

MULT GmbH *Mechanische und elektronische Fertigung Hard- und Softwareentwicklung*

LokLift

a space-saving parking system for locomotives and trains

The LokLift is basically a vertical transfer table with a shunting unit that can be equipped with up to 15 parking levels. There are five tracks in each level, resulting in a storage capacity of up to 75 trains (N gauge). An even larger number of train units is possible if, with the appropriate switching, two shorter train units parked one behind the other are parked at a time.



Compared to the conventional staging yard, this is an extremely space-saving, constructively simple and cost-effective solution, since complex track spiral constructions including extensive switch lines are no longer required and the own construction time is drastically reduced. In addition, the risk of accidental uncoupling and the associated rolling of individual cars (up to derailment with crash), which is inherent in high track coils, is eliminated.

The LokLift is suitable for single or bidirectional operation or as a terminus or through station. For track connection to the model railroad layout, it is additionally suggested, e.g. for single-direction operation, to set up a separate bypass track (= through track), so that the LokLift can be conveniently bypassed in case of malfunctions and the train sequence can be varied even more, if necessary.

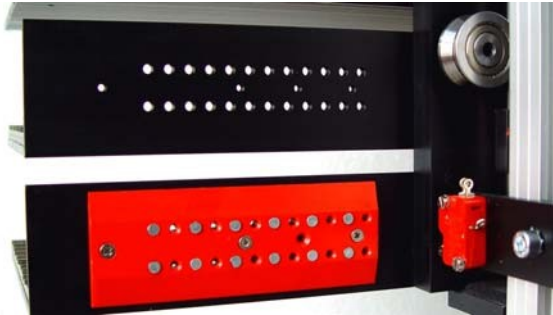
Four standard versions are currently available for tracks N six and H0. The dimensions and equipment can be found in table 1.

The exit and entrance to the parking level is provided at the factory at the same height and can be adjusted at the installation site by approx. ± 50 mm, depending on the number of parking levels used. Since the tracks are not included in the delivery, you can determine the desired track system yourself. The supplied milled shaped pieces for holding the track sleepers are also designed to match this. For monitoring the train position in the siding, up to three sections are provided, each of which can be monitored by a contact with an occupancy detector. The exact positioning of the parking levels at the entry and exit positions is ensured by a sensor with a positioning accuracy of ± 0.2 mm. The vertical shifting unit is driven by a DC motor with worm gear on a drive shaft, which uses chains to move two carriages up and down on linear guides. The parking levels are mounted on these carriages.

1. The parking level

Each parking level consists of an aluminum angle at the ends of which a track fixation is screwed. Two additional track fixings are included and are mounted on the layout. Together they serve the exact adjustment of the track ends at the transfer point.

to the layout. After mounting on the parking level, the approx. 1mm thick and shorter aluminum brackets result in a cable duct open at the top, in which the cables coming from the track sections are laid to the interface. The interface is a 24 pole contact block which connects the parking level in entry and exit position with the busy detectors and switches the traction current to the track. The number of the parking level is also available here as binary coded information.



Note: The tracks required for the construction, double-sided adhesive tape and 3mm corkboard are not included.

When mounting the parking level, the following mounting sequence is recommended.

- a) Assembling the contact block
- b) Applying the double-sided adhesive tape to the marked areas
- c) Peel off the protective film only in the area of the cable duct
- d) Measure and mark the center of the parking level
- e) Glue on the two long, thin aluminum angles in such a way that there is an approx. 24mm wide opening in the center of the resulting cable duct.
- f) At the ends of the long aluminum angles, the short aluminum angles are to be mounted immediately afterwards
- g) Peel off the remaining protective film and stick on the prepared cork boards.
- h) From some tracks, which are used as end pieces, pull off the track shoes on one side and press them into the track fixation
- i) Pre-mount the two track fixings flush with the aluminum angle of the parking level. The final positioning and bolting is only done with the adjustment at the installation site.
- k) Mounting the tracks by gluing them to the cork boards with super glue.
Attention: Do not forget insulating track shoes between the tracks pre-assembled in the track fixation and the middle track section! Leave at least two expansion joints between the tracks.
- l) Make solder bridges JP on the printed circuit board to code the parking level and mark number of the level on the aluminum bracket

This prepares the parking level for mounting on the two transport carriages of the linear guide.

Notice:

First assemble all parking levels including track mounting and cabling. Screw the lowest level (= level 1) to the shunting unit. Use the supplied countersunk screws on the right side and round head screws on the left side of the unit - when looking at the parking levels open to the front.

2. Mounting of the support frame

All screws used are Allen screws of sizes 4 and 5. First, the aluminum profiles 50x50mm, which represent the boom to the front, should be connected to the two vertical spars to form one L each. Then screw the two cross profiles to the right L as shown in Fig. 3. Place both chains on the sprockets of the drive axle and carefully insert the drive shaft into the bearing in the right vertical spar.

Now follows the assembly of the left vertical beam. Push the heads of the two screws protruding from the cross profiles into the T-slots of the left-hand boom, but do not tighten the screws yet. Now insert the drive axle into the bearing in the left vertical beam. Now tighten the two screws of the cross profiles firmly so that a firm connection is created.

Finally, the L-bracket at the rear must be pre-assembled slightly below the height of the table top. The final assembly takes place only after the LokLift has been moved to its final position at the installation site and the commissioning has been successful.

3. Drive and control

Before screwing the motor to the right vertical spar, you must place the drive chain around the sprocket on the motor side. Then connect the two spacers to the bearing block of the motor with the four M6 x 12 countersunk screws. This screw connection must be finally and firmly tightened. This means that the drive unit can now only be pushed up and down vertically on the tie bar. When the drive chain rests correctly on all the sprockets, press the motor unit down forcefully and screw it to the vertical spar in the final position.

Proceed in the same way with the lower chain deflection on the left vertical beam. This completes the assembly of the drive.

4. Commissioning

Before putting the LokLift into operation, make sure that the up and down movement of the parking levels is possible without any problems. Then connect the PC to the control electronics via the serial interface and only now plug the LokLift's power cable into a socket. After a few seconds the trolley will move upwards by the two chain hoists until the zero position has been recognized by the electronics. This position can be changed by moving the drive electronics in the T-slots of the right vertical beam by approx. ± 50 mm. The final position of the entry and exit height is determined by the four adjustable unit feet under the two outriggers. Be sure to use the milled fittings with a piece of track from your track system to adjust the height and tilt of the parking levels. Once you have completed these adjustments, you can mount the second level and check the position for entry and exit height. If set correctly, no further adjustment should be necessary. Proceed in the same way with the remaining parking levels.

If you are only partially equipping the LokLift for the time being, e.g. you have only obtained five of newly equippable parking levels, then you should check the entry and exit heights at position nine and then finish mounting them at position five.

After final assembly of all parking levels, you should carry out a final function test by selecting any level. This concludes the mechanical commissioning.

In order to check the running with a train, you must feed in the track voltage at the plug connection of the electronics provided for this purpose. This voltage is only present on the track when the LokLift is stationary in the entry and exit position. All other tracks are de-energized.

5. Important dimensions for the LokLift

All specifications, especially for H0 gauge, are provisional, and we expressly reserve the right to make changes. All dimensions in millimeters.

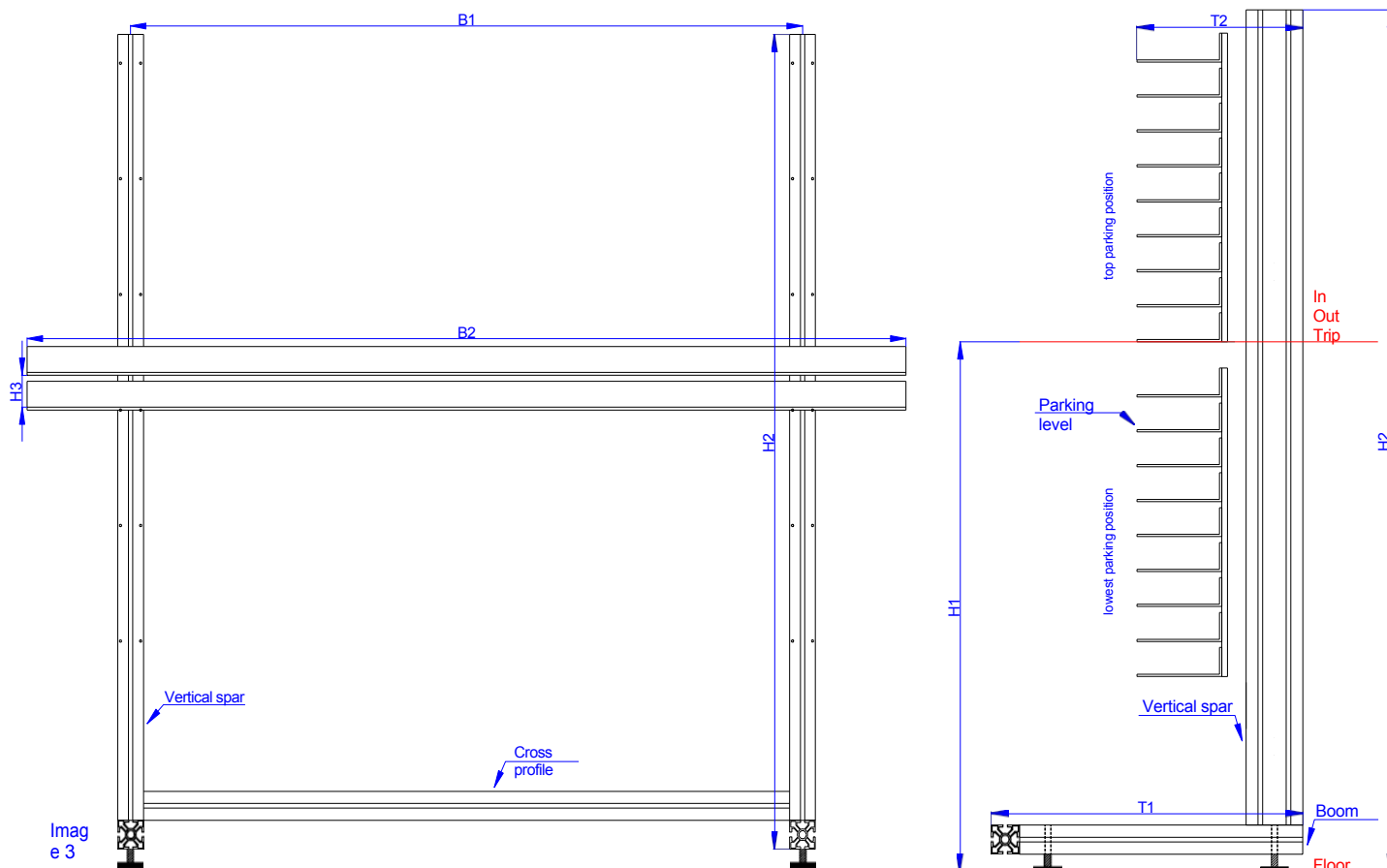
Table 1:

Size specifications for the LokLift				
Track	N		H0	
Parking level length (B2)	1200	1700	2500	3800
Distance between vertical bars (B1)	800	1300	1050	1700
Number of vertical bars	2		3	4
possible number of parking levels	maximum 15			
Entry / exit height (H1)	910, 910, 1070		910, 1310	
maximum height above the ground (H2)	1480, 1660, 2060		1750, 2550	
Number of tracks per level	5		3	
Light distance between the planes (H3)	100			
Distance from track center to track center	24		45	
Weight in kg	from approx. 120kg		from approx. 160kg	
Depth of the adjustable foot (T1)	500			
Depth back to front edge of parking deck (T2)	294			
Electrical connection	230VAC			
Control via	SELECTRIX, serial via handheld "LokLift Controller" or PC			
Standard equipment or scope of delivery	Connection for RS232, SX-Bus 5 and 10pin, ext. safety circuit, reset button, track power. The required parking levels have to be ordered separately and are enclosed as kit. Basic unit in disassembled, pre-assembled condition. Track fixing for various track system manufacturers. Emergency stop switch, PC - software for control.			

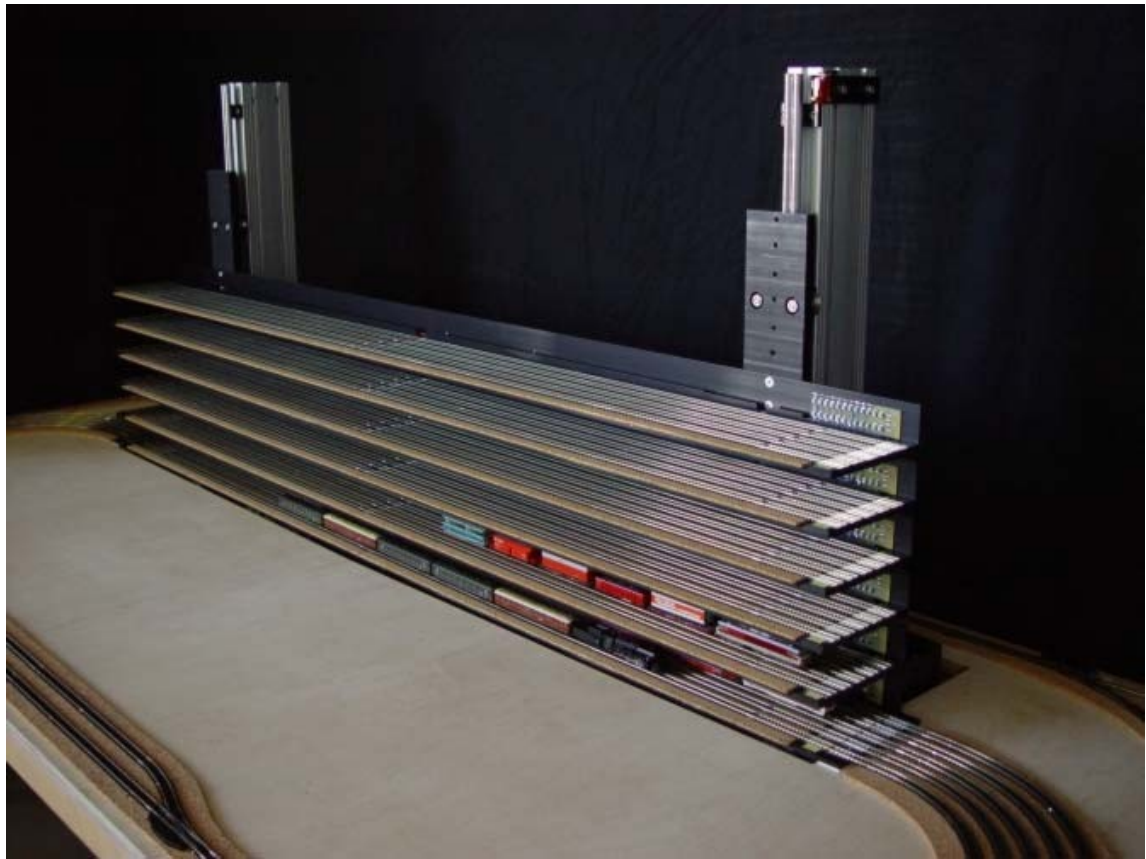
6. Prices

Around 90% of all LokLifts supplied are a special design in terms of height, length or number of levels. This makes a general statement about the price in the form of a price list almost impossible. We are happy to implement special requests for you. Please contact us and we will make you an offer.

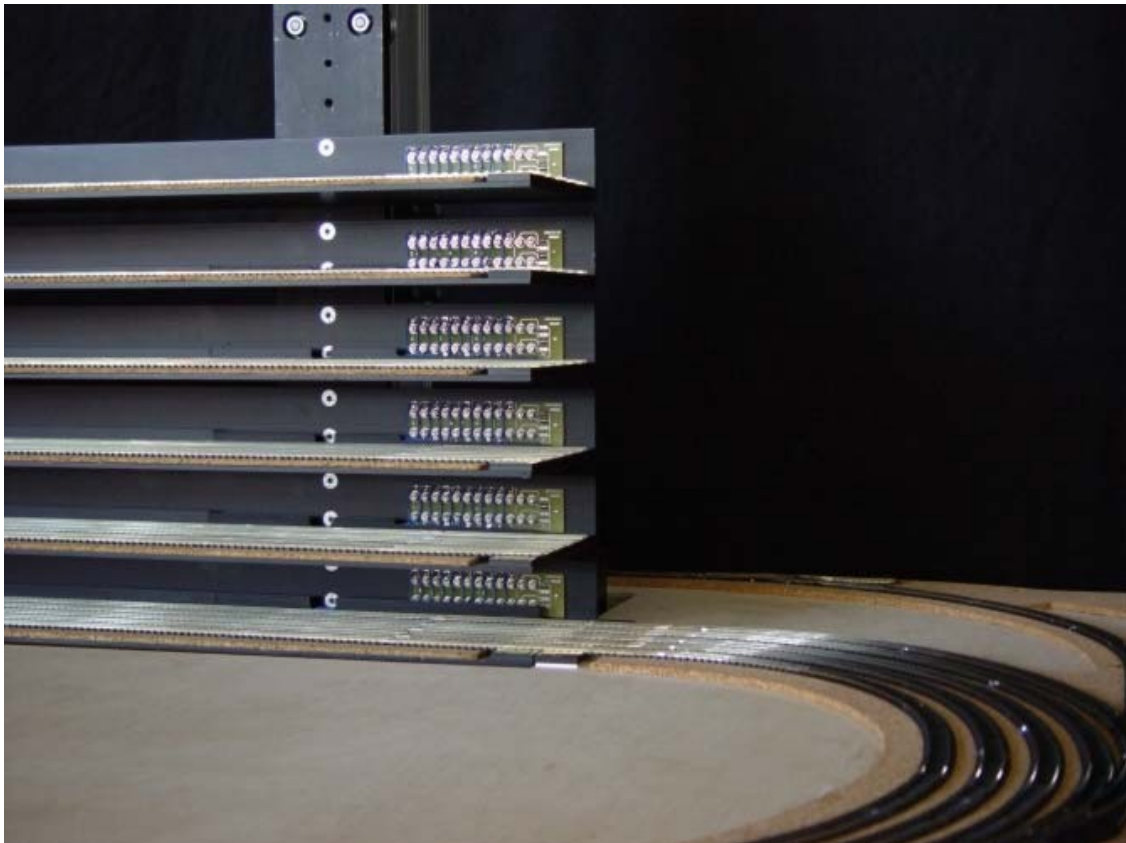
Description	Special features	N	H0
Basic unit with 9 parking levels each 1200mm, level distance 70, total height approx. 1500mm.	Number of tracks per level	5	3
Basic unit with 9 parking levels each 1700mm, level distance 60, total height approx. 1500.	Parallel track distance	24mm	45mm
Basic unit with 8 parking levels 2500mm each, level distance 100, total height approx. 1750.	Free, available connection contacts	18	
Basic unit with 8 parking levels each 3200mm, level spacing 100, total height approx. 1750.			
Basic unit with 8 parking levels each 3800mm, level distance 100, total height 1750			



Here we show you the use of a LokLift with a level length of 1700mm using the example of a layout under construction for N scale. Six of the possible nine parking levels are already mounted. The layout is on the lowest level.

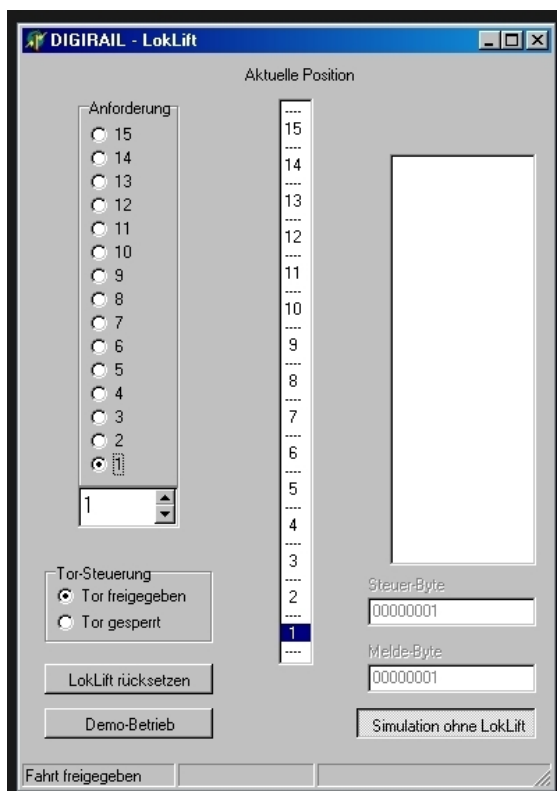
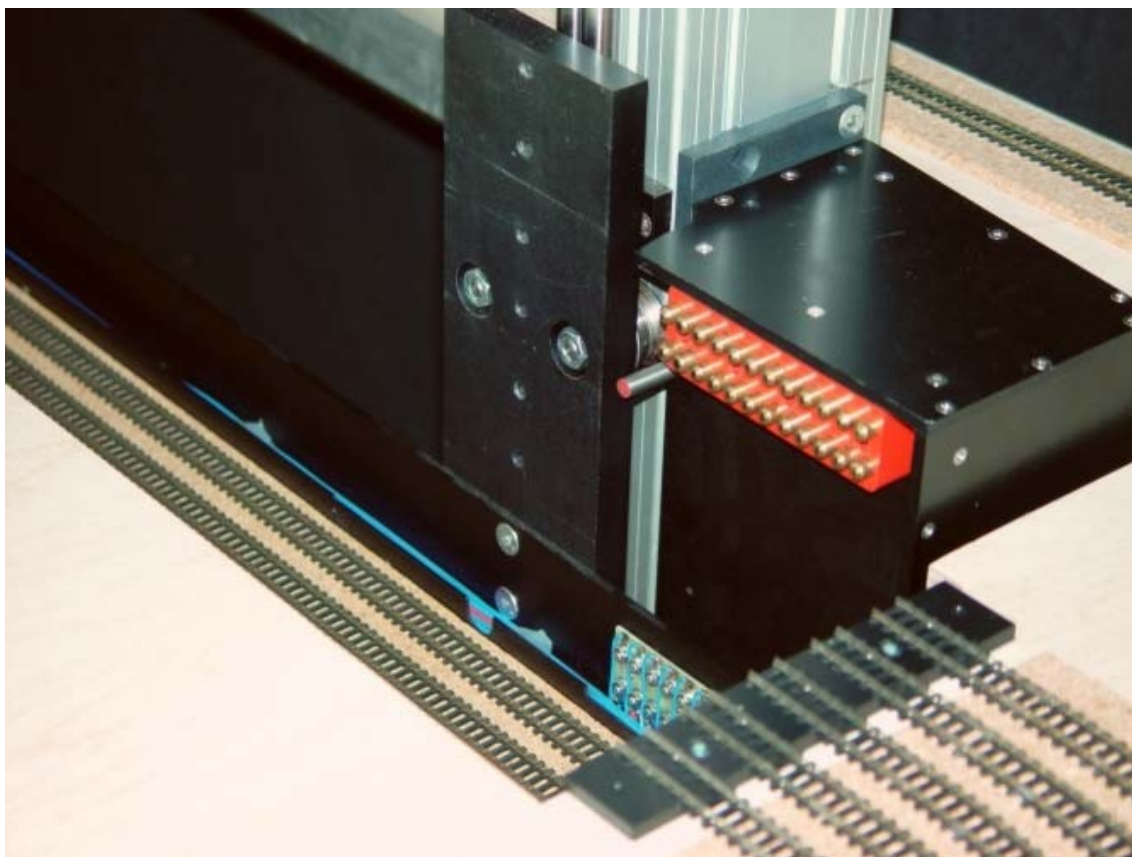


Here you can see the track transition from the turnout harp to parking level 1. Between the cork layers you can see the milled track end pieces for the track system used, which allow for a precisely fitting transition.



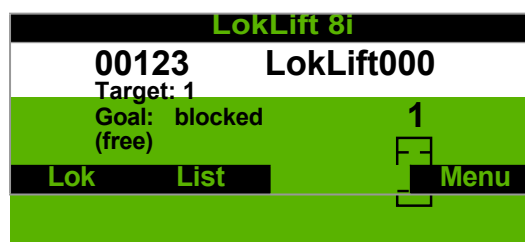
In this picture, the ninth parking level would be in and out. Since the level is not mounted, you can see a part of the housing where all the electronics are integrated. Via the 24 contacts of the red contact block the track current is applied to the parking level and at the same time the level number is recognized binary.

Below the contact block, next to the carriage, the proximity switch is visible, which ensures precise positioning of the parking level. The entire electronics housing can be adjusted vertically in height by approx. $\pm 50\text{mm}$. Fine adjustment at the transition to the plant with regard to horizontal and vertical inclination is made by height-adjustable feet.



This is the interface of the PC software with which you can control the LokLift via the serial interface. Select the level to be approached by mouse click and the control will bring your trains into the entry or exit position. The movement of the LokLift is displayed in the field "current position" as a moving bar.

If you operate the LokLift via multi control 2004 or the HC10, you will find this operating interface on the respective display. Via the numeric keypad you enter the level to be approached and the LokLift brings your train into play. And if you don't want to use the PC or one of the other digital systems, you can use our LokLift controller, see illustration on the next page, for control.





In this picture, two extremes can be seen in relation to the different track sizes: The LokLift on the left is a four-level version for gauge 1, the one behind it is one with nine levels for Z gauge.



For manual operation, the LokLift Controller is available in a version for 9 or 15 levels.



Für analoge Ansteuerung, ohne PC oder Softwareanwendung



innen z.B. mit
eschlossen



DCC oder Motorola Systemen
Weichenmodulen, die an die Tasten
werden, den LokLift ansteuern



vom PC aus
mit der im Lieferumfang

Windows - PC



SX - BUS

SX - BUS
zur Anlage



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von einer Steuerungssoftware
ST-TRAIN, TrainController
oder WinDigipet
über die SX-BUS-Zentrale.

Dieser Weg ist auch für Fremd-
systembenutzer (DCC, Motorola)
günstigste Einbindung des LL

Windows - PC

seriell oder USB

SX - Control 02



Ansteuerung im Selec
System über den SX -

serielle Verbindung

SX - BUS
zur Anlage



innen z.B. mit
eschlossen



DCC oder Motorola Systemen
Weichenmodulen, die an die Tasten
werden, den LokLift ansteuern

Examples for the control
of the LokLift via
the LokLift controller
the PC - software or
from the digital systems
DCC or Motorola.

Inquiry about the LokLift

Please enter your desired idea for the LokLift here. We will check the technical realization and prepare an offer for you.

Track	Z, N, TT, H0, LGB, 0 gauge	
Other		
Standard length of parking levels	1200 1700 2500 3200 3800mm	
Special length	_____ mm	
desired number of parking levels (= maximum overall height)	_____ Piece	
Maximum room height at the installation site	_____ mm	
Initial placement with number of parking levels	_____ Piece	
built ready for operation	_____ Piece	
As kit	_____ Piece	
Level spacing for overhead contact line	yes __	
Level spacing without overhead contact line	yes __	
Plane spacing special version	_____ mm	
Track system used (please specify manufacturer)		
Position of the red siding for levels delivered ready for operation	_____ Front, _____ Back	
Special equipment "SELECTRIX"	yes __	
Planned control from / via PC software serial connection manual operation	_____ _____ _____	
Addresses when used in the SELECTRIX system: LokLift, basic / additional address Busy indicator 8i, basic addresses		
Other:		