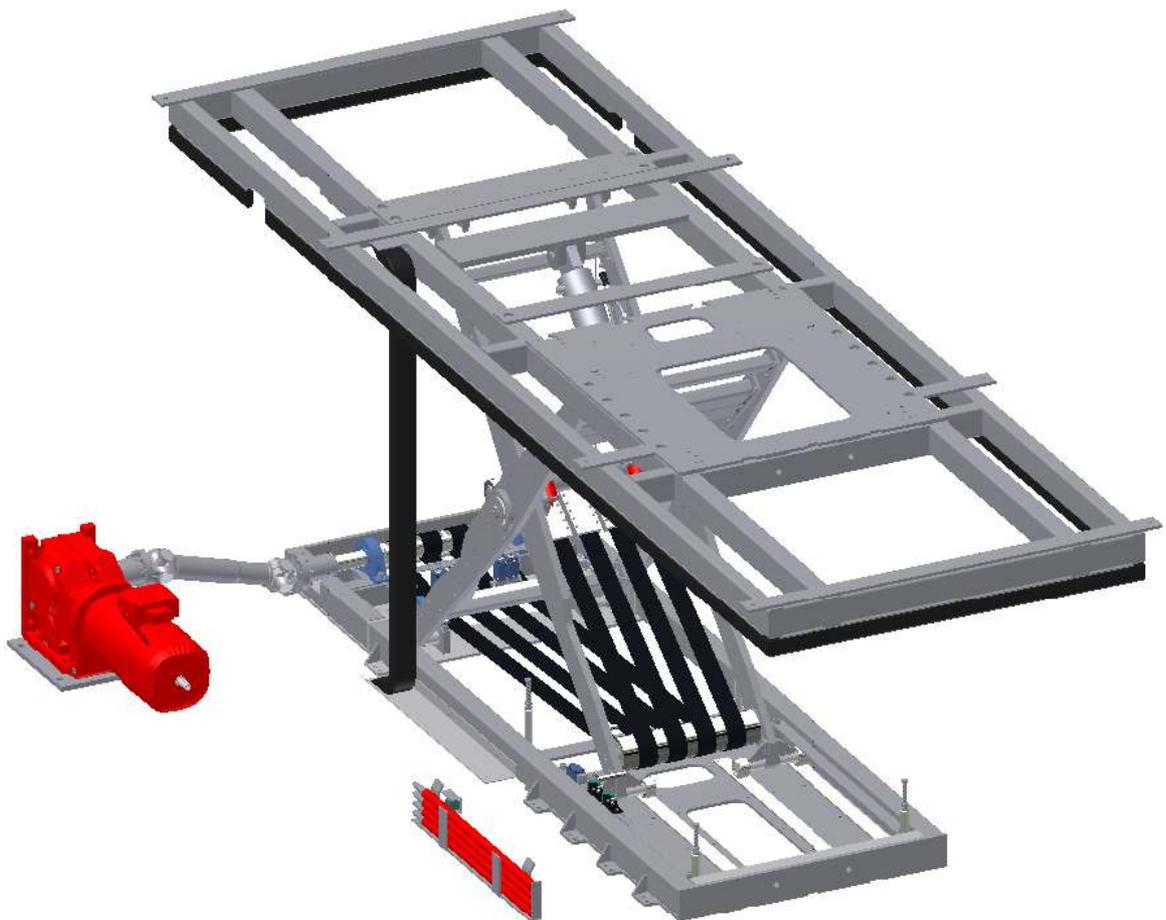


Flexlift Belt Lift Table Series RFK

Assembly and start-up Quick Start Guide



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Subject to changes

Please keep for later use

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Product range:

- Hydraulic flat lift tables
- Hydraulic compact lift tables
- Spindle lift tables
- Belt lift tables
- Pallet loading stations
- Vertical adjustable conveyors
- Special designs



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1 About this manual

Dear Customer,

You have acquired a high quality belt lift table from FLEXLIFT Hubgeräte GmbH.

The prerequisites for the reliable function of the lift table and its service life are that it is correctly installed and put into operation.

Improper or incorrect implementation results in damage to the lift table and thus loss of warranty.

We specify the correct assembly and commissioning of the lift table in this manual.

In addition to the instructions given here, the Machinery Directive (2006/42/EC) must be complied with for setting up the system as well as other applicable provisions for the components, particularly EN 1570-1 for the lift table. The general rules for occupational health and safety and the relevant accident prevention regulations are applicable for carrying out the work; the applicable regulations there must be complied with for use in third countries.

The instructions in this documentation do not release the person responsible for assembly and commissioning from contacting the manufacturer directly and clarifying any questions that might arise.

A more detailed version of this manual can be found on our website www.flexlift.de

2 Requirements for the assembly

2.1 Installation site - base

The base on which the lift table will be installed must be level and have sufficient load-bearing capacity.

Reinforcements such as additional girders on which the lower frame stands are required for installation in an already existing steel structure.

Please agree this with our Design Department.

It must be taken into account for the calculation of the substructure that a lift table can fall over in the worst case.

2.2 Personnel

Assembly and commissioning are only permitted to be performed by qualified, appropriately trained specialist personnel for the respective work.

At least one (two are better) experienced mechanical fitter and an assistant are required for the assembly of a lift table.

A control system expert and an electrician are also required.

2.3 Control System



The lift table controls must be available for the assembly as the lift table must be moved using its drive for some assembly steps.

A manual control mode (maintenance mode) for raising and lowering at slow speed in dead man operation (hold-to-run) is required. We recommend safely reduced speed (≤ 33 mm/s). The controls must be already completely programmed according to the Flexlift terminal diagram (submitted with the approval documents). All sensors of the lift table, particularly the safety limit switches (Overrun Lift Top, Slack Belt) and, if necessary, the stop valve of any catching cylinder must be evaluated in the controls.

The motor must never be connected directly to the mains power supply without any controls!

2.4 Frequency Converter and Ramps

The lift table must only be operated with a suitable frequency converter if the speed exceeds 25 mm/s.

The inverter must be suitable for hoists, this means it must have a brake output, and it must have a brake chopper (or alternatively a regenerating unit).

Start and deceleration ramps:

Start and deceleration ramps for starting and stopping the lift table at the limit positions and if necessary intermediate positions must be set up on the converter.

The following acceleration values for the ramps are generally applicable:

- Acceleration ramps for raising from the bottom limit position and from intermediate positions: ≤ 0.1 m/s²
- Acceleration ramps for lowering from the top limit position and from intermediate positions: ≤ 0.2 m/s²
- Deceleration ramps while raising: ≤ 0.2 m/s²
- Deceleration ramps while lowering: ≤ 0.1 m/s²

Current limitation

After completion of assembly, the current consumption produced in the converter when lifting the nominal load must be read and the current limitation set to 130 - 150% of this value.

2.5 Hoists, tools, material

Transport equipment, hoists:

Forklift, crane etc. for transporting the lift table and for positioning at the installation location.

Tools:

- Laser level, alternatively spirit level and long steel ruler/straight edge
- Tape measure, calliper gauge, solder
- Drilling machine
- Set of usual fitter's tools

- Torque wrench
- Welding machine

Material:

- Fastening material (heavy-duty anchors)¹.
- Shim plates in different thicknesses (1, 2, 3 and 5 mm), see Appendix 7.1.

3 What must strictly be observed for assembly and commissioning to prevent damage to the lift table

3.1 Factory settings

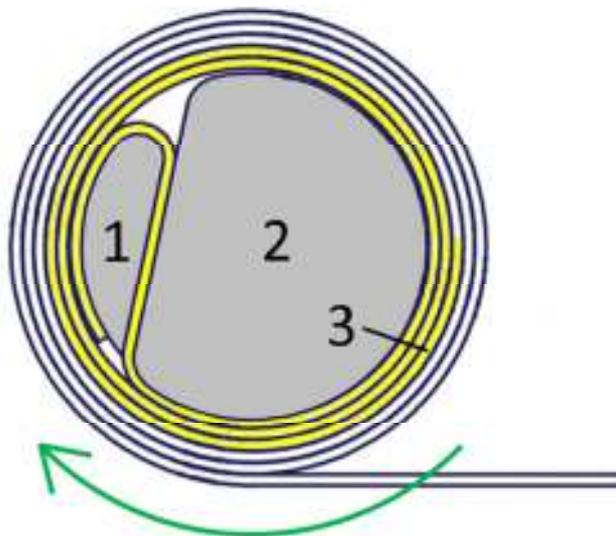
The lift table is completely mechanically adjusted (position of the fixed bearings and shafts, belt tension etc.) when delivered.

The safety limit switches (Overrun Top, Slack Belt) are also correctly adjusted.

These factory settings must not be changed!

3.2 Correct coiling of the belt on the winding shaft

Strictly ensure the correct winding direction of the belt on the winding shaft for the first-time lifting of the lift table using the controls.



Green arrow: correct rotation direction when lifting

1: Belt clamping piece

2: Winding shaft

3: Start windings: 1 1/2 to 2 windings (yellow) must always remain on the winding shaft.

If the belts are completely unwound from the winding shaft and then coiled reversed due to incorrect motor running direction or not activated slack belt limit switches, this results in considerable damage due to the reverse bends (kinking over the edge of the belt clamping pieces). This can result in cracking of the belt.

¹ For anchoring on concrete, we recommend Würth "glued dowels" (www.wuerth.de)



Belts that are coiled incorrectly must be completely replaced even if no damage is visible from the outside!

3.3 Compliance with the maximum permitted limit positions

In the event of overrunning the maximum permitted top limit position, significant mechanical damage to the lift table can be produced, including dropping!

Any overrunning of the maximum permitted bottom limit position can result in incorrect coiling of the belt on the winding shaft as previously described in section 3.2.

The lift table must not be operated without activated safety limit switches ("Lift Top", slack belt switch)!

The "Overrun Top" safety limit switch and the slack belt switch are permanently set and varnished when delivered. The setting of these switches must not be changed. These switches must never be used as position limit switches!

3.4 Fall protection (catching cylinder)

The lift table can optionally be equipped with a catching cylinder as fall protection. In the event of any disastrous fault in the drive train such as shaft break or simultaneous tearing off of all belts, this prevents the upper frame falling down. Depending on the design, the lift table in this case is either caught or braked.

For the catching cylinder design with electromagnetic stop valve, this must already be integrated in the controls during the assembly and commissioning.

For lowering the lift table, the stop valve must be energised in parallel with the motor brake. In contrast, the valve must not be energised when raising the table.

Any test of the catching cylinder (carrying out catch tests) is not authorised.

The catching cylinder must strictly be replaced after any catching operation!

4 Assembly

4.1 Positioning lift table at the operating location

- In the standard version, the lower frame has fastening plates with levelling bolts and thru holes for bolt fastening.



Tip: Screw in levelling bolts **before** setting down the lift table on the floor so that they protrude downwards for the later levelling.²

- Set down lift table on the floor (using crane or forklift) and position.
- Ensure that cables and belt are not damaged.
- Place shims (minimum thickness 4 mm) under the levelling bolts so that the bolts do not press into the floor.
- Remove sling gear from the lifting eyes.
- Remove any cable ties as transport lock on the belt (cut through the red marking).
- Do not remove the anti-twist protection on the winding shaft until the motor is flange-mounted.

4.2 Install separate motor (if applicable)

- Bring the motor into the intended position (approval drawing) and flange-mount it to the winding shaft of the lift table.
- Gear shaft and winding shaft must be exactly flush for direct connection to the winding shaft (e.g. rigid or curved teeth coupling).
- In the case of connection via universal joint shaft, align motor / motor plate in accordance with the approval drawing – changes only after consultation!
- Screw motor / gearbox, universal joint shaft and winding shaft at all fastening holes with the supplied bolts using a torque wrench.
- Fasten motor plate to the base with heavy-duty anchors. The lift table must not be started if the motor plate is not yet fastened!

4.3 Assembly of a limit switch column

A limit switch column with adjustable proximity switches that query a switching flag on the upper frame of the lift table is used in many cases for the height positioning of the lift table.

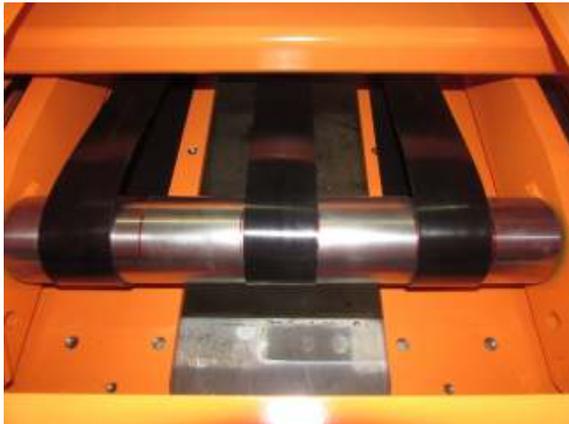
- Place limit switch column at the planned position (approval drawing) and fasten to the floor.
- Adjust switching flag on the upper frame accordingly for the column.
- Note: High, or mounted on steel structure, limit switch columns must also be braced to suitable neighbouring components to prevent any fluctuation.

² The levelling can be performed by unscrewing the appropriate adjustment bolts. This is easier than pushing the table up with the adjustment bolts.

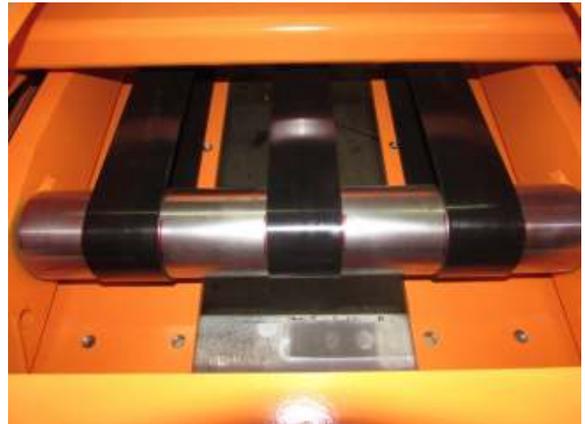
4.4 First time connection to the controls and test run

A first test run should be performed at this time.

- Correct position of the belts on the deflection roller (marks), correct if necessary.



Example: Left belt slipped



All belts in correct position

- Verify correct position of the cam roller shaft (profile rollers are positioned correctly on the round guides), correct if necessary.
- After connection of the controls, strictly pay attention to the correct winding direction of the belt for the first input of the "Lift" command (see 3.2)!
- Raise and lower the lift table approx. 10 times, but do not move into the area of the limit positions here.
- Test safety limit switch "Overrun Top" here (from a safe distance from outside, e.g. using a rod).
- Insert maintenance supports and set the upper frame down on the supports until the belts become somewhat slack. The slack belt switch must trip here.

4.5 Aligning and fastening lower frame

The lower frame must be aligned level very precisely in the longitudinal and transverse directions!

Maximum permissible deviation: 1 mm per running meter of the frame length.

Absolute no twisting of the base frame permitted!!!

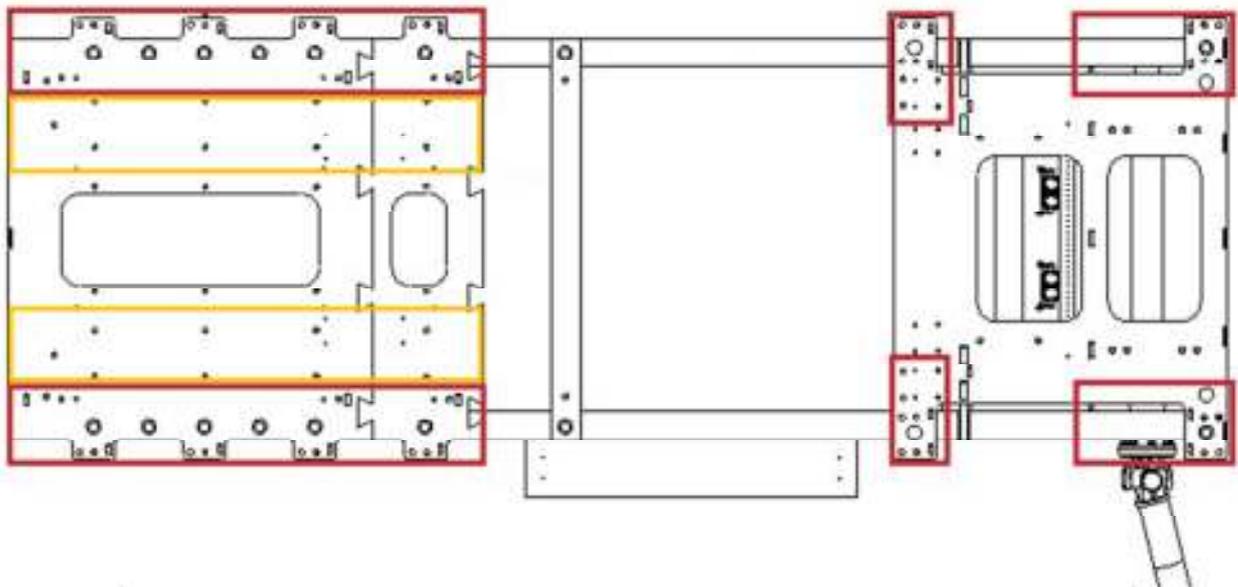
This is a prerequisite for the smooth operation of the entire lift table and thus also for the service life of the bearings and the drive!

- Align lower frame exactly level:
Using laser level or with ruler and spirit level, check in which areas the lower frame is too high and here gradually lower the frame using the adjusting screws.
- As measuring points, we recommend the fixed bearing housing and the slide rails of the lower frame.
- If the running pulleys are designed as "double pulley" (2 pulleys per scissor arm), all four running rails must be level with each other, i.e. each "pair" and the "pairs" with each other.
- After the levelling, anchor the lower frame to the base using suitable fastening materials. Do not tighten the fastening bolts until after bolstering them.

4.6 Supporting lower frame

The lower frame must be continually supported in the area of the contact surfaces, the running pulleys and the fixed points of the scissors (see illustration). The fixed points of the scissors also need to be bolstered in the transverse direction.

Bolstering:



The areas marked red of the lower frame must be bolstered.

For version with double rollers, the yellow marked areas must also be bolstered.

- Form adequately high stacks with the shims and insert between base and lower frame. The stacks should be completely between floor and lower frame.
- Weld the shims of the shim stack to each other (to prevent later sliding of the individual shims due to vibration). However, do not weld the shims to the lower frame.
- Tighten all fastening bolts of the lower frame after the bolstering.



- After approx. 20 operating hours, check the levelling of the lower frame again and tighten all floor screw connections.

4.7 Mounting attachments on the upper frame

The lift table is almost always completed by on-site attachments to the upper frame, in most cases conveyors.

- After alignment of the lower frame, carefully attach structural components to the upper frame and align.
- For the vertical adjustment of the structural components, use the upper frame as reference plane (or its cross members) - do not align in relation to the floor or lower frame!
- Any one-sided load of the lift table in the transverse direction (for example, side overhanging drive of a conveyor) resulting from the attachment must be compensated for using an appropriate counterweight on the opposite side.

4.8 Adjusting bottom limit position

- The height adjustment of the bottom limit position is made by adjustment of the appropriate sensors.
- This adjustment must be made when the lift table is not loaded.
- In doing so, the conveying level of the delivering conveyor should be set 2 mm lower on the transfer side than that of the conveyor being delivered to.
- The lift table has bolts as mechanical limit stops in the lower frame (on the scissors for double-scissor lift tables). These bolts must be set to a gap dimension of approx. 1 mm between bolt head and stop (on the upper frame or on the scissors). If the superstructure exceeds the top frame significantly, the superstructure needs to be supported as well at lowest position at most possible outer edge (not scope of Flexlift delivery!)
- If any horizontal adjustment in the transverse direction between lift table conveyor and a connecting stationary conveyor is required, this must be done on the stationary conveyor.
- The specified minimum overall height of the lift table must never be undercut, for example by removal of the limit stop bolts.

4.9 Adjusting upper limit position and intermediate positions

- The adjustment of the upper limit position and of intermediate positions is made by adjustment of the appropriate sensors.



- In doing so, the conveying level of the delivering conveyor should be set 2 mm lower on the transfer side than that of the conveyor being delivered to.
- Horizontal adjustment of the conveyor in the transverse direction must also be made here only on the stationary conveyor.

4.10 Lubrication

- In standard version the lift table has mainly maintenance-free bearings. Exception: bearing of cam roller shaft and the (optional) catching cylinder. These need to be lubricated.
- Lightly grease (universal lubrication grease) the contact surfaces of the scissor rollers (floating bearings) and contact surfaces of the lift cams. Recommendation for high-performance applications: CHESTERTON® Spraflex® Gold.
- The profile rollers of the cam roller system and their guide profiles must be lubricated. Continuous lubrication using Perma cartridges (Perma Classic) is usually envisaged for this. The Perma lubrication must be activated: For this, screw the activation screw (screw eye) completely into the lubricator until the screw eye tears off at the predetermined breaking point.
The colour of the activation screw identifies the dispensing time; red = 6 months, grey = 12 months. Note the activation date on the provided label field of the lubricator and record in the maintenance log of the lift table.
- In the case of design without Perma lubrication, the round profiles of the profile rollers must be lubricated manually.

4.11 Final check

- Finally, check the lift table again for correct installation and operational readiness. A checklist for this can be found in Appendix 7.2.
The lift table is operational if no defects are discovered during this check.

5 Notes

- During the start-up phase of the lift table, there may be pitting or slight chip formation in the area of the rollers and their contact surfaces due to the surface compaction. Material discolouration or rust-like deposits may form in the area of the cam rollers due to point load between the profile roller and the support rail.
These are normal physical processes.

6 Customer Service

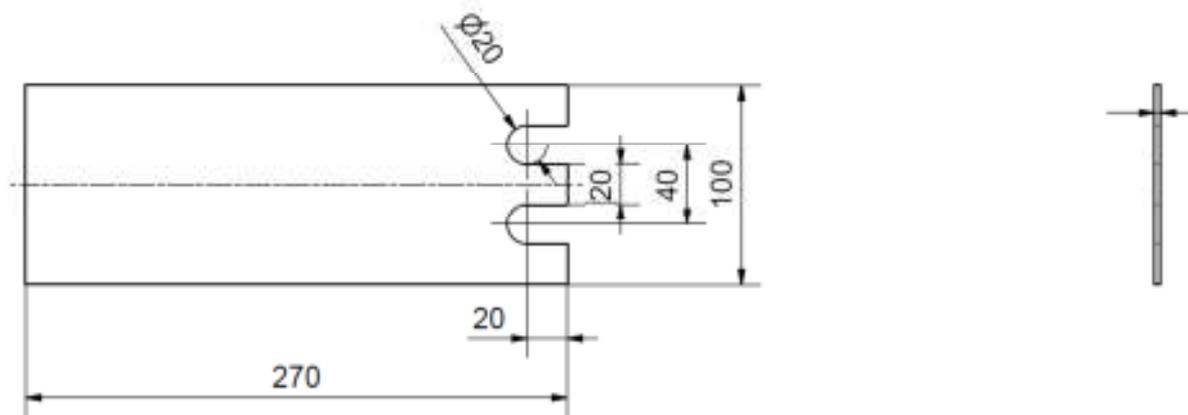
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7 Appendix

7.1 Shim plates example

The plates shown here are designed as "comb plates" with cut-outs for the bolsterring under the fastening plates.



Feed plates in various thicknesses
D = 1, 2, 3 and 5 mm



7.2 Checklist for belt lift table

Installation

- Levelling of the table within the tolerance ± 1 mm/m
- Contact surfaces reliably bolstered and bolstering secured
- Fixed point bearings reliably bolstered and bolstering secured
- Rollers run straight on the contact surface with max. 3 mm offset
- All floor anchors are permanently attached
- Adjusting screws are tight and locked
- Cylindrical rollers run straight on the cams
- Transfer height sufficiently adjusted and upstream and downstream conveyor technology adjusted to roller conveyor of the table
- Mechanical limit stops properly adjusted and fastened; table leaves mechanical limit stops without noticeable tilting

Mechanics

- The lift table raises and lowers without jerking, inclining and without disruptive noises
- Surfaces of the cylindrical rollers are cleaned and greased
- Contact surfaces (wear rails) of the scissor rolls clean and lubricated
- Automatic lubricator (optional) activated and functional
- Cylindrical roller bearings clean and greased
- Bearings of cam roller shaft are greased
- Centre bearing without offset and wear
- Information stickers (load capacity plate, rating plate) present and legible
- Cover plates attached on upper frame and not flapping
- General condition of the table is in order
- Bellows (if present), condition

Drive

- All bolts and nuts of the drive train tightened and marked
- All belts intact, clean, straight and without any damage and/or dirt
- Winding packs without greater offset (< 10 mm)
- Correct winding direction of all belts
- Pedestal bearings of the winding shaft intact
- Tschan coupling or cardan shaft lubricated and checked
- Correct position of the profile rollers in the guide rail of the guide rod



- Belt tension of all belts between drive shaft and turning shaft in the tolerance range ($\pm 10\%$ of the average value)³
- Acceleration and deceleration ramps sufficient and in accordance with Flexlift specifications
(rule of thumb: lower limit position = 0.1 m/s², upper limit position = 0.2 m/s²)

Catching cylinder (optional)

- Cylinder without leaks
- Compensation tank filled with nitrogen and marked
- Fittings tight and not leaking
- Bearings are greased

Electrical system

- Cable routing installed without any damage
- Safety switches adjusted, functional and marked
- Foot protection contact bar (if applicable) has switching function on all sides
- Reference switches adjusted, functional and marked
- Belt switch installed in tensioned position and marked
- Cable connections attached and strain reliefs secured
- Labelling attached

Adjusted overall height

bottom front right	bottom front left	bottom rear right	bottom rear left

- All points in the list have been checked without any defects**
- No changes to the lift table without written confirmation from Flexlift**
- The table operates safely**

.....
Place, date

.....
Signature and name of the expert
(CAPITAL LETTERS)

.....
Signature and name of the customer

³ Belt tension is adjusted ex works. Control / correction required only during later inspections.