INSTRUCTION MANUAL

DINO TL/TLB 120

Manufacturer:

Dinolift Oy
Raikkolantie 145 | FI-32210 LOIMAA
Tel. + 358 20 1772 400 | info@dinolift.com | www.dinolift.com

ORIGINAL OPERATING INSTRUCTIONS

Valid from serial number

120TL	**55001 ->**
120TLB	**75006 ->**

SERIAL NUMBERS	CHANGE	DATE
55001-> 75006->	Outrigger controls moved to the drawbar	5.2.2026

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1. TO THE OPERATOR

Keep this manual on the work platform of the lift in the box reserved for it. If the instruction manual gets lost, damaged, or for some other reason becomes unreadable, order a new manual from the manufacturer.

This manual is intended to familiarise the user with the structure and functions of the work platform, as well as with its appropriate use. The manual provides guidance on the service measures that are the responsibility of the user of the work platform.

Other maintenance procedures on the work platform require special skills, special tools or accurate knowledge about measurements or adjusted values. Guidance for these measures is provided in a separate service manual. For situations that require service or repair measures, contact the authorised service provider, importer or manufacturer.

DANGER

Read all the instructions in this manual before using the aerial work platform. Make sure that you have understood all the instructions. The instructions must absolutely be followed during operation and maintenance of the aerial work platform.

When handling the unit, in addition to the instructions in this manual, the user must also observe the local legislation, the guidelines stipulated by the employer, and regulations valid at the work site.

NOTICE

Information that only applies to a specific model version, feature or equipment, will have the identification included in the title. Check the applicability of such information to your machine.

Dinolift Oy is constantly developing its products. For this reason, the contents of this manual might not always be in full compliance with the most recent version of the product. Dinolift Oy reserves the right to modify the product without prior notice. Dinolift Oy assumes no liability for any problems caused by changed or missing data or mistakes in this manual.

Please consult your dealer or the manufacturer for more information and detailed instructions.

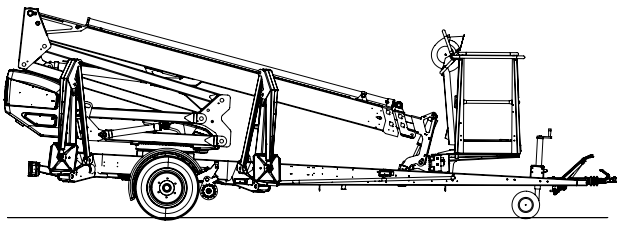
NOTICE

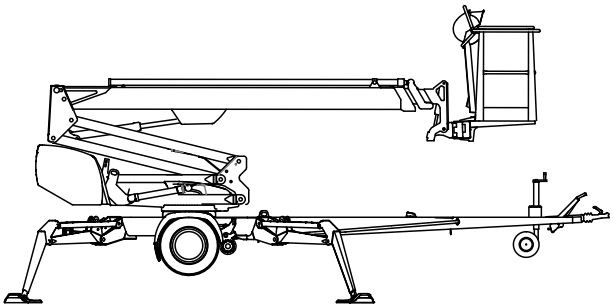
USA only
Dealers, installers, owners, users, operators, lessors, lessees and brokers must fulfill the responsibilities stated in the manual of responsibilities according to ANSI A92.20 and ANSI A92.22 standards for boom-supported elevating work platforms.

1.1. OVERVIEW OF THE UNIT

This unit is a trailer mounted, towable aerial work platform.
This aerial work platform complies with the standard EN280 type 1. Moving the lift by means of the driving device or by towing is possible only when the lift is in the transport position.

For the operation, the tyres of the lift shall be raised off the ground by means of the hydraulic outriggers.





The primary power source of the lift is the electric motor. The outriggers and the boom system are hydraulically powered.

As an option, the lift can be equipped with a hydraulic driving device.

Consult the chapters “Technical data” and “Structure and functions of the work platform” in this manual for more detailed information about the lift.

1.2. INTENDED USE OF THE WORK PLATFORM

The aerial work platform is exclusively intended for lifting people and tools to the work position to carry out work from the work platform. It can be used as a work platform within its permissible load-bearing capacity and reach (refer to the “Technical Specifications” table and the “Reach Diagram”) under normal operating conditions. Access to and from the work platform shall only take place in the access position at ground level.

The intended use also covers:
- Following all the instructions in the Operating Instructions
- Performance of the inspections and maintenance operations.
- Observation of the occupational safety regulations and road traffic regulations.

This aerial work platform is NOT insulated, and does not offer protection against contact with electric current. The aerial work platform must not be used for work on electric systems.

Observe the safety instructions concerning the operating environment, and the restrictions given in them.

NOTICE

The operator must receive instructions and consent from the manufacturer for all such specific work methods or conditions that the manufacturer has not explicitly defined in the unit's operation and maintenance instructions.

2. TECHNICAL SPECIFICATIONS

NOTICE

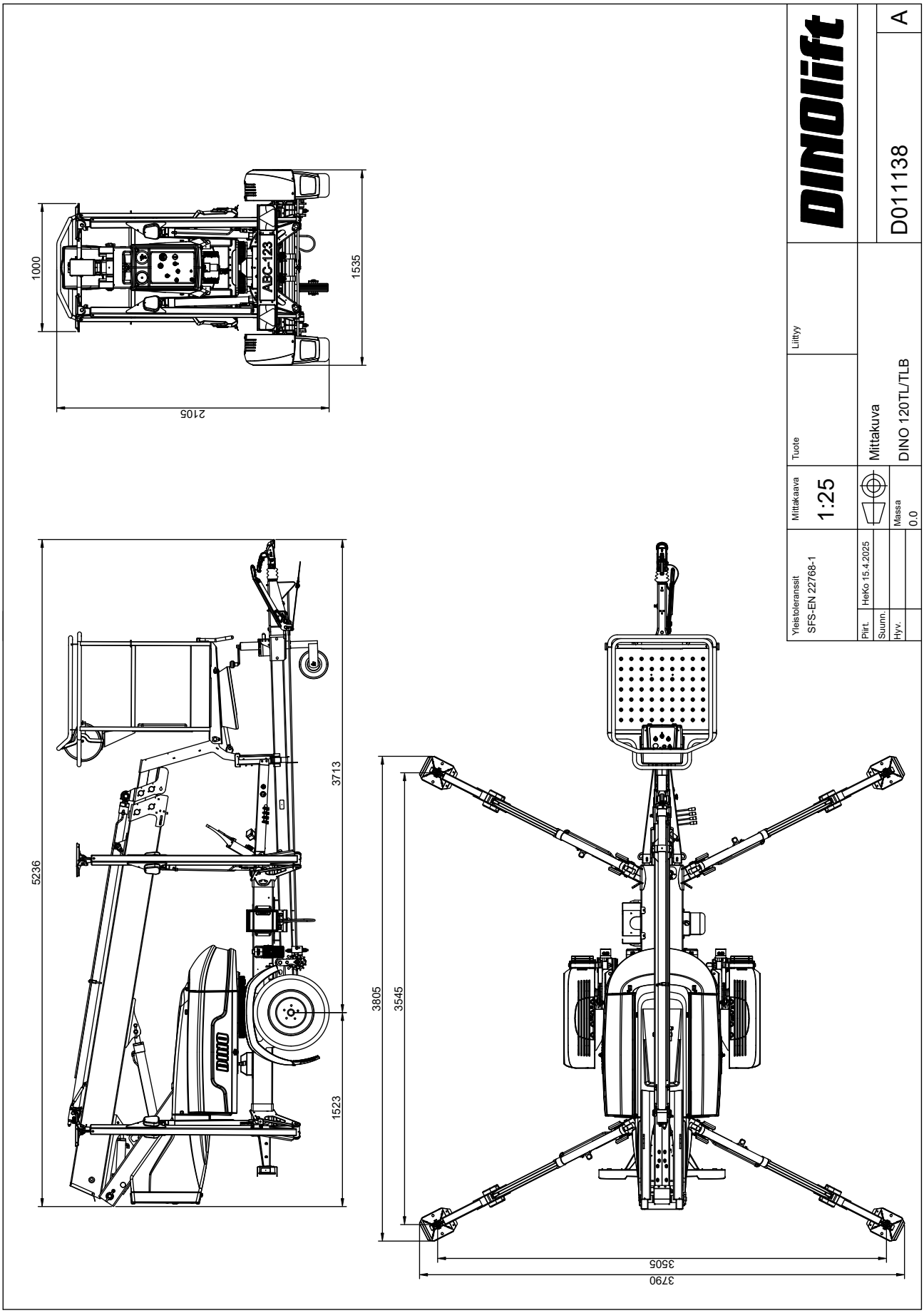
The information is valid for the machine in standard configuration. Different installed equipment or optional accessories may affect the given data! Such changes are marked on the machine and on the fitted equipment.

	120TL	120TLB
Max. working height	12,0 m	
Max. platform height	10,0 m	
Max. outreach	8,1 m	
Boom rotation	± 355°	
Turn area	refer to the reach diagram	
Support width / Footprint	3,5 / 3,8 m	
Transport width	1,53 m	
Transport length	5,2 m	
Transport height	2,11 m	
Minimum weight	1265 kg	
Maximum weight with optional equipment	1285 kg	
Max. allowed load on platform	130 kg	
Max. number of persons + additional load	1 person + 50 kg	
Max. allowed sideways load (caused by persons)	200 N	
Max. lateral inclination (chassis)	±0,3°	
Max. allowed gradient of ground to the side	6°	
Max. allowed gradient of ground lengthwise	7,6°	
Max. wind speed during operation	12,5 m/s	
Min. ambient temperature when working	- 20 °C	
Max. support force on the outriggers	10700 N	
Max ground pressure on outriggers	3,4 kg/cm2 (34 N/cm2)	
Platform size	0,7 x 0,85 m	
Gradeability	15%	
Socket outlets on the platform	2 x 230V/50Hz/10A*	
Power supply	Mains current	Battery power pack
	230V/50Hz/10A*	24VDC / 2kW Batteries 2 x 12V / 150Ah
Sound pressure level	< 70 dB	
Whole-body vibration	Not detectable	

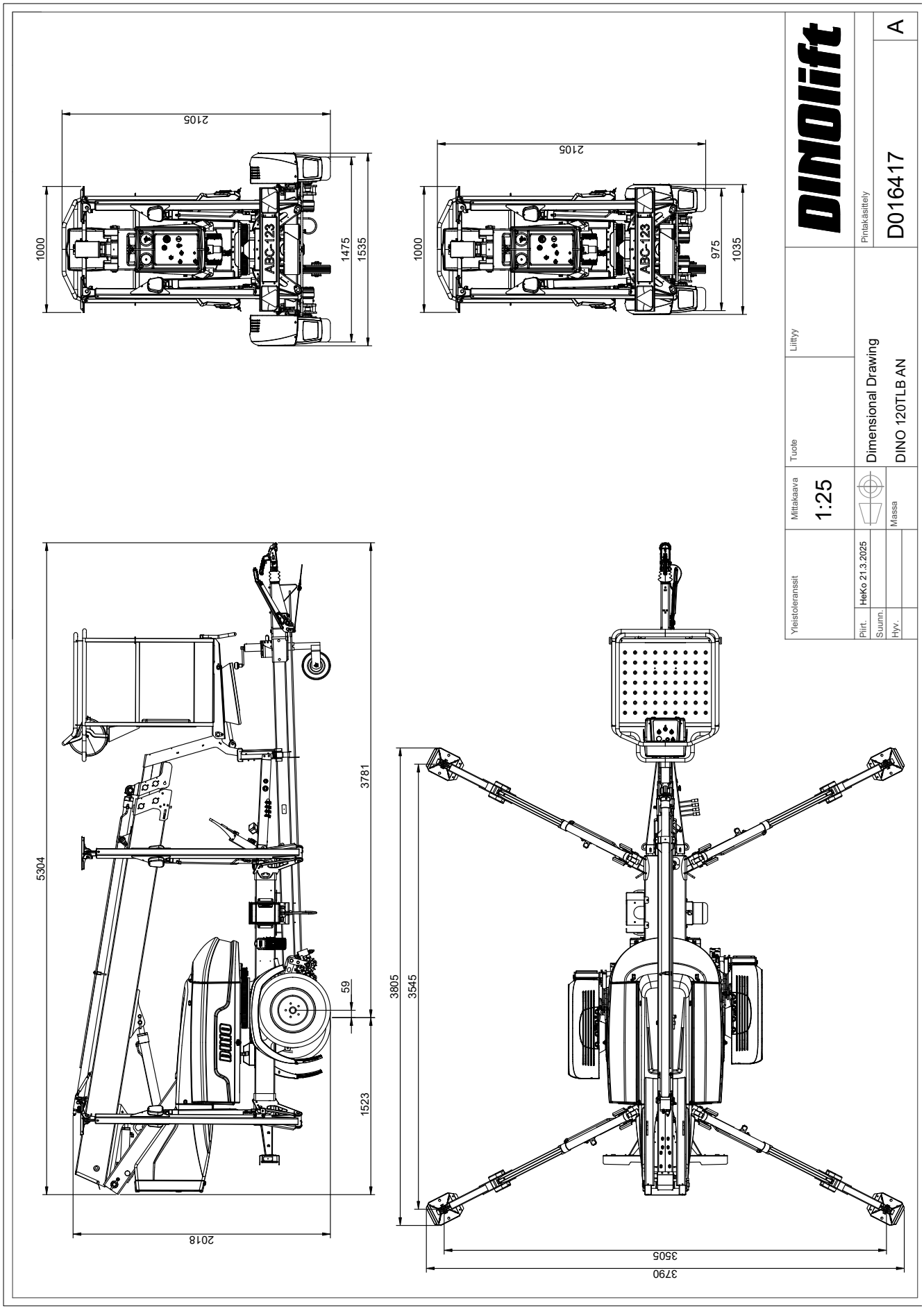
*Varies by region.

2.1. DIMENSION DRAWING

2.1.1. 120TL/TLB

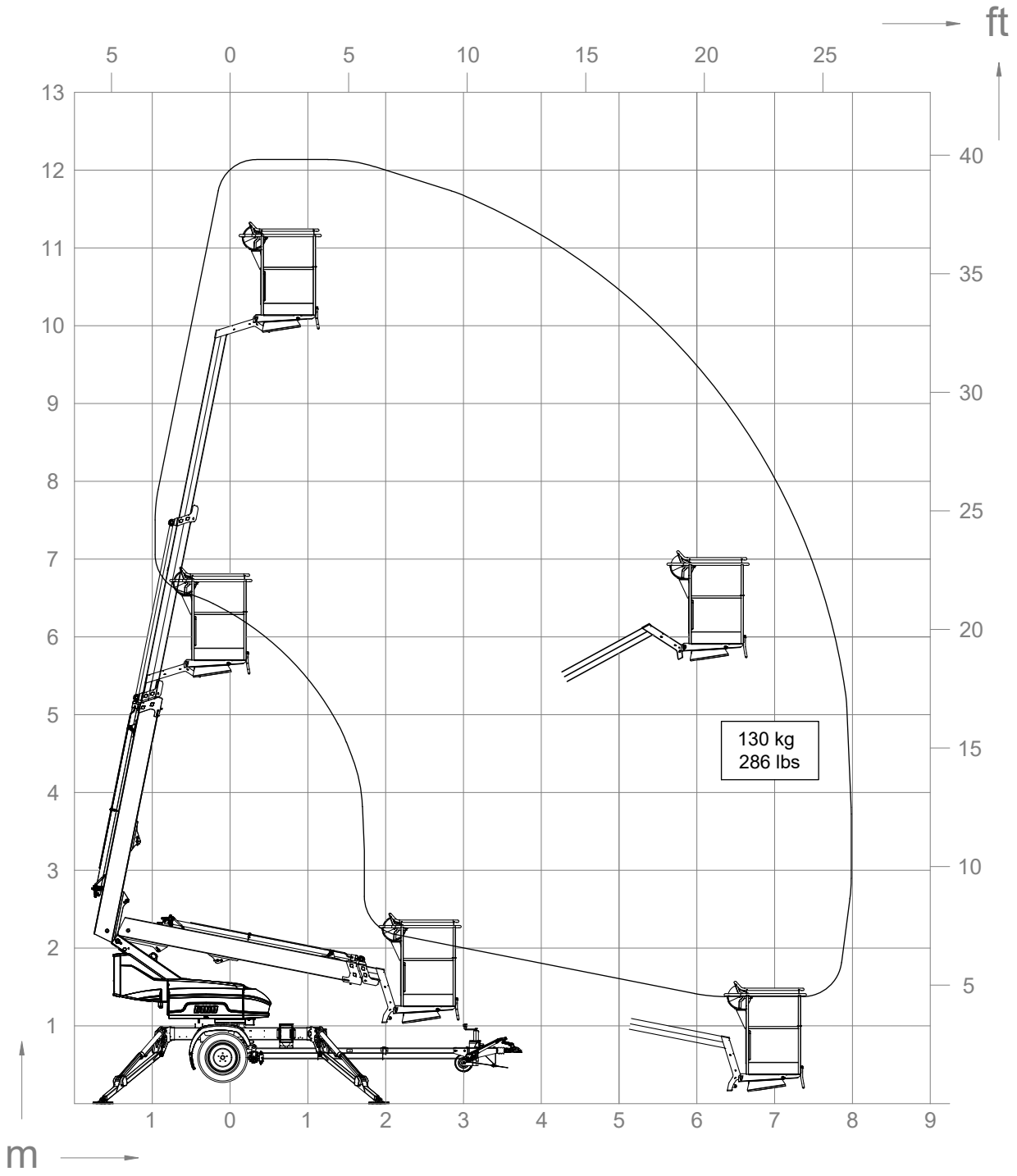


2.1.2. 120TL/TLB Narrow axle



2.2. REACH DIAGRAM

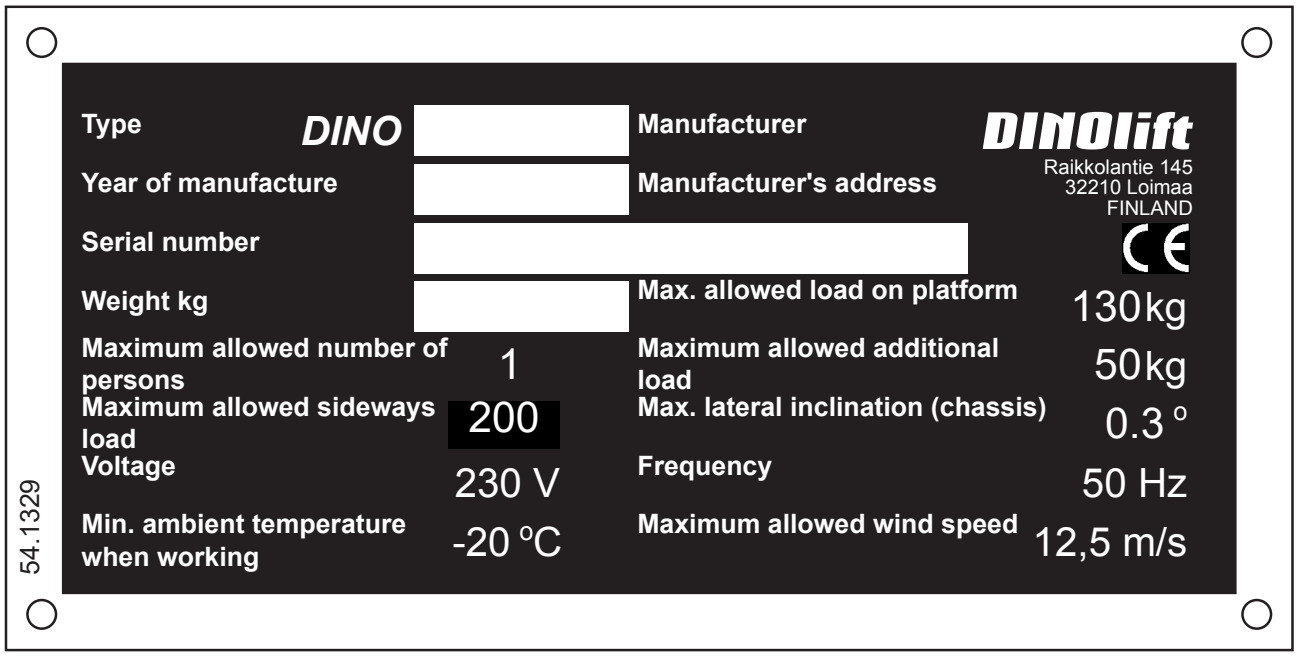
2.2.1. 120TL/TLB



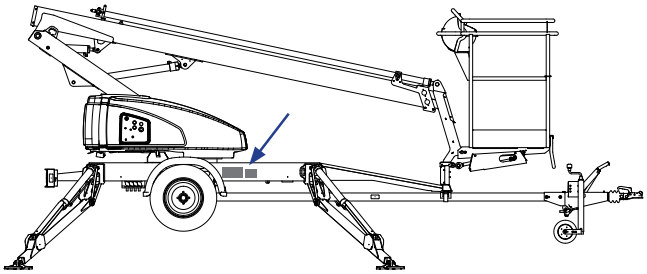
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Piirt. HeKo 22.5.2024 Suunn. Hyv.		Ulottumakaavio DINO 120TL/TLB	Pintakäsittely D011117

2.3. EXAMPLE OF THE MACHINE'S NAMEPLATE

The name of the manufacturer, and the production number and serial number of the machine have been marked on the nameplate as shown in the picture below.



The nameplate of the MEWP is located on the right-hand side of the chassis as shown in the picture.



The serial number is also engraved in the lift's chassis, on the upper surface of the chassis.

The vehicle identification plate of the trailer is located on the chassis next to the nameplate

Following data is written on the plate:

EU Type Approval Number (if available)		
Serial number		
	Total weight	kg
0	Maximum allowed weight on the towing hitch	kg
1	Maximum allowed axle weight	kg
2		kg

2.4. EXAMPLE OF EU DECLARATION OF CONFORMITY

EU declaration of conformity for machine

Manufacturer
Dinolift Oy
Raikkolantie 145
FI-32210 Loimaa, FINLAND

declares that

DINO 120TLB Access Platform no

is in conformity with the provisions of Machinery Directive **2006/42/EC** as amended and with national implementing legislation.

2006/47/EC Conformity assessment procedure followed: Annex VIII: internal control of production as confirmed in certificate No. **DCE D012094B**

Access platform also fulfils the requirements of the following EEC directives:
2014/30/EU

Following harmonized standards have been applied in designing the machine:
SFS-EN 280-1:2022, SFS-EN 60204-1:2018, SFS-EN-ISO 12100:2010, EN ISO 4413:2010, EN13001-3-1:2012+A2:2018, EN 61310-1:2008, EN ISO 13849-1:2015, EN ISO 13850:2015, EN ISO 4871:2009, EN ISO 11201:2010, EN ISO 3744:2010

Person authorized to draw up the Technical File: Santtu Siivola
Chief Engineer
Dinolift Oy, Raikkolantie 145,
FI-32210 Loimaa, FINLAND

Loimaa XX.XX.2024

Santtu Siivola
Chief Engineer

2.5. SAMPLE OF INSPECTION PROTOCOL FOR THE ACCESS PLATFORM

TEST CERTIFICATE

DATE:

FINAL INSPECTION OF PRODUCTION:

Inspection place: **Dinolift Oy** Inspector's signature:

BASIC INFORMATION

Manufacturer:	**Dinolift OY**	Place of manufacture:	**Finland**	
Address:	**Raikkolantie 145**			
	32210 LOIMAA			
Importer:				
Type of lift:	☑ Boom platform	☐ Scissor platform	☐ Mast platform	
Chassis:	☐ Car	☐ Self propelled	☑ Trailer mounted	☐ Vehicle mounted (quick coupler)
Boom:	☐ Articulated boom	☑ Telescopic boom	☐ Articulated telescopic boom	☐ Scissor
	☐ Fixed mast	☐ Telescopic mast		
Load control:	☑ Position control	☑ Limited size of work platform	☐ Moment sensing	☐ Load sensing
Outriggers:	☑ Hydraulic turning	☐ Hydraulic pushing	☐ Mechanical	☐ Stabilized with wheels

TECHNICAL SPECIFICATIONS

Machine and type:	**DINO 120TLB**	Max. platform height	**10,0 m**
Number of manufacture		Max. outreach:	**7,9 m**
Year of manufacture			
Rated load:	**130 kg**	Boom rotation:	**Continuous**
-max. number of persons:	**1**	Support width:	**3,5**
-max. mass of equipment:	**50 kg**	Transport width:	**1,53**
Power supply:	**24 VDC**	Transport length:	**5,2**
Lowest temperature:	**-20 °C**	Transport height:	**2**
Minimum weight:	**1250 kg**	Platform size:	**0,85 x 0,7 m**
Weight with fitted options (kg):			

INSPECTION POINTS (Y = meet standards N = do not meet standards ⊟⊟ not applicable)

	Y	N
A. GENERAL REQUIREMENTS		
1. Suitability for use	☑	☐
2. Certificate of conformity	☑	☐
3. User manual and storage	☑	☐
4. Machine plate - inspection plate	☑	☐
5. Instructional and safety plates	☑	☐
6. Safety colours	☑	☐
B. STABILITY		
1. Load plate and reach diagram	☑	☐
2. Supports / outriggers	☑	☐
3. Indicator for horizontal position	☑	☐
C. STRUCTURES		
1. Transport position / transp. equipment	☑	☐
2. Driving/towing equipment	☑	☐
3. Chassis	☑	☐
4. Turning device	☑	☐
5. Boom system	☑	☐
6. Structure and position of work platform	☑	☐
7. Hydraulic system	☑	☐

		Y	N
D. ELECTRIC SYSTEM			
1. Electric system		☑	☐
2. Electric appliances		☑	☐
3. Lights		☑	☐
E. SAFETY AND CONTROL DEVICES			
1. Safety sensors and limit switches		☑	☐
2. Sound signal		☑	☐
3. Emergency descent system		☑	☐
4. Protection of controls		☑	☐
5. Symbols / control directions		☑	☐
6. Placement of controls		☑	☐
7. Emergency stop		☑	☐
F. SAFETY FEATURES			
1. Prevention of unauthorized use		☑	☐
2. Locking device, covers and guards		☑	☐
3. Prevention of lifting		☑	☐
4. Prevention of opening of support		☑	☐
5. Safety distances		☑	☐
6. Control of loading		☑	☐
7. Limiting devices		☑	☐
G. TEST LOADING			
1. Overload test (150%)	195 kg	☑	☐
2. Functional test (110%)	145 kg	☑	☐

COMMENTS

DEFICIENCIES

Deficiencies have been repaired

Date: _____ Signature: _____

The initial inspection and test loading of the Dino aerial work platforms is performed by the manufacturer. A protocol, drawn up during the inspection, will accompany the lift.

The protocols of the start-up and periodic inspections must be kept with the lift or its immediate proximity for at least five years.

3. SAFETY

All the essential safety instructions and warnings, relevant to transport, use and maintenance of the lift, are described in this chapter.

DANGER

Failure to observe these instructions and safety regulations may cause a severe injury or even death. Familiarise yourself with all the safety regulations, operating instructions and signs affixed to the machine, and follow them.

Make sure that you understand all the safety instructions and regulations. Also make sure that others operating the machine or working on the work platform are familiar with these instructions.

3.1. SAFETY INSTRUCTIONS

Only specially trained personnel with authorisation in writing, who are well familiarised with the device, and at least 18-years old, are allowed to operate the unit.

Keep the lift free of any dirt, which may impair safe operation, and impede the inspection of the structures.

The device must be serviced and inspected regularly.
Only skilled persons, familiar with the service and repair instructions, are allowed to carry out servicing and repair work.

It is strictly prohibited to use a lift which is out of order!

Never remove or disable any safety devices of the machine.

WARNING

The device must neither be altered without the manufacturer’s consent nor be used under conditions, which do not meet the manufacturer's requirements.

The operator must receive instructions and consent from the manufacturer for all such specific work methods or conditions that the manufacturer has not explicitly defined.

Clean up any oil, fuel and chemical spills properly. Absorb oils in absorbent material and dispose of oily waste properly. Neutralize spilled battery acid with baking soda or other suitable material. Find out the cause of the leak and fix it.

If the machine has an internal combustion engine, always turn off the engine while refueling. Do not start the engine if you notice any signs of fuel or oil leakage on the machine.

Do not use the internal combustion engine indoors unless exhaust removal is ensured.

Charging lead-acid batteries emits dangerous chemicals. Make sure that the batteries are always charged in well-ventilated areas. Never charge a damaged batteries.

Keep the machine away from possible sources of ignition. Hot work operations are strictly prohibited in the vicinity of batteries or fuel tanks.

WORK AREA AND PREPARATIONS BEFORE LIFTING WORK

When working in busy areas, the operating range of the lift must be clearly marked by using either warning lights or fencing. Also check local regulations on working on public roads.

Ensure the unobstructed range of movement before operating the outriggers.

The load-bearing capacity and the gradient of the base must be taken into account when supporting the machine. Do not use the machine on a lorry, a railway car, a floating vessel or any other potentionally unstable platform.

Ensure that the outriggers cannot slide while on a gradient.

Additional support plates of adequate size must be used under the outriggers, when working on soft ground. Only use such additional support plates, on which the metallic outriggers will not slide.
While in the support position, ensure that the wheels are off the ground.

Always ensure the level position of the machine before starting the operation.

Always ensure that the work area is clear of outsiders. Danger of getting squeezed between rotating and fixed structures.

While operating the boom from the control centre on the turning device, beware of getting pressed against the outriggers or other structures that do not turn with the boom.

TRANSFERS

Observe the maximum allowed gradient when transferring the lift. During transfer in rough terrain, always try to position yourself higher than the machine.

Beware of fixed or moving obstacles in the terrain or near the lift while driving. Make sure that you have a clear view of the driving path.

Do not use the machine for towing.

LIFTING AND WORKING ON THE PLATFORM

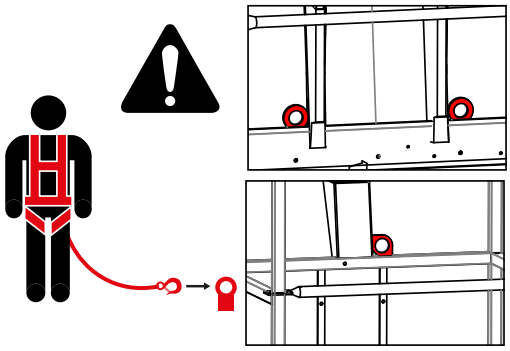
Never exceed the maximum number of persons, maximal loading or hand force, allowed for the lift. Never add load onto the platform while in the upper position.

Before operating, always ensure that the safety devices and the emergency descent system are in working order.

Use the safety harness! Fix the safety harness to the fixing points, intended for the purpose.

Note! The platform is fitted with a fixing point for the safety harness of each user. Only one harness per fixing point.

Do not use ladders, steps or other similar equipment on the platform.



Ensure that the gates are properly closed before starting the operation. If the work platform is equipped with ladder, these must be locked in the upper position.

Never throw or drop any objects from the platform. All the tools must be transported on the inside of the platform. Never leave the tools hanging outside the work platform, supported only by their power cord.

Do not lift the tools, accessories or other material on the railing of the platform or attached to the railing.

The aerial work platform must not be used as a crane.
The work platform must not be used for transferring goods or persons between different floors or working levels. Stepping on or off the platform in motion or elevated is prohibited.

When the boom is in its lowest positions, make sure it cannot clash during rotation with structures that do not turn with the boom.

Always make sure, before lowering the platform, that the area under it is clear.

Avoid damaging the platform by lowering it on the ground, or bringing it in contact with any structures.

Never use a lift alone. Make sure that there is always someone on the ground, who can call for help in case of an emergency.

OPERATING CONDITIONS

The weather conditions, such as wind, visibility and rain, must always be taken into account so that these will not adversely affect the safe performance of the lifting operations.

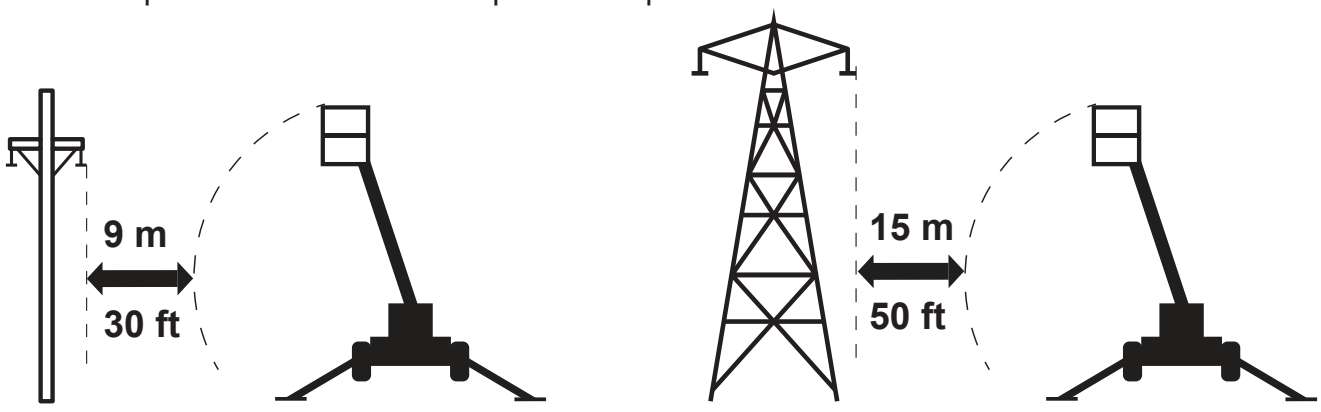
The use of the lift is prohibited, if the temperature drops under -20 °C, the wind speed exceeds 12.5 m/s or it's thundering.

Wind speed (m/s)		Conditions on land
0	Calm	Smoke rises vertically
1-3	Light breeze	Smoke moves with the wind and the wind feels on exposed skin. Leaves rustle.
4-7	Gentle breeze	Leaves and small branches of trees are moving. Flag is flying. Wind lifts dust and loose pieces of paper from the ground.
8-13	Strong breeze	Small broad-leaved trees and large branches sway. Wind whistles as it hits houses or other fixed objects. Umbrella is difficult to use.
14-17	Strong	All the trees are swaying. It is difficult. to walk against the wind.

NOTE! The wind speed can be much higher at a higher altitude than on the ground level.

Do not take tools/material of large surface area onto the platform. The increase in wind load may jeopardize the stability of the device.

Beware of the live aerial power lines in the area! Keep a safe distance from live overhead power lines and other exposed live parts.



Follow these distances if more detailed local instructions and information about the voltage level are not available. Always check local instructions and safe distances with an expert on a site-specific basis. The safe working distance depends on the voltage level of live parts.

This aerial work platform is NOT insulated, and does not offer protection against contact with electric current. The aerial work platform must not be used for work on electric systems.

3.2. SAFETY-RELATED NOTIFICATIONS

The following safety alert symbols and safety signal words are used in this manual.

Observe all the safety instructions that follow these symbols, in order to avoid dangerous situations and personal injuries.



This is a general safety alert symbol and it is used to alert you about a potential hazard. Observe the additional instructions given in form of text or symbols that follow this symbol.

DANGER

Red DANGER-message warns for an imminent or potential hazardous situation which, if not avoided, may result in death or serious injury.

WARNING

Orange WARNING -message is used in connection with potential risk factors, which if not avoided, under certain conditions, may result in death or serious injury.

CAUTION

Yellow CAUTION -message is used to warn about a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

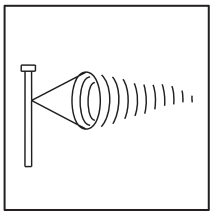
Blue notice-message is used to draw your attention to special notifications or instructions that are related to the operation or maintenance. Such messages include, for example, instructions that are related to reliability of the machine or aim to avoid material losses.


Risk of getting crushed - moving parts

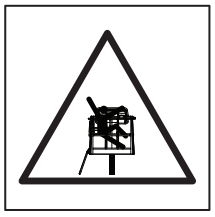

Risk of getting crushed - moving parts


Risk of getting crushed - falling objects


Harmful exhaust gas emissions

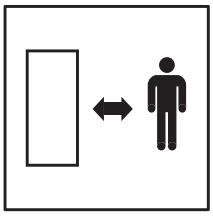

Wind speed

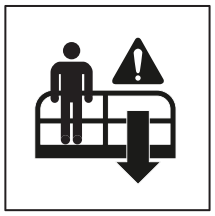

Risk of turning over

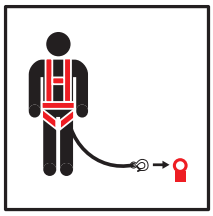

Risk of falling


Support force

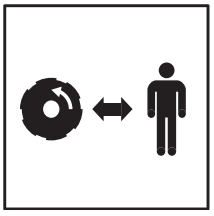

Smoking prohibited

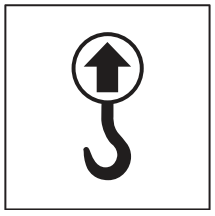

Keep safe distance

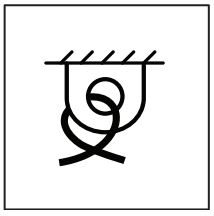

Emergency descent


Fixing point for the falling guard


Open flame prohibited

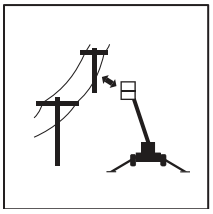

Keep safe distance

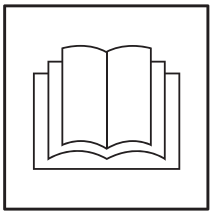

Lifting point

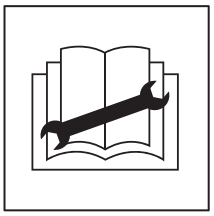

Fixing point

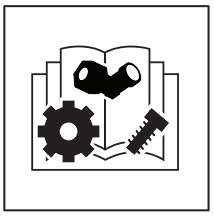


Running the engine indoors prohibited


Keep safe distance to the power lines


Operating instructions

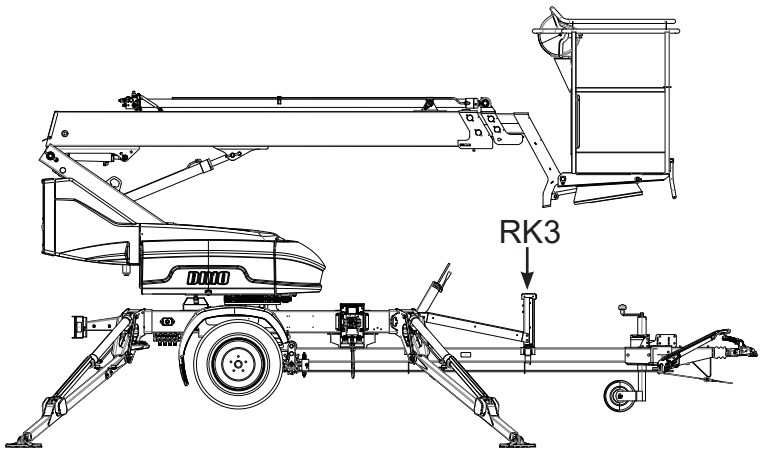

Maintenance instructions


Spare parts catalog

3.3. SAFETY DEVICES

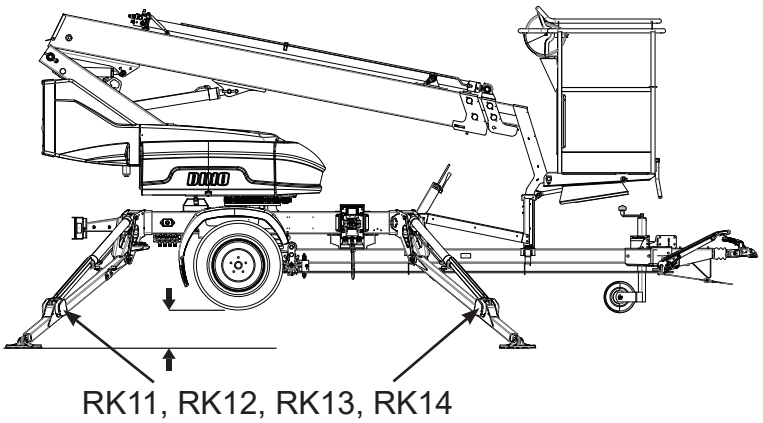
1. Supervision of transport position of the boom

The safety limit switch RK3 prevents the operation of the outriggers and the driving device when the boom is not resting on the transport support. The switch is located on the drawbar at the transport support.



2. Supervision of supporting

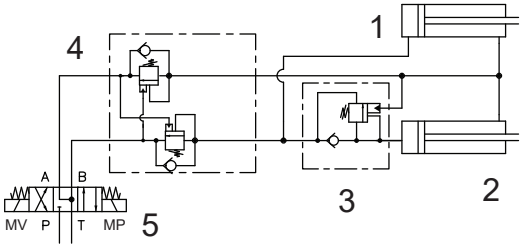
The lift's all support outriggers must be in the support position before the boom is lifted. Make sure that the wheels are off the ground.
The safety limit switches RK11, RK12, RK13 and RK14 are located on the support outriggers.



3. Preventing the inclination of the platform

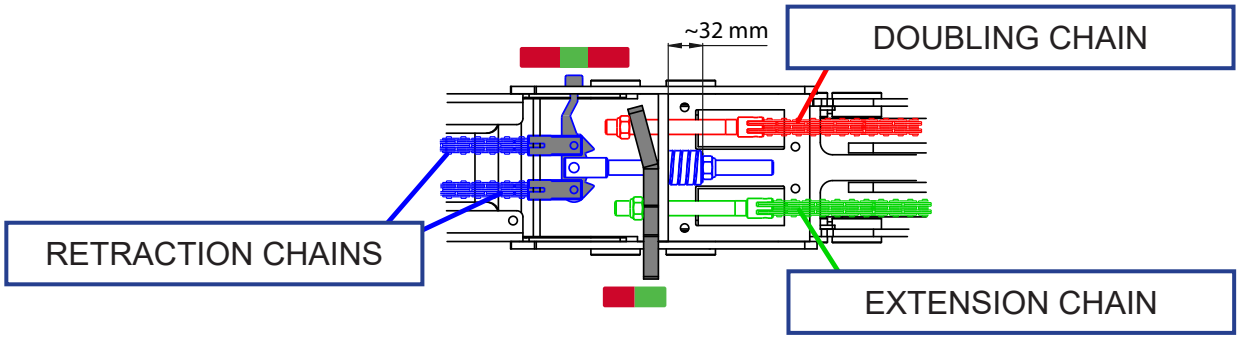
The platform is levelled hydraulically by means of a so-called slave cylinder system, where the master cylinder controls the slave cylinder that inclines the work platform.
The levelling system comprises the following parts:

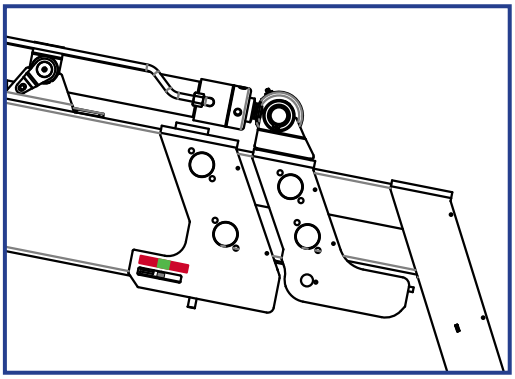
1. Master cylinder
2. Slave cylinder
3. Load regulation valve
4. Double load regulation valve
5. Electric directional valve

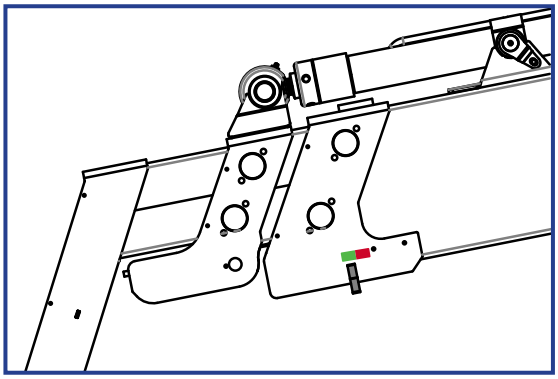


4. Indicator for the telescope chains (120TL-TLB)

The extension and retraction chains for the telescope are doubled. If the load-bearing chain slackens or breaks, the doubling chain prevents the movements of the telescope.







The levers at the top end of the outer boom indicates possible rupture of one of the load bearing chains for the telescope.

If the levers are inside the green area, the chains are intact.

If the lever is inside the red area, one of the chains has ruptured and the telescope must not be used! The chains have to be replaced and the required adjustments carried out before continuing operation.

5. Safety devices for hose rupture

All the load-bearing cylinders are equipped with valves for rupture or leak in the hydraulic system, which prevent the load from falling.

Outrigger cylinders	Lock valves	Prevent the inching of the outriggers in either direction.
Lifting cylinder of the boom	Load regulation valve	Prevents the load from falling
Telescope cylinder	Load regulation valve	Prevents the inching of the telescope in either direction.
Levelling system	Load-holding valves	Prevents the inclination of the platform in either direction.

6. Emergency stop buttons

Pressing the emergency stop button turns off the power unit and prevents normal operation. Emergency stop buttons are located at each control station. Once the button has been pressed, only the emergency descent functions remain operational.

The emergency stop button locks in the lower position, and it must be released before starting the power unit.

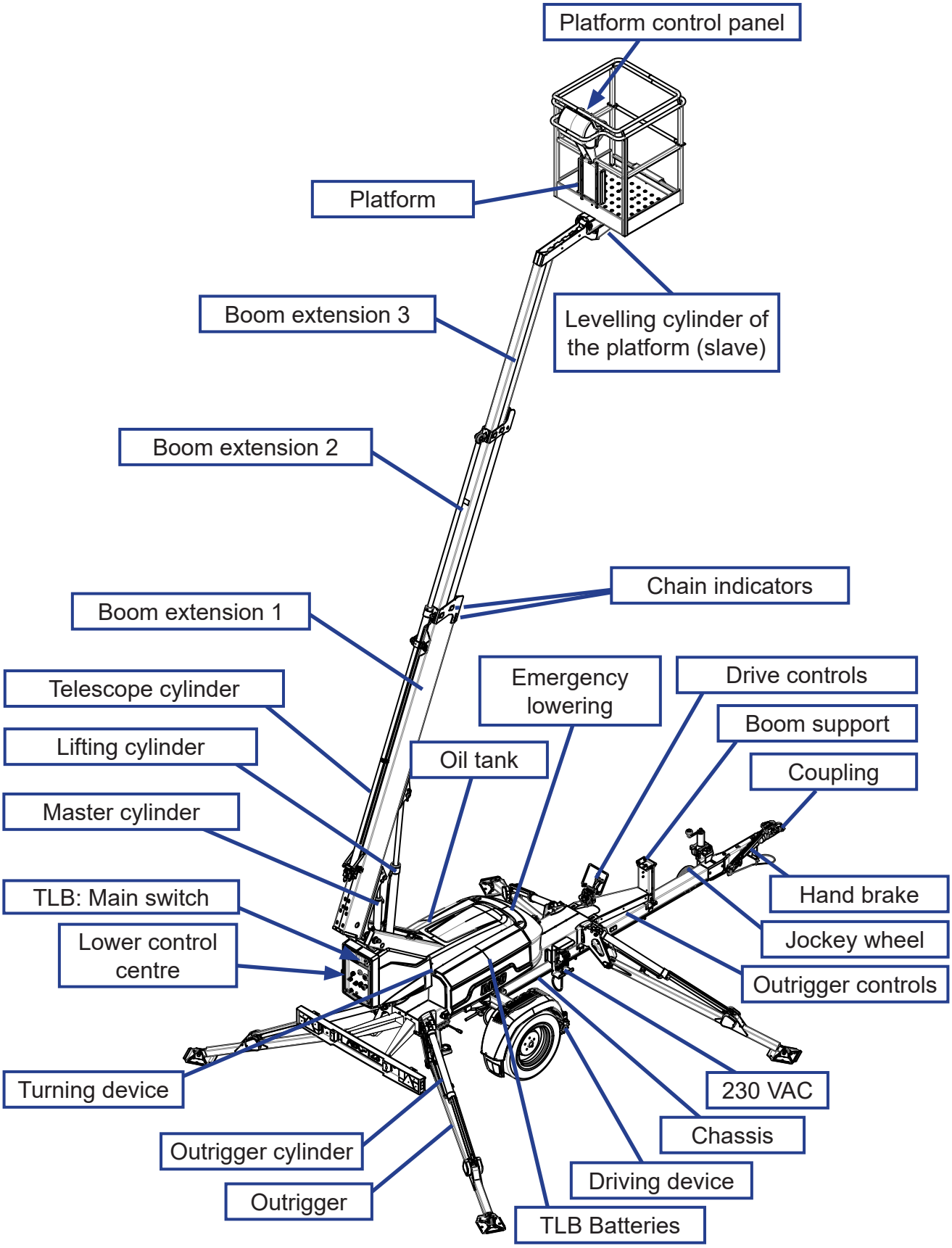
NOTICE

If the unit does not start, make sure that the emergency descent button is not pressed down at any of the control stations.

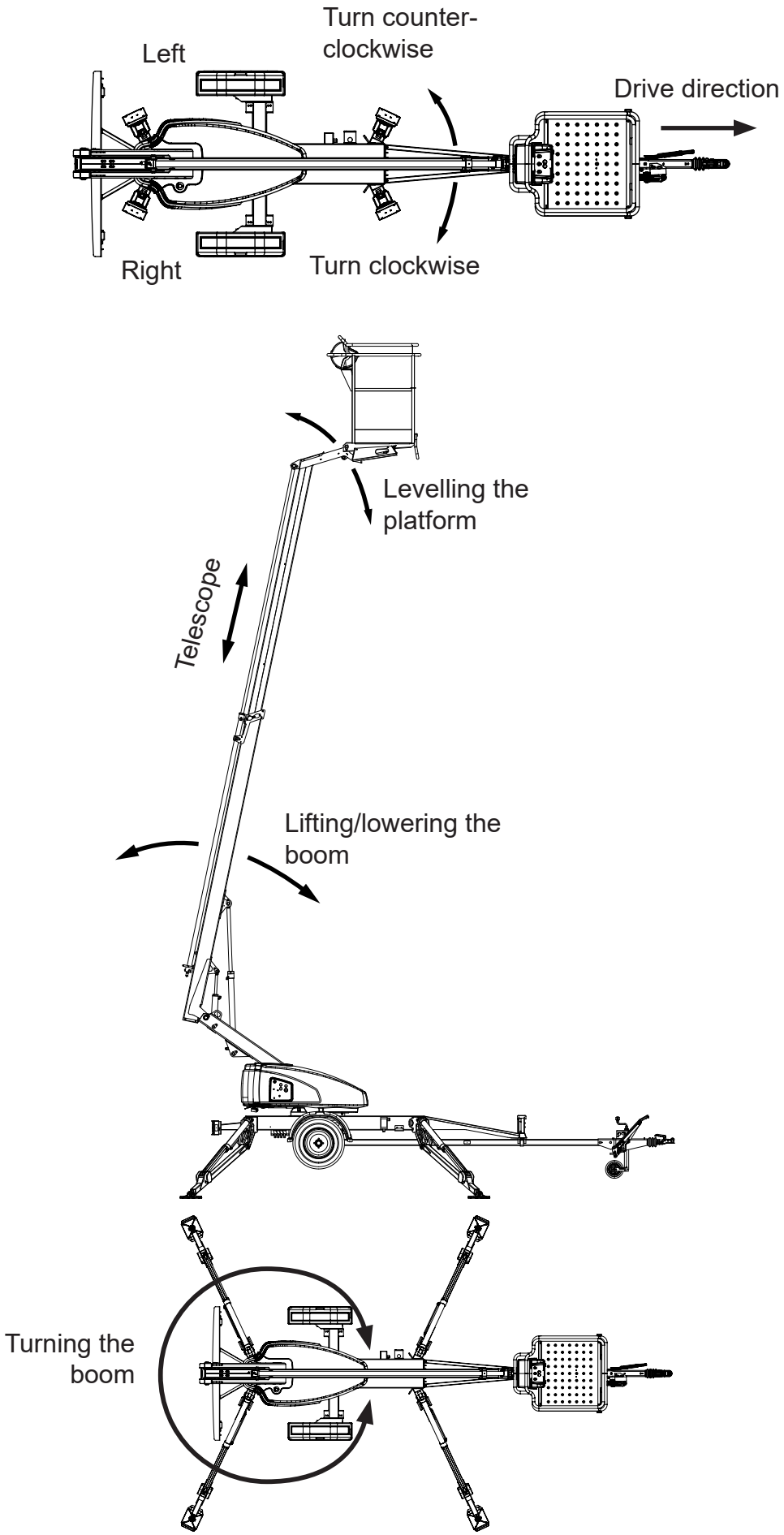
4. BASIC STRUCTURE AND FUNCTIONS

The denominations of the machine's essential parts and concepts, which are used later in these instructions, are described on the following pages.

4.1. STRUCTURE

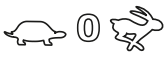


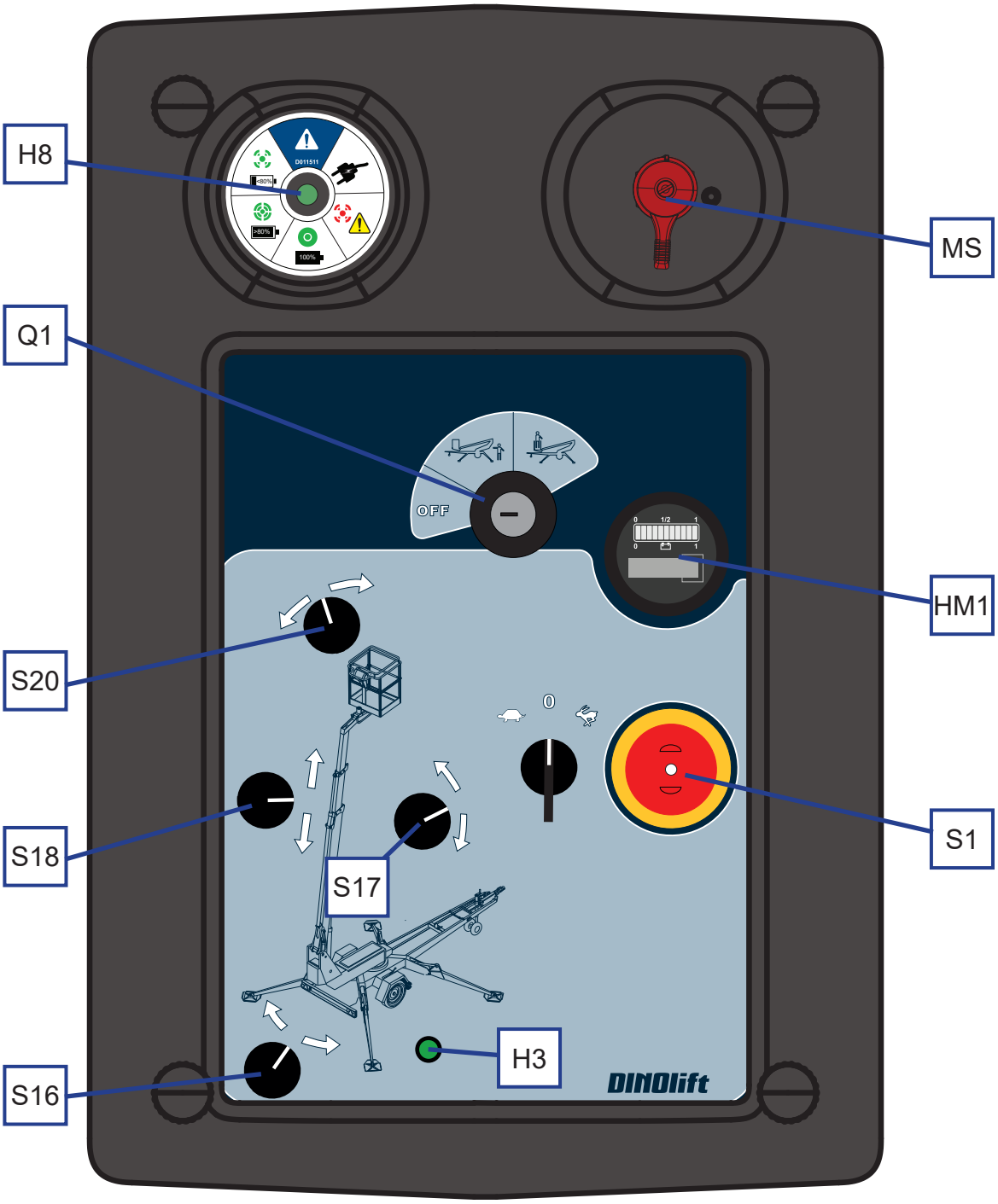
4.2. BASIC FUNCTIONS



4.3. OPERATING CONTROLS

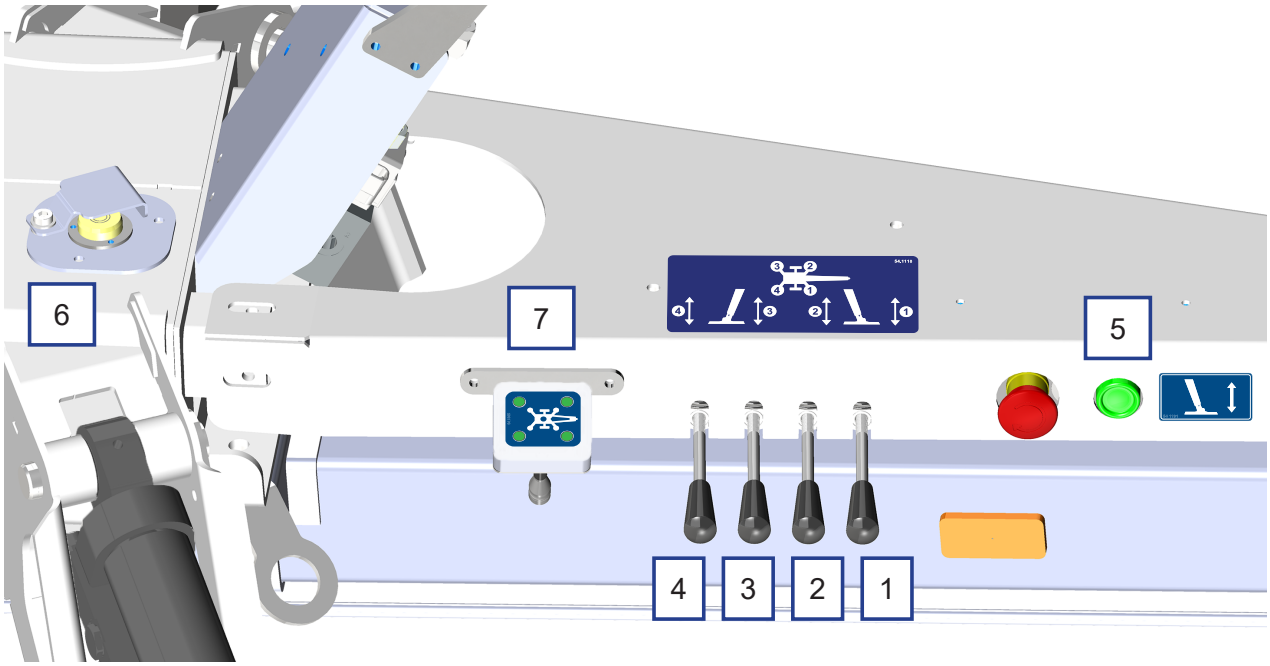
4.3.1. Ground control centre LCB

S1	Emergency stop + signal light	**Signal lights and gauges:**	
MS	Mains switch (120TLB)	H8	LED signal light for charging
Q1	Selector switch	H3	Signal light for the outrigger limit switches
OFF	Power off	HM1	Battery voltage (120TLB) / Hour meter
	Ground control centre (LCB)	**Rocker switches for platform and boom:**	
	Platform control centre (UCB)		Speed selector / activation switch for the movements
		S16	Turning the boom
		S17	Lifting/lowering the boom
		S18	Retracting/extending the telescope
		S20	Levelling the platform



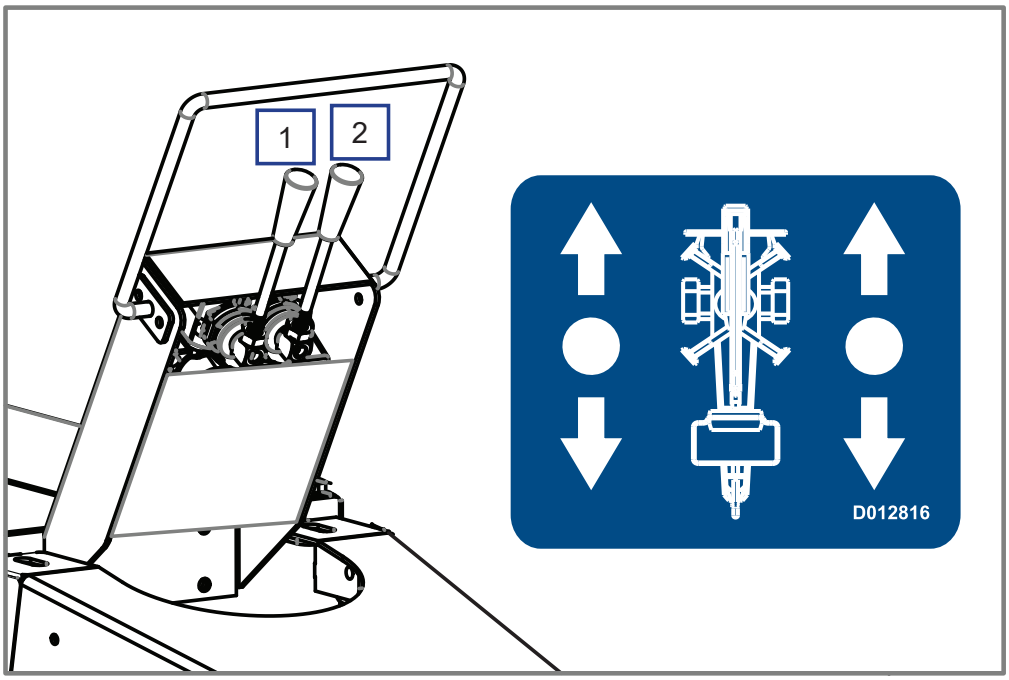
4.3.2. Operating controls for the outriggers

1	Front outrigger, right
2	Front outrigger, left
3	Rear outrigger, left
4	Rear outrigger, right
5	Activation button for outrigger operation / motor start
6	Spirit level
7	Signal lights for the outrigger limit switches (optional)



4.3.3. Operating controls for driving

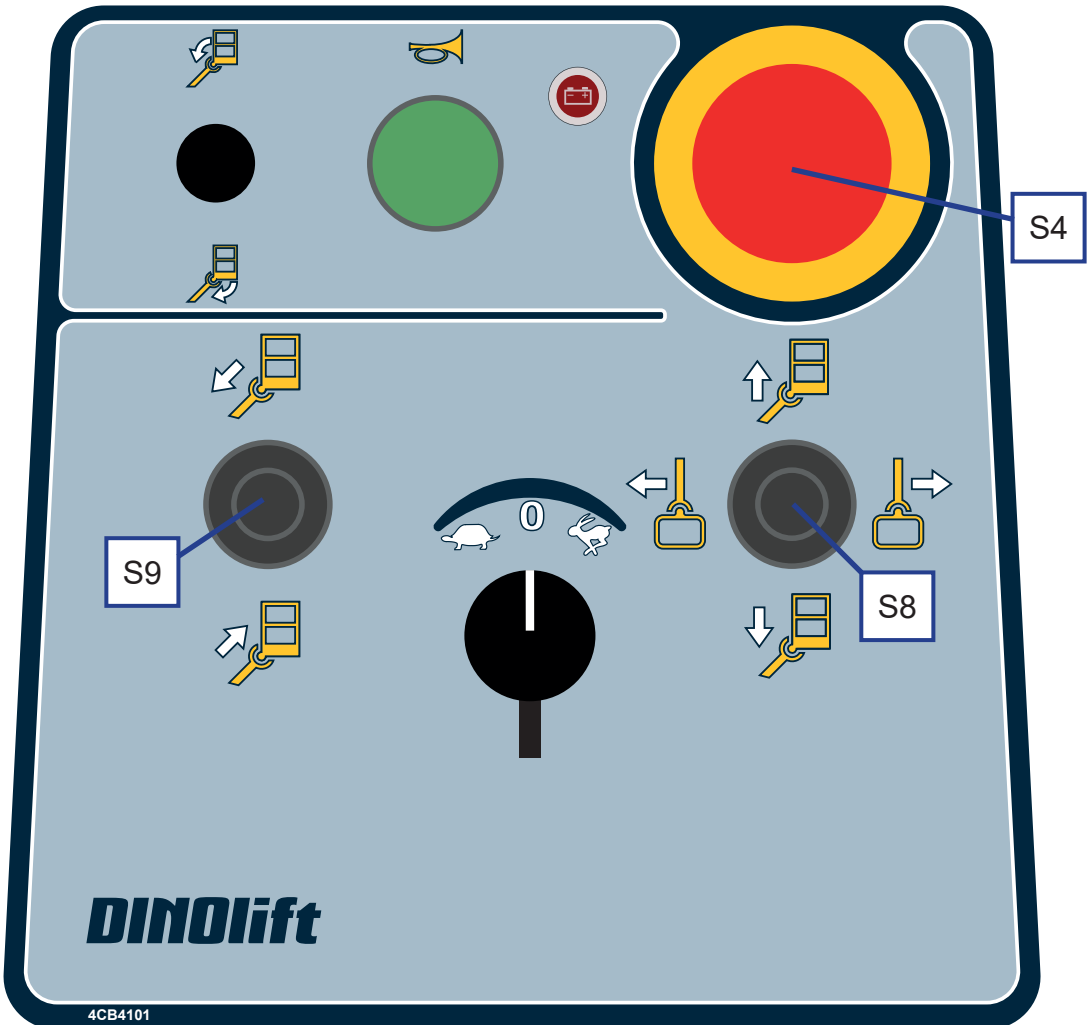
1	Operating the right driving device roller
2	Operating the left driving device roller



4.3.4. Platform control centre UCB

S4	Emergency stop		
	Sound signal		Speed selector / activation switch for the movements
	Lever switch for levelling the platform		TLB: Warning light for low battery charge

S9	Control lever for telescope movement	S8	Control lever for the boom
	Retraction/extension of the telescope		Lifting/lowering of the boom
			Turning of the boom



5. OPERATION

5.1. START-UP

NOTICE

All the regular servicing measures must be carried out before using the lift.

The operator must do a worksite inspection and daily maintenance:

- at the beginning of each workday
- before operating the lift at a new worksite
- when the operator changes in the middle of a workday

5.1.1. Worksite inspection

1. General information
   - Is the lift suited for the intended job?
   - Is the performance of the lift sufficient for the job? (reach, loadability etc.)
   - Is the lighting on the worksite sufficient?
   - Is the position of the lift safe?
   - Is the standing surface free from potholes, pits or too inclined areas?
   - Is the movement area of the outriggers and the boom, as well as the area under the outriggers, free from obstacles, which could cause collision or turn the machine over?
   - Is the terrain suitable for using the lift (evenness and load-bearing capacity)?

Soil material	Density	Max. ground pressure P kg/cm² (N/cm²)
Gravel	High density	6 (59)
	Medium density	4 (39)
	Loose	2 (20)
Sand	High density	5 (49)
	Medium density	3 (29)
	Loose	1.5 (15)
Fine sand	High density	4 (39)
	Medium density	2 (20)
	Loose	1 (10)
Sand/ mud	High density (very hard to work)	1.00 (10)
	Medium density (hard to work)	0.50 (5)
	Loose (easily worked)	0.25 (3)

DANGER

Risk of overturning! If needed, use sufficiently large and sturdy additional plates under the support outriggers. Do not use on soft or unstable ground.

2. Documents
    - Are the Operation and Service Instructions for this lift present?
    - Are inspections and servicing carried out in accordance with the instructions and have the defects affecting the safety been checked as repaired? (Inspection protocols)

3. Operator
    - Is the operator old enough?
    - Has the operator received the required training?
    - Is the operator in a suitable condition to operate the machine? The operator must not be under the influence of alcohol or drugs or be otherwise in a state of reduced physical and mental control.

4. Special issues on the worksite
    - Are there any additional regulations relevant to the worksite or the work?
    - Does the worksite have special hazards (bridge cranes, drop-offs, ATEX-areas, enclosed spaces etc.) to avoid during operation?
    - Is there a need for special marking or fencing of the work area to keep personnel from walking under a raised boom and platform?

5. Condition of the machine
    - Perform all the daily maintenance tasks according to instructions
    - Never use a malfunctioning machine

5.2. INSTRUCTIONS FOR WORKING

5.2.1. Starting up

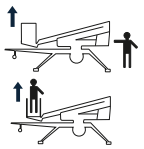
TL: Connect the mains cable to the power supply. The default power supply is is 230 VAC (-10%/ +6%), the frequency 50 Hz, and rating of the fuse 10A (the length of the connecting cable has some effect). Check the correct voltage and frequency from the name plate of the lift.

Maximum extensions cable length in 230 VAC mains electricity: 10 m (1.5 mm^2) or 25 m (2.5 mm^2). For 110 VAC, use half the length or double the cross-sectional area.

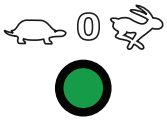
TLB: Switch on the main switch.

ALL MODELS:

1. Turn the selector switch Q1 away from the OFF position.



2. Start the electric motor with the speed selector or with the activation button for outrigger operation



With ground controls selected, the electric motor will stay on after movements are stopped if the boom is on the transport support. The motor can be stopped by turning the selector switch Q1 to OFF or UCB position.
With platform controls selected. the electric motor starts with activation of a movement and stops after the movement is stopped.

5.2.2. Charging (TLB)

When the system is active the meter shows batteries' state of charge (120TLB) and operating hours of the motor.



The state of charge of the batteries can be checked from the battery meter before charging and from the signal light for charging (H8) while charging. If the batteries are not charged to full the lift needs to be used before the battery meter calibrates to the right state of charge initially appearing as a rapidly decreasing state of charge.

Charging starts automatically after connecting the mains cable to the power supply. However, after fully charging, the lift must be disconnected momentarily from the mains before the charger starts to charge again.

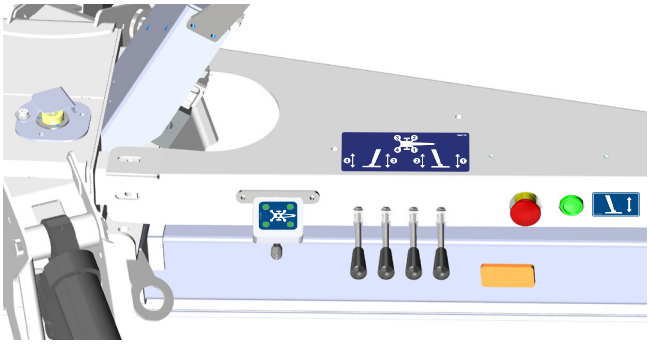
Capacity of the batteries is affected by the operating temperature.
100 % is reached at the temperature of 30 °C, at 0 °C the capacity is 80 % of normal, at -20 °C the capacity is 50 % of normal.

NOTICE

When the charger is connected to mains, the display immediately shows 100 % even if the batteries are not fully charged. You can check the state of charge of the batteries before charging.
Always keep the charger connected for a sufficiently long time irrespective of the readout on the display! The recharger is equipped with overcharge protection.

5.2.3. Supporting the lift

1. Press the activation button for the outrigger operation.
2. Lower the front support outriggers (on the drawbar side).
3. Lower the support outriggers in the rear.

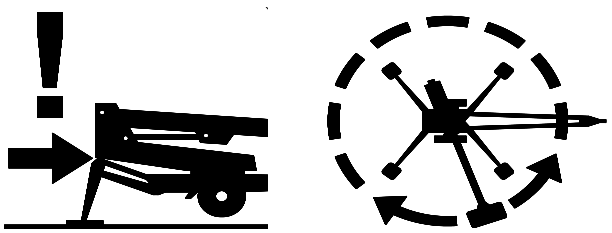


Do not damage the drawbar or jockey wheel! Make sure the wheel stays off the ground during levelling!

4. Level the chassis with the outriggers with the help of the spirit level (6). The air bubble must be located inside the inner ring.
5. Check that the green signal light (H3) in the lower control centre LCB is illuminated. It lights up when all the outriggers are in the support position and the limit switch circuit of the outriggers is closed.

Before operation, check that:
- the chassis is level, using the spirit level
- the wheels are off the ground
- the outriggers are firmly supported on the ground, and the green LED in the lower control centre is illuminated.

DANGER



Risk of tipping over! Using the lift is prohibited unless it is properly supported.
Observe the effect of ice, possible rain and inclination of the surface on the support (the outriggers must not slip on the surface).

Test the stability by turning the boom around loaded but the telescope fully retracted.
If you notice that the chassis inclines during the test, you must not continue the use. Also ensure that the turning device does not collide with obstacles or outriggers due uneven ground.

WARNING

Carry out all the daily maintenance routines and inspections in accordance with the maintenance instructions before operating the lift. **Failure to check the safety devices may cause a serious injury or make the consequences of an accident worse.**

All faults in safety devices or emergency lowering system must be repaired before operating the lift.

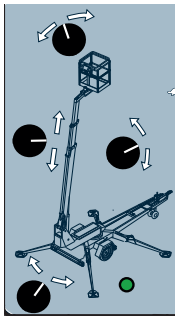
5.2.4. Operating the boom from the ground control centre



1. Turn the selector switch Q1 to the position LCB – ground control centre.



2. Select the movement speed using the speed selector switch. Selecting the movement speed starts the electric motor.



3. Drive the boom using the controls in the ground control centre:

   - extending and retracting the telescope
   - lifting and lowering the boom
   - turning the boom

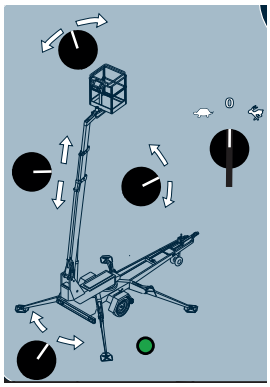
   The movement will stop as soon as the speed selector switch or the selector switch for the movement is released.

4. Before starting the operation, lift the platform from the drawbar and turn it to the side. Extend the telescope and lower the boom closer to the ground for easy entry.

Do not damage the drawbar or jockey wheel! Make sure the boom doesn't collide with the boom support, drawbar jockey wheel or the hand brake lever.

Adjusting the levelling of the platform from the ground control centre:

The levelling system of the platform will automatically keep the platform level during the movements. The position can be corrected if necessary.



The position of the platform may be adjusted from the ground control panel:

1. Turn the speed selector switch.
2. Select the direction of the correction movement using the control lever (S20).

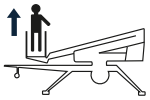
5.2.5. Operating the boom from the platform control centre

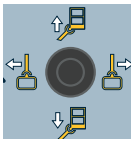
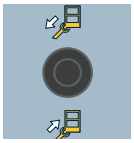
DANGER

Risk of falling! Wear a safety harness while on the platform, and fix it to the point marked for them.
Check that the gate of the platform remains closed during operation.



1. Turn the selector switch to the position ”Platform control centre UCB”, and remove the key. The motor stops when UCB controls are selected.
2. Step onto the platform and fix the safety harness to the attachment point.
3. Operate the movements of the boom and the platform as follows:



	Select the movement speed using the speed selector switch. Selecting the movement speed will start the motor automatically.
	Operate the boom using the right control lever. Whenever possible, keep the boom short while lifting and lowering the platform.
	Operate the telescope using the left control lever.
	If necessary, correct the position of the work platform.
Note! The movements of the boom and the platform will stop as soon as the speed selector switch or the selector switch for the movement is released. Once the speed selector switch is released, the electric motor will stop after a delay of 3 seconds. Selecting the movement speed will start the motor automatically.	

4. With the boom slightly lifted and the telescope extended, make sure that the platform does not lower by itself while the operating controls are not being used.
5. Drive the platform to the work location.

DANGER

Risk of tipping over! Do not overload the machine.
It is strictly prohibited to take additional load in the upper position.
Do not exceed the allowed manual force (200N), or load the platform more than allowed.



When moving the platform, remember the following

- beware of high voltage power lines
- do not touch open electric wires
- do not throw objects from the platform
- do not damage the lift
- do not damage other devices

WARNING

Crushing hazard! Keep a safe distance to the moving parts of the lift and to buildings and other obstructions around the lift. Hands and legs must be kept inside the work platform while the platform is moving. Beware of any obstacles above the platform.

WARNING

Crushing hazard! Monitor the chain indicators for the flyer chain during operation. If the indicators show that there may be a problem with the chains, do not operate the boom system.

IF THE SAFETY DEVICES OR THE EMERGENCY DESCENT SYSTEM ARE NOT WORKING, HAVE THEM REPAIRED BEFORE OPERATING THE LIFT.

If several control levers are operated simultaneously, only the movement with the least resistance will operate.

Working in the same position for a long time

- Check the stability and condition of the base regularly during the operation, taking into account the weather and ground conditions.

Lowering the platform to transport position

- Always retract the telescope completely before lowering the boom onto the transport support.

NOTICE

Do not damage the drawbar jockey wheel while lowering the platform to the transport position!

When leaving the lift

- Drive the lift to a safe position, preferably to the transport position.
- Switch off the power unit.

5.2.6. Measures to be taken at the end of the working day

At the end of the workday:
1. Retract the telescopic boom fully.
2. Lower the boom/platform onto the support on the drawbar. The limit switch on the transport support prevents the operation of the support outriggers if the platform is not down.
3. Close the control centre cover on the work platform.
4. Turn the selector switch to position OFF, and turn off the main switch.
5. If you want to recharge the battery (TLB), leave the mains cable connected; otherwise disconnect the lift from the mains supply
6. Make sure that the covers are locked.

NOTICE

To ensure proper operation and long service life of the batteries, it is recommended to always recharge them at the end of each workday, even though there was still plenty of charge left. Storing the batteries flat shortens their service life, and flat batteries also freeze easily.

5.2.7. Special instructions for cold weather operation

The lowest allowed operating temperature of the lift is -20 °C

In cold conditions, carry out the following special actions in addition to the normal start-up procedure:
1. Let the power pack run for a few minutes before starting the movements.
2. To ensure the proper operation of the valves, do first a few warm-up movements to change warm oil in the cylinders.
3. Check that the limit switches and the emergency descent devices are operational and clean (from dirt, snow, ice, etc.).
4. Repeat the warm-up movements regularly during working in the same position for a long time
5. Protect the control centre and the platform from snow and ice when the lift is not in use.
6. TLB: Take care of the battery charge. Cold weather weakens the battery capacity significantly and exposes partially charged battery to the risk of failure due to freezing.



Always keep the lift free from dirt, snow, ice, salt, etc. Accumulation of grit may cause malfunctions, paint damage, corrosion and excessive wear of components and structures.

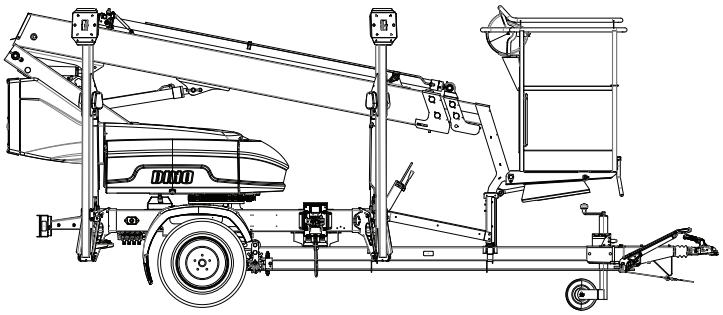
5.3. TRANSFERRING THE LIFT

The lift can be transfered by towing or using its own driving device.

The lift may only be moved in the transport position. No persons or load are allowed on the platform during the transportation.

5.3.1. Preparing the lift for transport

During transfer, the lift must always be in the transport position.



Prepare the lift for the transfer as follows:

1. Retract the telescopic boom fully.
2. Lower the boom/platform onto the support on the drawbar. The limit switch on the transport support prevents the operation of the support outriggers if the platform is not down.
3. Close the control centre cover on the work platform.
4. Lift the support outriggers.
   Lift the rear support outriggers first (do not damage the rear lights), and then the front support outriggers (do not damage the jockey wheel).
5. Make sure that the covers are locked and all tools and materials are removed from the platform.

WARNING

Rollaway risk! Before lifting the outriggers, make sure the machine can not roll away. Prevent movement using the handbrake and wheel chocks.

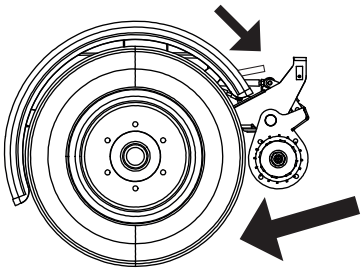
5.3.2. Using the driving device

The hydraulic driving device is intended for moving the lift within the work area if the towing vehicle cannot be used.

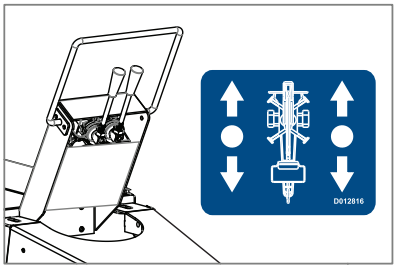
During transfer in rough terrain, always try to position yourself higher than the machine – especially when the axle is in the narrow position.



1. Turn the selector switch Q1 to position “LCB”.
2. Start the electric motor by turning the speed selector
3. Make sure that the platform is in the transport position and the outriggers are lifted in the upper position



4. Make sure that the mains cable is long enough to cover the whole travel distance – or that the cable has been disconnected (TLB).
5. Turn the driving device to the drive position on both sides.
6. Release the parking brake



7. Use the control levers on the chassis to drive the machine. Each drive roller can be controlled separately with the levers.

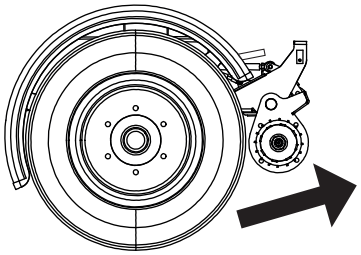
WARNING

Risk of sudden movements! Do not drive the jockey wheel into obstacles or potholes. If one of the wheels bumps into an obstacle, the lift may turn abruptly.

WARNING

Risk of tipping over! Use the axle in the narrow transport position only on flat surfaces and only when necessary. This position reduces the lift’s stability during transfer.

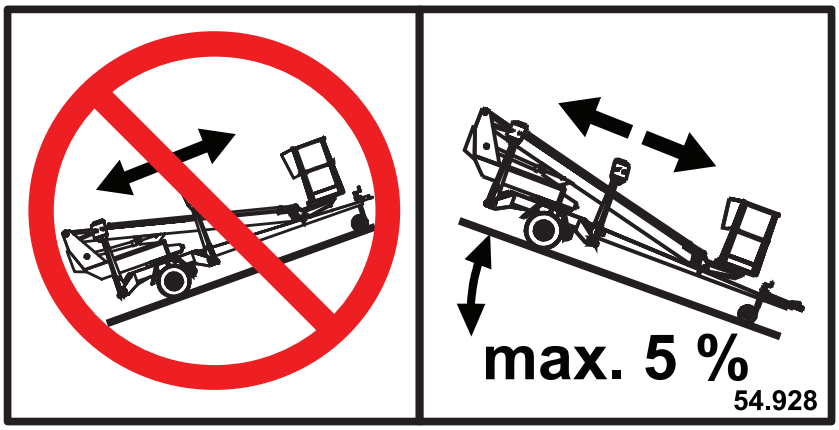
After the driving:
- Apply the parking brake.
- Disconnect the driving device from the tyres.



NOTICE

Be careful not to damage the jockey wheel tube by extending it too much.
When moving the lift using the driving device, a suitable length for the jockey wheel's stem can be achieved by adjusting the gap between the lower surface of the drawbar/brake rod and the wheel to 1-3 cm. Then the wheel may turn freely.

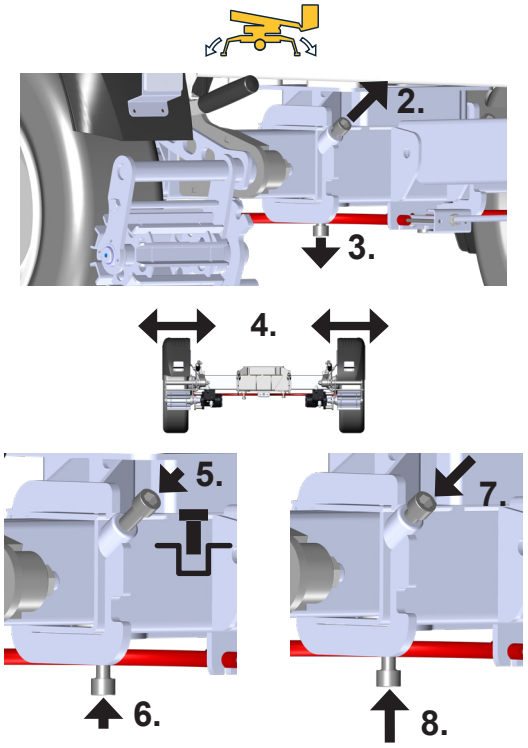
On a slope:
1. When driving on a slope, the drawbar must always point towards the descent. Never drive with the driving device with the drawbar pointing towards the ascent.
2. Always place chocks under the wheels before disconnecting the device from the towing vehicle.
3. Always apply the handbrake before disconnecting the lift from the towing vehicle.
4. Only use the handbrake as a parking brake or for emergency stopping.
5. When transferring the lift using the driving device:
   - take care not to allow the wheel to roll over your foot
   - look out for sudden sideways movements of the drawbar
   - be careful not to cause danger to other people and the environment
6. Do not move the device on a slope using only hand-power. You may lose control over it and cause an injury.
7. Never park a vehicle combination on a slope.
   Never leave the lift on a slope being supported only by the self-braking action of the driving device.



Do not drive downhill with the driving device, if the inclination of the surface is more than 5 per cent, (corresponding to a descent of 0.5 m over a distance of 10 m). If the gradient of the surface is greater than this, you may lose control of the device.

5.3.3. Adjusting the width of the axle (option)

1. Raise the lift onto its support legs.
2. Open the indexing bolt on top of the axle.
3. Loosen the clamping bolt underneath the axle.
4. Adjust the axle width so that the locking bolt aligns with its slot.
5. Turn the locking bolt just enough to secure the width adjustment.
6. Turn the clamping bolt to eliminate play, but do not tighten it yet.
7. Tighten the locking bolt.
8. Tighten the clamping bolt.



5.3.4. Towing the lift

Always ensure before towing:

- the axle is locked in the wide position if it is adjustable (option)
- transport position of the outriggers
- condition and pressure of the tyres The correct pressure ratings are marked on the tyres.
- that there is no load on the platform and all covers are closed and locked.

WARNING

Risk of tipping over! Never tow the lift with the axle in the narrow transport position.

Connecting to the towing vehicle

1. Lift up and push forward (in the driving direction) the handle of the ball-coupling. Now the ball-coupling is released.
2. Press the ball-coupling onto the towball using only a little force. The connection locks automatically.

Always make sure after connecting that the ball-coupling is properly locked.

3. Connect the emergency brake cables and light plug to the vehicle. Check the light cable for chafing and proper operation of the brake cables.
4. Check the operation of the lights.
5. Carefully release the parking brake and make sure that its locking is in order and that its handle stays in the lower position.
6. Disconnect the driving device on both sides
7. Lift up the jockey wheel to the transport position. Tighten carefully.

Clean and lubricate the ball-coupling and adjust the brakes regularly according to the service instructions.

NOTICE

Observe the national traffic regulations, the local and worksite-specific instructions, as well as the instructions concerning the towing vehicle.

WARNING

Risk of tipping over! Drive at an appropriate speed in turns, considering the lift's high center of gravity.



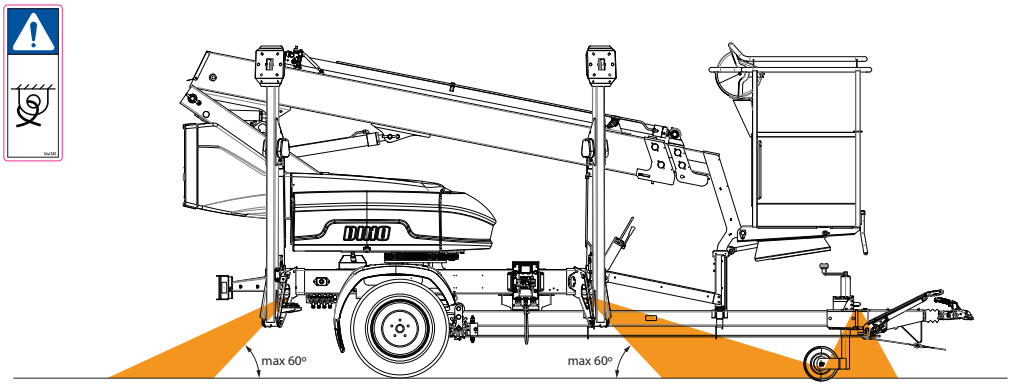
After towing

1. Apply the parking brake as firmly as possible
2. Lower the jockey wheel. Tighten carefully.
3. Disconnect the ball-coupling, light plug and brake cable from the vehicle
4. Place chocks under the wheels as an additional precaution.

Always check locking of the brakes after transportation. Use chocks under the wheels when disconnecting the lift from the car.

5.3.5. Tying down

If the lift is transported by other means than towing, it must be tied down at the marked points for the transport. The tying points are symmetrically located on either side of the lift.

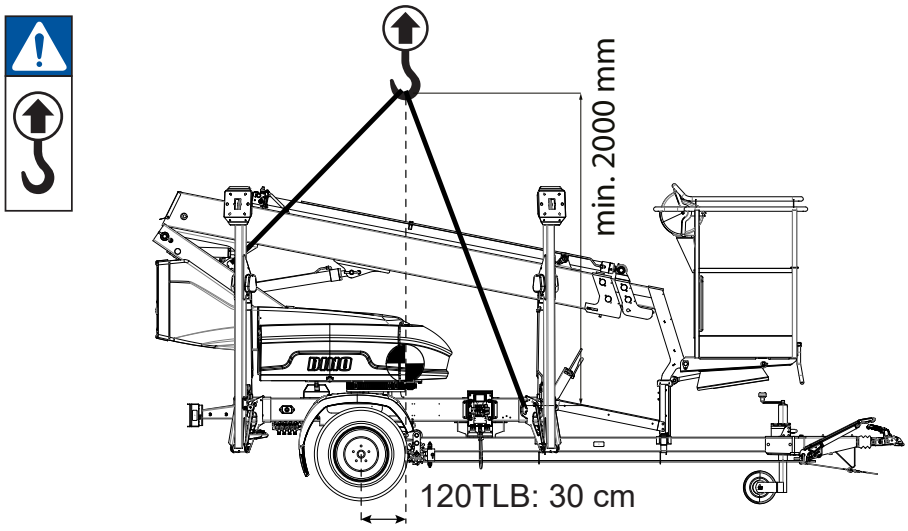


CAUTION

Risk of falling! Tie down the lift to the vehicle for the transport. The chassis of the lift is fitted with specific, marked lugs for tying. To avoid structural damage, use only the marked tying points.

5.3.6. Lifting the device

The device can be lifted using the lugs shown in the picture. The lifting lugs are located symmetrically on both sides of the lift.



During lifting the aerial work platform must be in the transport position. Remove all loose material from the top of the frame structures and the work platform before lifting.
Use for lifting a suitable crane with sufficient capacity and relevant accessories. Check the weight of the lift in the technical specifications.

Be careful not to damage the device during the lifting operation.

5.4. LONG-TERM STORAGE

Clean the machine carefully, lubricate it and apply protective grease to it before putting it into storage for a longer period of time (see point “Lubrication plan”). Repeat the cleaning and lubrication procedures when you resume the operation.

TLB: Make sure to maintain the charge of the batteries during storage to minimize degradation and prevent battery failure. Maintaining the charge is especially important during cold storage to prevent battery failure due to freezing. It is sufficient to connect the lift to the mains electricity for a few hours once a month.

NOTICE

If you leave the lift standing for a longer period of time, for example over the winter, we recommend propping it up to release any load from the wheels.

The periodic inspections must be executed following the steps described in the instructions.

6. IN CASE OF EMERGENCY

6.1. WHEN AT RISK OF LOSING STABILITY

Reduced stability can be caused by a fault in the lift, the wind or other lateral force, collapse of the standing base or negligence in providing sufficient support. In most cases one sign of reduced stability is the inclination of the lift.



1. If there is time, try to find out the reason for the reduced stability and the direction of its effect. Warn other people on the worksite using the alarm signal.
2. If possible, reduce the load from the platform in a safe manner.



3. Reduce the outreach to the side by retracting the telescope. Avoid abrupt movements.
4. Turn the boom away from the danger zone, i.e. to a position where the stability of the lift is normal.
5. Lower the boom.

If the stability has been lost as a result of a fault in the lift, repair such a fault immediately.



Do not use the lift until the fault has been repaired and the condition of the lift has been verified.

6.2. IN CASE THE OPERATOR IS INCAPACITATED ON THE PLATFORM

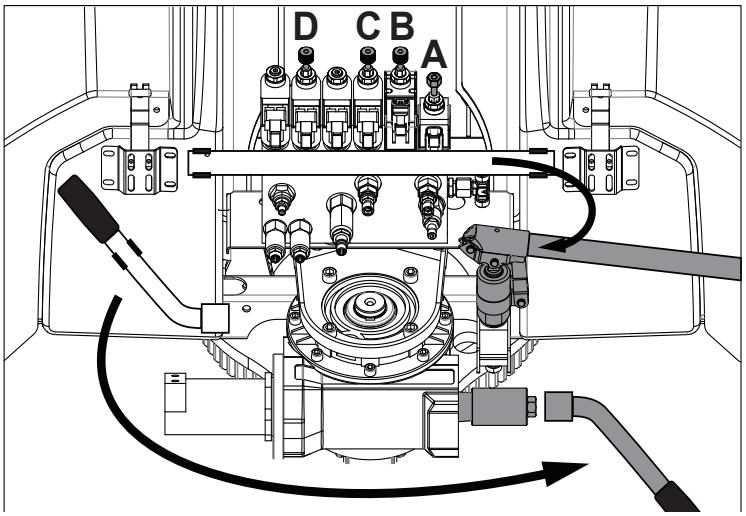
If the emergency stop haven't been activated on the platform and the key for the selector switch is available then the lift can be operated from the lower control centre (LCB).

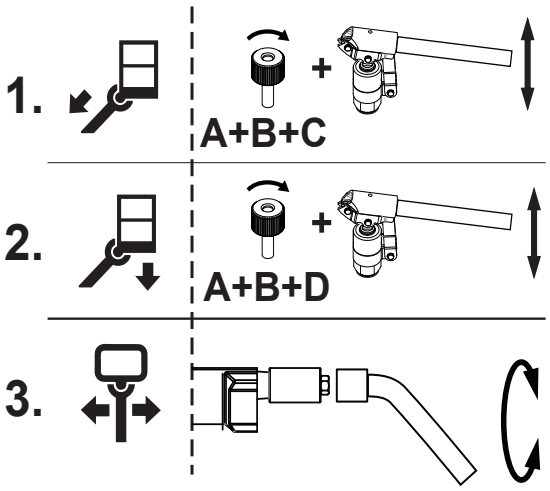
Otherwise refer to "6.3. In case the power supply is interrupted".

6.3. IN CASE THE POWER SUPPLY IS INTERRUPTED

As a precaution against power failure or other malfunction of energy supply, the lift is equipped with a manually operated emergency descent system.
The emergency descent system is located under the front and top covers of the turning device. The front cover is opened by releasing the locking mechanism at the bottom on both sides. The top cover is removed by opening its fastening at the rear end and sliding the cover forward.

Always check the condition of the emergency descent system before starting to use the lift.

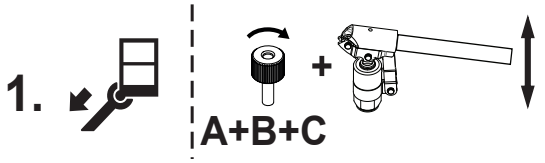




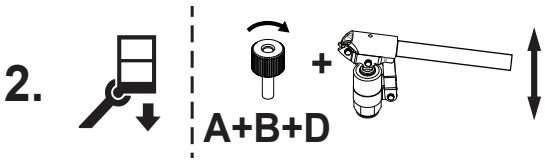
The emergency descent system can only be operated from the ground. If you are on the platform, call for help to operate the system.
NOTE Start by retracting the telescope completely, after that, lower the boom and turn the boom system.

Operation:

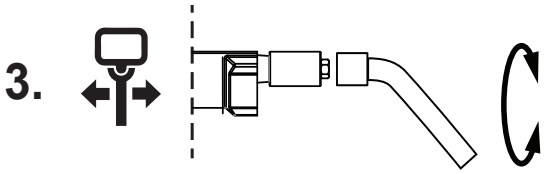
1. Retracting the telescope
- Turn the finger screws A, B and C all the way down clockwise.
- Using the hand pump, retract the telescope completely.
- Turn the screws fully open counter-clockwise after the pumping.



2. Lowering the boom
- Turn the finger screws A, B and D all the way down clockwise.
- Using the hand pump, retract the telescope completely.
- Turn the screws fully open counter-clockwise after the pumping.



4. Turning of the boom
To turn the boom, place the crank on the worm gear shaft. Turn the crank gently in the desired direction.



6.4. IN CASE OF MALFUNCTION, WHEN EVEN THE EMERGENCY DESCENT SYSTEM IS NOT OPERATIONAL

If not even the emergency system is working, try to warn other personnel present on the site or call for more help. When help arrives, try to
- restore the power supply required for normal operation of the lift
- resume the lift's normal operation by other means
- rescue the person on the platform by other means

7. INSTRUCTIONS FOR FAULT-FINDING

FAULT	REMEDY

1. The electric motor does not start if any of the movements is activated.

Main switch has been turned off.	Switch on the main switch located in LCB control centre.
The correct operating location has not been selected.	Select the correct operating location using the key switch Q1.
Emergency stop button in one control centre is pressed down.	Check that the buttons are pulled up and check that the light in LCB control emergency stop button illuminates. Re-start the motor using the speed selector switch.

2. TLB: Movements “boom up” and “telescope out” are not operational, even though the electric motor starts normally when other movements are being actuated.

Low battery voltage, lifting movements are impeded.	Recharge the batteries by connecting the mains cable.

7.1. OPERATIONAL PROBLEMS RELATED TO THE MOVEMENTS

FAULT	REMEDY

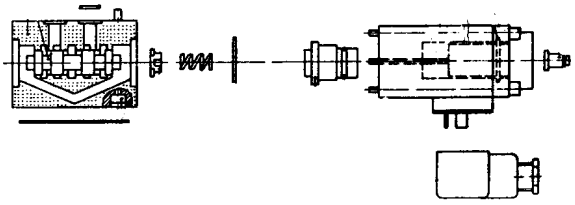
6. None of the platform movements is operational, although the electric motor is running and the selector switch is in the correct position (operation from the ground control centre or the platform control centre)

Green signal light for the outriggers is not illuminated. Limit switches for the outriggers have not closed.	Make sure that all the outriggers are steady supported on the ground.
	Check the operation of the outrigger limit switches RK11, RK12, RK13 and RK14.
The green signal light for the outrigger limit switches is illuminated, but the boom movements do not operate.	Check the operation of the safety relay SR2 for the outrigger circuit.
The lift has been overloaded, indicated by the illuminated red signal light.	Retract the telescope until the platform returns inside its operating range (the green light in the platform control centre lights up). 
The Safeguard (option) prevents the operation from the platform control centre.	Return the magnet of the Safeguard to its counter-piece.

7. Outriggers do not move

Boom is not resting on the transport support.	Drive the boom onto the transport support.
If the machine is equipped with remote control of the driving device: the emergency stop button on the remote control is pressed.	Release the emergency stop button
XTD: The selector switch (Q1) is in the wrong position.	Turn the selector switch to the correct position.
The limit switch on the boom support has not closed.	Drive the boom onto the transport support and check the operation of the limit switch RK3.
Electric valve for movement of boom/outriggers does not operate (jams in the centre position).	For remedy, refer to item 8.

8. Malfunctions of platform movements – only one of the movements can be operated

Irregular and indefinite malfunctions. 	Make sure that the hydraulic oil and the filter have been changed. Thoroughly clean the solenoid valve spools and housings (requires utmost cleanliness – particles, that cause malfunctions, cannot possibly be spotted with the naked eye). Also temporary contact failures in the joysticks may cause malfunctions. Spray with moisture repellent.
Lifting and lowering of the boom and the extension of the telescope are not operational, the red light is illuminated on the platform and in the ground control centre, and the buzzer is audible.	The boom has been overloaded; retract the telescope and retry the operation (automatic reset).

FAULT	REMEDY

9. Some of the boom movements is not operational

	Refer to item 8. Electric valve is open. Remedy as instructed above in conjunction with the seizure of the electric valve spool.
Activation of, for example, lifting of the boom, activates some other movement.	Some of the solenoid valves for the boom movements is jammed in the open-position. Wash carefully the spool and the housing.

10. Telescopic movement does not operate

	Refer to item 8. Ensure that the solenoid valve for the telescope is not stuck in the centre (open) position.

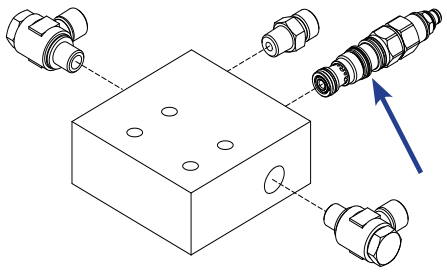
12. Too fast or slow movements

The boom movements are either too fast or too slow	Check the setting of the movement speeds according to the instructions.

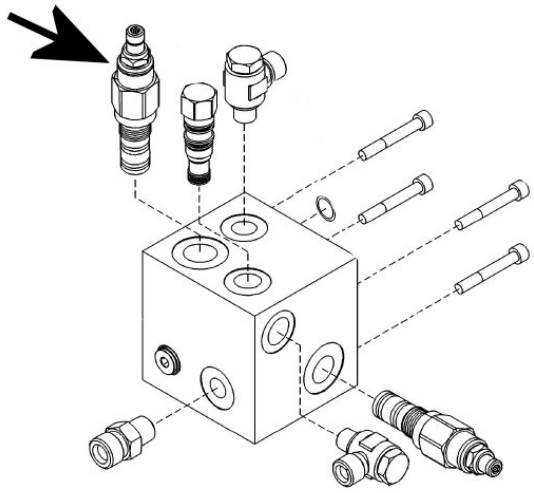
7.2. DRIFTING OF THE BOOM OR OUTRIGGERS

FAULT	REMEDY

13. Boom drifts slowly downward

Load regulation valve is leaking. 	Remove and clean the valve. Check the condition of the o-rings. Install the valve carefully – the correct tightening torque is 60 Nm. If necessary, replace the valve.

14. Telescopic movement drifts slowly inward

Load regulation valve is leaking. 	For remedy, refer to item 13.

FAULT	REMEDY

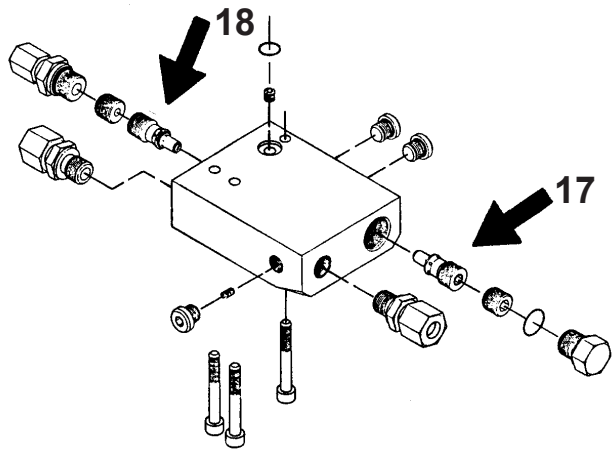
15. Platform drifts backward

Double load regulation valve on the bottom side is leaking.	For remedy, refer to item 13.
Load regulation valve under the platform is leaking.	For remedy, refer to item 13.

16. Platform drifts forward

Double load regulation valve on the rod-side is leaking.	For remedy, refer to item 13.

17. Outrigger does not stay in the support position

Load regulation valve on the bottom-side is leaking.	For remedy, refer to item 13 (lock valve). Tightening torque 55 Nm.
	

18. Outrigger does not stay in the transport position

Load regulation valve on the rod-side is leaking.	Measures as above.

19. Driving device is not operational, although the selector switch is in the correct position

Boom is not resting on the transport support.	Drive the boom onto the support.
If the machine is equipped with remote control of the driving device: the emergency stop button on the remote control is depressed.	Release the emergency stop button.
Electric valve for movement of boom/outriggers does not operate (jams in the centre position).	For remedy, refer to item 7.
TL/TLB: Electric motor is not running.	The electric motor needs to be started by using the selector switch in the LCB controls.

7.3. PROBLEMS RELATED TO TOWING

FAULT	REMEDY
19. Braking force is too low	
Too much play in the brake system.	Adjust the brake system.
Brake linings not yet run-in.	Pull the parking brake lever slightly and drive 2-3 kilometres.
Brake-shoes "glazed", dirty or oil on the friction surfaces.	Replace the brake-shoe sets. Clean the friction surfaces of the brake drum.
Overrun brake jams.	Lubricate the overrun.
Brake rod jammed or bent.	Repair.
Brake wires rusty or cracked.	Replace the wires.
20. Uneven and jerky braking	
Too much play in the brake system.	Adjust the brake system.
Shock absorber of the overrun device faulty.	Replace the shock absorber.
Reverse automatics – brake-shoe jams in the carrier.	Replace the brake-shoe in the carrier.
21. The brakes drag (only one of the wheels brakes)	
Brake units wrongly adjusted.	Readjust the brake units according to the instructions. Also refer to point 20 for possible cause.
22. The lift brakes when throttling down	
Shock absorber of the overrun device faulty.	Replace the shock absorber.
23. Reversing forced or impossible	
Brakes have been adjusted too tight.	Adjust the brake system.

FAULT	REMEDY

24. Wheel brakes overheat

Brake system wrongly adjusted.	Adjust the brake system.
Wheel brake dirty.	Clean the wheel brake.
Overrun brake – the transmission rod of the overrun jams.	Remove, clean and lubricate the transmission rod.
Parking brake not completely released.	Release the parking brake completely.

25. Ball-coupling is not locked

Inner parts of the ball-coupling dirty.	Clean and lubricate the inner parts of the ball-coupling.
Tow-ball of the towing vehicle too large.	Measure the tow-ball. According to DIN74058, the diameter of the ball must be max. 50 mm and min. 49.5 mm. If the measure is different or the ball is not perfectly spherical, replace the ball.

Always, when changing brake-shoes, replace all the shoes on the axle.
Always, when assembling the brakes, make sure to install the springs, the brake-shoes and the expander in the right way.
When adjusting the brakes, turn the wheels forward (in the driving direction)!

There are many possible reasons for malfunctions, but the following are the most common:

- low supply voltage (long and thin supply cable)
- the battery is flat (low voltage)
- contaminants in the hydraulic system
- loose electric connection or a contact failure caused by moisture

Keep the lift clean and protect it against moisture.

8. TO THE MAINTENANCE PERSONNEL

This maintenance instruction manual is intended to give the qualified service person, who is familiar with the basic structure of the lift, the required instructions for maintenance, adjustments and repairs of the lift.

These maintenance instructions are an addition to the operating instructions. It is essential, that the person, responsible for the maintenance, has familiarised himself with the operating and safety instructions of the lift before starting the service operations.

DANGER

Perform all the service and repair operations in accordance with the local regulations for occupational safety.

Exercise particular caution while performing service- and maintenance operations. A faulty machine may cause severe, unforeseen risks.
If you are not sure which parts, tools or measures are necessary, consult your dealer or the manufacturer's service organisation.

Dinolift Oy is constantly developing its products. For this reason, the contents of this manual might not always be in full compliance with the most recent version of the product. Dinolift Oy reserves the right to modify the product without prior notice. Dinolift Oy assumes no liability for any problems caused by changed or missing data or mistakes in this manual.

Please consult your dealer or the manufacturer for more information and detailed instructions.

NOTICE

The operator must receive instructions and consent from the manufacturer for all such specific work methods or conditions, as well as for service, repair or modification operations, that the manufacturer has not explicitly defined in the unit's operation and maintenance instructions.

8.1. GENERAL WARRANTY TERMS

Dinolift Oy warrants newly delivered DINO aerial work platforms to be free from defects in materials, constructional parts, components and workmanship, with terms and limitations set out in the warranty terms. Full warranty terms are provided by the distributor.

The warranty period starts from the date of delivery from factory. Warranty cases related to engines and generators or other accessories manufactured by external suppliers are to be handled by and with the local authorized distributor of each respective manufacturer.

The warranty covers only the cost of constructional parts and components used in the equipment. The warranty does not cover:

- damage or loss caused by transportation.
- damage or loss caused by misconduct, misapplication or accident damage, failure or loss caused by negligence of instructions, manufacturer specified service program, maintenance or storage.
- normal wear of the equipment and damage resulting therefrom, nor wearing parts and materials, such as rubber tyres, seals, hoses, fittings, batteries, filters, etc.
- damage, failure or loss caused by maintenance or repair work performed by unauthorised service personnel.
- damage, failure or loss caused by the purchaser’s acts or omissions causing alterations or modifications to the structure, configuration or quality of the product.
- any indirect damage or loss such as loss of profit and downtime costs, etc.
- any claims by a third party.
- any damage caused to other property.

Warranty claims and damaged parts shall be processed according to Dinolift instructions of warranty procedure. Contact the distributor for further instructions. No claim will be accepted if Dinolift notification and warranty procedures are not followed or non-original parts or parts not approved by the Supplier have been used.

For more information on warranty procedures, contact the distributor or

Dinolift Oy
After Sales Services
Raikkolantie 145
FI-32210 Loimaa
Finland
warranty@dinolift.com

8.2. SAFETY AND THE ENVIRONMENT

8.2.1. General safety instructions for maintenance

Exercise particular caution always when carrying out service- and maintenance operations. A faulty lift, or a lift from which covers, safety devices or other parts have been removed, may operate in an unexpected way.

If you must disable any of the safety devices for maintenance, make sure to resume its operation after the maintenance, and check that it works correctly.

Beware of sudden and unexpected movements.
Support the platform, the boom system, the articulated arms and the support outriggers in a position where the load does not rest on the structure under repair or cause any other danger (e.g. in transport position or use of supporting structures)

When removing hydraulic cylinders, also note that
- the cylinders may be oily and slippery
- the cylinders are heavy. Use a lift and suitable lifting gear for lifting

Do not spill oil on the ground.
Dispose of used oils and oily waste appropriately. Observe the local regulations and the regional or site-specific recycling instructions.

Remember when handling batteries:
Electrolytic liquid is highly corrosive – always wear protective clothing and eye guards.
The batteries generate hydrogen gas during charging – open flame prohibited, danger of explosion

Use genuine spare parts for maintenance. This way, you will ensure correct operation and structural safety of the lift even after the maintenance.

8.2.2. Filling quantities of chemical substances

	Liquid type	Volume
Hydraulic oil	Kendall Megaflow AW HVI 22 Fuchs Plantohyd SE 22	23 l
Hydraulic oil (winter option)	Neste Hydraulic 28 Arctic	23 l
Lubricant	Mobilgrease XHP 222	
Chain lubricant	Würth HHS Grease	

Consult the separate engine manual for more information and specific recommendations for engine oil.

The hydraulic oil type, used in the lift, is marked on the label, affixed to the side of the reservoir.

8.2.3. Materials and recyclability

Tyres

Type	Radial M+S	**Size**	185/70R13C 195/70R14
The tyres meet the requirements of the REACH regulation.			
The tyres can be recycled. A recycling fee has been paid for the tyres, so the used tyres may be left for recycling if they are replaced. Note the national and local regulations and policies.			

*Option

Other materials

Metals	Steel, aluminium, cast iron	Metal waste
	Hydraulic pipes and components	
	Power pack, axles	
	Pressureless and empty spray cans	
Plastics	Covers, mud flaps (ABS, PE), electrical enclosures (PC, PA) except their seals	Reusable plastic waste if available, otherwise in combustible waste Plastic parts are marked with material ID.
	Tyres	Tyre waste
	Plastic packaging	Packaging plastic waste
	Oil and solvent canisters and enclosure seals etc.	Combustible waste
Battery	Lead battery	Recyclabe hazardous waste: battery
Electric components	Wires, components	Waste electrical and electronic equipment
Hydraulic hoses and oily material	Used hoses and oily filters etc.	Hazardous waste: solid oily waste
Oil	Used oil	Hazardous waste: oil waste
Fuel and lubricants	Unused or bad fuel and lubricants	Hazardous waste
Aerosols	Not empty spray cans	Hazarsous waste
Packaging of hazardous waste	Grease tubes, oil spray cans etc.	Hazardous waste: solid oily waste

Note the national and local regulations and policies.

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9. MAINTENANCE SCHEDULE

Schedule	Person responsible	Reference
Daily	Operator	Operating instructions
1 month / 100 hours*	Competent person who is familiar with the lift	Maintenance instructions
6 months / 400 hours*		
Annually / 800 hours*	Skilled technician who is well familiar with the structure and operation of the lift	
As needed		
* Service must be performed every indicated month or operating hour interval, whichever comes first.		

NOTICE

In addition to the daily maintenance routines according to the maintenance schedule, every operator is obliged to perform a site-specific worksite inspection.

○ = Check (general/visual checking of condition).
● = Thorough Inspection. To be performed following the procedure, described in the separate maintenance instructions.
▲ = Carry out lubrication, services, replacement of parts and repairs in accordance with this point.

Always lubricate the lift and apply a protective grease film immediately after the washing.

The lift must be subjected to an extraordinary inspection always after an exceptional event. An event is exceptional, for example, if the lift has been damaged so severely, that its strength or operational safety may have been endangered. Consult the maintenance manual for more detailed instructions.

NOTICE

Under demanding conditions where moist, corrosive substances or corrosive climate may speed up the deterioration of the structures and induce malfunctions, the maintenance intervals must be shortened, or the influence of corrosion and malfunctions must be reduced by using appropriate protective agents.

	Maintenance item	Daily	100 h / 1mo	400 h / 6mo	800 h / 1yr	As needed	Notes
1	Outriggers						
	Structure	○	○	○	●		
	Foot plates				○		
	Joints		○/▲	○/▲	●/▲		Mobilgrease XHP 222
	Limit switch mechanism				○		
2	Chassis						
	Structure	○	○	○	●		
	Drawbar	○	○	○	●		
	Transport support				○		
3	Boom						
	Structure	○	○	○	●		
	Sliding surfaces		▲	▲	▲		PRF Teflube
	Slide pads		○/▲	○/▲	○/▲		
	Joints		▲	▲	○/▲		Mobilgrease XHP 222
4	Work platform						
	Structure	○	○	○	●		
	Gate	○	○	○	●		
	Platform carrier	○	○	○	●		
	Anchor points				○		
5	Turning device						
	Structure	○	○	●	●		
	Attachment of turning bearing			○	●		Testing Tightening M12: 80 Nm 115 Nm
	Lubricate nipples (1-1,5 g x 2 pcs.)			▲	▲		Mobilgrease XHP 222
	Attachment of angular gear				○		
	Play of angular gear				○		
	Lubricate gear rings			▲	▲		Ceplattyn 300
	Axial play of turning bearing				●		Max 1 mm
	Turning motor				○		
	Swing limiter				○		
6	Flyer-chain system						
	Chain indicator(s)	○	○	○	○		
	Lubricate chains			▲	▲		Würth HHS Grease
	Lubricate chain rollers		▲	▲	▲		Mobilgrease XHP 222
	Tightness of chains				●/▲		
	Attachment of backup chain				○		
	Condition of the chains				●		30 links max 389 mm
7	Cylinders						
	Load holding		○	○	●		
	Joints		○/▲	○/▲	○/▲		Mobilgrease XHP 222
	Telescope cylinder joints			○/▲	○/▲		Mobilgrease XHP 222

	Piston rod and wiper ring				●		
	Fittings				●		
	Platform levelling		○	○	○		
8	Driving device						
	Operation		○	○	●		
	Attachment to chassis				○		
	Load holding		○	○	○		
	Lubricate			▲	▲		Mobilgrease XHP 222
9	Hydraulic system						
	Oil filter cartridge				▲		
	Oil	○	○	○	▲		ISO VG 22, 15 litres
	Lines and fittings	○	○	○	●		
	Pressures				●		
10	Axle and wheels						
	Condition of axle				●		
	Attachmet of axle				●		62 Nm
	Tyres	○	○	●	●		Use max inflation pressure marked on the tyre
	Rims				○		
	Wheel bolts			○	●		90 Nm
	Play of wheel bearings				○		
	Grease jockey wheel				▲		
11	Tow ball coupling and overrun brake						
	Ball coupling		○	○/▲	○/▲		Würth HHS Grease
	Locking mechanism				○		
	Attachment				○		
	Overrun		○	○/▲	○/▲		Mobilgrease XHP 222
	Clearance				○		
	Operation				●		
	Operation of brakes			○	○		
	Brake rod and cables			○/▲	○/▲		Würth HHS Grease
	Brake adjustment at every 5 000 km		●/▲	●/▲	●/▲		5-8 mm, 150 mm, M10: 24 Nm, M12: 40 Nm
12	Electrical system						
	Control boxes				○		
	Connections				○		
	Limit switches and sensors				○		
	Wiring		○	○	○		
	Cable chain				○		
	Mains plug and socket				○		
	Fault current switch				○		
	Batteries and their electrolyte level (TLB)		○/▲	○/▲	○/▲		
	Road lights and reflectors	○	○	○	○		
13	Control system and safety devices						
	Operation	○	○	○	○		
	Operation of safety limit switches	○	○	○	●		
	Emergency stop	○	○	○	○		
	Emergency descent	○	○	○	○		

	Horn	○	○	○	○		
14	Decals, plates and instructions	○	○	○	○		
15	Test loading						
	Loading				▲		110 % of nominal load
	Check structures				●		
16	Corrosion protection				○	▲	
17	Movement speed adjustment					▲	
18	Special inspection					▲	

9.1. SCHEDULE FOR INSPECTIONS REQUIRED BY THE AUTHORITIES

Inspections must be performed in accordance with local, state or federal regulations, legislation, directives, standards. The manufacturer recommends following inspections, as required by local authorities in platforms country of origin.

A pre-use inspection must be done before taking the platform to use for the first time and before first start-up after major repairs and alterations.

A thorough inspection and a test loading of the lift must be carried out at least once every twelve (12) months.

The platform should undergo a major inspection within ten (10) years after having

been originally put into service. A major inspection includes non-destructive testing and inspection while dis-assembled.

A special inspection should be done if the platform has been exposed to exceptional circumstances which may have affected the structural integrity of critical components.

The inspections should be carried out on regular basis throughout the service life of the lift.

If the lift is used under extreme conditions, intervals between the inspections shall be reduced.

The overall operating condition of the lift as well as the condition of the safety-related control devices shall be established in the regular inspections. Particular attention shall be paid to changes which affect the operational safety.

During inspections the notifications given in previous inspections, practical experience from use and information on performed repairs should be taken into account and can be implemented for better safety.

Major and special inspections shall be carried out by a competent person or competent body, who is familiar with the operation and structure of the lift. The competent person sould periodically update their knowledge and be able to demonstrate their competency if so required.

A report should be made of the inspections and the reports should be kept with the unit stored in the space reserved for it.

The report should include

- information about the inspection

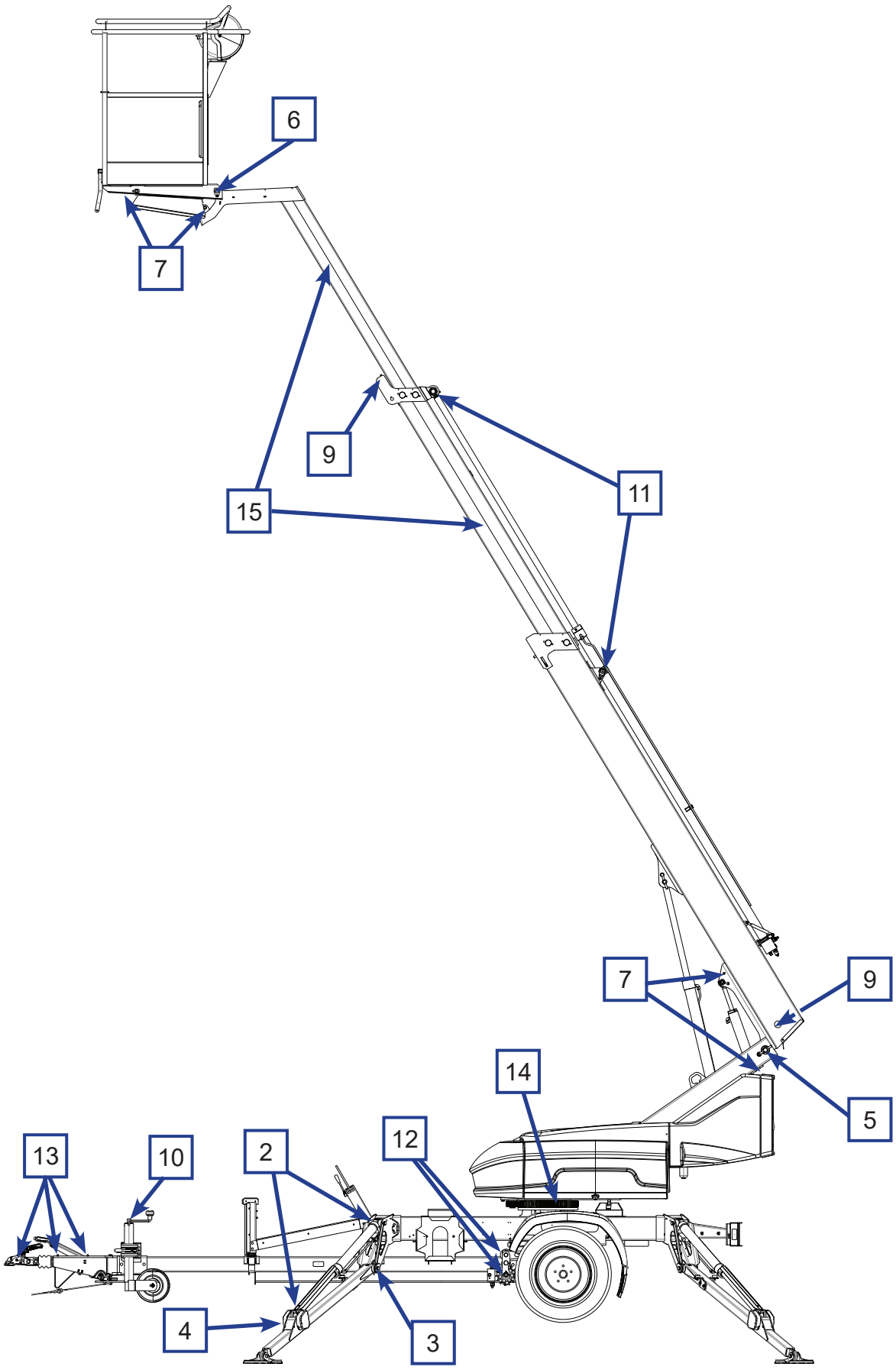
- data of repair welds (date, what was repaired and repaired by whom)

When the lift is ready for operation after annual inspection, the date of inspection shall be marked on the inspection plate affixed to the lift.

NOTICE

Check the regulations for the inspections and the competence of the inspector with the local authorities.

9.2. LUBRICATION PLAN



10. ROUTINE MAINTENANCE DURING OPERATION

The maintenance operations, that are the responsibility of the operator, are described in this chapter.

The more demanding maintenance operations that require special skills, special tools or specific measurements and adjustment values are instructed in the separate Maintenance Instructions. In such maintenance and repair cases, the operator shall contact an authorized service provider, the distributor or the manufacturer.

Make sure that all the service and maintenance procedures of the lift are performed in time and according to the given instructions.

WARNING

Any such faults, observed during operation or periodic service, which affect the operational safety of the unit, must be repaired before the lift is used next time.

Keep the lift clean. Clean the lift especially carefully before services and inspections. Impurities may cause serious problems, for example, in the hydraulic system.

Use original spare parts and consumables. Consult the spare parts list for more detailed information about the parts.

The first service after 20 hours of operation

- change the pressure filter element
- adjust the brakes according to the instructions (see point “Wheel brakes and bearings”)
- check the wheel bolts for tightness after about 100 km of driving

If the lift is operated under demanding conditions (in exceptionally humid or dusty environment, corrosive climate, etc.) the intervals between the oil changes and the other inspections shall be shortened to meet the prevailing conditions in order to maintain the operational safety and reliability of the lift.

The timely performance of the periodic servicing and the inspections is absolutely mandatory, because neglecting them may impair the operational safety of the lift.

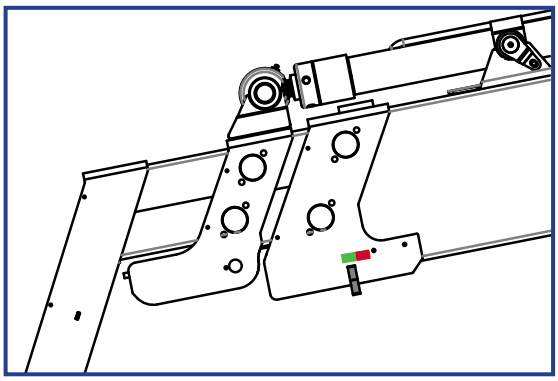
The guarantee will not remain valid, if the servicing and the periodic inspections are not performed.

10.1. INSTRUCTIONS FOR DAILY MAINTENANCE AND INSPECTIONS

10.1.1. Chassis, boom and work platform

Check visually the condition of the access routes, the work platform, the platform gate and the handrails.
Check visually the condition of the boom and the frame structures.

Check, that the mechanical indicators for chain failure are aligned properly.



10.1.2. Axle and wheels

Check visually that the tyres are duly inflated, and do not show any damage.

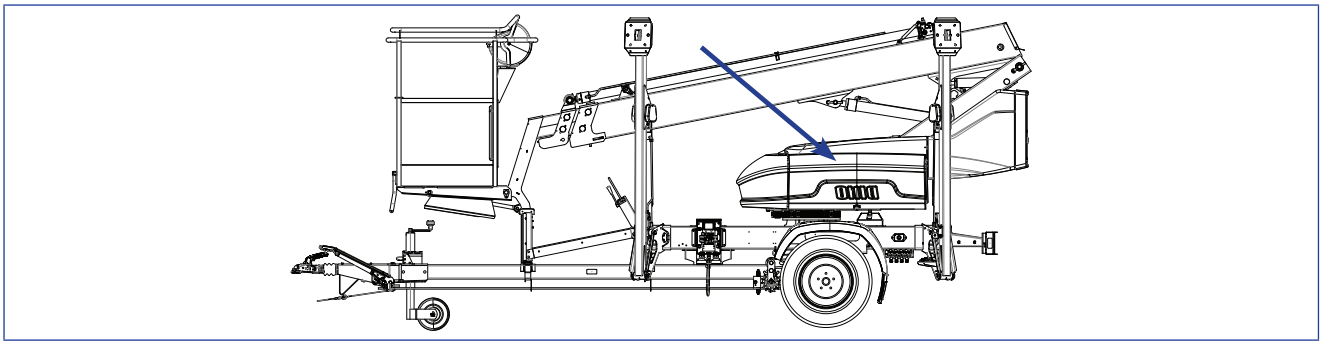
10.1.3. Lights

Check the condition of all the warning and signal lights as well as the road traffic lights of the trailer.

10.1.4. Hydraulic oil level

Check the hydraulic oil level with the platform in the transport position.
As required, top up hydraulic oil to the upper mark on the dipstick.

The hydraulic oil tank is located under a cover of the turning device, as shown in the picture.



10.1.5. Electrical and hydraulic systems

Check the condition of hydraulic hoses, pipes and connections visually.
Make sure that there are no visible oil leaks.

Check that the electrical components, housings or wiring do not show any visible signs of damage.

Any externally damaged components, hoses, clashed pipes and connections or loose or damaged wiring must be changed before operation.

10.1.6. Control system and safety devices

Operation of the safety limit switches

Test the operation of the safety limit switches that prevent the movements of the boom and the outriggers as follows:

1. The lift is in the transport position with the outriggers in the upper position, and the driving device connected.
2. Lift the boom via the controls in the lower control centre.
   The boom must not operate in any position of the selector switch.
3. Lower the outriggers to the operating position of the lift
4. Using the controls in the lower control centre, lift the boom so much that it raises from the support
5. Drive the outriggers.
   The outriggers must not operate in any position of the selector switch.

Operation of the emergency descent, the emergency stop and the sound signal

Test the operation of the emergency stop and the emergency descent system from the lower control centre LCB:

- lift the boom and extend the telescope about 0,5m. While driving, press the emergency stop button – the movement should stop
- using the emergency descent, retract first completely the telescope, then lower the boom
- pull up the emergency stop button

Test the operation of the emergency stop and the sound signal from the platform control centre.

10.1.7. Decals, plates and instructions

Check that all the signs, warning decals and pictorials are in place, intact and clean.

If the labels have started to come off or tear apart, or if the symbols or texts are illegible, then the decals must be replaced.

Product numbers of the decals are visible on the decals or the product numbers of new decal sets can be found in the spare part list.

Check that the user manuals accompanying the lift are legible.

11. PERIODIC SERVICE

The measures, included in the maintenance schedule, which are the responsibility of a skilled service person, who is thoroughly familiar with the operation and structure of the lift, are described in this chapter.

11.1. INSTRUCTIONS FOR MONTHLY SERVICE AND INSPECTION

In addition to the measures given in this chapter, you should also carry out the daily inspections according to the maintenance schedule.
If you observe any flaws, defects or damage in the lift, take the necessary corrective actions.

11.1.1. Lubrication

The nipples are marked in the lubrication plan. In the machine, their positions are marked with decals.

Apply grease until the grease, that comes out of the joint, is clean. Wipe off excessive grease, if necessary.

	Lubrication point	Lubricant	Pcs
2 and 3	Joints of the outriggers and the outrigger cylinders	Mobilgrease XHP 222	9
4	Moving parts of the outrigger limits		4
5	Bearings of the boom		1
6	Levelling bearings of the platform		1
7	Articulation bearings of the levelling cylinders		4
9	Chain rollers of the telescope		3
15	Sliding surfaces of the telescope	PRF Teflube (PTFE oil)	2

Use the same or equivalent lubricant as marked in the table.

11.1.2. Telescopic boom

Check the play between the slide pads and the slide surface from both ends of the boom sections.
If necessary, eliminate the play of the slide pads to make the boom extensions run in the centre without chafing the edges. The slide pads **must**, however, **not** press the boom.

Adjusting the front end slide pads
1. Lift the boom to horizontal position with the telescope retracted.
2. Reshim slide pads on the side.
3. Start tightening the attachment bolts of the front end lower slide pad until the telescope cylinder’s pin becomes loose.
4. Reshim the upper slide pad to that or the next thickest option.
5. Adjust the lower slide pad to minimize play, ensuring that the slide pads do not squeeze the boom between them.

Adjusting the rear end slide pads

1. Adjust slightly the position of the telescope from retracted position to access the slide pad adjustment screws through the holes on top of the rear end of the boom.
2. Tighten screws until the slide pad touches it's mating surface. Do not tighten the screws to the point where they compress the slide pad against its mating surface.

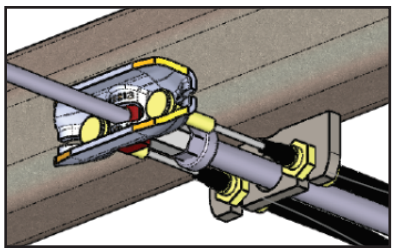
NOTICE

The slide pads must always be secured after the adjustment using threadlocker.

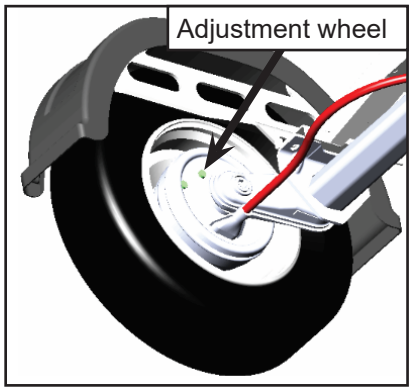
11.1.3. Tow ball coupling and overrun brake

Check the condition of the overrun device and the tow ball coupling. Check the brake adjustment.

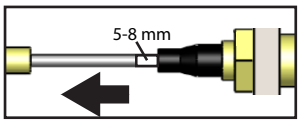
Adjusting the brakes

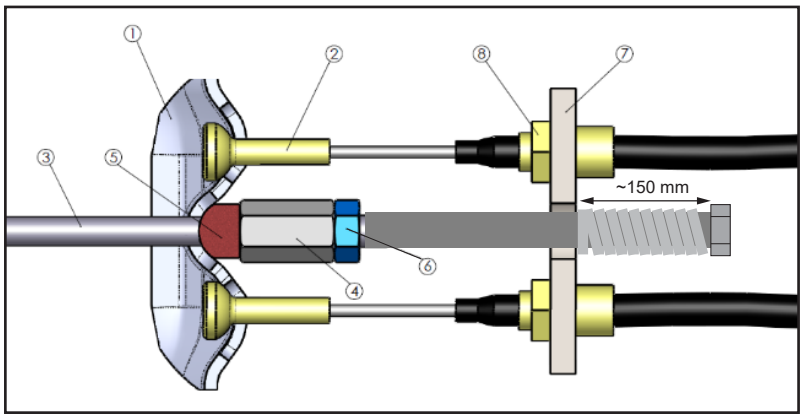


1. Bring the lift to the support position by raising its wheels off the ground. Pull the coupling outwards and release the handbrake.
2. Twist the brake compensator to pull the brake wires and measure their spring-return manoeuvring space. Correctly adjusted the manoeuvring space should be 5-8 mm.



3. Remove the green cover of the brake adjustment wheel and adjust the manoeuvring space of the brake wires by turning the adjustment wheel (tightening towards the arrow).
4. Raise and release the handbrake 3 times. Measure the brake wire manoeuvring space again.
5. Adjust the compensator approximately straight and minimize play.
6. Check that the tyres can roll free and tighten the brake rod fixing nuts, fixing nut M10 = 24Nm, M12 = 40Nm. Also adjust the pre-tension of the rod's return spring 150 mm.





Tightening the brake system too much causes overheating of the brakes during transportation, and added force requirement on the driving device.

We recommend performing a test run after the adjustment in order to ensure flawless operation of the brakes by braking 2-3 times.

NOTICE

The brakes must be adjusted after every 5000 km. Depending on the total towing distance of the trailer, the adjustment may not be necessary at every monthly service.

11.1.4. Driving device

Check that the driving device is operating correctly.
When the lift is transferred by means of the driving device, it must travel straight.

Check the load holding of the driving device.

11.1.5. Battery and wiring.

Check visible wiring.

On 120TLB, also check visually the condition and attachment of the battery.

CAUTION

Electrolytic liquid is highly corrosive – always wear protective clothing and eye guards.
The batteries generate hydrogen gas during charging – naked flame prohibited, danger of explosion

Check the batteries regularly

- Keep the batteries clean externally. You can wash the batteries with warm water and a brush. Make sure the plugs for the cells are closed so that washing water cannot enter the cells.
- Check that the batteries do not show cracks or leaks.

Make sure the level of electrolyte in the battery is correct

- Top up with distilled water only after the charging is finished. Correct level of the electrolyte is 3 mm below the edge of the mark.
  - If the level is too high, the liquid will spume out from the plugs during charging.
  - If the level is too low, the upper edges of the elements will corrode.



- If the level of the electrolyte is so low, that the tops of the elements are not submerged, top up water as much as is required to cover the elements. After that, charge the batteries and recheck the electrolyte level after the charging is finished.
- Do not add battery acid to the battery, only distilled water.

11.1.6. Control system and safety devices

Test the operation of the emergency stop and the emergency descent system from the lower control centre LCB:

- lift the boom and extend the telescope about 0,5m. While driving, press the emergency stop button – the movement should stop
- using the emergency descent, retract first completely the telescope, then lower the boom
- pull up the emergency stop button

Test the operation of the emergency stop and the sound signal from the platform control centre.

11.1.7. Platform levelling system

Put at least half of the nominal load on the platform. Drive the boom up and down a few times. The platform should stay levelled.

If the platform, viewed by the operator, drifts forwards, the reason can be:
- A leak in the slave cylinder double load regulation valve (on the rod side) in the direction of the electric directional valve.
- An internal leakage in the cylinder.

If the platform, viewed by the operator, drifts backwards, the reason can be:
- a leak in the load regulation valve on the piston side of the slave cylinder in the direction of the electric directional valve
- an internal leakage in the cylinder

If the valves are not tight, refer to the service instructions for checking the load regulation valves. Do not change the preset values.

11.1.8. Load holding and load regulation valves

Check the operation of load holding and load regulation valves as follows.

1. Level the machine with the outriggers so that the wheels are clearly off the ground
2. Lift the boom up from the support.
3. Extend the telescopic boom 30-50 cm
4. Measure the height of the platform floor from the ground.
5. Repeat the measurements after 60 minutes. The height should be no more than 100 mm different than at the beginning of the test. If the value has changed more, do a more detailed inspection as described in the annual inspections.

11.2. INSTRUCTIONS FOR INSPECTIONS EVERY 6 MONTHS

These service measures must be carried out between the annual services at every 6 months or 400 hours, whichever comes first.

In addition to these service measures, also carry out the measures included in the daily and monthly services.

11.2.1. Turning device and gear ring

Check visually the turning device and its welded seams. In particular, check the attachment points of the joints and the turning bearing.

	Lubrication point	Lubricant	Pcs
14	Turning gear bearings	Mobilgrease XHP 222	2
14	Outer parts of gear ring	CEPLATTYN 300	-

NOTICE

Excess grease pressure may press out the turning bearing seal. Use only one pump with a grease gun (1.5g) per runing bearing nipple.

11.2.2. Lubrication

	Lubrication point	Lubricant	Pcs
11	Articulation bearings of the telescope cylinder	Mobilgrease XHP 222	3
13	Overrun		2
12	Joints of the driving device		2
	Brake wires	Würth HHS Grease	2
13	Moving parts of the tow ball coupling		
9	Visible parts of the Flyer-chains		2

11.2.3. Axle and wheels

Check the attachment.

	Tightening torque
Wheel bolts	90 Nm

Check the tyre pressures: Use the max pressure marked on the tyre. The pressures for the jockey wheel are marked on its bracket.

Check the condition of the brakes

The following service measures must be carried out every six months or after driving 13,000–15,000 km:

- check the brake linings for wear
- check the operation of the overrun brake (by means of a test run – execute a few braking tests)

The **wheel bearings** are lubricated for life and do not require any servicing.
(The bearings do not require any lubrication and they cannot be adjusted.)

Turn the wheels at least once every 3 months to keep the lubricating film intact.

NOTICE

The double row angular contact compact bearings have a long service-life and they are maintenance-free. Therefore, the bearings very rarely break under normal operating conditions. If a bearing fails due to exceptional operating conditions, replace the entire brake drum assembly with the pressed-in bearings and locking nut.

Assign a specialised workshop for the work.

11.3. INSTRUCTIONS FOR ANNUAL MAINTENANCE OF THE LIFT

The annual maintenance must be carried out every 12 months or 800 hours of operation, whichever comes first. The measures of the smaller services need not be carried out separately in connection with the annual maintenance as they, to the extent necessary, are included in the instructions for the annual maintenance.

Under demanding conditions where moist, corrosive substances or corrosive climate may speed up the deterioration of the structure and induce malfunctions, the inspection must be performed more often and the influence of corrosion and malfunctions must be reduced by using appropriate protective means.

Only technical specialists who are familiar with the structure and the operation of the lift are allowed to maintain the lift.

NOTICE

The annual maintenance of the lift with relevant inspections does not replace the annual inspection, executed by an expert or an expert body with documented evidence of competence.

Clean the lift thoroughly before the service
The hydraulic and electric appliances must not be dismantled if they are not clean. Any contaminants in the system may cause malfunctions later on. Wash the lift externally.

- Use pressure air to dry the electric devices, hydraulic connectors etc. before opening them.
- Apply appropriate moisture repellent to the electric appliances after the drying.
- Always protect the piston rods with e.g. CRC3-36 anti-corrosive agent after washing with a solvent.

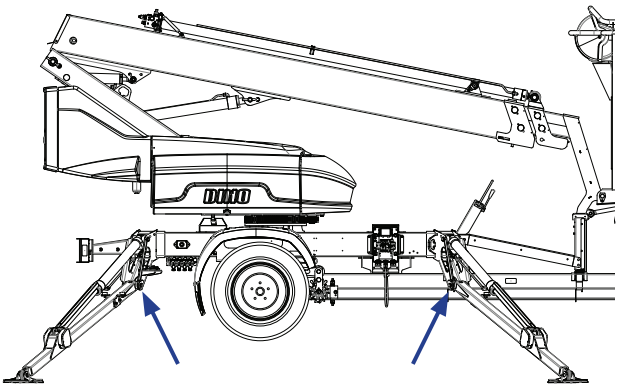
⚠ CAUTION

Be careful not to direct the high pressure water jet straight to the electric appliances, such as the control centres on the chassis and on the platform, relays, solenoid valves and limit switches.

11.3.1. Chassis structures, boom, platform and platform carrier

1. Inspect the outriggers and joints
   - General condition of the outriggers and their attachment to chassis. The structures must not show signs of deformations or cracks.
   - Welded seams for cracks, corrosion or breaches.
   - Check the footplates for deformations, cracks or breaches.
   - Check the locking of the pins.
   - Check that the footplate can turn freely on its joint.

- Check the condition of the joints:
  - lower the outriggers slightly
  - move the outriggers back and forth horizontally and check the joints for play
  - check the operation and condition of the limit switch mechanisms on the outriggers
  - replace any worn out parts



2. Inspect the chassis and drawbar
   - General condition. Pay particular attention to the load-bearing structures. The structures must not show signs of deformations or cracks.
   - Check the attachment of the drawbar to the chassis.
   - Welded seams for cracks, corrosion or breaches.
   - Check the condition of the transport support of the boom.

3. Inspect the boom
   - Extend the telescope and check that there are no permanent deformations, dents or traces of substantial wear in the structures.
   - Check the welded seams for wear, cracks or breaches.
   - Check the boom attachment for cracks or breaches.
   - Check the condition of the cable chain, its clamp brackets as well as the tightness of the screw connections.
   - Check the condition of the platform brackets.
   - Inspect the sliding pads and their play from both ends of the boom – readjust if necessary. Lubricate the sliding surfaces.

	Lubrication point	Lubricant	Pcs
15	Sliding surfaces of the telescope	PRF Teflube (PTFE oil)	2

Adjusting the front end slide pads

1. Lift the boom to horizontal position with the telescope retracted.
2. Reshim slide pads on the side.
3. Start tightening the attachment bolts of the front end lower slide pad until the telescope cylinder's pin becomes loose.
4. Reshim the upper slide pad to that or the next thickest option.
5. Adjust the lower slide pad to minimize play, ensuring that the slide pads do not squeeze the boom between them.

Adjusting the rear end slide pads

1. Adjust slightly the position of the telescope from retracted position to access the slide pad adjustment screws through the holes on top of the rear end of the boom.
2. Tighten screws until the slide pad touches it's mating surface. Do not tighten the screws to the point where they compress the slide pad against its mating surface.

NOTICE

The slide pads must always be secured after the adjustment using threadlocker.

4. Inspect the pins, bearings and pin locking from
   - boom joint
   - the locking of the platform pin.

5. Inspect the work platform
   - General condition.
   - Check that the platform does not show signs of deformations, substantial wear or buckles
   - Check that the handrails, the steps, the gate and the attachment of the gate are in order
   - Check that the gate closes automatically
   - Check the condition of the platform floor plate
   - Check the platform carrier for notable buckles or deformations
   - Check the condition and attachment of the safety harness fixing points.

Inspect all bolted connections visually.
Make sure that all possible repair welding has been carried out properly and that the seams have been protected against corrosion.

11.3.2. Turning device and rotary adaptor

Perform overall visual inspection of the turning device and its weldings. Check especially the attachment of joints and turning bearing.

Check the turning device
- General condition. Pay particular attention to the load-bearing structures. The structures must not show signs of deformations or cracks.
- welded seams for cracks, corrosion or breaches
- attachment of the pinion gear
- play and attachment of the angular gear
- condition of the gear ring
- play of the turning bearing
  - Max. allowed axial play is about 1 mm.
  - Vertical play in the turning bearing when the turning device is lifted with an overhead crane or boom is driven out with load if no crane is available
- check the attachment of the turning motor
- check the attachment bolts of the turning device for tightness:

	Testing	Tightening
M12	80 Nm	115 Nm

NOTICE

If you have to turn open or tighten the attachment bolts, secure them with threadlocker. Always tighten the bolts crosswise.

- Lubricate the turning device bearings and gear ring

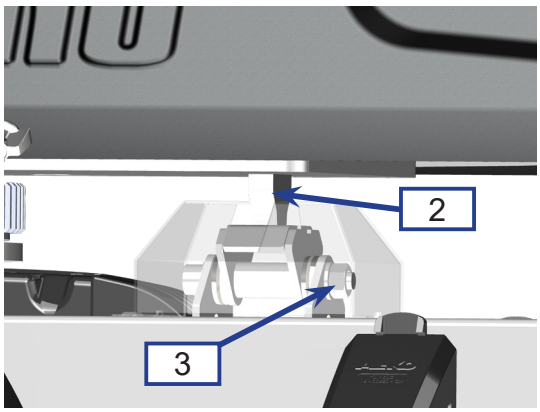
	Lubrication point	Lubricant	Pcs
14	Turning gear bearings	Mobilgrease XHP 222	2
14	Outer parts of gear ring	CEPLATTYN 300	-

NOTICE

Excess grease pressure may press out the turning bearing seal.
Use only one pump with a grease gun (1.5g) per turning device bearing nipple.

CHECK THE OPERATION OF THE SWING LIMITER

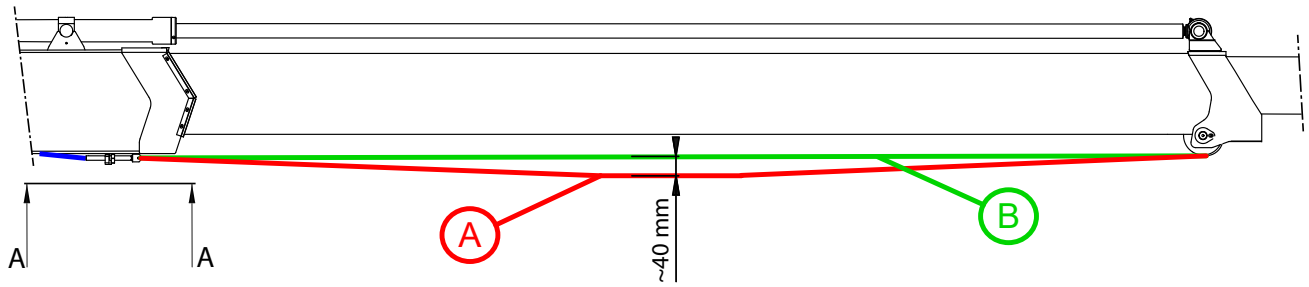
- Check the condition of the hoses and electric wires routed from the turning device to the chassis
- Check that the hoses and the electric wires are not twisted, while the boom is resting on the support
- Ensure that the swing limiter does not allow the boom to be turned more than 355° in either direction from the boom support.
- Ensure that the swing limiter mechanism is sufficiently tight so that it cannot be too easily moved by handpower.
  1. Lift the boom away from the support, and turn it sufficiently far to the side
  2. Test that the limiter cannot be moved too easily by hand
  3. Tighten the bolt, if required
  4. Drive the boom back onto the support, in the position shown in the picture, ensuring that there is no twisting of the hoses and wires that are routed through the slewing ring.

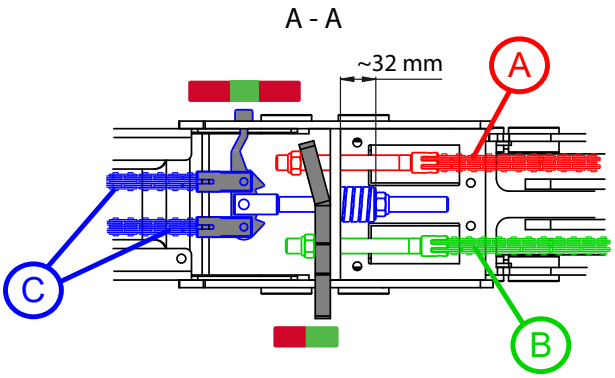


11.3.3. Telescopic boom flyer-chains

Inspect the condition and attachment of the flyer-chains, the locking of the pins and the tightness of the spring.

1. Drive the boom to a horizontal position.
2. Drive the boom extensions completely out and retract them by about 30 mm.
3. Check that the extension chain (B), closer to the indicator, does not sag significantly. Adjust as necessary. **Note! Tightening this chain also affects the length of the spring. (see the Point 5).**
4. Check that the extension chain (A), farther away from the indicator, sags in the middle by about 40 mm. Adjust as necessary.
5. Check the length of the spring of the retraction chain (C) by extending the boom completely. The length of the spring should be about 32 mm.





6. Extend and retract the boom several times after the readjustment. Return the boom to the measuring position, and repeat the measurement.
7. Check the attachment of the extension chain (A), farther away from the indicator, by pulling it with your hand.
8. Check the elongation of the extension chains (A and B) from the tip of the outer boom and from the middle of the visible part of the chains. The length of 30 chain links, 381 mm as new, must not exceed 389 mm.
9. Check that the chain runs smoothly over the rollers so that the links aren't seized, by driving the telescope from end to end.
10. Replace seized or worn out chains in pairs. Always change also the backup chain of the disqualified chain.
11. Lubricate the chains.

	Lubrication point	Lubricant	Pcs
9	Visible parts of the Flyer-chains	Würth HHS Grease	2

11.3.4. Cylinders and cylinder bearings

1. Outrigger cylinders
   - Drive the outriggers to their lowest position.
   - Inspect the condition of the piston rod, wiper ring and tightness of the connections.
   - Check the cylinder bearings, pins and the locking of the pins.
   - Check the condition of the piston rod guards.

2. Boom cylinder:
   - Drive the lift cylinder to its upper position.
   - Inspect the condition of the piston rod, wiper ring and tightness of the connections.
   - Check the cylinder bearings, pins and the locking of the pins.
   - Drive the lift cylinder to its lower position.

3. Telescope cylinder:
   - Same inspection as for 2nd Boom cylinder.

4. Levelling sylindrs (master and slave):
   - Inspect the condition of the piston rods, wiper rings and tightness of the connections.
   - Check the cylinder bearings, pins and the locking of the pins.
   - Check the condition of the slave cylinder guard.

Lubricate joints on the boom and outriggers.

	Lubrication point	Lubricant	Pcs
2 and 3	Joints of the outriggers and the outrigger cylinders	Mobilgrease XHP 222	9
4	Moving parts of the outrigger limits		4
5	Bearings of the boom		1
6	Levelling bearings of the platform		1
7	Articulation bearings of the levelling cylinders		4
9	Rollers of the telescope		3
11	Articulation bearings of the telescope cylinder		3

11.3.5. Hydraulic system

Driving device
- Check that the valves of the driving device operate properly and no movement occurs when the spool is in the neutral position.
- Check the load holding of the driving device.

Electric directional valves of the boom
- Operate all the boom and turning movements. Make sure that they are all functioning properly and that the movements stop as soon as the contols are released.

Check
- the hoses for any leaks or chafing
- that the pipes do not show any dents, leaks, trace of corrosion or chafing at the clamps
- that all the pipes are properly fastened
- the hose and pipe connections for leaks, and that the connections are properly tightened

Replace any externally damages hoses or buckled pipes. The explosion-proof protective sleeve must be renewed, if it is damaged by chafing.

Measure the pressures

1. Connect the pressure gauge to the measuring points marked in the diagram. The oil must be at operating temperature (40-60 °C) during the measurement.

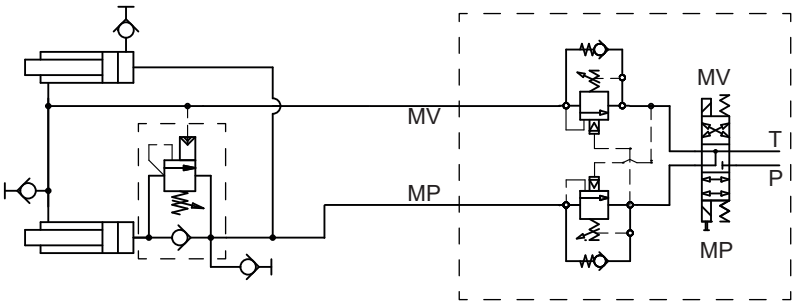
2. Check the main operating pressure and the pressure relief valve settings of the different movements according to the table below. To get maximum pressure, drive the cylinder of the respective movement against its end position in the direction to be measured.

Measurement	Point	Max pressure	Movement to be measured
Main pressure	M	210 bar	Boom extensions in
Turning device	MP	55-70 bar	Turning device counter-clockwise / clockwise

If you have to readjust the pressure, secure the new setting with a seal.

11.3.6. Platform levelling system

The platform is levelled by means of a so-called slave cylinder system, where the master cylinder under the platform controls the slave cylinder. The platform keeps its level position only if the valves in the system are tight.



The levelling system comprises the following parts:
1. Master cylinder
2. Slave cylinder
3. Load regulation valve
4. Double load regulation valve (8A and 8B)
5. Electric directional valve

Put at least half of the nominal load on the platform. Drive the boom up and down a few times. The platform should stay levelled.

If the platform, viewed by the operator, drifts forwards, the reason can be:
- A leak in the slave cylinder double load regulation valve (on the rod side) in the direction of the electric directional valve.
- An internal leakage in the cylinder.

If the platform, viewed by the operator, drifts backwards, the reason can be:
- a leak in the load regulation valve on the piston side of the slave cylinder in the direction of the electric directional valve
- an internal leakage in the cylinder

If the valves are not tight, refer to the service instructions for checking the load regulation valves. Do not change the preset values.

11.3.7. Load holding and load regulation valves

Check the operation of load holding and load regulation valves as follows.

1. Level the machine with outriggers so that the wheels are clearly off the ground.
2. Place a test load on the platform. The test load should be 80-100% of the nominal load.
3. Attach a plumb line on the platform.

From the ground control centre:

4. Lift the boom, so the platform doesn't hit anything when extending the telescope.
5. Extend the telescopic boom 30-50 cm.
6. Measure:
   - stroke from outrigger cylinders
   - stroke from telescope cylinder.
7. Lift the boom to about 15 degrees from horizontal.
8. Measure the stroke from boom and slave cylinders.
9. Measure the height of the platform floor using the plumb line.

10. Repeat the measurements after 60 minutes. The cylinder stroke values should have no more than 5 mm difference. Plumb line marking should be no more than 100 mm different than at the beginning of the test.

If a valve is leaking, do the necessary service actions.

NOTICE

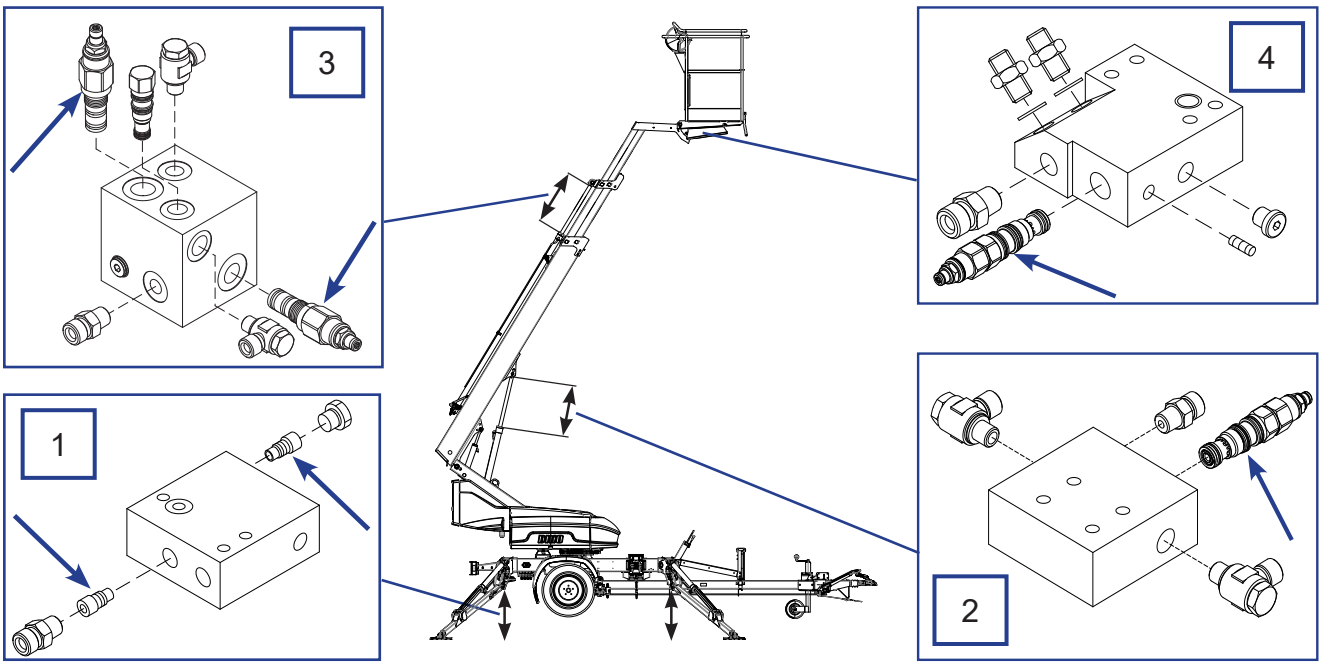
The valve can only be opened 2–3 times after which it has to be replaced. After this, the valve may start to leak, and it must be replaced by a new one.

Service instructions for the valves

- Remove and clean the valve.
- Check the O-rings and, if necessary, replace them.
- Put the valves carefully in place.
- Do not change the pre-set values of the valves.
- If necessary, replace the valve.

WARNING

Support the platform, the boom system and the outriggers in a position, where the load does not rest on the structure to be repaired. Ensure that the cylinders are not under pressure.

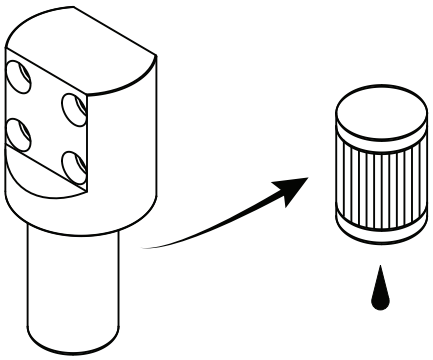


11.3.8. Hydraulic oil and filters

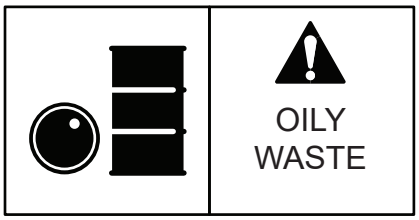
CAUTION

Protect your skin against exposure to hydraulic oil. Used oil can be harmful to the skin.

Changing the hydraulic oil and the filter:

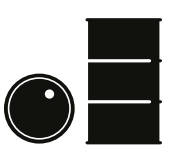


1. Drive the lift in transport position.
2. Drain off the hydraulic oil tank via the drain plug.
3. Clean and rinse the oil tank with suitable agent.
4. Replace the pressure filter. Lubricate O-rings before assembly.
5. Put the drain plug back in place.
6. Refill the tank with fresh oil, the volume required for change is about 15 litres
   - see the decal affixed to the oil tank for data about the oil filled at the factory.
   - Do not mix different oil types.
   - The viscosity class of the hydraulic oil must be ISO VG 22, and the oil must meet the requirements according to DIN 51524- HVLP.
7. Drive the movements after refilling, and check that the level of the oil is between the min and max markings. If the oil level is under the min marking, top up the oil.



CAUTION

Used oil and oily filters and other components are hazardous waste.
Do not spill oil into a sewer or to the soil. **Environmental hazard.**



11.3.9. Axle and wheels

- Check the attachment.

	Tightening torque
Axle's attachment bolts	62 Nm
Wheel bolts	90 Nm

- Check the condition of the rubber absorbers and the torsion arms.
- Check the condition of the wheel bearings.
- Check the rims and the tyres.
- Check the tyre pressures: Use the max pressure marked on the tyre. The pressures for the jockey wheel are marked on its bracket.
- Lubricate the driving device.

	Lubrication point	Lubricant	Pcs
12	Joints of the driving device	Mobilgrease XHP 222	2

11.3.10. Tow ball coupling and overrun brake

Check:
- attachment of the tow ball coupling and the overrun
- clearances
- condition of the tow-ball coupling and the overrun
- condition of the locking device
- condition of the safety wire
- attachment of the brake rod
- overrun brake mechanism moves freely and automatic reverse works:
  1. Compress the overrun with a looped cargo strap.
  2. Check by hand that the wheels rotate backwards only.
  3. Release the overrun and check that it returns to its initial position.
  4. Apply the parking brake.
  5. Check by hand that the wheels do not rotate.

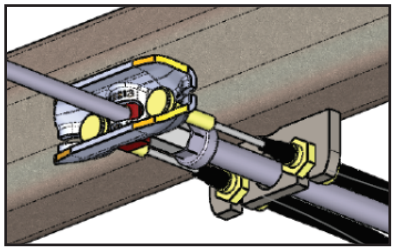
Check thoroughly the condition of the brakes
1. Remove the wheels.
2. clean the brake system and check the settings
3. check that the brake shoes can move, and that their springs properly return them
4. replace any worn out linings
5. put the wheels in place and tighten the wheel bolts
6. Remember to re-check the tightness of the wheel bolts after a drive of about 100 km.
7. check the free movement of the overrun brake and the parking brake

Lubricate the coupling, overrun and jockey wheel.

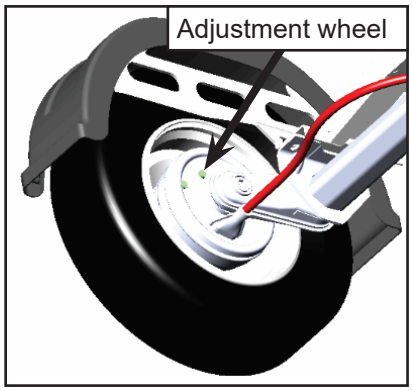
	Lubrication point	Lubricant	Pcs
10	Jockey wheel thread	Mobilgrease XHP 222	1
10	Jockey wheel slide	Würth HHS Grease	1
	Brake wires		2
13	Moving parts of the ball coupling		
13	Overrun	Mobilgrease XHP 222	2

Check the brake adjustment.

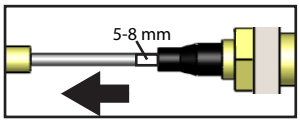
Adjusting the brakes

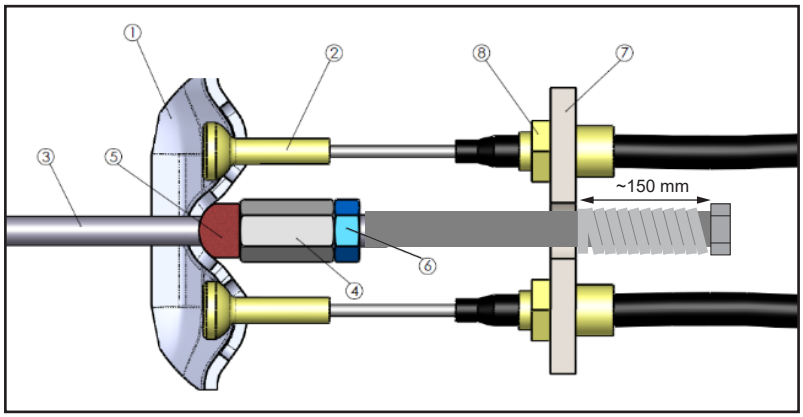


1. Bring the lift to the support position by raising its wheels off the ground. Pull the coupling outwards and release the handbrake.
2. Twist the brake compensator to pull the brake wires and measure their spring-return manoeuvring space. Correctly adjusted the manoeuvring space should be 5-8 mm.



3. Remove the green cover of the brake adjustment wheel and adjust the manoeuvring space of the brake wires by turning the adjustment wheel (tightening towards the arrow).
4. Raise and release the handbrake 3 times. Measure the brake wire manoeuvring space again.
5. Adjust the compensator approximately straight and minimize play.
6. Check that the tyres can roll free and tighten the brake rod fixing nuts, fixing nut M10 = 24Nm, M12 = 40Nm. Also adjust the pre-tension of the rod's return spring 150 mm.





Tightening the brake system too much causes overheating of the brakes during transportation, and added force requirement on the driving device.

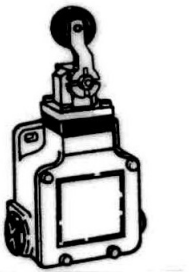
We recommend performing a test run after the adjustment in order to ensure flawless operation of the brakes by braking 2-3 times.

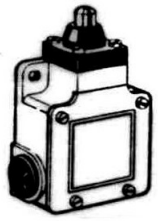
NOTICE

The brakes must be adjusted after every 5000 km. Depending on the total towing distance of the trailer, the adjustment may not be necessary at every monthly service.

11.3.11. Electrical system and operating controls

Inspect the electric system thoroughly
- Check that the control panel boxes are dry, clean and tight.
- Check the condition of the cable connections and their protection against moisture
- Check the condition and attachment of the limit switches and sensors
    - from the drawbar (transport position of the platform, RK3)
    - on the support outriggers (RK11, RK12, RK13 and RK14)





- Check the lead-throughs for tightness
- Check the connections of the electric valves
- Check the connections of the solenoid valves
- Perform visual inspection of all electric wiring
- Check the condition of the power supply plug, fault current switch and socket outlets
- Check the condition of the electric motor.

Check visible wiring.

On 120TLB, also check visually the condition and attachment of the battery.

CAUTION

Electrolytic liquid is highly corrosive – always wear protective clothing and eye guards.
The batteries generate hydrogen gas during charging – naked flame prohibited, danger of explosion

Check the batteries regularly
- Keep the batteries clean externally. You can wash the batteries with warm water and a brush. Make sure the plugs for the cells are closed so that washing water cannot enter the cells.
- Check that the batteries do not show cracks or leaks.

Make sure the level of electrolyte in the battery is correct
- Top up with distilled water only after the charging is finished. Correct level of the electrolyte is 3 mm below the edge of the mark.
    - If the level is too high, the liquid will spume out from the plugs during charging.
    - If the level is too low, the upper edges of the elements will corrode.



- If the level of the electrolyte is so low, that the tops of the elements are not submerged, top up water as much as is required to cover the elements. After that, charge the batteries and recheck the electrolyte level after the charging is finished.
- Do not add battery acid to the battery, only distilled water.

Check the operating controls and signal lights on both control centres.

- Check the overall condition of the electric appliances inside the box and spray with moisture repellent, if necessary
- Check the cables and the tightness of the cable clamps
- Test all movements. Check that all the movements stop when the control is released.
- Test the operation of the emergency stop and the emergency descent system from the lower control centre LCB:
  - lift the boom and extend the telescope about 0,5m. While driving, press the emergency stop button – the movement should stop
  - using the emergency descent, retract first completely the telescope, then lower the boom
  - pull up the emergency stop button
- Test the operation of the emergency stop and the sound signal from the platform control centre.

11.3.12. Control system and safety devices

Check the operation of the safety limit switches for the outriggers and the boom from the ground control panel LCB:

1. lift the platform from the transport position
   - the outriggers must not operate in any position of the selector switch
2. drive the boom to the transport position and lift the outriggers
   - the boom must not operate in any position of the selector switch

11.3.13. Check the lights

Check the condition of the lights and the reflectors. Replace any burned-out bulbs or lights, and damaged reflectors.

11.3.14. Decals, plates and instructions

Check that all the signs, warning decals and pictorials are in place, intact and clean.

If the labels have started to come off or tear apart, or if the symbols or texts are illegible, then the decals must be replaced.

Product numbers of the decals are visible on the decals or the product numbers of new decal sets can be found in the spare part list.

Check that the user manuals accompanying the lift are legible.

11.3.15. Test loading

1. Place the lift on an even surface with good carrying capacity.
2. Drive the outriggers to their lowest position (the minimum support width). Level the chassis.
3. Turn the boom to the side from the dawbar and lower it on the ground.
4. Place a weighed load of 143 kg on the platform.
5. Lift the boom up to horizontal position.
6. Extend the telescope until the control system stops the movement.
7. Rotate the turning device 360°.
8. Lift the boom to maximum angle.
9. Extend the telescope to its full length (maximum lifting height).
10. Drive the boom down to horizontal position.
11. Drive the boom system back to transport position.

Check the structures after the test-run.

After the above mentioned test loading and the subsequent inspection have been completed without finding any defects in the structure or stability of the lift, the lift may be used provided that the reach and platform load restrictions, presented in the reach/platform load chart of this manual, are observed.

The max. allowed load on the platform is 130 kg.

11.3.16. Anti-corrosion treatment

If needed, repeat the anti-corrosion treatment using e.g. Tectyl 210R anti-corrosion agent.

11.4. SPECIAL INSPECTION

(INSPECTION AFTER AN EXCEPTIONAL SITUATION)

The inspection is required if the lift has been damaged in a manner which may affect its strength or safe operation.

- that the lift has been subjected to all inspections included in the annual periodic service
- the lift must be subjected to a test loading and an operational inspection with a load of 110%.
- a protocol shall be drawn up of the inspection

BLANK

BLANK

12. CHANGE OF OWNER

For the owner of the lift:

If you have purchased a used DINO lift from some other than the manufacturer, please post your details to the manufacturer using the form on this page, and send it to:

info@dinolift.com

This information makes it possible for us to provide you with the safety bulletins and other campaigns relevant to your machine.

Note! It is not necessary to inform about a rented machine.

Machine model: DINO _____

Serial number: _____

Previous owner: _____

Country: _____

Date of purchase: _____

Current owner: _____

Address: _____

_____

Country: _____

Contact person

Name and position in the company: _____

Telephone: _____

E-mail: _____

NOTES

NOTES