*
Cylinder roller bearing grease	6/12 Monate	Highlevel grease *Klüberplex BEM41-141 (Fabr. Klüber)* *Klüberlub BE 41-542 (Fabr. Klüber)*
Check by an expert	every 12 months	test certificate
Initial lubricant used: make ARALUB HL2 (type K2 K-30)		
The operating instructions of the corresponding manufacturers are included in the Annex of the scissor lift documentation.		

⚠ Do not mix different types of lubricants!

⚠ Running rails and the roller surfaces on the loose side must be easily lubricated.

⚠ The supporting rollers of the cam roller must be easily lubricated.

⚠ Without the brake the platform will move automatically downwards.

⚠ Before removing the geared motor the platform has to be lifted above the maintenance position, the maintenance supports have to be inserted, the main switches have to be switched off.

⚠ After the completion of the work performed on the scissor lift, an operational test has to be made.

In case of inobservance the warrantee claim becomes null and void

11.1.1 Cleaning recommendation

For polyurethane toothed and flat belts
Made of TPU-ST1 – 3, TPU-FD1, TPU-AU1, TPU-KF1, TPU-AS1

Well suited:

- Water
- Soapy water
- Ethyl alcohol (ethanol, spirit)

Alternatives:

- Ethanol
- Hydrogen peroxide 3%
- Petroleum

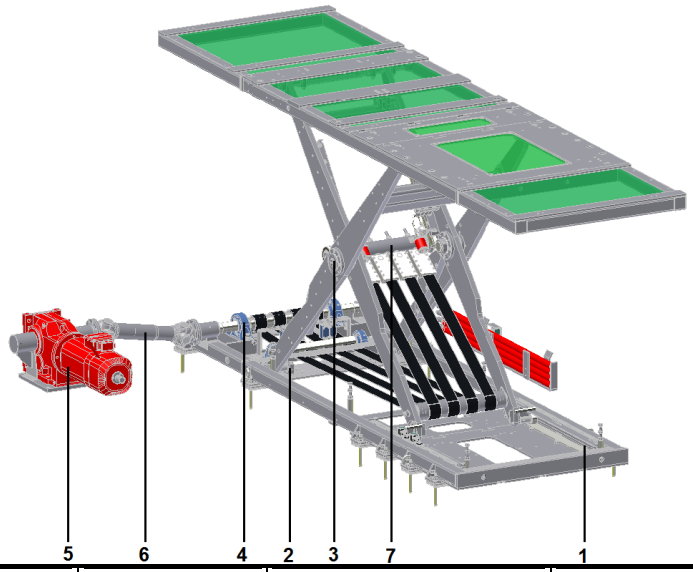
Not suitable:

- Ketones (acetone, MEK)
- Benzene
- Diesel
- Trichloroethylene
- Aromatics (such as toluene)
- Acids
- Alkalis

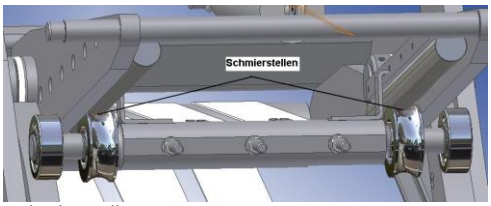
Remarks

Do not place the belt in the cleaning agent, but clean it with a moistened cloth. In doing so, move over the surface lightly; do not rub (let the belt dry well).
Ensure good ventilation. Fire precautions may have to be taken.

11.2 Lubrication chart



7 Cam roller technology



Schmierstellen = grease area

Item	Module	Remark	Maintenace intervals in months at a clock frequency of: <30cycles/h 3-shift	<60cycles/h 3-shift	>60cycles/h 3-shift	Lubricant
1	Roller surface	if necessary lubricated for increased durability	3 Mon	2 Mon	1 Mon	Bearing grease
2	Fixed bearing	Maintenance-free				
3	Center bearing DU-bushing	Maintenance-free				
4	pedestal bearing/ drive shaft	Lubricate	6 months	3 months	1 months	Bearing grease
5	Motor gear unit	lubrication check	12 months	6 months	3 months	
		lubrication change	36 months	24 months	12 months	Gear oil ISO VG 220 (Mobilgear 630)
	Motor brake	check	12 months	6 months	3 months	
6	Cardan shaft	Grease	6 months	3 months	1 months	Bearing grease
7	Cam roller Technology **Wear part**	automatic lubrication by means of Perma-sleeve (depending on colour of activation screw)	green / red / grey: 3 / 6 / 12	green / red / grey: 3 / 6 / 12	green / red / grey: 3 / 6 / 12	Replace lubricator *Staburags® NBU 12 (Fabr. Klüber))*
7.1	Cylinder roller bearing	grease	12 months	6 months	3 months	High level grease *Klüberplex BEM41-141 (Fabr. Klüber) Klüberlub BE 41-542 (Fabr. Klüber)*

Initial lubricant used: make ARALUB HL2 (Typ K2 K-30)
Initial lubricant used Perma: make Staburags SF32

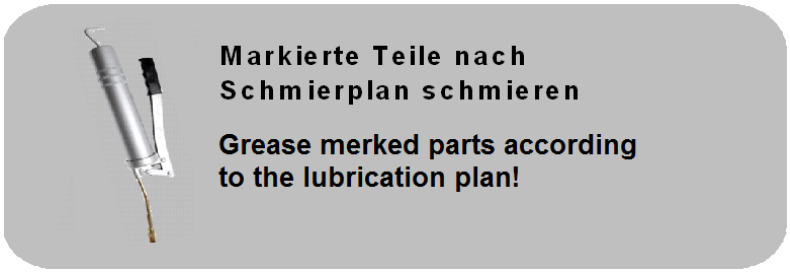
Note: Do not mix different types of lubricants!

Running rails and the roller surfaces on the loose side must be easily lubricated.

If the maintenance intervals are not kept the warranty claim becomes null and void!

Automatic lubrication
The automatic lubrication is enabled before start up operation; the date of start-up must be indicated. The duration of the lubrication depends on the respective colour of the activation screw (please see chapter 18 - *Documentation of the lubricator).*
The level of the Perma-sleeve should be checked at regular intervals. Always make sure that there are no air bubbles in the feeding pipe.

If the admissible number of cycles is exceeded, the lubricant film may tear, resulting in damage to the profile roller and the mounting rail and in the guarantee claims getting null and void.



11.2.1 Lubricating and servicing the plummer block housing

The bearing inserts are filled at the factory with the required amount of grease. Additional lubrication is not required under normal operating conditions.

Under difficult conditions, such as continuous operation at high speeds, high temperatures (operating temperature of +70°C or above), heavy loads or excessively wet or dirty environments, the housing needs to be relubricated regularly.

Relubrication system
Each housing is equipped with a lubrication groove within the spherical bore. Each insert has four staggered lubrication holes in the outer ring.

Relubrication quantities depend on the insert size. Relubrication should be carried out during operation (while the insert turns at operating temperature). Press suitable (bearing) grease into the unit until fat edges form at the seals.

CAUTION: The grease must be able to flow out unhindered.

12 Troubleshooting

There is a danger of personal injury during repair works by moving machinery parts, therefore it is important to observe the following points:

Competent, trained and instructed staff may perform repair- and maintenance work only.

Works under the scissor lifts may be performed only with unloaded platform and maintenance supports or socket pins in place.

Adhere to safety instructions during maintenance work.

Turn off main power switch and secure against reclosing.

12.1 Troubleshooting check list

Kind of trouble	Possible cause	Correction
Scissor lift does not elevate, no motor noise	Main power switch not actuated	Switch on
	Voltage is not applied	Check fuses, motor protection and leads
	Defective motor	Replace motor
Scissor lift suddenly does no more lift or lower	Defective control	Correct fault
	Safety limit switch started-up	Correct fault
	Belts worn-out	Replace
Scissor lift does not go down	Limit switch actuated or defective	Repair or replace
	Rollers blocked	Correct fault
	Defective control	Correct fault
	Maintenance supports not inserted	Remove maintenance supports
Scissor lift does not stay in the selected position	Brake is being electrically energized	Check control
	Defective brake	Replace brake

Kind of trouble	Possible cause	Correction
Motor protection reacts	Excessive load	Reduce load, **Observe admissible load**
	Brake does not open	Check assembly
	Defective belt drive	Replace, pay attention to maintenance intervals
	Motor failure	Check assembly
Creaking and crunching sounds during the lifting movements	Insufficient lubrication at bearings	Grease (replace maintenance-free) bearings
	Rollers worn	Replace part
	Defect in the belt system	Replace part
	Lift table base not properly aligned.	Align table base

This does not include any faults which are due to improper use or crashes.

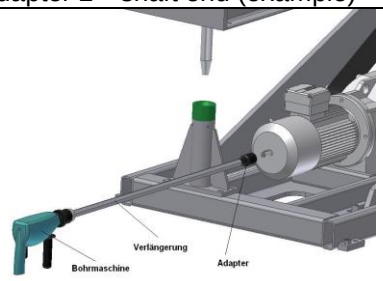
In case of a crash during start-up or operation of the lift table the manufacturer is to be informed immediately.

12.2 Optional Equipment: Emergency-lifting and lowering with an electrical drill

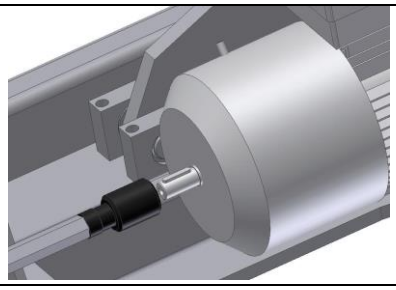
(extra cost option)

In the case of a power failure or defective motor the lift table can be emergency driven by an electric drill. For safety reasons, only use a two-hand drill machine. This work has to be executed by two persons.
Fit adapter (adapter for 2nd shaft end = extra-cost option) to electric drill machine and connect adapter to the end of the second motor shaft. Fix handle or pivot (extra-cost option) for releasing the brake to the brake.

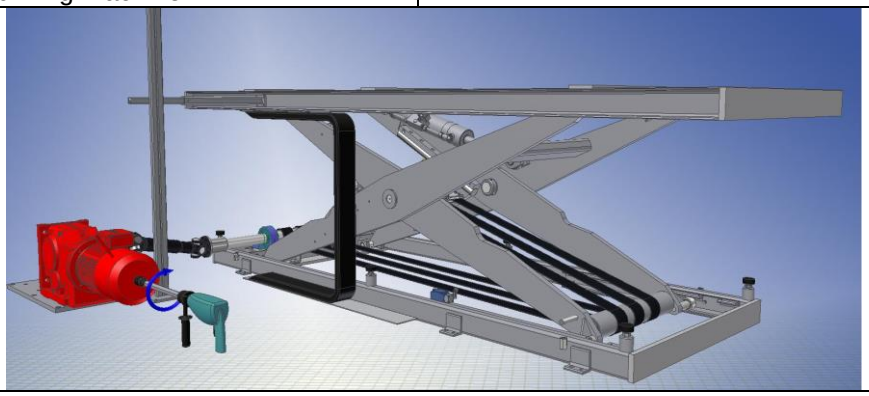
Adapter 2nd shaft end (example)



Emergency lifting by means of drilling machine



Adapter for 2nd shaft end



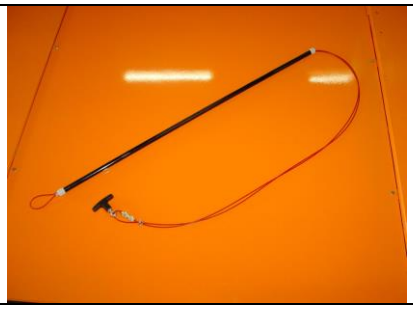
Nothub mittels Bohrmaschine

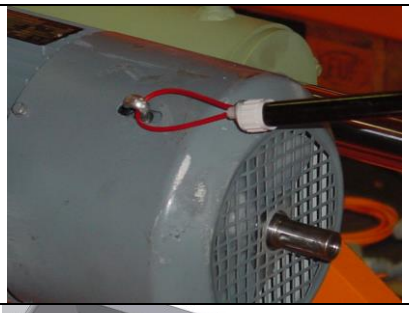
One person for operating the two-hand drill machine and one person for opening and closing the brake.
These works may only be executed by suitably trained and experienced persons.

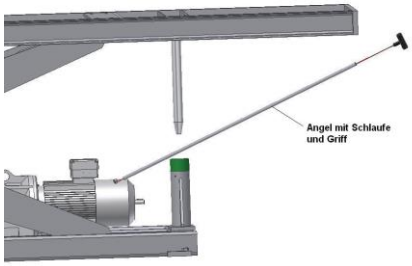
Accessories at extra charge:

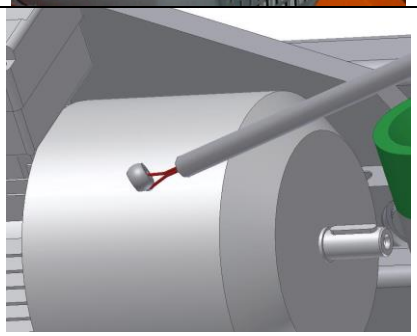
Designation	Type	Art.-No.	Manuf./Suppl.
Adapter for 2nd shaft end	19x40 mm lang	EFRT-0021/2.WE	Flexlift

Fix handle or pivot (extra-cost option) for releasing the brake to the brake.

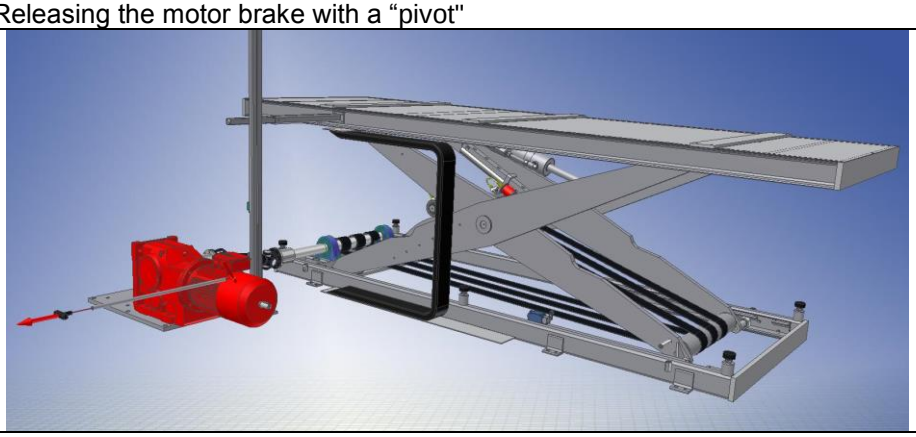








Releasing the motor brake with a “pivot"



Releasing the motor brake with a “pivot"

Now the lifting platform can be lifted or lowered carefully with the electric drill, please note that the brake must always be released.

⚠ Attention: If during this emergency operation the brake accesses, the drill machine can strike and hurt the operator!

Accessories at extra charge:

Designation	Type	Art.-No.	Manuf./Suppl.
Pivot for releasing the motor brake		EFRT-0021/ANGEL	Flexlift

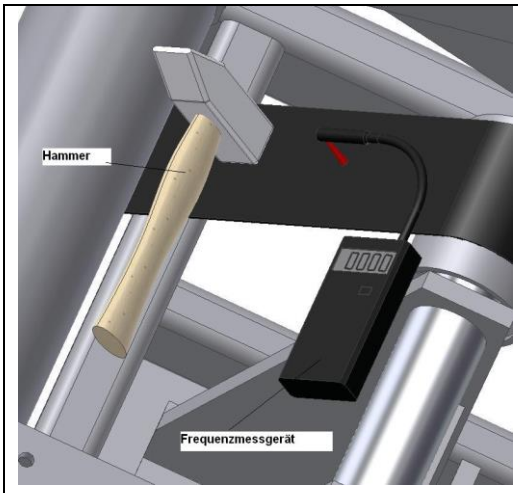
12.3 Procedure for setting the belt tension by means of a frequency meter)

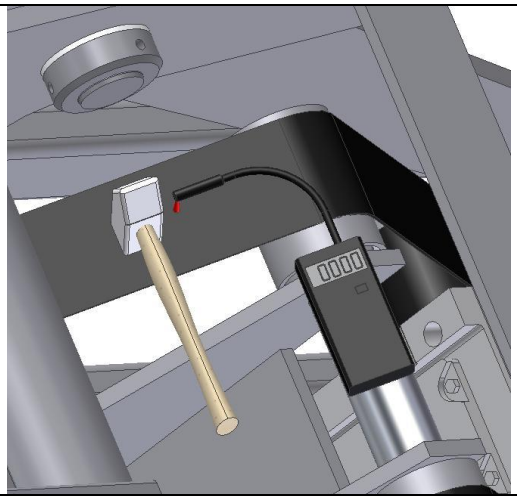
(see chapter 17), (extra-cost option)

- Remove the load from the lift table.
- Move the table to a height of approximately 50 mm.

⚠ Caution: The lift table may not lie on its mechanical limit positions.

- Determine the belt tension between the drive shaft and the deviating shaft by means of a frequency meter.
- Position measuring head of the frequency meter at a distance of 10-20 mm from the belt.
- Fasten the belt by means of a tool (e.g. hammer) and make the belt vibrate.





Frequenzmessgerät:	frequency meter
Hammer:	hammer

- The frequency is indicated at the measuring instrument.
- Repeat procedure 3 – 4 times to avoid measuring errors.
- If the frequencies measured are within a tolerance range about +/- 10% of the average frequency the belts do not need to be tightened.
- If the difference of the frequencies measured is greater than +/- 10% of the average frequency, the belt that is the slackest has to be adjusted and the tension measured again.

- Repeat this procedure until the frequency of the belts is within the tolerance range required about +/- 10% of the average frequency.

During operation the frequencies set can fluctuate. A difference in frequency between the belts of the measurement height stated above about +/- 10% of the average frequency is to be considered as normal and irrelevant according to the belt manufacturer's instructions.

No precise specification of the frequency to be set can be made as the frequency depends on the weight of the lifting device including any additional structures and the respective centre distance. These values are not clearly known to the manufacturer before shipment.

Accessories at extra charge:

Designation	**Type**	**Art.-No.**	**Manuf./Suppl.**
Frequency meter	VSM-1	WRZG-0960	Contitech/Flexlift

12.4 Bolted Connections

Load-bearing components, which are screwed to the lift table - e.g. roller channels, cam rollers shafts, cam roller curves - are fixed with bolts (unoiled) of strength class 10.9 (DIN 267).
The bolts are tightened with torque key and secured with threadlocker Loctite® 243 (blue, medium fast).

Tightening torques:

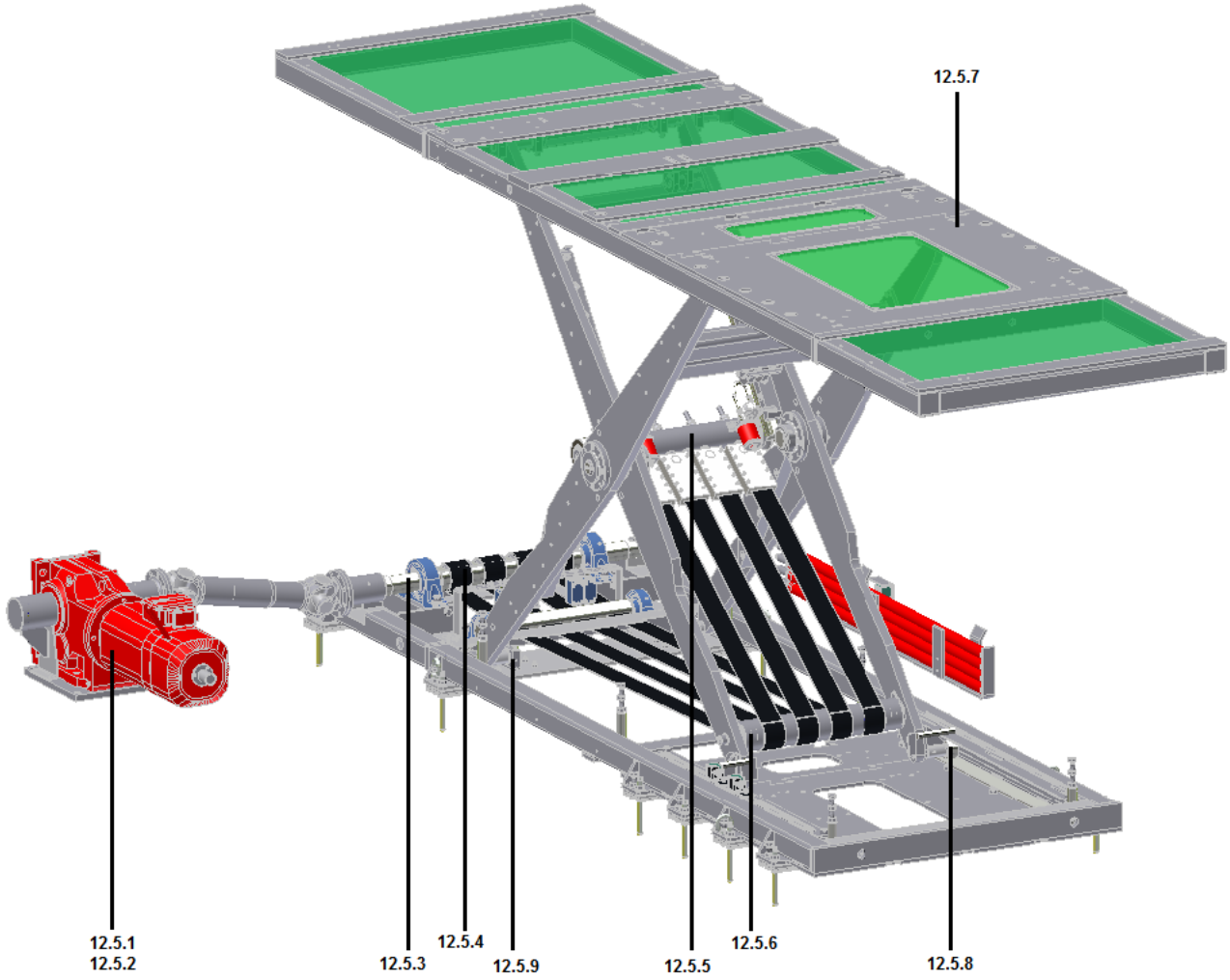
M8	37 Nm
M10	75 Nm
M12	128 Nm
M16	314 Nm
M20	615 Nm
M24	1060 Nm

Attention: To **pedestal bearings** (cast housing) **lower tightening torques** apply:

M10	35 Nm
M12	65 Nm
M16	150 Nm
M20	290 Nm
M24	500 Nm

For fixing of the pedestal bearings bolts of strength class 8.8 are sufficient. However, to avoid any possibility of confusion, we recommend to use bolts strength class 10.9 as well. Also these bolts are tightened with a torque spanner and secured with threadlocker Loctite® 243.

12.5 Disassembly of drive unit



12.5.1 Replacing the bevel gear motor completely

System status

System status	Power-free

Tools required

- Spanner

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	Lower the scissor lift completely or insert the maintenance supports and lower the scissor lift on to the maintenance supports.
3	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
4	Unplug/unscrew the electrical connector /motor cable from the gear motor.
5	Loosen cardan shaft completely on the gearbox side.
6	Loosen 4 screws with which the gearbox is attached to the holding block.
7	Now the geared motor can be exchanged.
8	Assembly is done in reverse order.
9	Plug in/screw on the electrical connector/motor cable in the gear motor.
10	Connect the scissor lift to the power supply.
11	Carry out a functional test.
12	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
13	Carry out the commissioning.

When exchanging the motor, lubricate the feather keys with special paste (e.g. Noco-Fluid, USDA-NSF-H1, Prod. SEW) to avoid frictional corrosion from forming.

Pay attention to correct winding direction of the belts on the drive shaft!

The belt tension must be within the tolerance range.

12.5.2 Replacing the motor

System status

System status	Power-free

Tools required

- Spanner

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	Lower the scissor lift completely or insert the maintenance supports and lower the scissor lift on to the maintenance supports.
3	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
4	Unplug/unscrew the electrical connector /motor cable from the gear motor.
5	Drain gear oil.
6	Loosen the screws between motor and gear.
7	Pull motor out of the gearbox.
8	Clean sealing surface of the gearbox.
9	Apply appropriate sealant to gearbox and motor.
10	Assemble and bolt motor and gearbox together. Remove excess sealant.
11	Refill gear oil and pay attention to tightness.
12	Assembly is done in reverse order.
13	Plug in/screw on the electrical connector/motor cable in the gear motor.
14	Connect the scissor lift to the power supply.
15	Carry out a functional test.
16	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
17	Carry out the commissioning.

When exchanging the motor, lubricate the feather keys with special paste (e.g. Noco-Fluid, USDA-NSF-H1, Prod. SEW) to avoid frictional corrosion from forming.

Pay attention to correct winding direction of the belts on the drive shaft!

The belt tension must be within the tolerance range.

12.5.2.1 Oil change at the motor

System status

System status	**Power-free**

Tools required

- Spanner

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	Lower the scissor lift completely or insert the maintenance supports and lower the scissor lift on to the maintenance supports.
3	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
4	Unplug/unscrew the electrical connector /motor cable from the gear motor.
5	Gear oil can be drained via the oil drain plug or pumped out with a hand pump (accessories at extra charge).
6	Fill in new gear oil via the oil inlet screw.
7	Plug in/screw on the electrical connector/motor cable in the gear motor.
8	Connect the scissor lift to the power supply.
9	Carry out a functional test.
10	Carry out the commissioning.

Accessories at extra charge:

Designation	Type	Art.-No.	Manuf./Suppl.
Hand pump with tube		WRZG-0021/Handpumpe	Flexlift

12.5.3 Replacing the drive shaft/winding-up shaft

System status

System status	**Power-free**

Tools required

- Allan key

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	lower the scissor lift on to the maintenance supports.
3	Unwind the belts completely from the drive shaft by hand.
4	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
5	Unplug/unscrew the electrical connector /motor cable from the gear motor.
6	Release the clamping union retaining the flat belt onto the drive shaft.
7	Remove the screws on the pedestal bearings of the drive shaft.
8	Remove drive shaft from cardan shaft.
9	Dismount pedestal bearing of the drive shaft.
10	Pull of the shaft flange from drive shaft by means of pull-off fixture. Remove feather key out of the drive shaft.
11	Fix shaft flange and feather key on new drive shaft.
12	Assembly of the components is done in reverse order. (ensure that the lubricating nipples in the pedestal bearing are lubricated)
	**Align drive shaft in parallel with reversing shaft!**
13	Plug in/screw on the electrical connector/motor cable in the gear motor.
14	Connect the scissor lift to the power supply.
15	Carry out a functional test.
16	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
17	Carry out the commissioning.

The belt tension must be within the tolerance range.

12.5.4 Replacing the belts

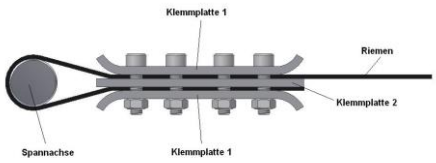
System status

System status	Power-free

Tools required

- Allan key

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	lower the scissor lift on to the maintenance supports.
3	Unwind the belts completely from the drive shaft by hand.
4	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
5	Unplug/unscrew the electrical connector /motor cable from the gear motor.
6	Release the clamping union retaining the flat belt onto the drive shaft.
7	Loosen the clamping plates on the opposite side of the belts.
	
8	Pull the belts out of the lifting table.
9	Assembly of the components is done in reverse order.
⚠	Make sure that the profile roller is correctly fitted in the track of the cam roller guides
10	After installing the belts, the belt tension is set to the same initial tension value for all belts on the belt tensioning facility using an initial belt tension measuring device.
11	Plug in/screw on the electrical connector/motor cable in the gear motor.
12	Connect the scissor lift to the power supply.
13	Carry out a functional test.
14	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
15	Carry out the commissioning.

We recommend generally exchanging all belts at the same time.

The belts must be replaced after 6 years (manufacturer’s instructions)

During installation ensure all belts are the same length to facilitate installation due to the same tooth pitch.

Pay attention to correct winding direction of the belts on the winding core!

The belt tension must be within the tolerance range.

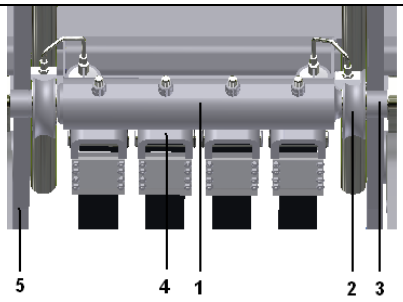
12.5.5 Replacing the cam roller shaft completely

System status

System status	**Power-free**

Tools required

- Allan key



1 Cam roller shaft 2 profile roller/cylinder roller bearing	3 roller/cam roller 4 belt clambing gab	5 guide cam roller (chock)

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	lower the scissor lift on to the maintenance supports.
3	Unwind the belts completely from the drive shaft by hand.
4	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
5	Unplug/unscrew the electrical connector /motor cable from the gear motor.
6	Remove M 16 nuts at the clamping fork ends.
7	Remove the clamping fork with belt on the cam roller shaft.
8	Pull cam roller shaft from guide.
9	Assembly of the components is done in reverse order
⚠	**Make sure that the profile roller is correctly fitted in the track of the cam roller guides.**
10	Plug in/screw on the electrical connector/motor cable in the gear motor.
11	Connect the scissor lift to the power supply.
12	Carry out a functional test.
13	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
14	Carry out the commissioning.

⚠ **The belt tension must be within the tolerance range.**

12.5.5.1 Replacing the rollers at the cam roller shaft

System status

System status	**Power-free**

Tools required

- Allan key
- Fuse tongs

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	lower the scissor lift on to the maintenance supports.
3	Unwind the belts completely from the drive shaft by hand.
4	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
5	Unplug/unscrew the electrical connector /motor cable from the gear motor.
6	Remove M 16 nuts at the clambing fork ends.
7	Remove the clamping fork with belt on the cam roller shaft.
8	Pull cam roller shaft from guide.
9	Remove locking ring from the cam roller shaft.
10	Pull off roller/cam roller
11	Remove locking rings
12	Pull off profile roller/cylinder roller bearing
13	Assembly of the components is done in reverse order
	**Make sure that the profile roller is correctly fitted in the track of the cam roller guides.**
14	Plug in/screw on the electrical connector/motor cable in the gear motor.
15	Connect the scissor lift to the power supply.
16	Carry out a functional test.
17	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
18	Carry out the commissioning.

The belt tension must be within the tolerance range.

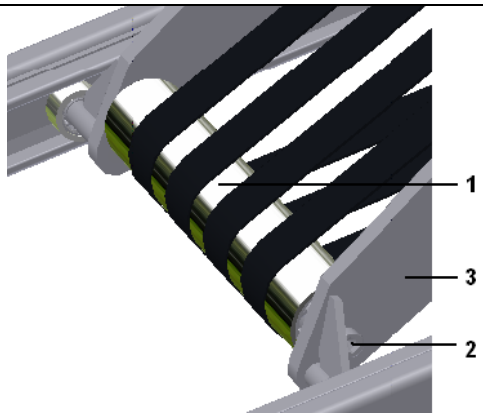
12.5.6 Replacing the deviating roll completely

System status

System status	Power-free

Tools required

- Allan key



1 inner scissor
2 deviating roll
3 M20-screw

Exchange procedure

Step	Activity
1	The scissor lift must be free of any load.
2	lower the scissor lift on to the maintenance supports.
3	Unwind the belts completely from the drive shaft by hand.
4	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
5	Unplug/unscrew the electrical connector /motor cable from the gear motor.
6	Remove M 20 screws at the inner scissor
7	Remove the deviating roll.
8	Assembly is done in reverse order.
9	Plug in/screw on the electrical connector/motor cable in the gear motor.
10	Connect the scissor lift to the power supply.
11	Carry out a functional test.
12	Check the belt tension using a frequency meter (see Chapter 12.3 and 19)
13	Carry out the commissioning.

The belt tension must be within the tolerance range.

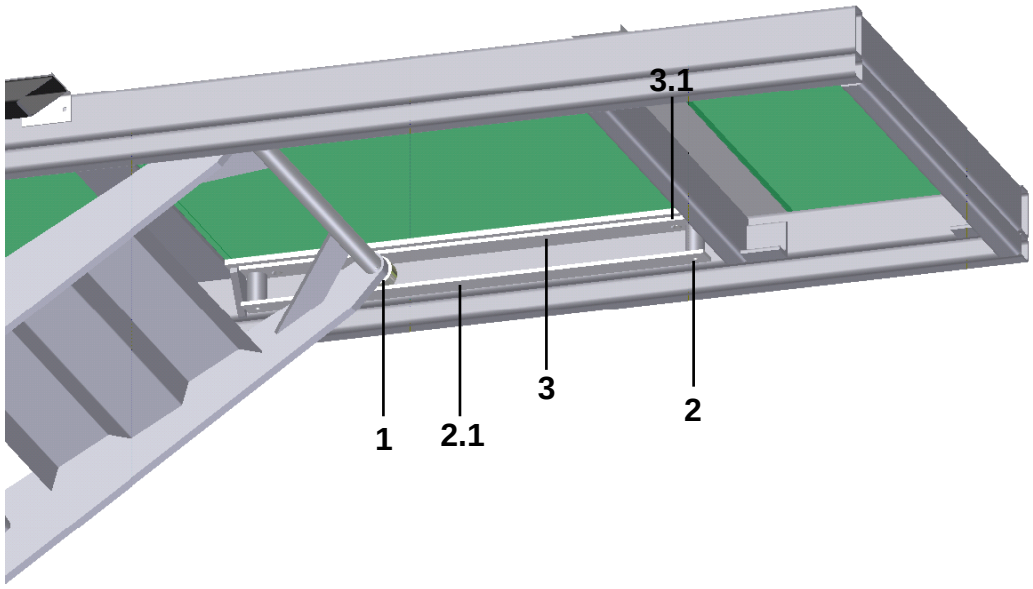
12.5.7 Exchanging rollers/wear bars in upper frame

System status

System status	In maintenance operation

Required tools

Circlip pliers



Model example

1- roller	2- guiding rail 2.1- fixing screw of guiding rail	3 - wear bar 3.1- fixing screw of wear bar

Exchange procedure

Step	Activity
1	The scissor lift must be free of load.
2	Loosen fixing screws of guiding rail
3	Raise upper frame and tilt it slightly over the pivot bearings.
4	Rollers/wear bars can be removed now.
5	Refit new parts in the reverse order.
6	Carry out a functional test.
7	Re-commission the lift table.

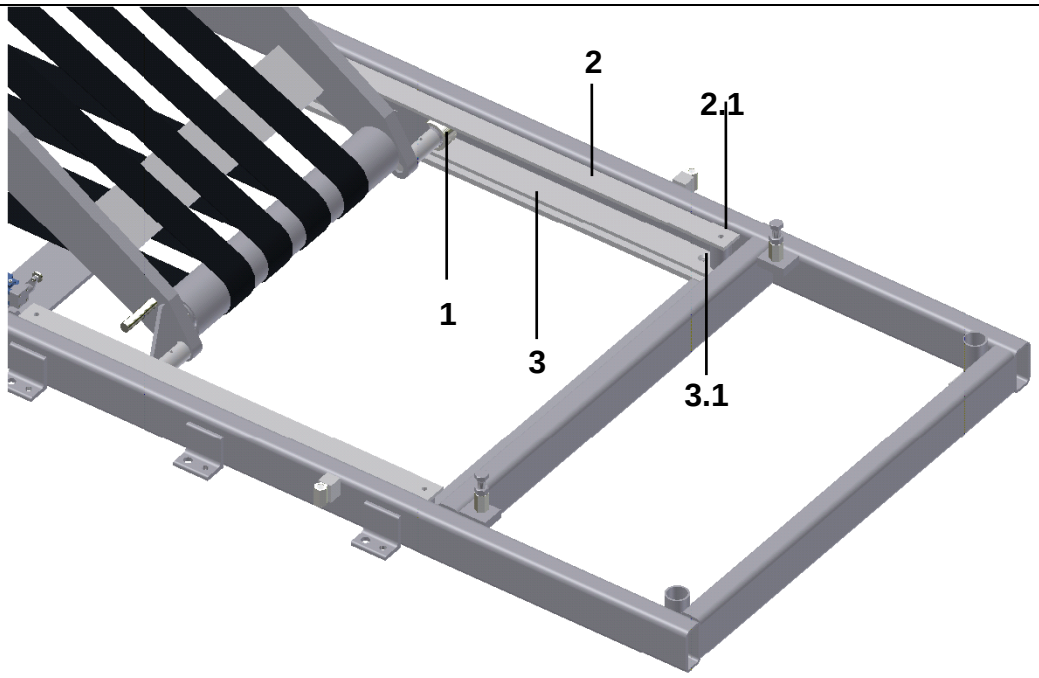
12.5.8 Exchanging rollers/wear bars in lower frame

System status

System status	**in maintenance operation**

Required tools

Circlip pliers



Model example

1roller	2 guiding rail 2.1- fixing screw of guiding rail	3- wear bar 3.1- fixing screw of wear bar

Ablauf des Austausches

Step	Activity
1	The scissor lift must be free of load.
2	Loosen fixing screws of guiding rail.
3	Raise scissors and tilt it slightly over the pivot bearings.
4	Rollers/wear bars can be removed now.
5	Refit new parts in the reverse order.
6	Carry out a functional test.
7	Re-commission the lift table.

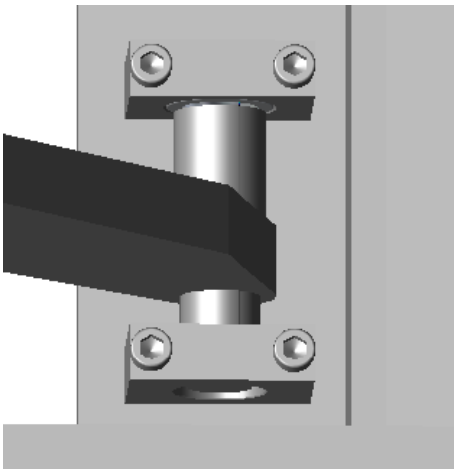
12.5.9 Exchanging the scissor pivot bearings

System status

System status	**Power-free**

Tools required

- Allan key
- Torque wrench



Exchange procedure

Step	Activity
1	Raise the scissor lift. The scissor lift must be free of any load.
2	Insert the maintenance supports and lower the lifting table on to the maintenance supports.
3	Disconnect the scissor lift from the power supply and ensure it can not be switched on again unintentionally or without authorisation.
4	Prop the top frame on the scissor pivot side or hang it on ropes until the strain has been removed from the scissor pivot bearings.
5	Exchange the scissor pivot bearings.
⚠	**If all scissor pivot bearings must be exchanged make sure that this is not done simultaneously. First replace the scissor pivot bearings in the top frame and than those in the base frame.**
6	Carry out a functional test.
7	Carry out the commissioning.

12.5.10 Storage of spare parts

Spare parts are sensitive to dirt and damage. They have to be stored dry.

The manufacturer does not assume any liability if the customer or final customer does not have any spare parts on stock or did not order a training on the special lift table delivered.

13 Manufacturer and after sales service

FLEXLIFT Hubgeräte GmbH
Eckendorfer Straße 115
D – 33609 Bielefeld, Germany

☎ ++49 – 521-7806-0
Fax ++49 – 521-7806-110
E-mail: verkauf@Flexlift.de

14 Declaration of Incorporation

according to EC directive 2006/42/EC on machinery (annex IIB)

Name and address of the manufacturer:

FLEXLIFT Hubgeräte GmbH
Eckendorfer Straße
D-33609 Bielefeld

We herewith declare, that the partly completed machinery described below

Product denomination:	**Electro-mechanical scissors lift table Flexlift**
Type:	RFK-K 1500/150
Commission no.:	2014207194
Serial no.:	50329
Year of manufacture:	2014

is complying with all essential requirements of the Machinery Directive 2006/42/EC, as far as the scope of delivery allows.

In addition we declare that the relevant technical documentation has been compiled in accordance with part B of Annex VII.

The partly completed machinery is conforming to the EC Directives 2006/95/EC relating to electrical equipment and 2004/108/EC relating to electromagnetic compatibility.

We commit ourselves to transmit, in response to a reasoned request by the market surveillance authorities, relevant documents of the partly completed machinery by our documentation department.

The partly completed machinery must be 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, where appropriate, and until the EC Declaration of Conformity according to Annex II A is issued.

Bielefeld, 01.01.2010	Carsten Heide, executive director	
Place, Date	Name and function of signatory	Signature

15 Factory acceptance certificate before delivery

Comm. No. : 2014207194

The following were checked and tested:

1. The specified dimensions	☒	
2. Parallelism of top and base frames	☒	
3. Overall height and setting limits	☒	
4. Height of lifting and setting of limit switches	☒	
5. Running surfaces of the wheel flange rolls without paint and grease	☒	
6. Thread of measuring transmitter vertically	☐	☒ N/A
7. Lifting capacity*, 1.25 times rated load	☒	
8. Catching cylinder with and without load (done by supplier)	☐	☒ N/A
9. Speed of lifting and lowering	☒	
10. Screw for emergency drain at motor	☒	☐ N/A
11. Maintenance props/supports	☒	☐ N/A
12. Function of foot protection contact bar	☐	☒ N/A
13. Function of safety limit switches	☒	☐ N/A
14. Proper labelling	☒	
15. Warning signs	☒	
16. Signs: Factory sign, load capacity	☒	
17. Colour/protection from corrosion	☒	
18. Examination of welding work	☒	
19. Check of the threaded connections	☒	
20. Activation of the Perma-Lubrication	☐	☒ N/A
21. Delivery complete according to specifications	☒	☐ N/A
22. Isolation measurement	☒	☐ no
23. Measurement of sound level	☐	☒ no
24. Electrical wiring	☐	☐ n.a.
25. Power consumption with and without load	☒	
26. Neutral delivery	☐	
27. Warning notes for installation and commissioning	☒	

* the entire lifting distance was travelled along with the testing weight with platform lifted and lowered.

The tests were carried out carefully, dispatch approved.

Bielefeld, the FLEXLIFT Hubgeräte GmbH

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The signed and stamped Factory Acceptance Test will be delivered to you after remaining amount due was paid.

16 Test certificates

The scissor lift has should be checked by an expert every year in consideration of the standards and regulations which are relevant for the construction and the function of the unit, as otherwise the warranty claims become null and void!

Date	Result and required actions (additional sheet if necessary)	Signature/Tester/Company	Faults corrected on: Signature

If this test certificate is missing or is not filled in according to the maintenance instructions, the guarantee is void.
All maintenance and repair works must be documented in order to avoid limitations of the warrantee claims.

17 Appendix: Documentation of the initial tension measuring device, type VSM-1

The pretension measuring device VMS-1 is a fully electronic measuring device which is designed to measure the pretension of toothed belts, V-ribbed belts and V-belts. Through use of a microcontroller a high precision and repeatability are achieved. The frequency of the vibration generated of a belt span is shown from which the pretension force in the span can be easily calculated.

$$F_{stat} = 4 \cdot m \cdot L_f^2 \times f^2$$

with

F_{stat}	stat. span force in **N**
m	belt weight in **kg/m**
L_f.	free span length in **m**
f.	Eigen frequency in **Hz**

To measure the frequency please proceed as follows:

1. Ensure that the drive to be measured is at a standstill. Never take measurements on a running belt drive!
2. Switch the device on using the ON/OFF button, initially the device carries out a self test and when the button is depressed the charging level of the battery is displayed in mV. Then release the button.
3. The device is ready to measure when 0000 is displayed.
4. Hold the device in such a way over the flat side of the belt span so that the sensor at the tip of the bendable arm is located centrally approx. 1…20mm above the belt section to be measured. The best measuring distance can vary depending on the colour and the material of the belt. As a general rule the following applies: for brightly coloured material with good reflection qualities the sensor can be further away from the belt (approx. 10...20mm), for darker material with poor reflection the sensor must be closer to the belt (1...5mm). A red spot of light on the belt indicates the position of the sensors above the belt. Take care that the sensor head is parallel to the back of the belt. Then make the belt vibrate by providing an impact. Ensure that the movement is regular with sufficient amplitude. By impacting the belt with a tool, for example with the head of a screwdriver, the stimulus is facilitated.
5. The frequency of the vibration is displayed in Hz in the display window. An acoustic signal is issued if the measurement was successful.
6. If the belt is still vibrating sufficiently after the first measurement, other measured values are automatically displayed. After the belt vibration has ceased the last measured value remains on the display.
7. Press the ON/OFF button to switch the device off.

Display tips:

1. Display when the button is depressed when switching on, e.g. 8250: The charging level of the battery in mV, in this case 8250mV=8.25V
2. Display 0000: The device is ready to measure
3. Display FebA. Operating voltage too low, the device switches off automatically after 3 seconds. This display is issued for battery voltages less than 6.8V.

Handling tips:

1. After 1 minute measuring rest the device switches itself off automatically to save the batteries.
2. If no reading is displayed this can be due to an irregular belt vibration with too low an amplitude. The following action can solve the problem:
    - impact the belt more strongly or
    - reduce the distance between the sensor and the belt.
3. Only change the batteries when the device is switched off.
4. If used correctly the device functions smoothly from a battery voltage of 6.8V upwards.
5. If values are successively displayed which are partially non-reproducible this is probably due to too bright an external light preventing the measurement of the belt vibration or the belt is not vibrating freely with sufficient amplitude. In this case the disturbing light sources must be switched off or screened off and an equal vibration of the belt produced.
6. If there is no measurement check if the sensors in the measuring head are dirty on the outside. If this is the case clean the sensors without solvent using a soft cloth.
7. **If the belt is very short,** the vibration amplitudes of the belt can be strongly reduced. As a result in rare cares faulty measurements occur or no reading is displayed. This can be avoided if the initial vibration is sufficiently strong, e.g. by plucking the belt like a guitar string. Additionally the sensor must be kept as still as possible (e.g. no shaky hands). By placing the sensor head on a fixed component or element on the gear housing or wall or similar, hasty movements of the sensor can be avoided and the reproducibility of the measurement improved.

Other important information:

- Protect the device from moisture and strong blows!
- The device may not come into contact with solvents or caustic fluids!
- The device must be kept clean and not exposed to direct sunlight.
- Never take measurements on a running drive!
- Hold the sensor head to the belt in such a way that a symmetrical cone of light is produced on both lateral sectional planes.

Technical data:

Measuring range:	10...500 Hz
Resolution:	1 Hz
L x W x H:	appr. 120 mm x 60 mm x 25 mm (without sensor)
Weight:	appr. 160 g
Sensor:	optical sensor at the end of a flexible arm
Bend radius of the sensor arm:	minimum 45 mm
Battery:	9V compound battery
Display:	4 digit LCD
Power consumption:	appr. 20mA when switched on < 30 µA when switched off
Rated application temperature:	22°C
Application temperature range:	+10...+50°C

No guarantee is provided for the data above.
The manufacturer reserves the right to make improvements to the device.

18 Appendix: Checklist Belt Lift Table

CHECK LIST				Type:	RFK-K 1500/150
Series:	RFK-K			Serial No.:	50329
				Comm. No. :	2014207194

Mechanics

- ☐ The lifting table lifts and lowers without jerks, without tilt, without noticeable noise levels
- ☐ Top frame, base frame and scissors are parallel and without noticeable deformations or other mechanical damage
- ☐ Weld seams okay, without fissures
- ☐ Running surfaces of the rollers without grease
- ☐ Maintenance supports installed
- ☐ Bearings without visible wear and tear
- ☐ Shafts and bolts secured
- ☐ All screw connections (and fastening screws of add-on components) tightened
- ☐ Signs (load-bearing plate, name plate) present and readable
- ☐ No considerable changes or modifications carried out on the lifting table

Drive

- ☐ All belts undamaged
- ☐ Correct winding of all belts without lateral offset (≤ 10 mm)
- ☐ Correct winding direction of all belts on the drive shaft
- ☐ Belt tension of all belts between drive shaft and deflection roller within the tolerance range (0/-10% of the average frequency)
- ☐ Sufficient lubrication of the profile rollers in the cam roller system (replacement of the lubrication system if necessary)
- ☐ Correct position of the profile rollers in the guide track of the cam roller shaft

Electrical system

- ☐ Feed and control cables undamaged
- ☐ Safety switch undamaged and operative
- ☐ Cable connections tightened and strain reliefs secured

☐ **All points of the check list checked without any complaínts.**
☐ **No objections against further operation of the lifting table.**

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Place, Date	Name of the expert (in block letters)	Signature