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1. INTRODUCTION

1.1. PURPOSE

Bigab hook lift trailers exists in 9 different types of modules with a variety of additional extras which all has it's own purpose but with the same unique flexibility. The flexibility lays in its ability to handle different kinds of loads on one and the same chassed. This allows the Bigab to be used at a wide range of different user applications.

Bigab 15 – 19 is the hook lift trailer for the farmer and/or entrepreneur with varying transport needs. The trailer is fully equipped to handle long and hard working hours. The trailer is possible to combine with lorry transports.

For your safety, it is extremely important that you follow the instructions presented in this instruction manual for your particular BIGAB model.

The unique flexible system gives operators the most cost effective and flexible transport system available. Behind the Bigab trailers lays more then forty year of knowledge and 25 years of product development.

We understand that you are anxious to get to work the trailer, but stop for a bit and take time to carefully read through this instruction book. The Bigab trailer is unique which also if not used properly could turn out to be dangerous. A few moments reading through the instruction book might save you time and money in the future.

We congratulate you at your chose of trailer and wish you and your Bigab all the best for the future!

EG-FORS MW
Manufacturer

EG – Försäkran om överensstämmelse med direktiv 2006/42/EG
EU-declaration of Conformity 2006/42/EG

Tillverkare:
Manufacturer:

Fors MW AS
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Lotland

Den tekniska dokumentationen är sammanställd av Leif Fors:
The technical file is compiled by Leif Fors;

Försäkrare kändes att denna uttåtning
Hereby confirm that this equipment:

1. Fordonstyp/Vehicle type: XXXX
2. Tillverkare/Manufacturer: XXXX
3. Serienummer/Chassis number: XXXX
4. Tillverkningskod/Manufacture code: XXXX
5. Tillverkningsår/Manufacture year: XXXX

Är tillverkad i överensstämmelse med direktiv 2006/42/EG och kan användas monerat tillsammans med annan utrustning för att utgöra en komplett maskin.
Is manufactured accordingly to demands in directive 2006/42 EG and therefore can be used mounted together with other equipment to provide a machine.

Utställningen får ej tas i bruk förrän den maskinen eller utrustningen som den skall ingå i överensstämmer med kraven i EG:s maskindirektiv.
The equipment can't be used before the machine or the formation that it will take place in, is accordingly to the demands of the EG machine directive.

Signatur:
Signature:
Leif FORS, CEO

Datum/Plats:
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EU declaration of conformity with Directive 2006/42 EC

1.2. TECHNICAL SPECIFICATIONS

Technical specifications.

Table 1.

Hooklift trailer	15-19
Frame: Hollow sections	250*100
Bogie: Pendulum	Axel distance 1470 mm
Hubs:	100*100, 10 bolts
Wheels:	500/60-22,5
Brake: Hydraulic drum *Depending on market	400*120 on 4 wheels
Towing eyelet:	Type for hitch hook
Support leg: Manual	yes
Light system: 12 volt	yes
Tractor hydraulic: *For brakes	2 double, *1 single action
Oil volume: With system filled	18 L
Oil volume cylinders:	Press 72 L, draw 54 L
Oil flow:	60 – 120 L/min
Hydraulic pressure:	22 Mpa
Tipp angle:	55 degrees
Chassi weight (±1%): Standard equipped	4100 kg
Chassi length (±50mm):	7290 mm
Distance eyelet to centred bogie (±20mm):	5700 mm
Distance eyelet to ground surface:	450 mm
Height at skid surface:	1140 mm excluding the hook frame
Wide over tyres (±30mm):	2450 mm
Container length:	5500-6500 mm
Total weight (±1%):	19100 kg
Max load including container (±1%):	16000 kg
Max hooking load including container (±1%):	16000kg
Pressure on eyelet: depending of lenght of container and load	2600 – 3500 kg
Max speed:	40 km/h

1.3. DESIGN OF THE DEVICE

The Trailer is constructed out of cold hollow steel sections. Through this construction the trailer receives maximum endurance and stiffness regarding both bending as well as twisting. The trailer is steady both in the tip as well as in the changing movement. The trailer is equipped with a strong pendulum bogie that has been equipped with brakes on all wheels.

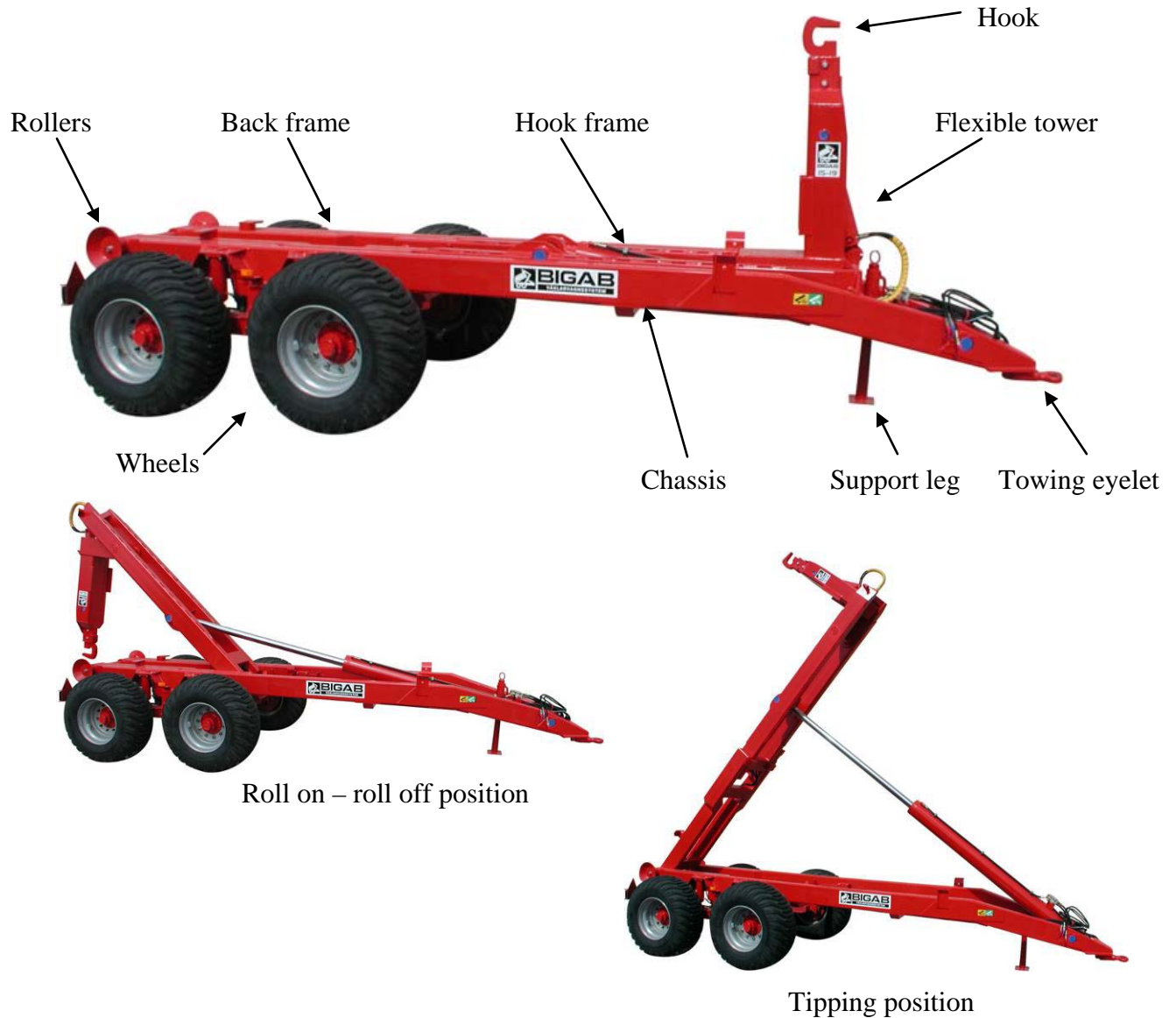


Figure 1. Design of the device

1.4. MAIN MODULES

The trailer consists of the following subassemblies and functional devices.

1.4.1. Chassis

Chassis is constructed out of cold hollow steel sections.

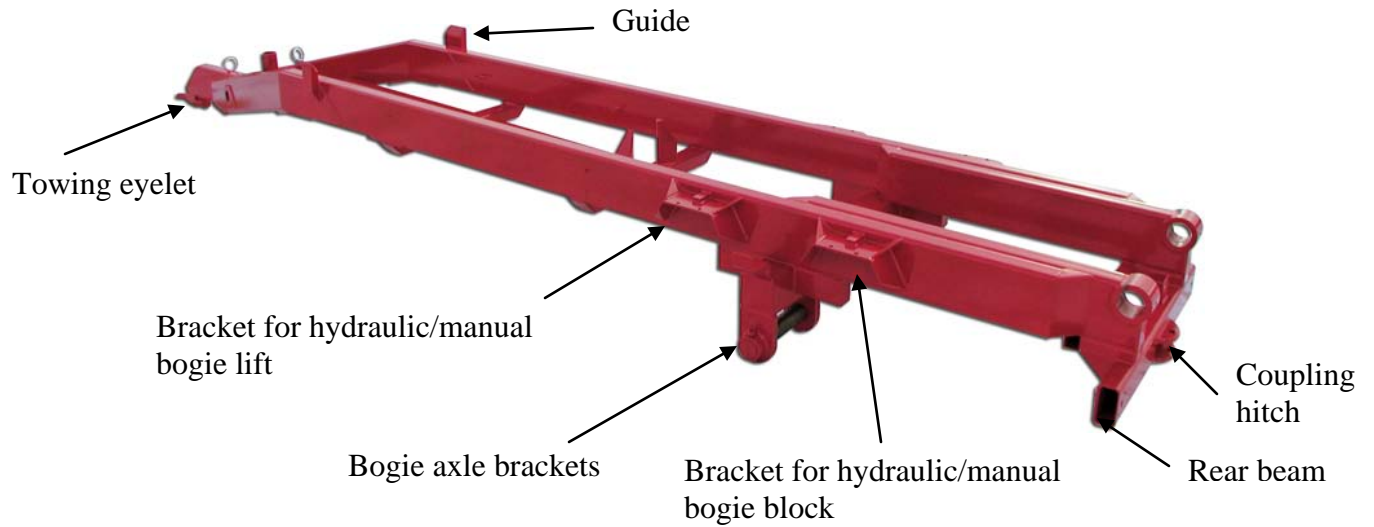


Figure 2a. Chassis with bogie block system

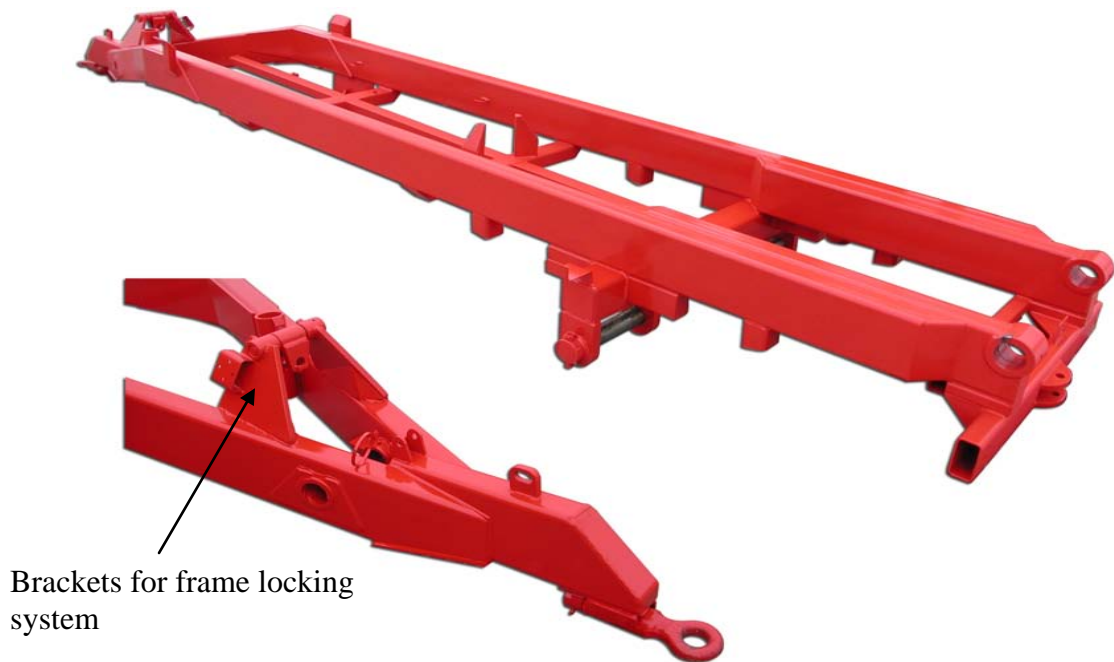


Figure 2b. Chassis with frame locking system

1.4.2. Back frame

Back frame is constructed out of cold hollow steel sections

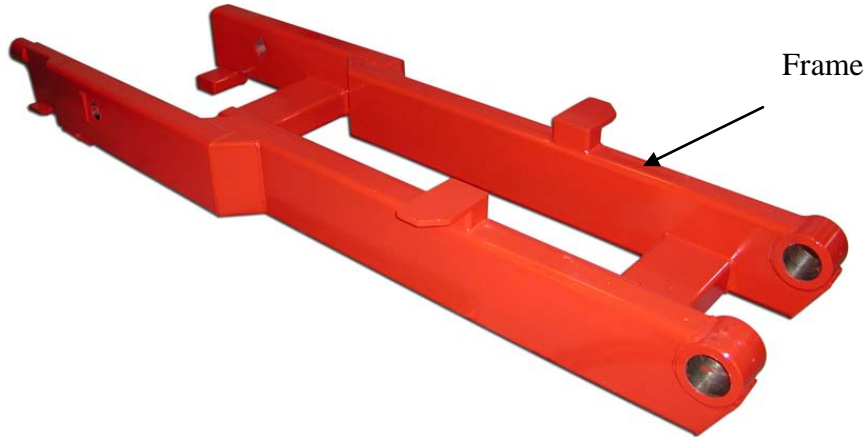


Figure 3. Back frame

1.4.3. Hook frame

The hooking frame is constructed from cold hollow steel sections

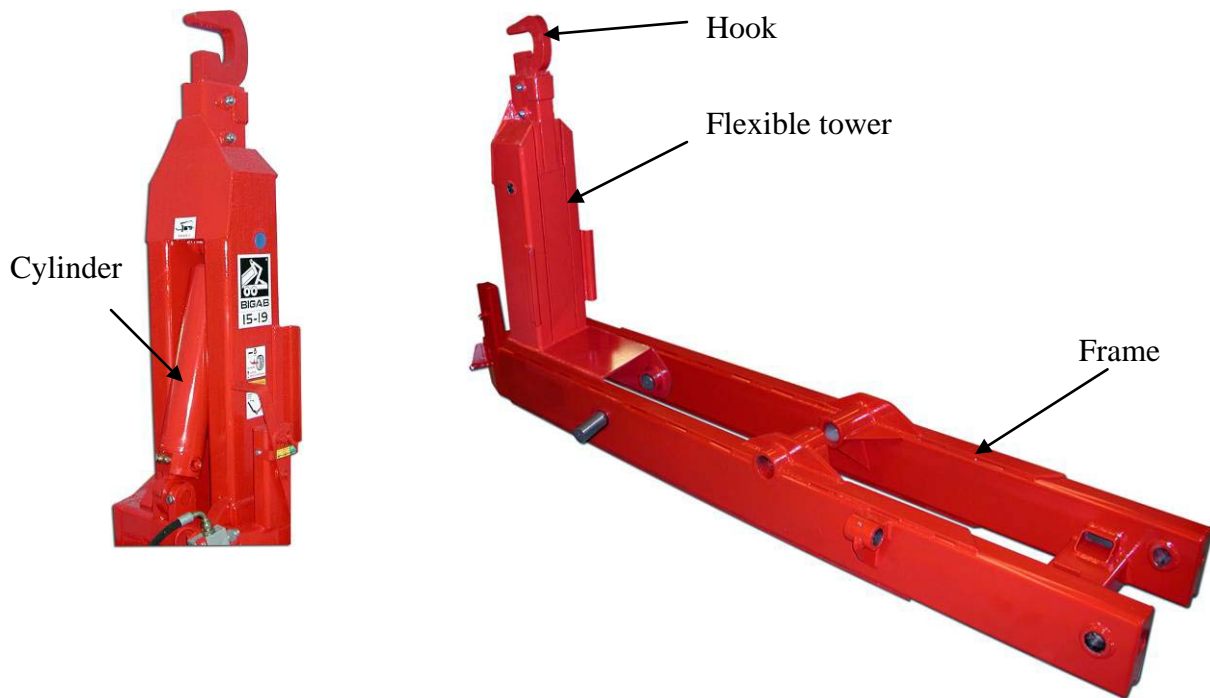


Figure 4. Hooking frame

1.4.4. Bogie

The trailer is equipped with a strong pendulum bogie that has been equipped with brakes on all wheels.

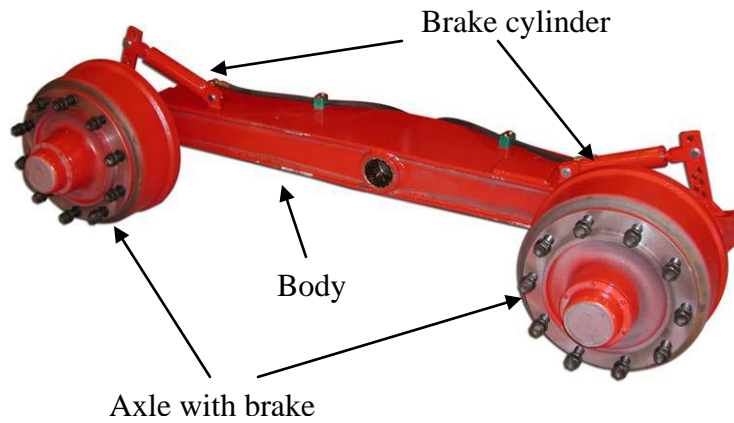


Figure 5. Bogie

1.4.5. Hook

The Trailer is equipped with adjustable hook for two different standard heights.

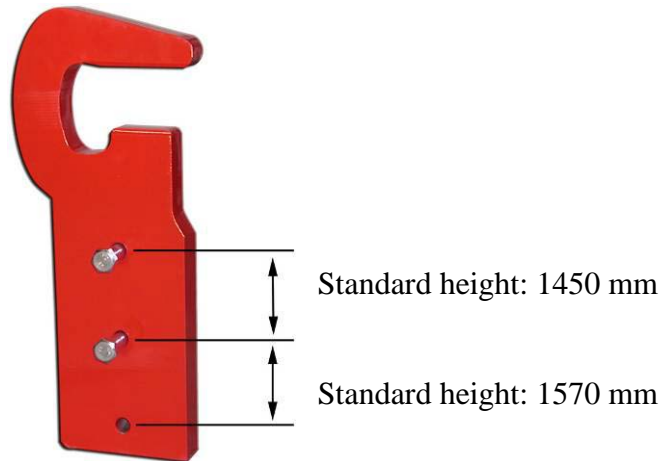


Figure 6. Hook

1.4.6. Support leg

Support leg is designed to be of supporting use when the trailer is under maintenance or when trailer is not in use. Before driving the support leg must be lifted up and fixed with the pin.

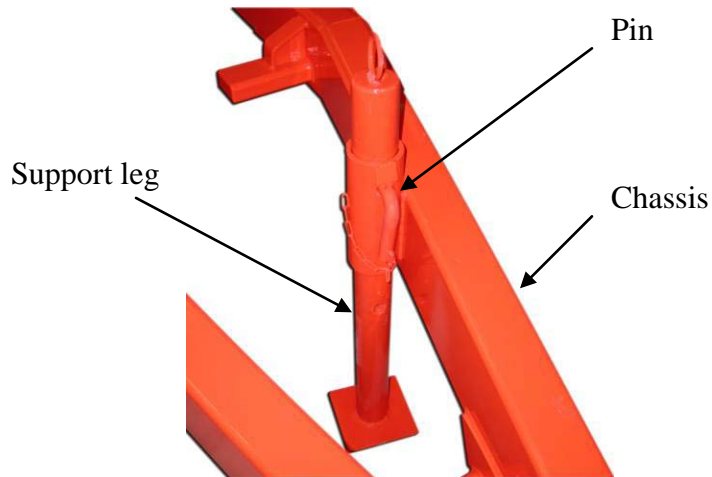


Figure 7. Support leg

1.4.7. Changing operation unit

This unit is designed for manual changing operation from rolling on - rolling off to tipping. Lever is located on the left side of the chassis. This function is also available with hydraulic drive as additional equipment.

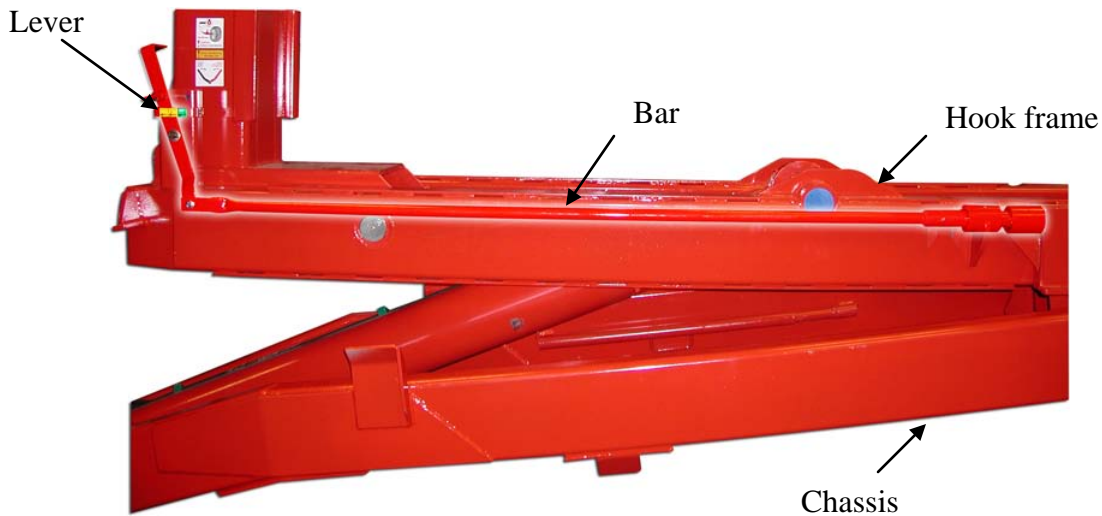


Figure 8. Changing operation unit

1.4.8. Towing eyelet

The eyelet is used to hitch the trailer to the pulling vehicle. It is **extremely** important that the towing eyelet is checked for defaults every time the trailer is used. The towing eyelet needs to be replaced at least once a year. It is up to the users responsibility to see to that this is done.

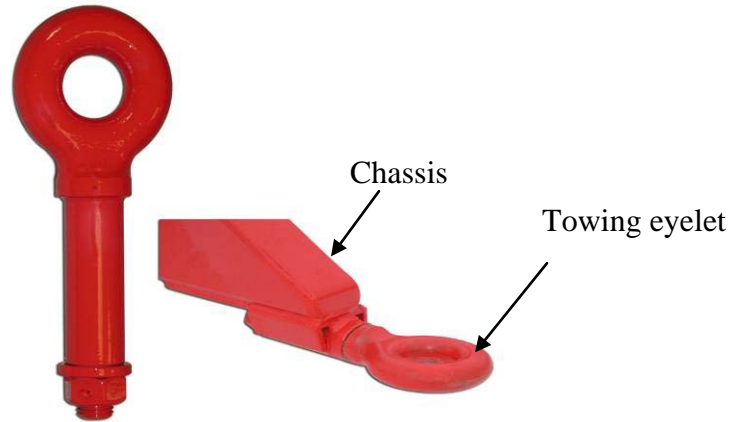


Figure 9. Towing eyelet

1.4.9. Coupling hitch

The coupling hitch is used for coupling other trailed devices to the trailer. Coupling hitch is also used for coupling reflector.



Figure 10. Reflector

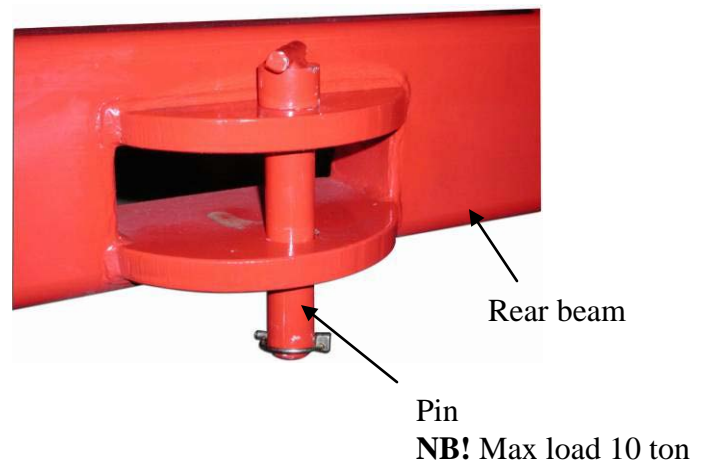


Figure 11. Coupling hitch

1.4.10. Steering rollers

The steering rollers are designed to guide the container. During handling roll on – roll off the container frame must be inside the rollers.



Figure 12. Steering rollers

1.4.11. Bogie block

The bogie block is used for bogie blocking during the handling of roll on – roll off. This function is also available with hydraulic drive.

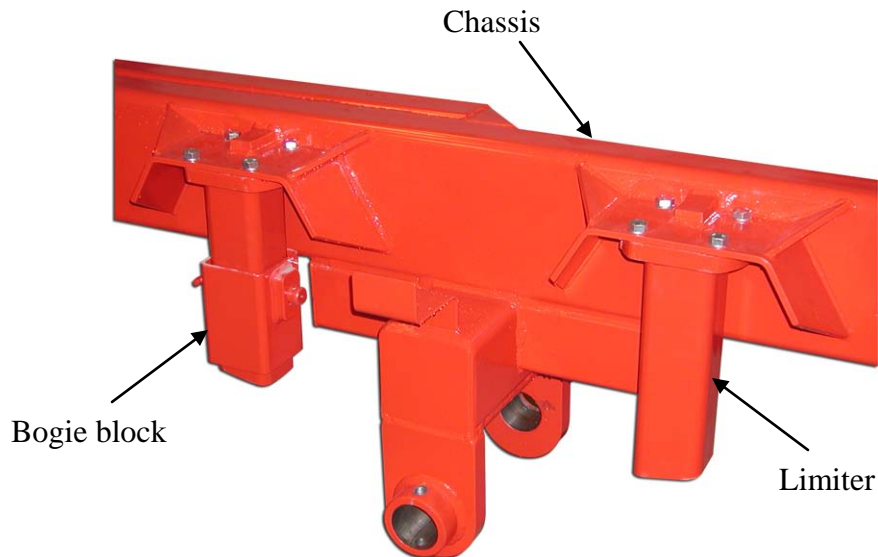


Figure 13. Bogie block

1.4.12. Frame lock



The hydraulic frame lock is used to lock the frame during the exchange function.

The manometer is present to indicate the tensile force on the cylinder. The manometer is set at 100 bar on delivery, but can subsequently be adjusted either up or down according to the size of the tractor.

1.4.13. Wheels

Wheels for different trailer types

Table 2.

Trailer type	Standard wheel type	Alternative wheel type	Air pressure (bar)	Speed (km/h)
15-19	500/60R-22,5		3,5	40
		600/50-22,5 ELS	3,2	40
		385/65-22.5	4,0	40
		445/65R-22.5		40

1.4.14. Hydraulic system

The trailer is equipped with a hydraulic system for working movements. See chapter 3.5

1.4.15. Electrical system

The trailer is manufactured with 12V electrical system. See chapter 3.4

1.4.16. Brake system

The trailer is equipped with hydraulic brake system. Also is available pneumatic brake system as an additional extra. The hydraulic pressure in the brake line is not allowed to raise over 16 Mpa. If using too high of a hydraulic pressure the tappet of the brake arm might go from centum and lock the brakes.

1.5. SAFETY DEVICES

1.5.1. Security post

Always use the safety support when carrying out service work in the tipped position. The safety support may not be used under any circumstances when the container bridge is loaded.

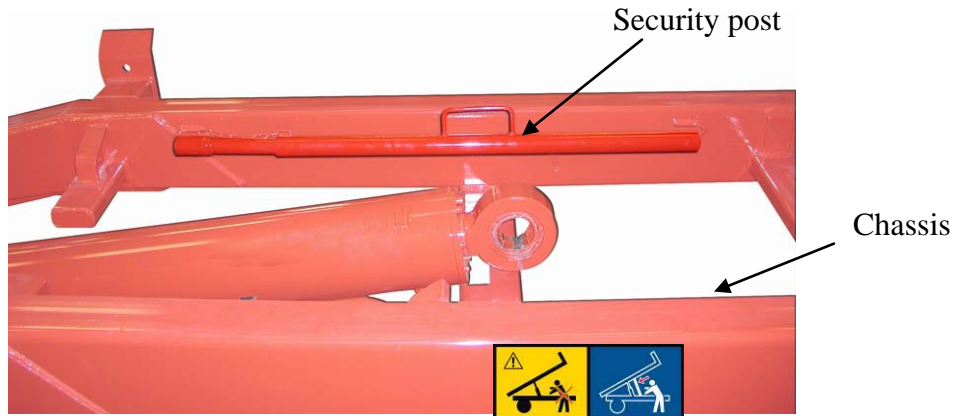


Figure 15. Security post

1.5.2. Location of the decals on the trailer

The trailer is equipped with a range of signs relating both to safety and information. Check that all the signs are in the correct positions.

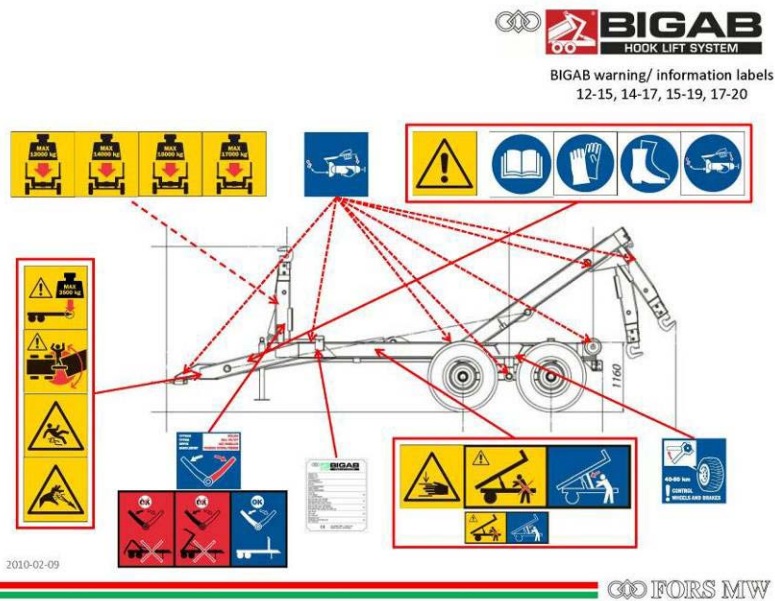


Figure 16. Location of the decals on the trailer

1.5.3. Presentation of decals



Figure 17. Warning triangle and instruction manual decal.

The trailer is supplied with a warning triangle alongside the instruction manual decal in order to reinforce the requirement for the user to read the entire instruction manual carefully before starting to use the trailer. Ignoring this can entail a danger to life.



Figure 18. Decal for the use of safety equipment.

These decals challenge the user to employ appropriate safety equipment in order to avoid injury when using the trailer.



Figure 19. Risk of clamping injuries

There is a risk of clamping or crushing injuries during work and maintenance.



Figure 20. Hazardous area

Standing between the trailer and the towing vehicle when the trailer is being operated, moved with frame steering or when other functions are activated between trailer and tractor, can be potentially fatal. As the driver, you must always ensure that the area around the machine is free of people.



Figure 21. Risk of slipping

There is a risk of slipping as the surfaces of the trailer can be slippery due to precipitation in combination with pre-existing oil and/or clay on the surface. The ground around the trailer can also become slippery, as the tyres can tear up the surface and expose clay and soil.



Figure 22. Hydraulic fluid under pressure

Hot hydraulic fluid at high pressure levels can occur in the hydraulic system. Take care when connecting, and replace poor quality hoses.



Figure 23. Using the exchange unit

The exchange unit may not be operated unless the frame is folded down. During transport with the trailer, the hook must be folded down in the parking position.



Figure 24. Use the safety support during all service



Leaning under the raised frame is absolutely prohibited unless it is blocked with the safety support. Under no circumstances may the trailer be carrying either a load or a container when using the safety support.



Figure 25. Max. load



It is absolutely prohibited to load more than the amount your model is intended to handle. This can result in danger to you and your surroundings.



Figure 26. Max. pressure on towing eyelet



Ensure that you do not load in such a way that the pressure on the towing eyelet exceeds the permitted laws and regulations. The trailer is designed for a maximum pressure of 3,500 kg on the towing eyelet. The pressure is largely determined by the way the load is distributed on the container bridge, and it is the user's responsibility to ensure that this is not exceeded.



Figure 27. Tyre inspection

The tyres must be tightened and the brakes checked regularly at a minimum interval of 40–50 kilometres.

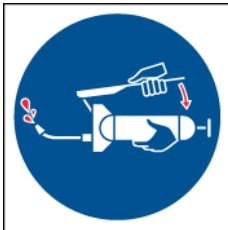


Figure 28. Lubrication.

This decal is used to show the importance of regular lubrication of the trailer.



	
PRODUKT TYP PRODUCT TYPE FAHRZEUG TYP	
TILLVERKNINGSÅR YEAR OF PRODUCTION BAUJAHR	
TILLVERKNINGSNUMMER SERIAL NUMBER HERSTELLUNGSNUMMER	
TOTALVIKT TOTAL WEIGHT	KG
ZUL. GESAMTGEWICHT	
MAX LAST INKL. FLAK: TIPPING MAX LOAD INCL. BODY: TIPPING	KG
MAX GEWICHT INKL. AUFBAU: KIPPEN	
MAX LAST INKL. FLAK: FLAKVÄXLING MAX LOAD INCL. BODY: RÖLLJÄNRELOF	KG
MAX GEWICHT INKL. AUFBAU: AUF-ABROLLEN	
AXEL TRYCK AXLE LOAD	KG
ZUL. RÄKSLAST	
MAX KROKTRYCK ADMISSIBLE SUPPORTING LOAD	KG
ZUL. STÜTZLAST	
 AS FORS MW • TULE 30 76505 SAUE • ESTONIA	

Figure 29. Data plate

Tightening torque for nuts

Table 3.

Nuts with spherical collar, conical nuts. Screws with spherical collar.	Thread	Dished discs	Flat discs (St37)	Flat discs (St52)
				Screw Class. 8.8
			N.m.	
	M18x1,5	310	330	460
	M20x1,5	-	490	630
	M22x1,5	-	630	740
Flat collar nut with lock washer	M18x1,5	210	270	360
	M20x1,5	-	360	450
	M22x1,5	-	460	550
Nut with flat seat captive washer	M18x1,5		260	360
	M20x1,5		350	500
	M22x1,5		450	650
Screwed connection disc/rim on track adjustable wheels	Thread	Flat discs		
		Screw Class. 8.8		
	M18x1,5	260-330		



Figure 30. Lubricate points.

All of the hydraulic hoses of the trailer are marked with colored labels. See table below for more detailed information. Functions depend of the hydraulic system configuration.

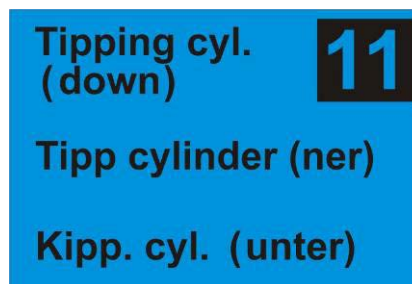


Figure 31. Hydraulic hose label (example tipping cylinder)

Hose label colors:

- Red - oil from pump.
- Blue - oil to tank.
- Yellow - Brake

Marking for hydraulic hoses

Table 4.

No.	Color mark	Function
1	Yellow	Brake
10	Red	Tipping cyl. (up)
11	Blue	Tipping cyl. (down)
12	Red	Tower (front)
13	Blue	Tower (back)
14	Red	Telescope (in)
15	Blue	Telescope (out)
16	Red	Frame-lock for tipping
17	Blue	Frame-lock for hooking
18	Red	Bogie-block (on)
19	Blue	Bogie-block (off)
20	Red	Bogie-lift (on)
21	Blue	Bogie-lift (off)
22	Red	Extra port (a)
23	Blue	Extra port (b)
24	Red	Rear tailgate (a)
25	Blue	Rear tailgate (b)
26	Red	Steering control (p)
27	Blue	Steering control (t)
28	Blue	Straight steering control (t)

2. INSTALLATION

2.1. UNPACKING

Before unpacking, check visually that the trailer is not damaged during transportation. If the trailer is damaged, inform about this to the company that transported the trailer and the manufacturer of the product immediately.

- Usage of the trailer is strictly forbidden if safety devices of the trailer are damaged. For more detailed information about safety devices see 1.5
- When you are unpacking the trailer be careful: do not damage sensitive components, do not change factory settings or damage paint or other surface finishes.
- Lift up the trailer from transportation frame.
- Lower the trailer to the floor.
- Be careful when lifting so that cables, connectors or other components are not damaged for instance between lift work and trailer frame.
- Weight depends see technical information for data.

2.2. ADJUSTMENTS

Quick couplings are used in the operation of connecting the vehicle in use with the trailer. These couplings serve to disconnect the hoses without their breakage and to prevent loss of oil under accidental strain and pull.

2.3. WITHDRAWAL FROM USE AND STORAGE

- It is not allowed to store the trailer in a cold and/or damp environment for a long period.
- All metal parts are recyclable and should when time comes be handed over to a recycler.

3. FUNCTIONAL DESCRIPTION

3.1. HANDLING IN ROLL ON – ROLL OFF

If your BIGAB is equipped with suspension there is no bogie blocking.

Exchange and tipping must be operated from the operator's seat in the towing vehicle!

Figure 1

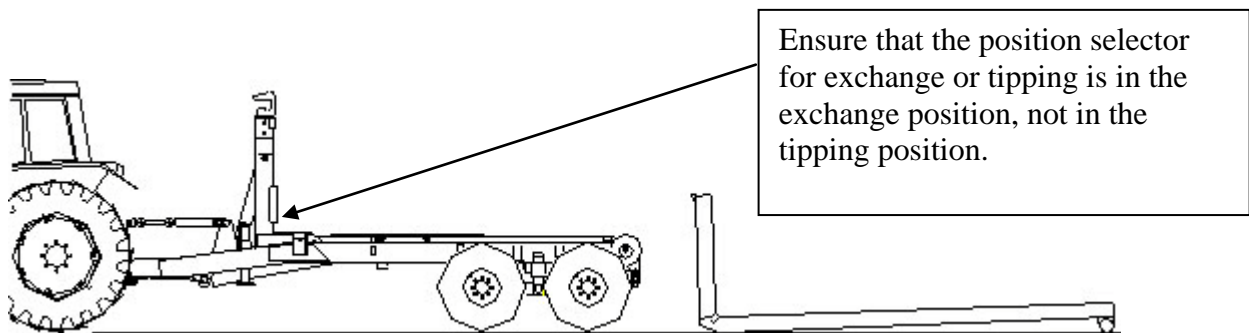
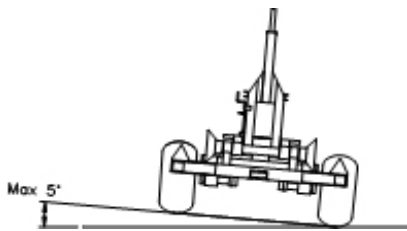


Figure 2



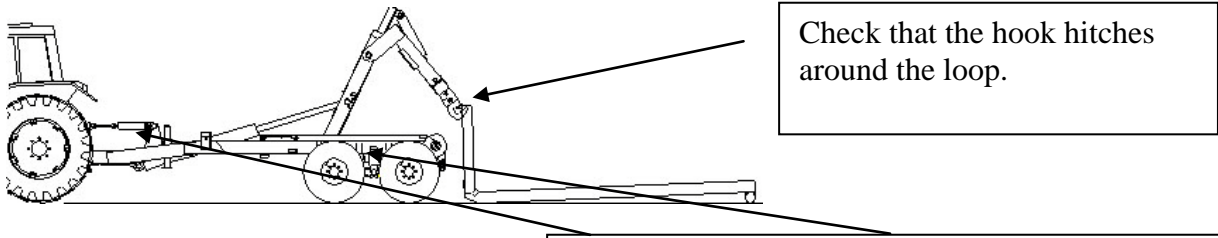
Place the hooklift trailer on a flat surface. The sideways incline may not exceed 5 degrees.

Failure to read this instruction manual can be potentially fatal!

Under no circumstances may you reverse/exert pressure with the towing vehicle in order to facilitate exchange. This entails an immediately risk of the trailer or the towing vehicle being damaged, which can be potentially fatal. The load must be pulled on and the trailer and the towing vehicle must roll in under the freely suspended load.

Figure 3

STOP
Stop if the tractor lifts off the ground!



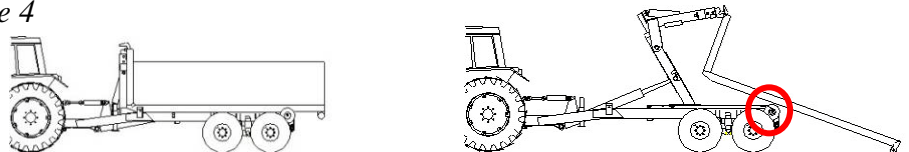
On-loading!

- Check that the load carrier is inside towing vehicle and the trailer to make it easier to roll on the load. Check the position of the tower during on-loading so that the container bridge's frame does not catch on the rollers from behind.
- The tower must be fully retracted when rolling on the container bridge in order to increase lifting force and reduce the strain on the towing eyelet. Ensure that the container frame does not catch in the rollers at the back of the trailer. Adjust the tower upwards continually during exchange in order to move past the rollers. If the tower is not adjusted upwards during on-loading, there is a considerable risk of the exchange's lock being damaged if the container frame catches in the rollers.

Check that the frame lock and bogie blocking are activated.

IMPORTANT! Follow the movement with the retractable tower so that the front of the hooklift trailer's frame does not catch on the rollers. When you have passed the rollers, always keep the hooklift trailer's frame close to the rollers.

Figure 4



Off-loading!

Release the brakes on both the towing vehicle and the trailer to make it easier to roll off the load. Check the position of the tower during off-loading so that the container bridge's frame does not catch on the rollers from above.

Lock the frame and activate bogie blocking between the towing vehicle and trailer.

1. Raise the hooklift frame slightly so that the container bridge does not scrape against the frame when off-loading the container bridge.
2. Then retract the tower so that the locking rails/wings on the container bridge frame move freely and cannot be damaged.
3. Adjust the tower upwards continually so that the container frame does not catch on the rollers at the back of the trailer during off-loading.
4. If the tower is not adjusted upwards during off-loading, there is a considerable risk of the exchange's lock being damaged if the container frame catches in the rollers.

3.2. HANDLING IN TIPPING

Note! For the models mentioned in this instruction manual, the maximum container bridge length is 6.0 m during tipping. Ensure that the towing vehicle and the trailer are securely coupled before tipping.

Figure 1

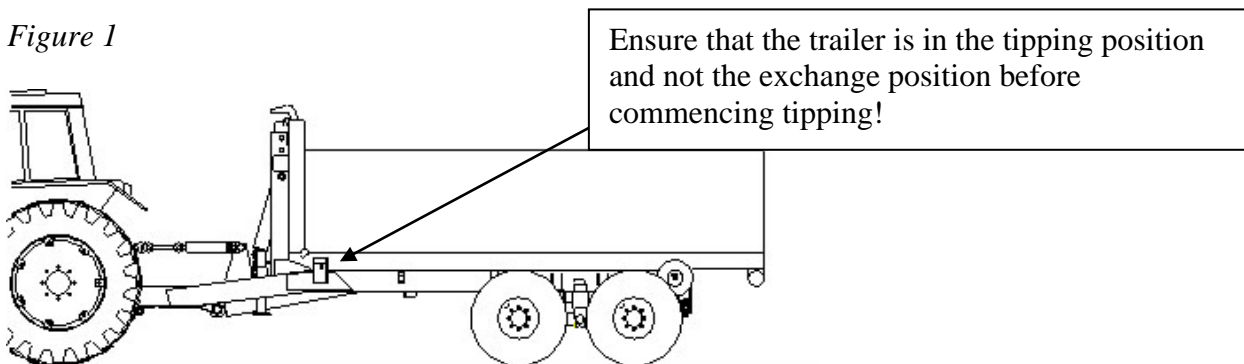
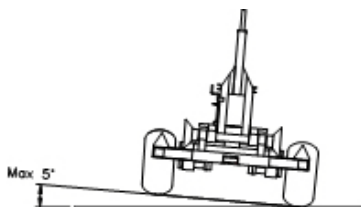


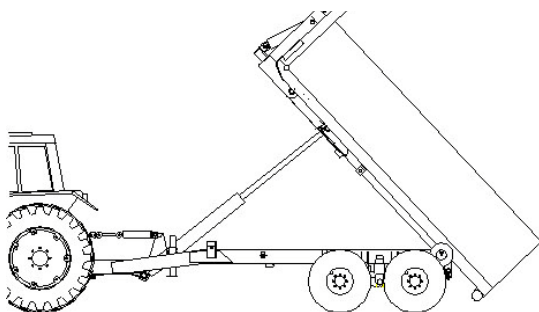
Figure 2



Place the hooklift trailer on a flat surface. The sideways incline may not exceed 5 degrees.

Figure 3

At maximum tipping – drive slowly forwards until the container bridge is empty. Lower the container bridge before continuing to drive. Important! Ensure that the container bridge is locked in the correct position before driving.



IMPORTANT!

When tipping, use the brakes to ensure that the machine does not roll away when the load slides off.

3.3. OPERATION WHEN DRIVING

It is the responsibility of the user to ensure that a sufficiently powerful and heavy towing vehicle is coupled to the trailer in all situations. The use of a towing vehicle that is too small and insufficiently powerful can entail risks for the user and the surrounding environment, as well as leading to damage to the vehicle and trailer.

Load* (excl. the container's dead weight)

Load	Kg/m ³	Full container 7 m ³	14 m ³	21 m ³	27 m ³
Peas, Wheat, water content 15%	800	5,600 kg	11,200	16,800	21,600
Rye, water content 15%	750	5,250 kg	10,500	15,750	20,250
Barley, water content 15%	680	4,760 kg	9,520	14,280	18,360
Oats, water content 15%	560	3,920 kg	7,840	11,760	15,120
Silage, newly harvested	850	5,950 kg	11,900	17,850	22,950
Macadam	1400	9,800 kg	19,600	29,400	37,800
Gravel	1550	10,850 kg	21,700	32,550	41,850
Clay	1800	12,600 kg	25,200	37,800	48,600
Wood chips (50% moisture content)	350	2,450 kg	4,900	7,350	9,450

*The higher the moisture content of the load, the heavier the load, a fact that the user has to take into consideration. This table is only an approximate estimate of the weights that can occur, and it is the responsibility of the user to ensure that the vehicle's limits and the applicable legislation are not being exceeded. The specified values are not exact values, just examples.

Figure 32. Example of weight with different types of load

For information purposes and for examples of how much different loads can weigh, please refer to the above table. This table should only be viewed as guidance and information. The manufacturer cannot be held responsible for dimensions or volumes specified in the table, and the table may only be viewed as a recommendation.

3.3.1. Load on towing eyelet and coupling

Always adapt your driving to the load, road conditions and your level of experience. Do not exceed the maximum speed specified for the trailer. Ensure that you have the correct pressure on the tow hook when you are driving. Ensure that you do not exceed the intended upwards and downwards pressures on the trailer's towing eyelet and the coupling to the hook device. The given ideal conditions and theoretical calculations indicate the following maximum load values, and it is recommended that the user observes these load values.

Max. load upwards in kg

BIGAB 15 - 19 3700kg

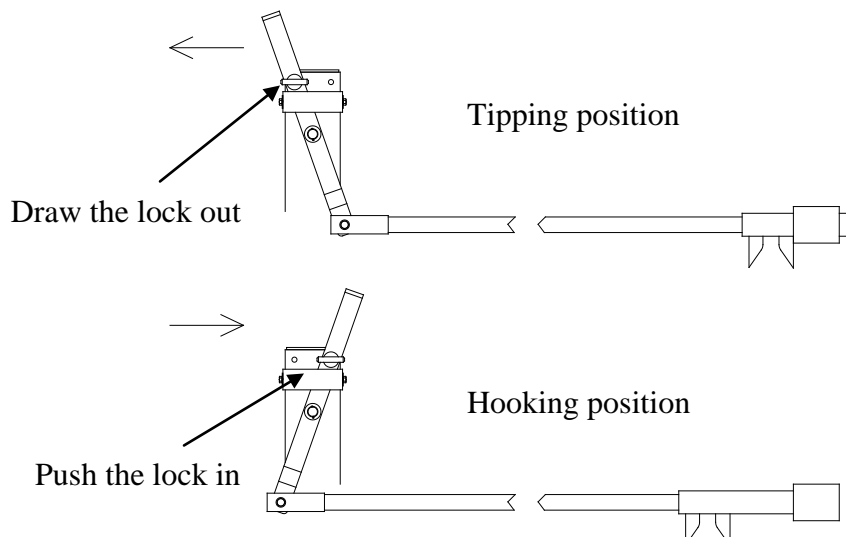
Max. load distributed evenly over the container.

Max. load downwards in kg

BIGAB 15 - 19 3500kg

3.4. CHANGING OPERATING FUNCTION

Figure 21 shows the lever for manually changing between the operating functions. The lever is located on the left side of the chassis. This operating function is also available with hydraulic drive.



Note! The bolt needs to be locked within the handles extreme position

Figure 32. Changing operating function

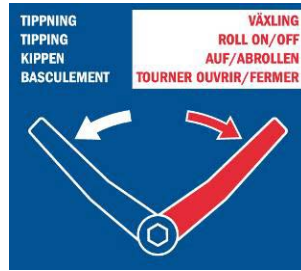


Figure 33. Labels

3.5. ELECTRICAL SYSTEM

The trailer is manufactured with 12V electrical system. Configuration depends of options, example reversing light, border light or additional cable connector.

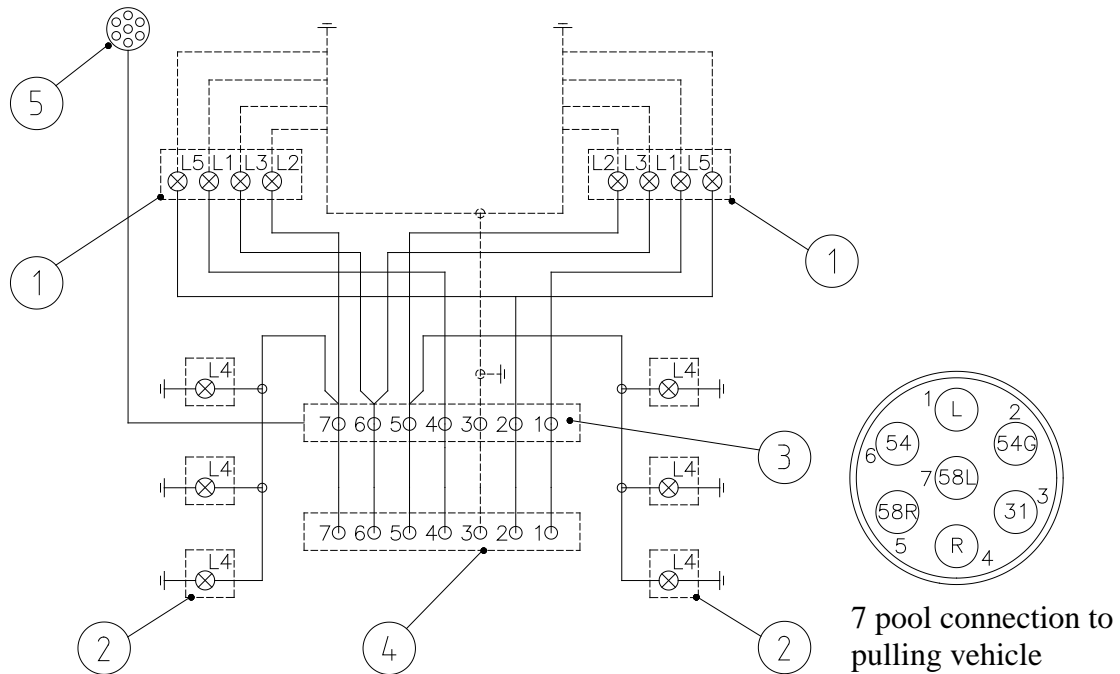


Figure 34. Electrical diagram

Electrical components.

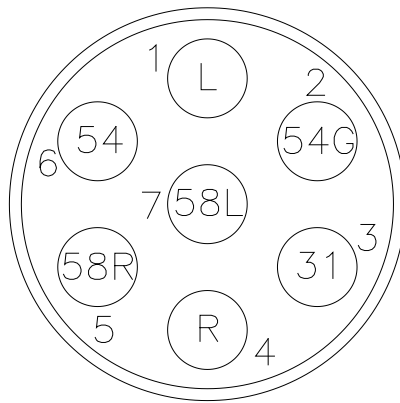
Table 5.

Pos.	Art. No.	Title
1	920765	Rear light
1	920766	Rear light with reversing light - special
2	920770	Border light 111x40 (orange) - special
3	920715	Cable terminal
4	920695	Cable Connector 7 pools (male)
5	920180	Cable Connector 7 pools (female) -special

Connections of the cables and lamps.

Table 6.

Nr.	Color	Function	Lamp
1	Red	Flashing left	12V-21W (L1)
2	Brown	Reversing light	12V-21W (L5)
2	Brown	Spare (without reversing light)	
3	Yellow	Earth	
4	Blue	Flashing right	12V-21W (L1)
5	Grey	Rear right	12V-21W (L2)
5	Brown	Side marking	12V-5W (L4)
6	Black	Brake light	12V-10W (L3)
7	Green	Rear left	12V-21W (L2)
7	Brown	Side marking	12V-5W (L4)



3.6. HYDRAULICAL SYSTEM

3.6.1. Main hydraulic system

The trailer is delivered with filled up and tested hydraulic system. The hydraulic system consists of the functional components showed in the figure below. Technical data and configuration depends on the type of trailer (see table 1). The hydraulic system is filled up with hydraulic oil VMGZ or SAE100R16. It is applied as a working fluid of the hydraulic systems for operating in the open air at temperatures ranging from -50°C up to $+60^{\circ}\text{C}$ at a continuous operation service. For hydraulic system maintenance see chapter 5.

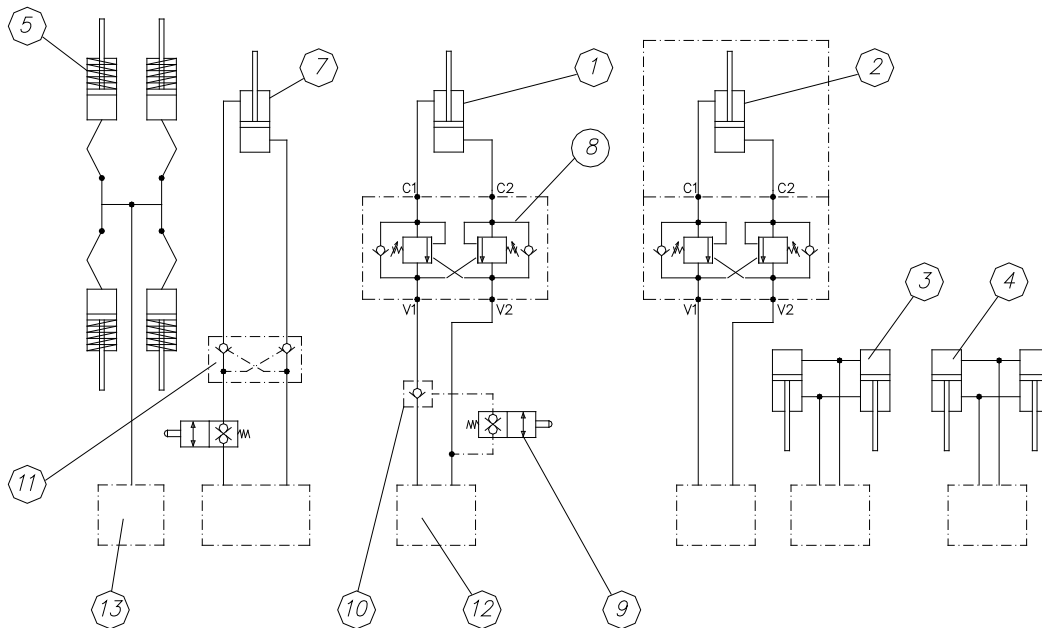


Figure35. Hydraulic system.

Hydraulic components

Table 7.

Pos.	Art. No.	Title
1	913267	Tipping / Rolling cylinder with pilot operated valve
2	913240	Tower cylinder
3	313158	Bogie block
4	313158	Bogie lift
5	913212	Brake cylinder
7	913230	Operation changing cylinder
8	913630	Pilot operated valve
9	913640	End of stroke valve (Note! only with pos. 7)
10	915200	Pilot operated check valve (Note! only with pos. 7)
11	915201	Pilot operated double check valve (Note! only with pos. 7)
12	-	Main connector of pulling vehicle
13	914570	Brake quick coupling 1/2"

3.6.2. Frame lock hydraulic system

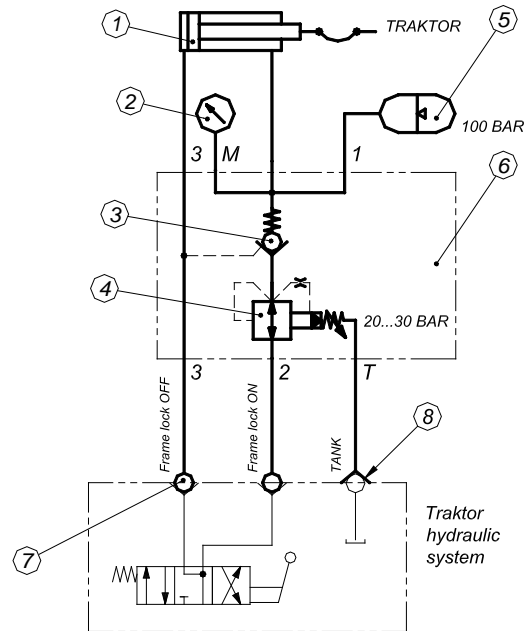


Figure 36. Frame lock hydraulic system.

Hydraulic components for frame lock

Table 8.

Pos.	Art. No.	Title
1	313134	Cylinder 90/40-300
2	915275	Manometer
3	915271	Pilot operated check valve
4	915266	Pressure reducing/relieving valve
5	915280	Hydro-pneumatic accumulator
6	915265	Manifold
7	914570	Bayonet coupling male
8	9145702	Bayonet coupling female

4. SAFETY INSTRUCTIONS

IMPORTANT:



READ AND UNDERSTAND THE USER MANUAL CAREFULLY BEFORE USING THE DEVICE. CONSULT THE USER MANUAL TO SOLVE YOUR PROBLEMS. THE DEVICE HAS AN IDENTIFICATION LABEL ON IT. BEFORE USING THE TRAILER, ENSURE THAT FACTORY SETTINGS HAVE NOT CHANGED AND THERE ARE NO PARTS BECOME LOOSE DURING TRANSPORTATION. MAKE SURE THAT ALL WARNING SIGNS LABELS AND TAPES ARE IN THE APPROPRIATE PLACES.

THE TOWING EYELET MUST BE CONTROLLED FOR DEFAULTS EVERY TIME BEFORE THE TRAILER IS USED. THE TOWING EYELET NEEDS TO BE CHANGED AT LEAST ONCE A YEAR. IT IS UP TO THE USER OF THE TRAILER TO SEE IT THAT THIS IS DONE.

4.1. GENERAL

Before you start to work:

- Carefully examine the trailer.
- Check that all joints are connected tightly.
- Check that the trailer is located on hitch hook.
- Check the lights.
- Check that the brakes are functioning.
- Check that hydraulic hoses and couplings are intact and free from cracks.
- Check that all hydraulic functions are working.
- Check the towing eyelet for defaults.
- Control brakes.
- Control the lights.
- Remember that it is not allowed to use this unit for functions not confirmed by producer.
- Be aware that a long container needs enough working space and turning area.
- Respect the safety distance.
- Never stand by the drawbar when connecting and disconnecting or when functions between the towing vehicle and trailer are activated.
- Be sure that nobody is in the working area of the trailer.
- Do not exceed maximum loading values.
- Always engage the base machines parking brakes before loading. If necessary put some obstacles in front of wheels.
- Study safety instruction.

During maintenance:

- Be sure that the trailer is standing on a flat surface.
- Be sure that the trailer can't move.
- When lubrication or servicing the trailer, turn off the vehicle engine.
- Be sure that the trailer can't slip when using support leg, jack or similar equipment.
- Always use the security post in tipping position when servicing.
- Never attempt to do maintenance work on the hydraulic system before you are sure there is no pressure.
- Do not tighten or repair leaking hydraulic couplings while the system is pressurized.
- Never attempt to localize a leakage from hoses or connections by feeling with hand. The high-pressure oil jet can penetrate skin and cause serious burns and damages. High-pressure oil is also highly flammable.
- Avoid getting oil into eyes. Use safety goggles and gloves. If oil has got into eyes flush them with cool water and immediately contact a doctor.

Figure 37. Safety



Note!

It is strictly forbidden to lean under the container body without using the security post!

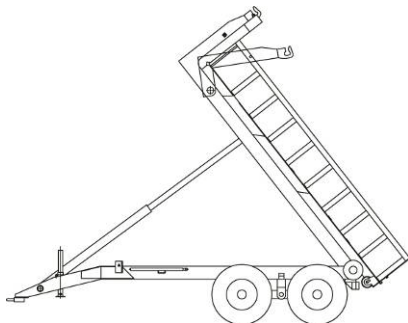


Figure 38. Raised container bridge

Never drive under obstacles such as bridges, electrical cables, etc., with the container bridge raised.

Driving:

- Don't forget to lift the support leg up before driving.
- Do not exceed maximum travel speed.
- Never make sharp turns at great travel speed.
- Long container needs enough working space and turning area.
- Do not exceed maximum loading values
- Be sure that the container is firmly fixed before driving.
- Recommended load placement - symmetrical.

4.2. WORKING AT EXTREME CONDITIONS

Recommended working temperature range for a Bigab trailer is -30°C up to $+40^{\circ}\text{C}$.

Note that working at low temperatures accelerates hydraulic gaskets wearing and increases hydraulic hoses exposure to damages and steel constructions exposure to brittle fracture. When working at lower temperature than recommended, lift lighter loads than usual.

Before starting to work in cold conditions let the oil circulate freely through the system a few minutes. Slowly work every action through several times so that gaskets come pliable before they receive full pressure.

At exceptionally warm conditions beware of hydraulic oils excessive heating. Too high oil temperature (higher $+80^{\circ}\text{C}$) degrades oil and damages gaskets.

4.3. ACTING IN DANGEROUS SITUATION

If the trailer comes into contact with high voltage electric wires comply with the following instructions:

IF YOU ARE OUTSIDE THE MACHINE

Do not attempt to get into the machine. Keep everybody out from the machines vicinity. Do not touch any part of machine.

IF YOU ARE INSIDE THE MACHINE

Get out of it by JUMPING. Avoid touching any conducting parts. Do not make yourself a wire through which electricity may flow. Get away from the machine by JUMPING so that both feet do not touch the ground at the same time. Electric field at ground can cause fatal voltage between legs. At about 20 meters away you should be safe but this is of course a questions of circumstances.

5. MAINTENANCE / SPARE PARTS

5.1. MAINTENANCE SCHEDULE

All kinds of maintenance work are subdivided into two groups: operating (preventive) and compulsory (scheduled).

The need for operating maintenance is determined based on the results of checking.

General

- Maintenance works must be carried out regularly to ensure safe and malfunction-free operations.
- Maintenance works does not require any special tools. The user can perform most of the operations.
- Use correct tools.
- Attempt to localize the defects as clearly as possible; you should have to avoid opening the system unnecessarily.
- Keep disassembled parts and repair area protected from dirt.
- Keep spare parts in their packages until needed for installation.
- Valve adjustments and repairs are recommended to be handled by service personnel.

Daily inspections:

- Examine visually the loader. Note defects and failures that might affect safety. Repair possible defects and failures.
- Check so there is no leakages on hydraulic system, or damaged hoses.
- Work through every function to its extreme position.
- Check the oil level.

Weekly maintenance:

- Clean the trailer regularly with sponge and soap.
- When cleaning never use hot water under high pressure, it will remove the grease from bearings.
- Check the operation of the device.
- Check hydraulic pressure.
- Check the brake condition.
- Control wheel nut tightness. When tightening the locking force must be 330-370 Nm.
- Check the lights, reflectors and bulbs.

Monthly maintenance:

- Check the air pressure in tires.
- Check if there is enough lubricant on glide surfaces.
- Clean and lubricate hydraulic cylinders.
- Check hydraulic hoses for damages.

Recommended lubricants:

BRAND	TYPE
BP	Energrease LS-EP2, L2M
ESSO	Beacon EP2, Multipurpose GR Moly
MOBIL	Mobilux EP2, Mobil Grease MP Special
SHELL	Alvania EP Grease 2
UNION/TEXACO	Marfak Multi-Purpose 2, Molytex Grease 2

5.2. MAINTENANCE OPERATIONS



IMPORTANT:

BEFORE MAINTENANCE AND SERVICE OPERATIONS READ AND UNDERSTAND THE SAFETY INSTRUCTION.

During maintenance:

- Be sure that the trailer is standing on a flat surface.
- Be sure that the trailer can't move.
- When lubrication or servicing the trailer, turn off the vehicle engine.
- Be sure that the trailer can't slip when you using support leg, jack or similar equipment.
- Always use the security post in tipping position when servicing.
- Never attempt to do maintenance works on the hydraulic system before you are sure there is no pressure.
- Do not tighten or repair leaking hydraulic couplings while the system is pressurized.
- Never attempt to localize a leakage from hoses or connections by feeling with hand. The high-pressure oil jet can penetrate skin and cause serious burns and damages. High-pressure oil is also highly flammable.
- Avoid getting oil into eyes. Use safety goggles and gloves. If oil has got into eyes flush them with cool water, after contact the doctor.

5.2.1. Surface cleaning

Remove accumulated dust and dirt. Painted outer surfaces should be cleaned regularly with sponge and soap. When cleaning never use hot water under high pressure, it will remove the grease from bearings.

5.2.2. Maintenance of the hydraulic units

Hydraulic system is shown in chapter 3.5.

- Clean and lubricate piston rods of hydraulic cylinders.
- Check the hydraulic valves:
Check visually hydraulic valves. In case of leaking replace the damaged valve.
- Check hydraulic hoses:
Check visually hydraulic hoses and union pipe connections. Replace a hose in case of leaking or if there are ruptures or slashes on it.
- Check the level of oil, add and replace oil.
- Check the operation of the device.

When replacing hydraulic components such as hoses, gaskets etc, make sure they correspond with original parts. To avoid malfunctions and ensure safe operation use original spare parts.

Changing the seals

Change all cylinder seals at the same time. The piston cannot be split. The seals must be slipped over the piston edge. Be careful not to break the seals when fitting them in place.

- After removing the old seals clean the grooves carefully before fitting the new seals into place.
- Lubricate the new seals with hydraulic oil.
- Open the pistons lock nut.
- Screw the piston off.
- Withdraw the guide piece from the rod.
- Change the guide piece seals; make sure that the piston rod seal is the right way round, i.e. the lip against the pressure.

NB: Never operate the hydraulic system with the level of oil dropping below the lower mark.

5.2.3. Maintenance of the pneumatic units

- Clean and lubricate piston rods of pneumatic cylinders.
- Emptying the water collector:
Condensed water is removed from the air tank located in the side of trailer.
- Check the pneumatic valves:
Check the pneumatic valves by listening to the working sound. In case of leaking replace the damaged valve.
- Check pneumatic hoses:
Check visually pneumatic hoses and union pipe connections. Replace a hose if there are ruptures or slashes on it.
- Check the operation of the device.

5.2.4. Maintenance of the electrical components

The trailer is manufactured with 12V electrical system. Electrical system is shown in chapter 3.4.

The wires to the electrical equipment are of different colors, which facilitate the location of the wire leads connecting individual items of the electrical equipment. Refer to the electrical diagram (figure 23) to ensure a correct subsequent reconnection of the electrical units and also when checking the operation of the equipments and individual electric circuits.

- Clean and check the lights:
In case of fault replace the lamp. If the lamp keeps on braking repeatedly, find out the case of the matter.
- Check electrical connectors:
Clean them of dirt and dust.
- Check wires insulation:
Check wire insulation, wire joints and protection of insulation against rubbing during jolting and contacting the trailer parts. Protect the wires from oil and fuel, which ruin insulation. Wipe dirty wires.

NB: Join and disjoin plug connectors only with dead circuits.

5.2.5. Maintenance of the brake system

The trailer is manufactured with a hydraulically functioned brake system. Air brake system with negative or positive action is optional.

Control the brakes regularly. Test the brakes at least once per week while trailer is working.

See to it that no lubricant penetrates into the brakes. Any lubricant, which has penetrated the brake, causes greasing of the disks, thereby reducing friction between their working surfaces. A poor operation of the brakes is the result of such happening. In such a case dismantle the brake, eliminate the oil leakage, wash the greasy disks with gasoline and let them dry out.

Control always the brake control linkage after the drum being dismantled, adjust if needed.

For adjusting the brakes you need to lift up the bogie-frame from the ground and adjust the brake levers. You do this by spinning the wheel while adjusting. The brakes are correctly adjusted when they spin freely without any scraping noises from the wheel. After all kinds of adjusting in regards to the brakes, always carry out a practical brake test before driving away.

If the brakes seems to work grainy, found the brakes, pull the trailer maintaining low speed for a couple of hundred meters, try again through braking the vehicle while driving in a normal speed. Keep on reiterate until the brakes functional normally. If necessary contact our service department!

BIGAB models 7 – 10, 8 – 12 and 10 – 14 – the brake show distance to the drum needs to be adjusted through loosening and by doing so adjusting the brake control linkage.

BIGAB models 12 – 15, 15 – 19 and 20 – 24 – the brake show distance to the drum on the brake cylinder needs to be adjusted through loosening or vice versa tightening the adaptable screw on the brake.

5.2.6. Maintenance of wheels

The maintenance of the wheels before proceeding to work consists in watching over the condition of the threaded joints and timely tightening there of and in observance of the rules for use and maintenance of tires.

- Check the threaded joints.
- Check the pressure of air in the tires.

Wheels pressures see table 2.

Tightening torque for nuts see table 3.

5.2.7. Maintenance undercarriage

Every day

It is necessary to visually check the nuts on the bogie side each time the customer uses the trailer. If the axel for the bogie side is at all moving (see picture 1) the trailer is in **danger**. Stop at once and tighten the bolts showed in picture 2.

Weekly

Once per week (or not later than 20 hours) it is needed to lubricate the grease nipples shown in picture 3. You need to lean under the trailer to be able to grease the glide bearings. This will be easier to do if the trailer is without load.



Axel for bogie side

Bolts on either side of the bogie

Grease nipples

5.2.8. Lubrication

Recommended lubrication cycle is once per week or after 20 working hours. Lubricate points equipped with grease nipples by using a grease gun. See chapter 5.1 for recommended lubricants.

- Ensure regularity of lubrication by following the lubricating schedule.
- Keep flammable material away from heat, sparks and open fire.
- Do not let oil run into the nature. Oil spilled into ground pollutes environment.

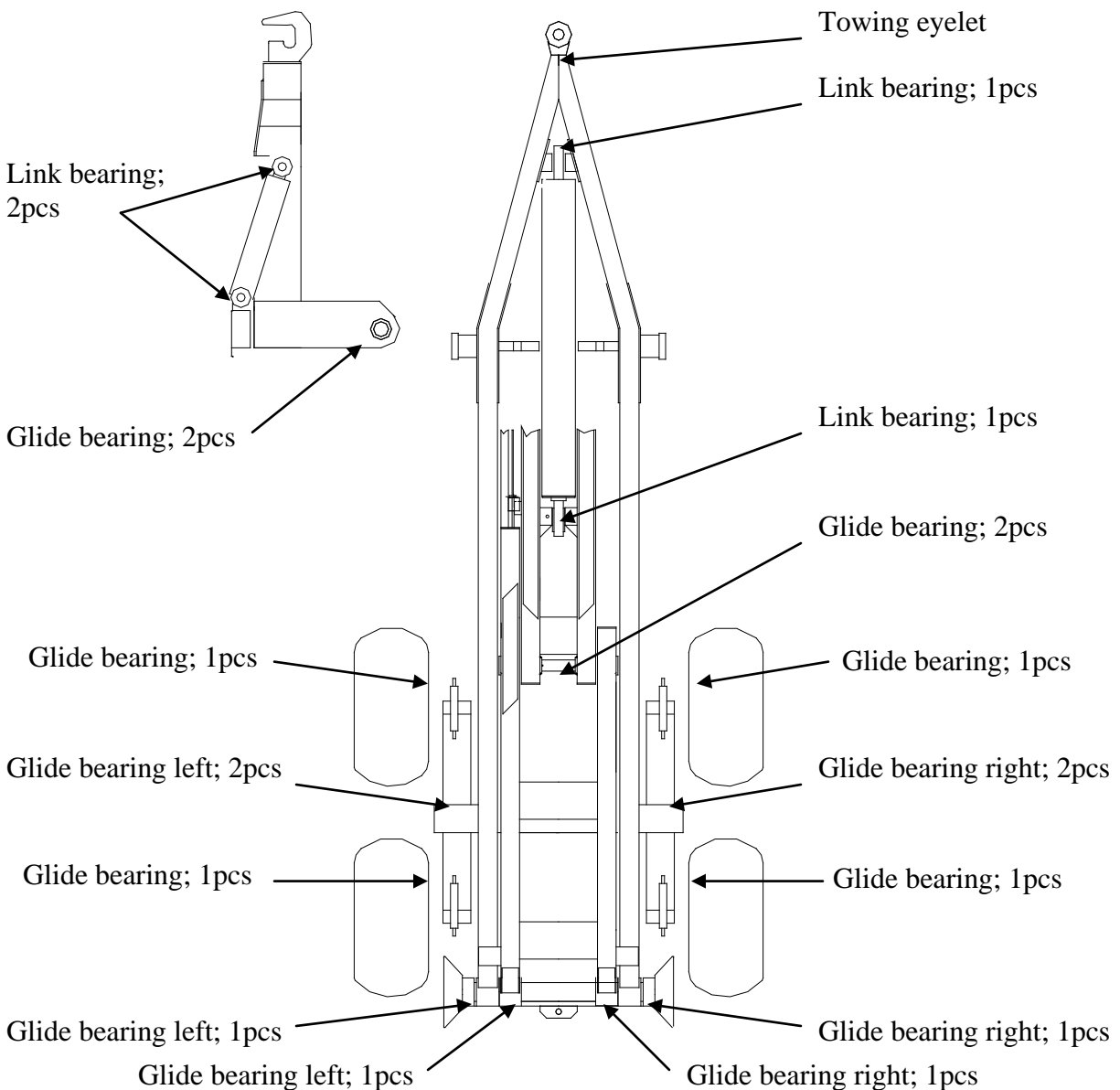


Figure 39. Lubrication points

5.3. SPARE PARTS

5.3.1. Back and Hook frames



Figure 40. Cylinder coupling

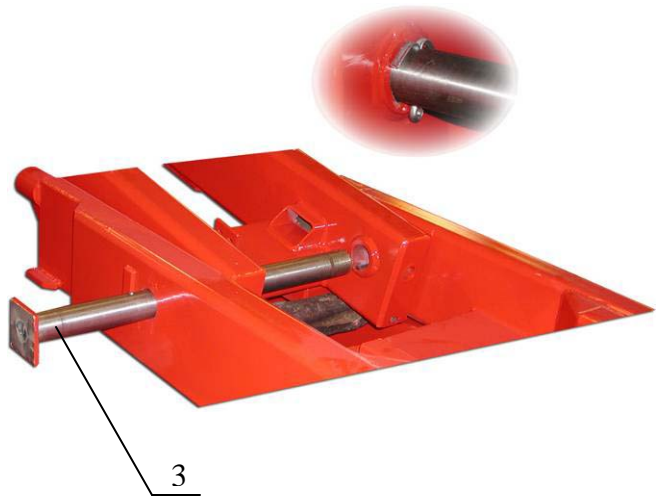


Figure 41. Back and hook frame coupling



Figure 42. Flexible tower

Back and rolling frame spare parts

Table 9.

Pos.	Art. No.	Description	Note
1	37211111	Axle	
2	37211183	Distance ring	
3	37211110	Axle	
4	37211112	Axle	
5	37211115	Axle	
6	37211120	Axle	
7	37211180	Distance ring	

5.3.2. Bogie

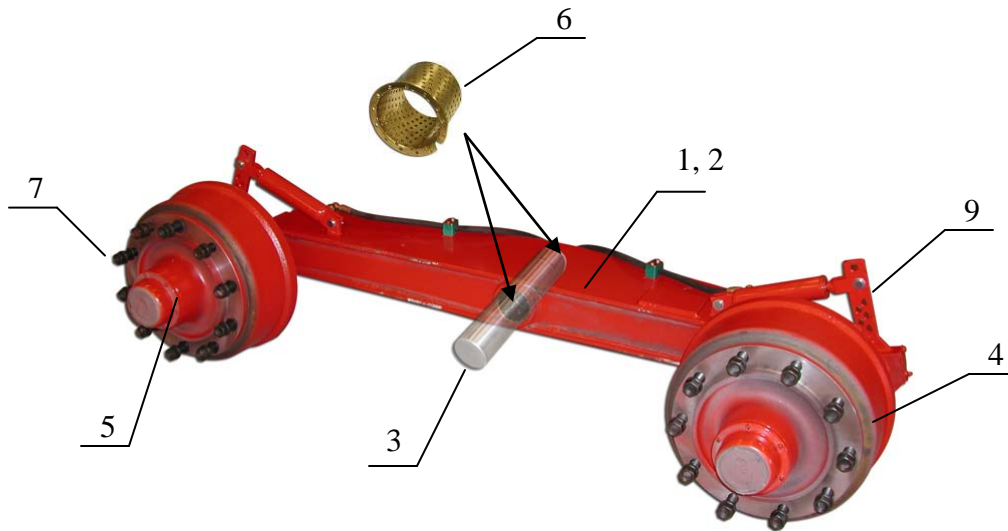


Figure 43. Bogie (Right side)

Bogie spare parts

Table 10.

Pos.	Art. No.	Description	Note
1	37211031	Bogie comp. (Left side)	
1	37211030	Bogie comp. (Right side)	
3	37211040	Bogie axle	
4	916145R	Stub axle	
5	916145L	Stub axle	
6	909125	Slide bearings Ø80	
7	916480	Ring nut M20	
9	916466	Brake arm	

5.3.3. Bogie block

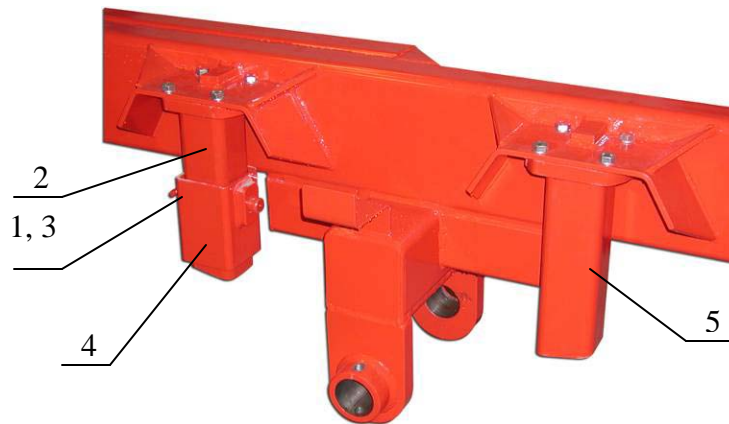


Figure 44. Bogie block

Bogie block spare parts

Table 11.

Pos.	Art. No.	Description	Note
1	37203083	Pin	
2	37211082	Limiter	
3	920230	Linch Pin	
4	37203081	Bogie block	
5	37211084	Limiter	

5.3.4. Frame locking

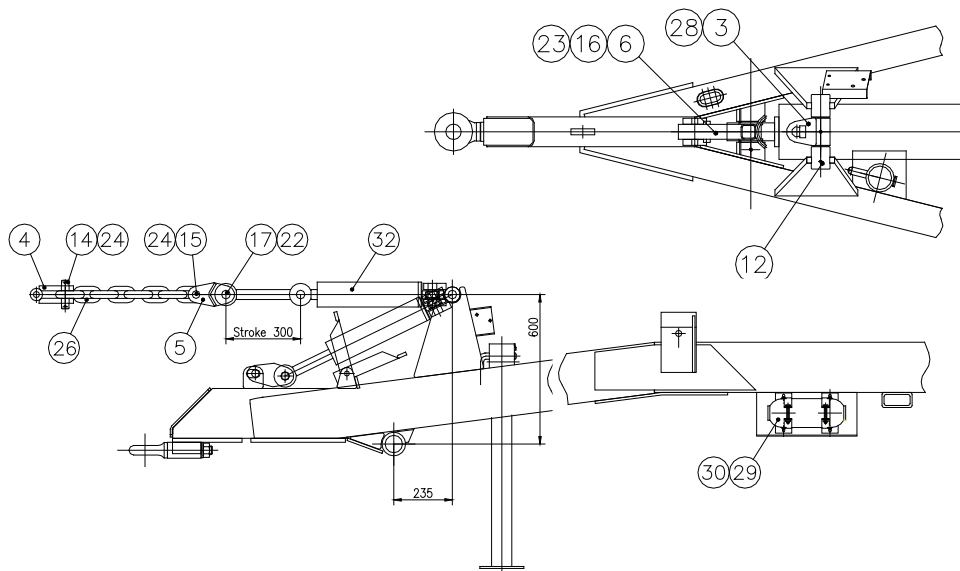


Figure 45. Frame lock

Frame locking spare parts

Table 12.

Pos.	Art. No.	Title
	391519	Hydr. frame lock system
3	37121520	Link
4	37121525	Link
5	37121530	Link
6	37121535	Support
12	37121522	Axle
14	37121527	Pin
15	37121532	Pin
16	37121532	Pin
17	37024378	Pin
22	908110	Split 4x45 DIN 94
23	911250	Stopper ring 20 DIN 471
24	920030	Locking pin 6x40 DIN 11023
26	920223	Chain (8 link)
28	930105	Grease nipple
29	915280	Hydro pneumatic accumulator
30	915280C	Fixation clamp
32	313134	Cylinder 90x40x300

5.3.5. Steering rollers

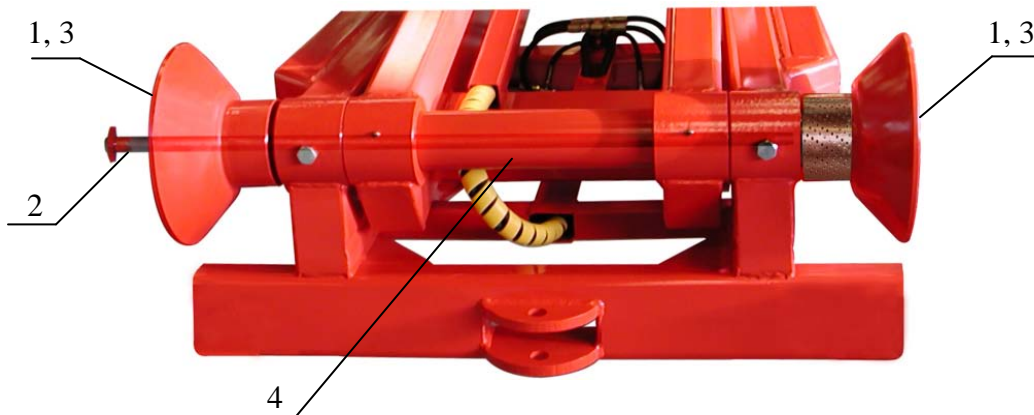


Figure 46. Steering roller spare parts

Rollers spare parts

Table 13.

Pos.	Art. No.	Description	Note
1	320340/320341	Roller comp. (left, right)	
2	37203045	Axle	
3	909115	Slide bearings Ø100	
4	320360	Tipper axle	

5.3.6. Changing operating unit

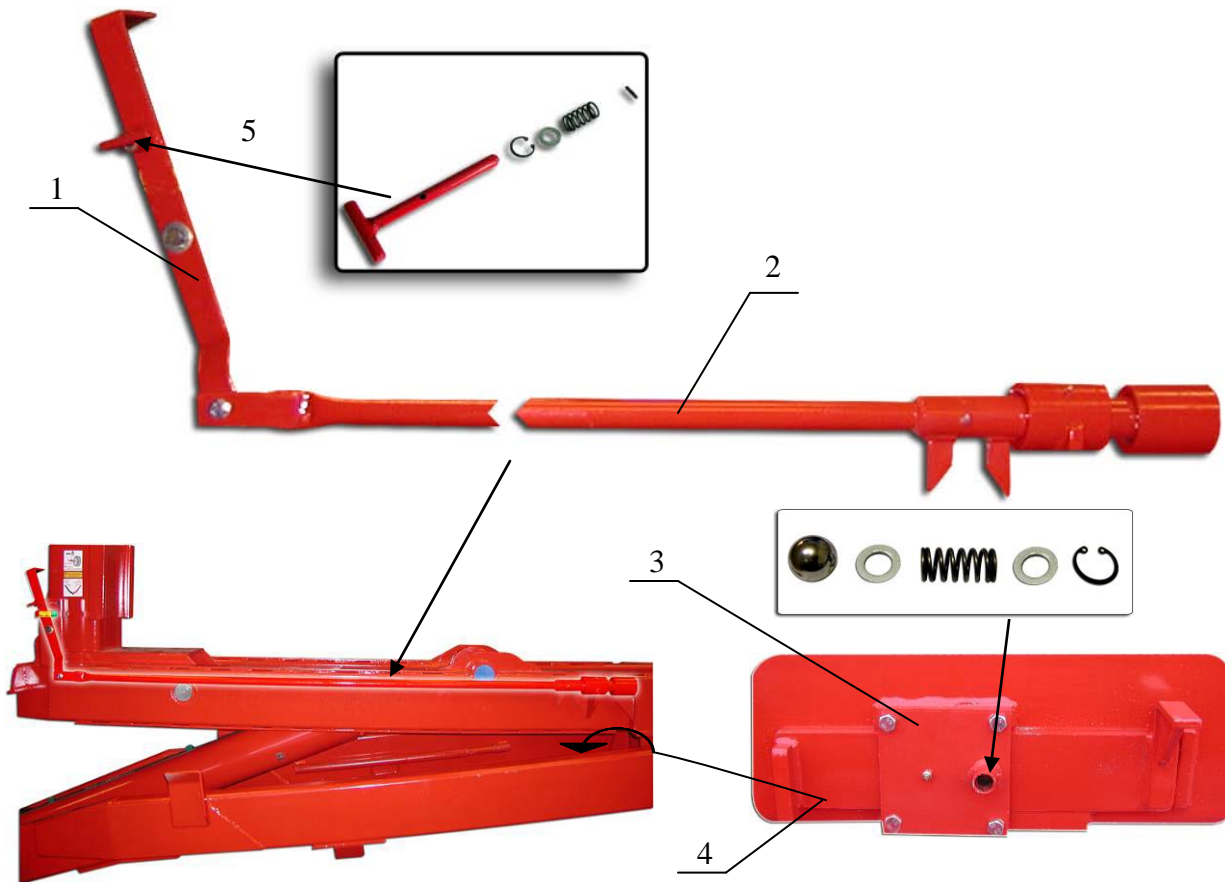


Figure 47. Changing operation unit

Changing operating unit spare parts

Table 14.

Pos.	Art. No.	Description	Note
	37211006	Changing unit compl.	
1	37211060	Handel compl.	
2	37211062	Lock	
3	37211230	Stop plate compl.	
4	37211228	Lock/Direction plate	
5	372203080	Stopper handle kit	

5.3.7. Hydraulic components

For hydraulic diagram see chapter 3.5.1

Hydraulic components spare parts

Table 15.

Pos.	Art. No.	Description	Note
1	913265	Tipping / Rolling cylinder 200/100-2300 with pilot operated valve	
	37913265	<u>Sealing kit for hydraulic cyl. 200/100</u>	
	37913266	<u>Front bush for hydraulic cyl. 200/100</u>	
	37913268	<u>Piston for hydraulic cyl. 200/100</u>	
2	913240	Tower cylinder 125/63-450	
	37913240	<u>Sealing kit for hydraulic cyl. 125/63</u>	
	37913241	<u>Front bush for hydraulic cyl. 125/63</u>	
	37913243	<u>Piston for hydraulic cyl. 125/63</u>	
3,4	313158	Bogie block / lift 100/60-180	
	37313160	<u>Sealing kit for hydraulic cyl. 100/60</u>	
	37313162	<u>Front bush for hydraulic cyl. 100/60</u>	
	37313163	<u>Piston for hydraulic cyl. 100/60</u>	
5	913210	Brake cylinder 40/20-60	
	37913210	<u>Sealing kit for hydraulic cyl. 40/20</u>	
	37913212	<u>Front bush for hydraulic cyl. 40/20</u>	
	37913213	<u>Piston for hydraulic cyl. 40/20</u>	
7	913230	Operation changing cylinder 50/32-70	
	37913230	<u>Sealing kit for hydraulic cyl. 50/32</u>	
	37913232	<u>Front bush for hydraulic cyl. 50/32</u>	
	37913233	<u>Piston for hydraulic cyl. 50/32</u>	
8	913630	Pilot operated valve	
9	913640	End of stroke valve	
10	915200	Pilot operated check valve	
11	915201	Pilot operated double check valve	
13	914570	Brake quick coupling 1/2"	

For frame lock hydraulic diagram see chapter 3.5.2

Frame lock hydraulic components spare parts

Table 16.

Pos.	Art. No.	Title
1	313134	Cylinder 90/40-300
	37313940	<u>Sealing kit for hydraulic cyl. 90/40</u>
	37313942	<u>Front bush for hydraulic cyl. 90/40</u>
	37313944	<u>Piston for hydraulic cyl. 90/40</u>
2	915275	Manometer
3	915271	Pilot operated check valve
4	915266	Pressure reducing/relieving valve
5	915280	Hydro-pneumatic accumulator
6	915265	Manifold
7	914570	Bayonet coupling male
8	9145702	Bayonet coupling female

5.3.8. Cylinder description

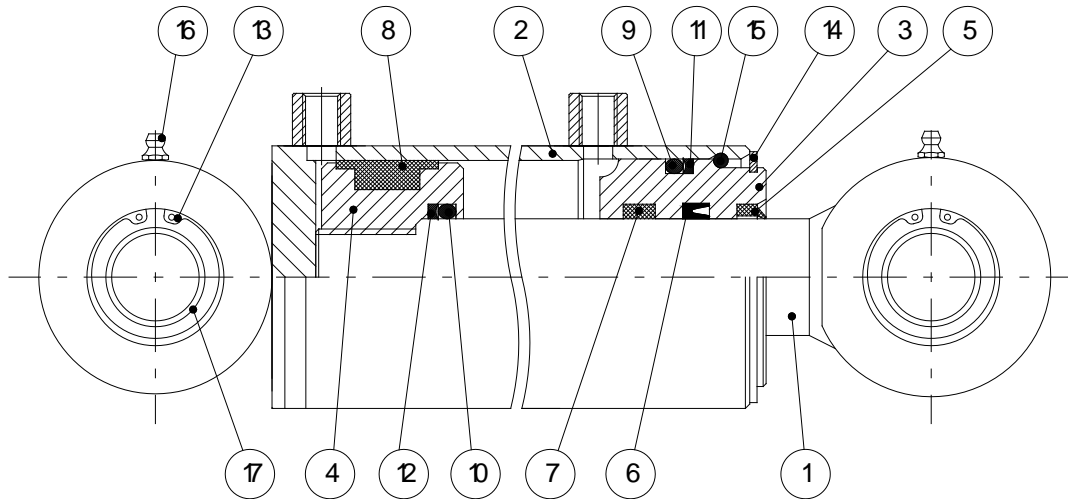


Figure 48. Cylinder description

Table 17.

Pos.	Description	Note
1	Piston rod	Spec. order
2	Cylinder tube	Spec. order
3	Front bush	
4	Piston	
5	Scrape ring	Included in sealing kit
6	Sealing	Included in sealing kit
7	Bush ring	Included in sealing kit
8	Sealing	Included in sealing kit
9	O-ring	Included in sealing kit
10	O-ring	Included in sealing kit
11	Sealing	Included in sealing kit
12	Sealing	Included in sealing kit
13	Locking ring	
14	Locking ring	Included in sealing kit
15	Locking ring	Included in sealing kit
16	Grease nipple	
17	Link bearing	

5.3.9. Electrical system

For electrical scheme see chapter 3.4 Pos. 5-8 concerning spare parts table is not shown in electrical scheme.



Figure 49. Rear lamp

Electrical spare parts.

Table 18.

Pos.	Art. No.	Description	Note
1	920765	Rear lamp	
1	920766	Rear light with reversing light - special	
2	920770	Border light 111x40 (orange) - special	
3	920715	Cable terminal	
4	920695	Cable Connector 7 pools (male)	
5	920180	Cable Connector 7 pools (female) -special	
6	920723	Lamp 12V, 5W	
7	920745	Lamp 12V, 21W	
8	920725	Lamp 12V, 10W	

5.3.10. Other parts

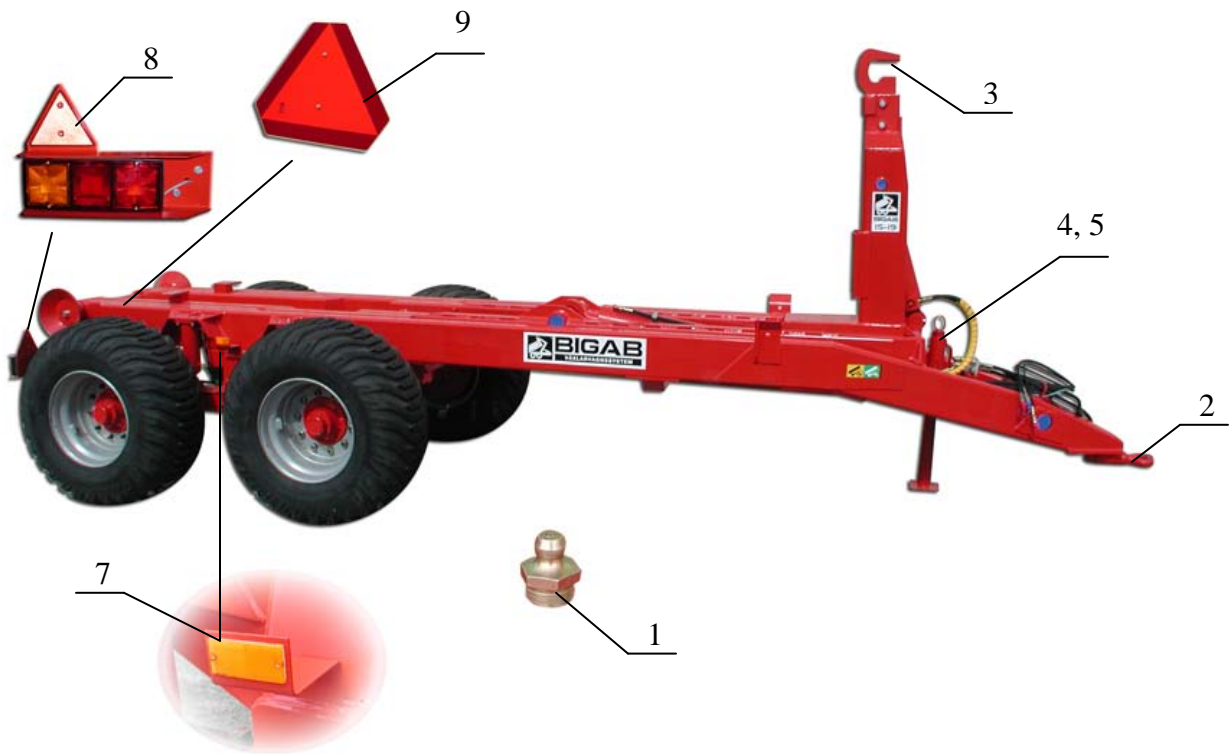


Figure 50. Other spare parts

Other spare parts

Table 19.

Pos.	Art. No.	Description	Note
1	930105	Grease nipple	
2	920120	Towing eyelet	
3	37221002	Hook	
4	37211068	Support leg	
5	37203067	Pin	
6	37203085	Security post	
7	920160	Reflector 94*44 (orange)	
8	920150	LBF board	
9	920155	Reflector 3-angle (red)	

6. TROUBLESHOOTING

These troubleshooting instructions are provided to help you to determine the cause for a malfunction.

Electrical equipment troubles

Fault symptoms	Reason and action
Lights fault	Lamp born out. Replace lamp.
	Check and clean electrical connectors.
Wire broken.	Check and repair wire.

Hydraulic equipment troubles

Fault symptoms	Reason and action
Too slow lift of implement or cylinders will not return from working position to neutral.	Valve stuck. Clean valve parts. Valve should move freely without seizure.
Ingress air into hydraulic system.	Locate leaky point and eliminate defect. Check oil level.
Excessive leakage of oil in pump.	Replace pump
Low oil pressure.	Adjust oil pressure.
Hydraulic cylinder piston packing out of order.	Replace packing.
Hydraulic system noise	Air entrapped into system. Locate air suction and eliminate defect.
Distributor safety valve maladjusted.	Adjust valve.
Oil leaking	Replace ruptured hose or tighten hose connection.
Oil leaks through final drive labyrinth seals.	Rubber packing between track sprockets and hub or labyrinth seals worn. Replace rubber rings.

Brake system troubles

Fault symptoms	Reason and action
Poor operation of brakes Greasy or worn-out drive disk linings.	Wash linings with gasoline or replace from spares
Maladjustment of brake control linkage.	Adjust brake control linkage.