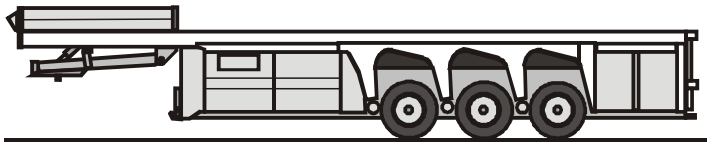
Operating and maintenance instructions
Innenlader for transporting concrete parts

INNENLADER
FOR TRANSPORTING
CONCRETE PARTS

Owner of the vehicle:

Vehicle identification number:



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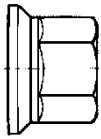
Ausgabe Okt. 2021_engl. (Übersetzung)

After having taken delivery of the vehicle, please check fixed seat of the wheel nuts after 50 km. Please repeat checking after 50 km loaded driving (and also after every wheel change).

Tightening torques

BPW axle with spigot alignment **630 Nm**

SAF axle with spigot alignment **600 Nm**



M 22x1,5

Wheel nut with pressure plate

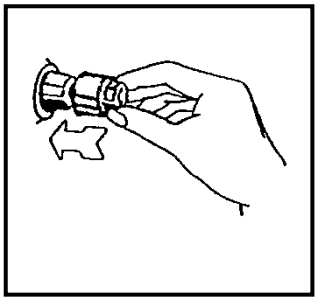
It is forbidden to enter the interior of the Innenlader when there is a concrete part rack inside.

Protecting cover for wheel nuts

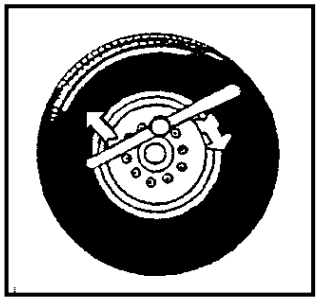
Installation

The protecting cover is attached by hand to the wheel nut to be protected and is tightened by means of the same key as the wheel nut by a clockwise rotation of approx. 15° to a stop. At the first tensions the click into place can be noticed clearly by a SNAP. At the same time with the rotation you should slightly press the protecting cover so that the cover is pressed onto and that the screw connection is sealed.
The disassembly is executed with the same key by an anticlockwise rotation of 15°. The cover hex is made in a way that at a disassembly the cover is removed at the same time with the key.

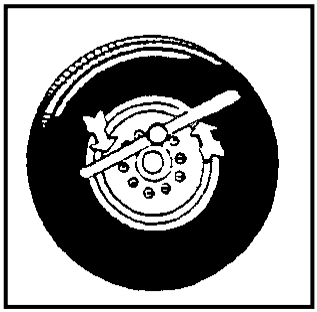
Attaching - very easily - without adhesion



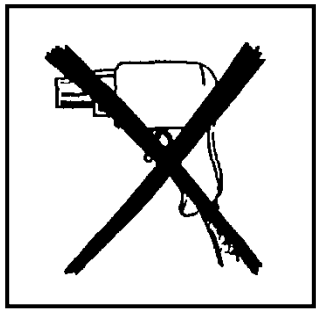
Tensioning with the key 15° to the right hand side



Disassembly with the key 15° to the left hand side



But do not use any impact wrench



I N D E X

1. Introduction

This Langendorf-vehicle has been manufactured with the support of computers according to the latest technical findings. Thus the vehicle is sophisticated regarding efficiency and endurance.

Please read very carefully the following

OPERATING- AND MAINTENANCE INSTRUCTIONS

Independent of these instructions, the valid national regulations, prescriptions and security directions must be respected.
Regular maintaining will guarantee a long vehicle endurance; many necessary repairs can be avoided by respecting the regularly intervals for maintenance and inspection, according to our instructions. These operating instructions shall help you to accustom yourself easily with the vehicle.

Before putting your vehicle into operation, listen to the instructions of our technical personnel when taking delivery of the vehicle.
As we always do the utmost to improve our products, it is possible that your vehicle shows innovations which could not been considered when printing these instructions.
We would like to point out that we cannot accept any claims - of whatever kind - arising from the contents of these instructions.
In case you are in need of spare parts, please order them at our works with the vehicle identification number and the construction year of the vehicle.

The leading principle for a correct traffic behaviour:

"For participating in traffic, caution and mutual consideration are always indispensable"

We have produced a reliable and safe vehicle. It is now up to you to move it safely in the traffic.

Good journey!

Langendorf GmbH
D-45731 Waltrop

1.0. General information on these instructions

In these present operating and maintenance instructions several trailer types which correspond to each other with regard to their basic components, are contained. Besides, important special equipment and additional devices have been considered so that the execution of your vehicle can be different in some descriptions and illustrations. We have summarized in these operating and maintenance instructions the essential points for due operation and maintenance. These instructions are part of the vehicle and have to be carried along with it during operation. Please note the when selling the vehicle, these instructions have to be passed to the new owner. If the vehicle is changed later (extensions or modifications), it has to be documented in **"annex B"**.

Chapter 1 **Introduction**
In this chapter you will find general security instructions.

Chapter 2 **Technical data**
In this chapter you will find the "Technical data" of the trailer

Chapter 3 **Operation**
In this chapter you will find exact information how to operate the trailer. This makes it easier for you to get quickly and safely into the handling of the trailer.

Chapter 4 **Legal obligations**
In this chapter you will find information on legal regulations.

Chapter 5 **First inspection**
In this chapter you will find information on the works which have to be done for the first inspection.

Chapter 6 **Maintenance and inspection**
In this chapter you will find information on an easy and due maintenance for a long lasting safety in traffic and readiness for service of your trailer.

Chapter 7 **Hints for a long time immobilisation of the trailer**
In this chapter you will find information on a long time immobilisation of the trailer.

Chapter 8 **Tightening torques**
In this chapter you will find information on the tightening torques of screws.

Chapter 9 **Lubrication plan**
In this chapter you will find information on the greasing.

Annexe A **Check list for the regular examination and maintenance works**
In this chapter you will find a check list for the maintenance and servicing.

Annexe B **Supplements**
In this chapter all modifications concerning the operation or maintenance of the trailer have to be recorded.

Annexe C **Wiring schemes**
In this chapter you will find the standard brake, hydraulic and electric schemes

You will find following symbols in these instructions in order to point out dangers or especially important points. These symbols mean the following:

Wherever you find this symbol, there is **danger for persons and their lives** if you do not observe exactly these instructions.

Wherever you find this symbol, there might be **damages on the vehicle** if you do not observe exactly these instructions.

Wherever you find this symbol, your attention is called to a **particularity.**

Copyright

1.1 General security instructions and operation conditions

Pay attention to all the labels concerning security and danger on the vehicle.

All the labels concerning security and danger on the vehicle must always be complete and always readable!

No modification of the vehicle (modification and mounting) must be made without the permission of the manufacturer! This concerns also the installation and adjustment of security systems and valves as well as the welding of carrying pieces.

!

Use only original spare parts!
All parts relevant to the chassis and type specific parts such as springs, air bellows, shock absorbers, axles, tipping cylinders, hydraulic and pneumatic valves etc. are especially adapted to the Langendorf vehicles and cannot be compared to the parts available in the shops.
We can accept any guarantee claims only when using original spare parts.

Use according to the rules

The vehicle is manufactured according to the technical level and the recognized technical rules concerning security. But the use can lead to danger of life and limb of the user or of another person resp. to impairments of the vehicle and of other things.

The vehicle must be used in faultless condition and under consideration of the security and of the dangers according to the operating instructions! A defect which can impair the security must be repaired at once!

For the duly use the prescribed operating, maintenance and care conditions of the manufacturer must be respected.

The vehicle can only be used, maintained and cared by persons, who know the vehicle and are informed about the dangers.

Unauthorized modifications on the vehicle exclude a responsibility of the manufacturer for the resulting damages.

Basic rules for the operation of the vehicle

Before putting the vehicle into operation check it concerning the traffic and operating security.

1. Consider the general valid security regulations and safety rules in addition to the operating instructions.

2. The respective rules are valid when using the public traffic ways.

3. Before beginning the work, the driver and operator of the vehicle must know all devices and operating elements as well as their functions! It is too late during the work!

4. Before driving, check the area around and under the vehicle (children!). You must have enough sight!

5. The transport of persons on the loading area is not allowed!

Driving operation

1. The driving speed must always correspond to the surrounding condition. Avoid a sudden turn during trips in mountains and valleys.

2. Consider the perm. axle loads and total weights!

3. Observe the max. perm. support load of the trailer coupling!

Parking the vehicle

The vehicle must be secured so that it can not roll away (parking brake, chocks)

Hydraulic system

Only workers with special knowledge and experiences in the hydraulic can work on hydraulic devices!

1. There is high pressure on the hydraulic system!
2. Use the corresponding devices for the search of leaks! Danger of hurt.
3. The hydraulic system must be totally without pressure before starting repair works.

Brakes

1. Check the function of the brakes before each trip!
2. A detailed examination must be made regularly as for the brake systems!
3. Adjustments and repair works on the brake system can only be made by specialized workshops or recognized brake services!

Wheels and tyres

1. Check that the vehicle is parked safely and secured so that it can not roll away (chocks) for works on the tyres.
2. Repairs on the tyres can only be made by specialists and with the suitable mounting tools!
3. There is a danger of explosion if there is a too high air pressure on the tyres!
4. Check the air pressure regularly!
5. Tighten the wheel screws with the corresponding tightening torque! (see page 2)

2. Technical Data

Please find the current weights in the vehicle documents

Perm. semitrailer total weight ..... kg

Perm. semitrailer axle load ..... kg

Perm. fifth wheel load approx. ..... kg

Dead weight ..... kg

Payload approx. ..... kg

Loading length ..... _____ mm

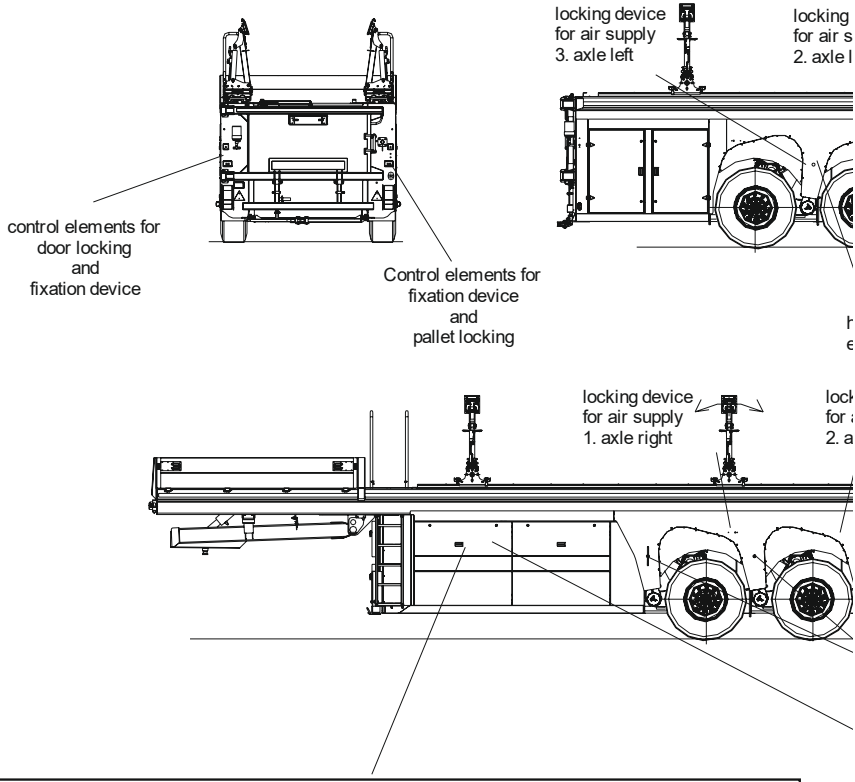
Loading width ..... _____ mm

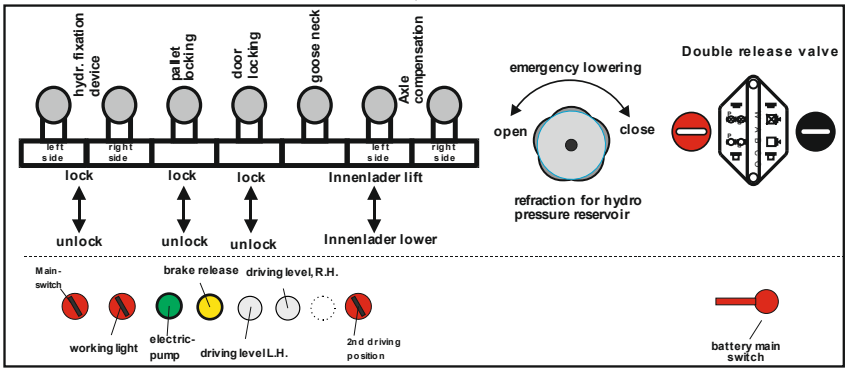
Outer width ..... _____ mm

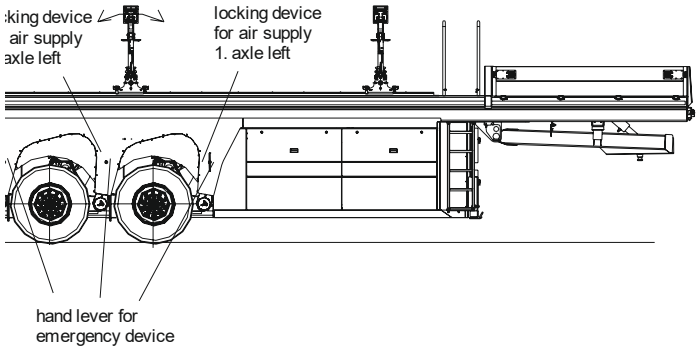
Platform length ..... _____mm

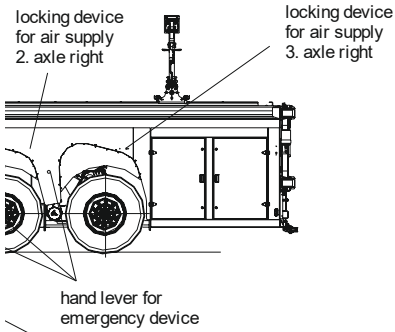
Delivery: _____

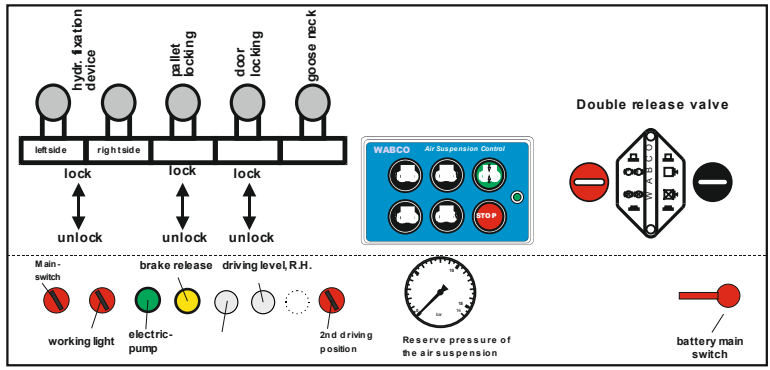
(Date, signature)


control elements for
door locking
and
fixation device
Control elements for
fixation device
and
pallet locking
locking device
for air supply
3. axle left
locking device
for air supply
1. axle right


hydr. fixation device
pallet locking
door locking
goose neck
Axle compensation
left side
right side
lock
unlock
Innenlader lift
Innenlader lower
emergency lowering
open
close
refraction for hydro pressure reservoir
Double release valve
Main-switch
working light
brake release
electric-pump
driving level, R.H.
driving level L.H.
2nd driving position
battery main switch


king device
air supply
axle left
locking device
for air supply
1. axle left
hand lever for
emergency device


locking device
for air supply
2. axle right
locking device
for air supply
3. axle right
hand lever for
emergency device


hydr. fixation device
pallet locking
door locking
goose neck
leftside
rightside
lock
unlock
lock
unlock
lock
unlock
WABCO
Air Suspension Control
STOP
Double release valve
Main-switch
working light
brake release
electric-pump
driving level, R.H.
2nd driving position
Reserve pressure of the air suspension
battery main switch

3. Instructions

These instructions also describe several functions and equipment which do not belong to the normal scope of supply, but which can be ordered additionally as special equipment.

When putting together the train pay attention that the fifth wheel heights fit together. Otherwise there would be a critical axle load shifting and damages on the fifth wheel coupling.

3.0 General hints for operating the Innenlader

The Innenlader is intended for transporting empty and loaded concrete part racks. The load (loaded and empty racks) must be duly secured during road driving. Pay attention also to chapter 3.2 “loading”.

The Innenlader is ***not intended***
- for transporting persons and animals
- for transporting goods which cannot be duly secured.
- for transporting goods which the perm. total weight of the Innenlader is exceeded with
- for transporting goods which the perm. total dimensions (length, width, height) of the Innenlader are exceeded with.

3.1 Hitching and unhitching of the semitrailer

Hitching:

Before hitching, proceed as follows:

1. Secure the wheels of the semitrailer.

2. The semitrailer platform must be approx. 50 mm lower than the fifth wheel height of the tractor. The corresponding height must be adjusted via the air suspension of the tractor.

3. Open the fifth wheel coupling lock.

4. The coupling is then ready for hitching and locks automatically by driving the tractor under the semitrailer.

The driver must check that nobody or nothing is between the tractor and the trailer before driving backwards.

5. After a successful operation, check the locking mechanism and suspend the cab hook. If it is not possible to suspend the cab hook, repeat the hitching operation.

6. Duly couple the electro, hydraulic and air connections. Pay attention that the connections are right and tight. The lines must give way to all movements without tension, friction and bending when cornering.
   - first line: connect brake line **(yellow)**
   - second line: connect supply line **(red)**

7. Put the chocks away and put them in the according supports.

8. Lift the air suspension of the tractor that high that it is possible to push in and to secure the support.

9. Switch the air suspension of the tractor to driving position.

10. Release the parking brake of the semitrailer.

11. Check the function of the brake, light and hydraulic system.

! When combining the train (tractor - semitrailer) newly, you have to ensure before driving that all connection lines have the necessary length also at the max. steering angle. Furthermore pay attention to the fact that there is sufficient distance from tractor to semitrailer.

The combination is ready for driving.

! **It is forbidden to unhitch the semitrailer when loaded!**

Unhitching:

For unhitching, proceed as follows:

1. Secure the parking brake of the semitrailer and additionally block the wheels of the last axle with chocks.

2. Move back the tractor a little bit so that the lock of the fifth wheel coupling is released. The locking of the fifth wheel coupling can now be opened easily.

3. Lift the air suspension system of the tractor that high that the supports can be put down and secured.

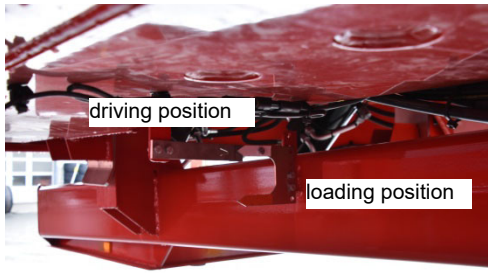
4. Release the electro, air and hydraulic hoses.
   - **first line**: remove supply line **(red)**
   - **second line**: remove brake line **(yellow)**

   This order must be strictly observed when removing the coupling heads because otherwise the trailer brake would be released.
   Connect the connection couplings to the empty couplings of the front wall in order to avoid dirt accumulation.

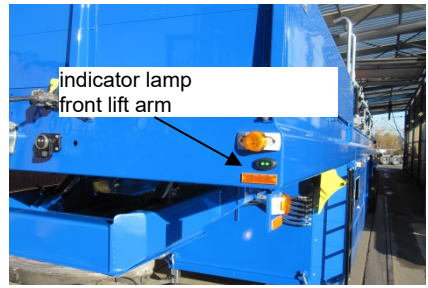
5. Drive away the tractor from under the semitrailer. The coupling is releasing automatically.

3.1.1 Adjusting the driving height

When combining the train take care that the required driving height can be adjusted. For that the hydraulic suspension must be lifted that high that there is a dimension of 1990 mm from ground to the upper edge of the longitudinal member in the rear area of the vehicle. As special equipment two indicator lamps can be fixed for adjusting the driving height in the switch box on the left vehicle side. Pay attention to the signs on the vehicle.



After that the lift arm must be lifted that high that the Innenlader is standing horizontally. Pay attention that in this position also the fifth wheel coupling of the tractor must stand horizontally because otherwise this might lead to damages on the fifth wheel coupling and the lift arm.



The Innenlader is equipped with an indicator lamp for the front lift arm. It is mounted on the left front side of the semitrailer and can be observed in the mirror of the tractor.
If the green indicator lamp lights, the lift arm **is not** in driving position. When the lift arm reach the driving position, the lamp goes out.

3.2. Loading

Keep within the permissible total weights and within the permissible axle loads of the tractor as well as the semitrailer when loading. Overloading reduces life of tyres, axles, springs and chassis frame. In addition, the braking distance is longer than usual and the safety is herewith reduced. Please make sure that there is an equal load distribution and sufficient fixation of the load by means of lashing rings and ropes.

The gratings mounted on the longitudinal member must only be used to stand on them when fixing the load. It is forbidden to walk on the longitudinal member. Put up a ladder to climb up to the gratings. Pay attention to the corresponding national regulations (e.g. German BGV D29 vehicles (VBG12) §24).

It says:

Places of work on vehicles which are 2 m or higher above the ground and which have to be walked on, have to be equipped with fixed railings of at least 1 m height.

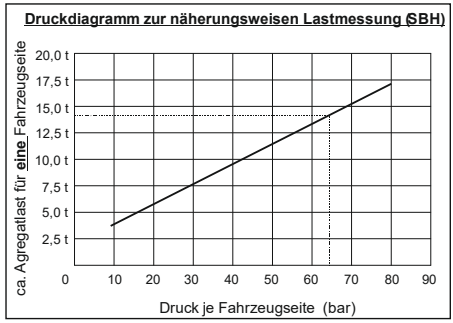
All accessory parts, such as lashing parts, tools, wooden planks, movable floors, also have to be secured and fixed according to regulations. Pay attention that these parts cannot slide or fall down in normal driving situations as well as in extreme situations (drastic brake, obstacle-avoidance manoeuvre etc.).

3.2.1 Axle load measurement for heavy transport

The approximate load measurement on the Langendorf Innenlader can be carried out via the WABCO Smartboard or 2 pressure manometers, depending on the equipment variant.
Due to the special design (independent wheel suspension), the pressure for determining the unit load is measured separately for the left and right side of the vehicle. This can lead to different pressures being indicated if the loading is not centred and/or the Innenlader is in an inclined position.
When using a WABCO Smartboard, the higher pressure is used to display the unit load / axle load. Please refer to the separate instructions for the WABCO Smartboard.
When using 2 pressure manometers, a distinction must be made between the hydraulic and the air-suspended Innenlader.

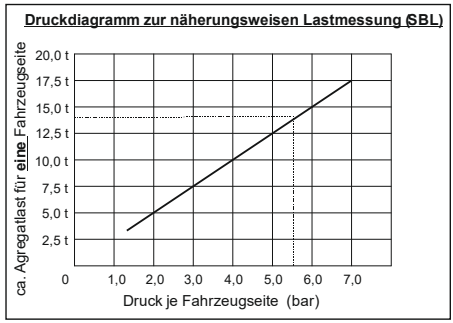
Hydraulically suspended Innenlader

For the hydraulically suspended Innenlader, the pressure on the pressure manometer should be between 10 and 65 bar.
10 bar = empty Innenlader
65 bar = 13,5 t unit load per side
= 27 t total unit load



Air suspended Innenlader

For the air-suspended Innenlader, the pressure on the pressure manometer should be between 1.2 and 5.4 bar.
1,2 bar = empty Innenlader
5,4 bar = 13,5 t unit load per side
= 27 t total unit load



3.3 Brake system

Automatic load-depending two-line compressed air brake including parking brake according to European regulations ***with WABCO-EBS brake system.***

The brake system is equipped with a double release valve for the operation brake and the parking brake. By pulling the release valve (black) the operation brake is released. The vehicle can be moved without coupled brake line.

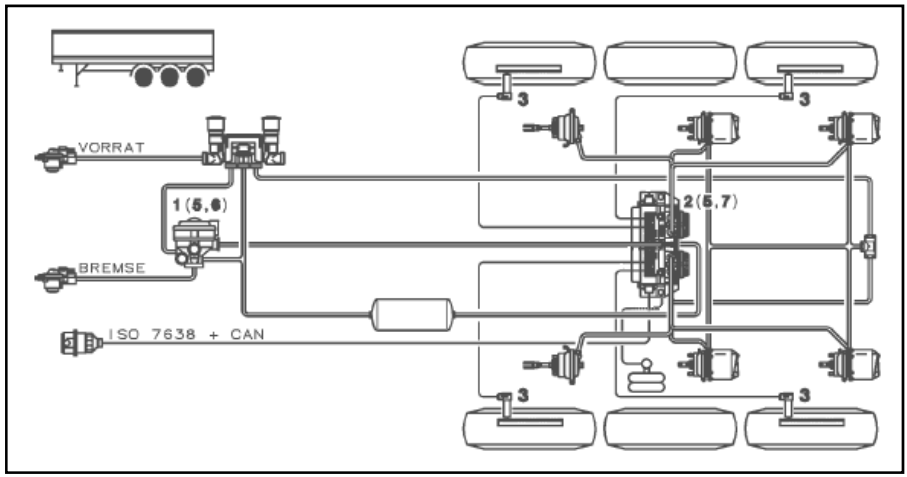
Before operating the release valve the semitrailer must be safely connected to the switching vehicle. The switching vehicle has to be in braked position!
You have to pay special attention for switching works with released operation brake because the semitrailer must be braked by the switching vehicle.

System design and particularities for the equipment with EBS:

The semitrailer may only be operated behind tractors with plug-in connection according to ISO 7638 (5- or 7-poles).

When turning on the ignition, the EBS electric system carries out a detailed check of the system. E.g. also the voltage supply is checked. If during this self-check the starter is operated, this leads automatically to a voltage drop which in this moment is recorded by the system as a defect and is shown by the flashing of the warning device in the driver's cab.
Pay attention that when starting tractors **without** own system check, you have to wait for approx. 6 seconds after having switched on the ignition before operating the starter so that the WABCO-EBS system is able to carry out its self-check before.

The EBS standard system (**E**lectronic **B**rake **S**ystem) for the 3-axle semitrailer is shown schematically in the following diagram. It regulates the brake pressures electronically sidewise. The system consists of a two-circuit compact trailer modulator (2) with digital data interface acc. to ISO 1199-2 to the EBS tractor, an EBS trailer brake valve (1) as well as ABS sensors (3).



The semitrailer with this brake system must be compatible to conventional and EBS-braked tractors. At a brake-down of the EBS in the trailer it can be braked pneumatically redundant. So there are three possible modes of operation:

a.) **Operation behind new tractors with EBS as well as extended ISO 7638 plug-in connection with CAN-interface (CAN = controlled area network) acc. to ISO 11992**
All EBS functions can be used. The brake request of the driver (rated value) is transmitted via the data interface to the trailer vehicle.

b.) **Operation behind conventional tractors with ISO 7638 plug-in connection for the trailer ABS supply, without CAN-interface**
All EBS functions except the rated value transfer, can be used via the CAN data interface. The rated value is given via the pressure sensor in the trailer brake valve. This pressure sensor measures the trailer control pressure.

c.) **Redundancy operation**
At a defect or if the electric voltage supply is not connected it is pneumatically braked, but **without load-depending brake force regulation and without ABS function.**

3.3.1 Parking brake

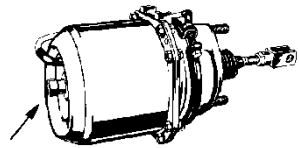
! **Do not operate the parking brake immediately if the brake is overheated because otherwise the brake drums / brake discs might be damaged (cracks).**

This kind of parking brake is a spring parking brake without linkage which effects on the wheels of the axle(s). The brake force is produced by a robust spring, which is mounted in the spring parking brake cylinder. The advantage is that, even when there is no supply of pressure, the brake is nevertheless effective. The spring is preset with released brake by air pressure which effects on a piston, and therefore the piston rod is released. For braking the spring brake is ventilated with the shift valve (left hand side of driving direction in front of the first axle). The power of the spring effects on the brake via the piston rod.
When there is no air supply, the spring brake can be loosened by a mechanical emergency device.

Before loosening the spring cylinder, the semitrailer must be secured against rolling, because neither the brake system nor the parking brake is working.

There are two different brake cylinder types. Releasing the spring parking brake is made as follows:

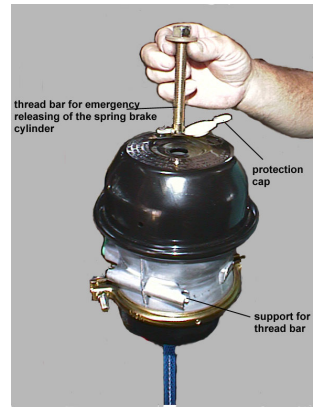
Type 1
For emergency releasing of the spring parking brake, the hex bolt (spanner size 24) at the cylinder has to be screwed out entirely.



Type 2

- Take the thread bar out of its support.
- Remove the protection cap
- Put the thread bar into the bore and fasten it by making a 90° turn.
- By turning the nut (spanner size 19) to the right hand side, the mounted spring is retracted and the brake released.

Before continuing the normal road driving, the cylinder has to be repaired or replaced.



3.4. Antiblock device (ABS)

When pressing the brake pedal too hard, normal brake systems can lock the wheels, especially on slippery streets. By this the steering ability is lost and the braking distance is becoming longer, the vehicle can also skid. The ABS system prevents from this locking of the wheels and keeps the directional control and the steering ability, even during an emergency brake operation. It enables the driver to brake and steer at the same time also in critical situations. Furthermore this device always controls the optimal utilization of the transmittable brake power and cornering forces between the tyres and the road.

But ABS cannot compensate driving habits which are not adjusted to the current traffic and road circumstances. Especially the driver is not exempted from the estimation of brake distances and maximum cornering speed, which are resulting from the constant physical laws.

! **When working on vehicles with ABS note the following:**

- **Welding on the trailer or tractor**
  Tests have shown, that arc-welding is not dangerous for the ECU, the electronic control unit.
  In this connection it is assumed, that no mechanical / electrical components (incl. the ECU box) are used as ground for the welding power.
- **Paintworks**
  The maximum heat for the ECU during paintworks is 85°C

3.5 Hydraulic equipment

The hydraulic pressure for the axle assembly, the front lift arm, the door locking and, if required, for the pallet locking and the hydraulic fixation can be produced, depending on the equipment variant, via the hydraulic system of the tractor and/or an electro pump assembly.
Switching between these different systems is made via ball cocks. Pay attention to the signs on the vehicle.
There are two different equipment variants for operating the electro pump assembly:

1. Voltage supply of the electro pump assembly from the tractor.
   For operating the electro pump, the semitrailer must be connected via an additional electric supply line (at least 35 mm²).
   After having switched on the key switch the pump assembly can be started optionally via the front button (in driving direction on the left hand side behind the side panelling) or via one of the rear buttons (in driving direction left and right) when operating the corresponding control valve at the same time.

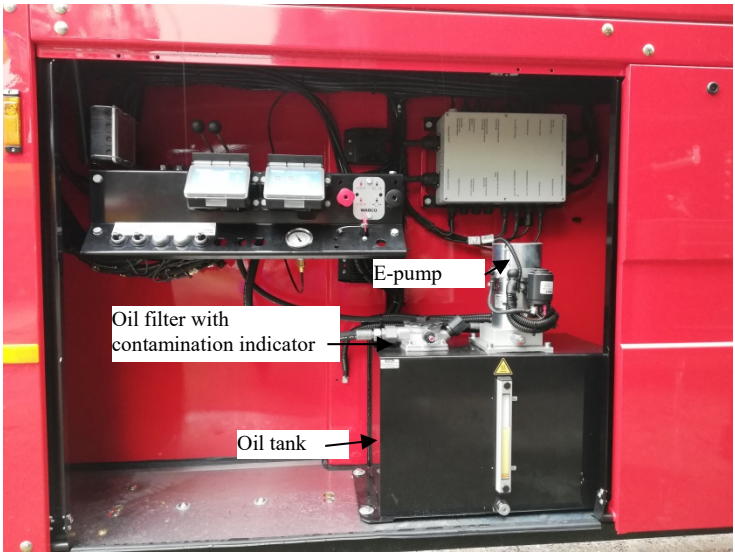
2. Voltage supply of the electro pump assembly from the trailer.
   For operating the electro pump assembly two batteries are mounted in the trailer. They can be charged by the generator of the tractor when driving. A corresponding charging line is required for this.
   If the charging line is supplied by the company Langendorf, pay attention to following points:

- The batteries are charged only if the key switch is in „O-position“.
- At a failure of the batteries the charging line cannot be used as supply line to the tractor. For this a separate supply line (at least 35 mm²) must be installed.
- If the vehicle is parked for a longer period of time, we recommend to switch off the batteries by means of the battery disconnecting switch in order to protect them.

   After having switched on the key switch and, if necessary, the battery main switch the pump assembly can be started optionally via the front button (in driving direction on the left hand side behind the side panelling) or via one of the rear buttons (in driving direction left and right) when operating the corresponding control valve at the same time.

To avoid an unauthorized operation and to ensure the charging process of the batteries, the main switch must be brought into „O – position“ and taken out after having finished the operation (loading or unloading the semitrailer).

The electro pump unit with oil tank is mounted at the front left behind the side panel.



The electric motor is equipped with an overheating protection switch. Please make sure that sufficient cooling phases are observed between operating procedures.
To lower the Innenlader , it is not necessary to keep the pump running for the entire period. By shortly operating the pump, the corresponding valves are activated. The oil from the chassis cylinders is then pushed back into the oil tank by the dead weight of the Innenlader.

3.6 Front lift arm, hydraulically controlled

The Innenlader is equipped with an indicator lamp for the front lift arm. It is mounted on the left front side of the semitrailer and can be seen in the mirror of the tractor.
If the green indicator lamp lights it **is not** indicated that the lift arm is in driving position. When the lift arm reach the driving position, the lamp goes out.

The front lift arm has been constructed in a way to be lowered. By this it is possible to lower the Innenlader completely.
The lift arm can be lifted or lowered hydraulically. The control levers for this can be found in driving direction on the front left hand side behind the side panelling.

! Before lowering the Innenlader, the train has to be in straight position. When the semitrailer has lowered itself over the fifth wheel coupling, only a small steering angle is possible. With larger steering angles there is the danger that the hand lever of the fifth wheel coupling comes to contact.

To lift or lower the lift arm proceed as follows.

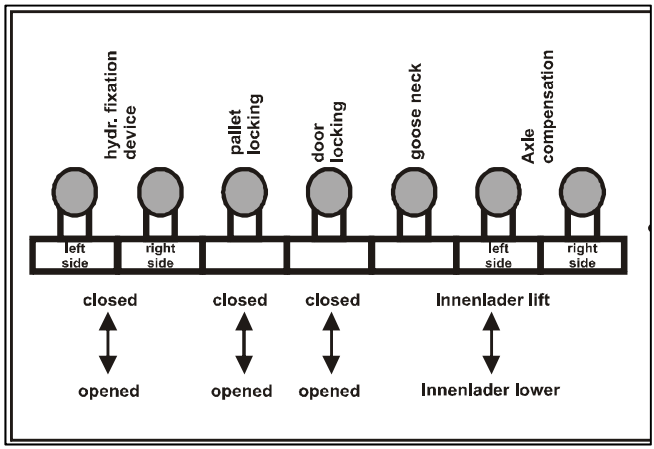
1. Switch on the ignition and parking light to ensure the voltage supply of the electro pump assembly.

2. Switch on the electro pump assembly by means of the key switch.

3. By pressing the button and at the same time putting the control lever to the rear, the lift arm is retracted. That means that the Innenlader is lowered.

Because of the geometry of the axle fixation there is a movement in longitudinal direction of the vehicle when lifting resp. lowering the Innenlader. Therefore you have to release the parking brake of the semitrailer for this action by operating the yellow push button (at the front left hand side in the side flap). The parking brake of the tractor remains operated for this action

4. After having lifted the Innenlader, the lift arm must be pulled out so far that the Innenlader and the fifth wheel coupling of the tractor are standing horizontally.



3.7 Axle assemblies

The Innenlader can be equipped optionally with an air suspension assembly or with a hydraulic axle assembly.

3.8 Air suspension assembly

3.8.1 Driving with the air suspended Innenlader

The Innenlader is, because of its special construction (dump type vehicle), equipped with air bellows which have a very large stroke. Therefore the following particularities have to be paid attention to when driving the Innenlader.

1. Larger side tilt when cornering.

2. Take special care when driving sharp bends resp. turning manoeuvres and braking the Innenlader at the same time. If the Innenlader comes to stop, the brake has to be released slowly because otherwise, in extreme exceptional situations, the Innenlader could fall over.

3. Limited ground clearance
   Because of the limited ground clearance of the Innenlader you must adjust speed and take special care when driving on bad road conditions and especially when driving over obstacles. If necessary, the air suspension of the Innenlader must be lifted because otherwise the concrete part rack could have contact to the ground.
   For lifting the air suspension, please see chapters "3.5.2 Electronically controlled air suspension ECAS" and “3.5.3 Lowering and lifting the Innenlader by means of the lifting valve”.

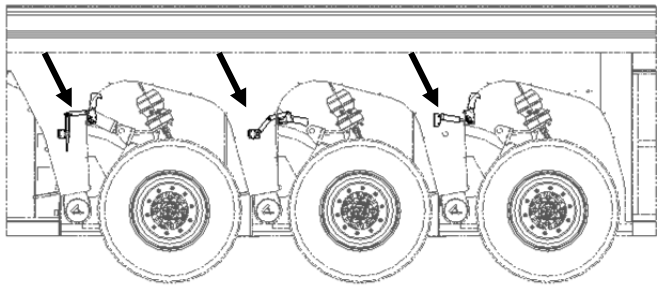
3.8.2 Air suspension

Before driving, let the engine run until the operation pressure in the brake system directed and the driving height of the air suspension is obtained. Check level position of the ECAS system. Do not drive in any case with air bellows without pressure or partially ventilated air bellows because there is no balance between the axles or an insufficient balance, and parts of the air suspension might be damaged.
To keep the function of the air suspension system as far as possible when there is a failure of a bellow, there is the possibility of cutting off each air bellow separately via a cut-off cock. For this, pay attention to the signs at the vehicle.
Lifting and lowering the Innenlader for loading/unloading is controlled by the lifting valve or by the ECAS system, depending on the vehicle equipment. Please take notice of the different descriptions.

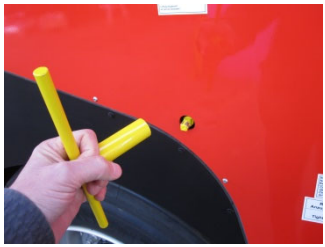
To avoid an unintentional lowering while driving, the trailer is equipped with an emergency device. The vehicle might be equipped with a manually controlled or with a pneumatically controlled emergency device.

3.8.3 Emergency device

1. Manually controlled emergency device



The emergency device can be switchen on / off by means of the key.
For this the key has to be pressed in and at the same time has to be turned by approx. 45°.
When the emergency device is switched on (driving position), the square is flush with the vehicle



Emergency device in driving position

Emergency device „open.
(vehicle can be lowered)

2. Pneumatically controlled emergency device
   With this kind of equipment the emergency devices at all axles are switched on resp. off at the same time via the mounted compressed air cylinders. The rocker switch for doing so can be found at the front left hand side in driving direction behind the panelling.

3.8.4 Axle restraint system with emergency device

When the Innenlader is empty or partially loaded, there is the possibility for 2- and 3-axle vehicles of lifting the first axle line (and for 3-axle vehicles also the 3rd axle line on special request). Pay attention to the national regulations here. The allowed axle loads must not be exceeded.

When the axle is not lifted, the restraint system serves as emergency device and has to be operated as described in chapter 3.8.3.

To lift the first axle line, proceed as follows:

1. Ensure that the parking brake is not operated and that the combination is secured against rolling away by putting chocks under the trailer.

2. Lower the air suspension of the Innenlader as described in point 3.8.4.

3. Operate the axle restraint device (pneumatic or mechanic, depending on the execution).

4. Lift the air suspension oft he Innenlader in driving position.

Switching off the restraint device is made in the same order.

! The air bellows get their necessary elasticity, which is needed for the pressing together when driving with lifted axle, only after some time because of the continuous movement. Therefore we recommend not to operate the axle back holding device for the first 5.000 km. The same should be applied after every exchange of an air bellow.

3.8.5 Lowering and lifting the Innenlader by means of the lift/lower valve

The Innenlader can be lowered completely for loading/unloading via the lift/lower valve. The valve can be found at the right hand side in driving direction at the rear of the vehicle.

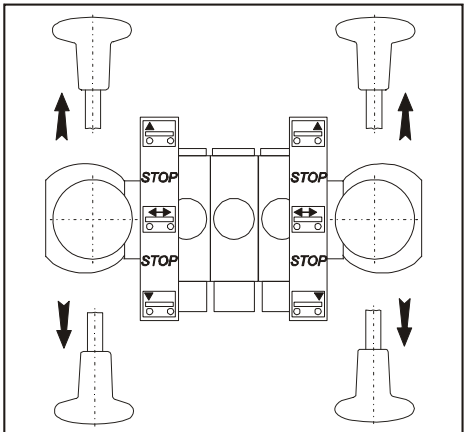
Because of the geometry of the axle fixation there is a movement in longitudinal direction of the vehicle when lifting resp. lowering the Innenlader. Therefore you have to release the parking brake of the semitrailer for this action by operating the yellow push button (at the front left hand side in the side flap). The parking brake of the tractor remains operated for this action.

For lowering the Innenlader completely by means of the lift/lower valve, you have to proceed as follows:

1. Switch off emergency device.

2. Put the lift/lower valve to position "lowering the Innenlader"". Pay attention to the fact that the lever is locked in driving position.
   When having obtained the height needed, put the lever into stop position.

In this lever position there is not any axle load compensation, i.e. when driving over obstacles it is possible that the whole trailer weight is carried by one axle. Therefore the vehicle may only be driven in walking speed and has to be lifted to driving position (lever position in the middle) as soon as possible. The normal driving height is adjusted.



Lift and lower valve for L.H and R.H side.

3.8.6 Air suspension type ECAS, electronically controlled

Die Luftfederung Ihres Sattelanhängers ist mit einer elektronischen Regelung ECAS (Hersteller WABCO) ausgerüstet.

The air suspension of your Innenlader is equipped with an electronic adjustment type ECAS (producer WABCO).
The ECAS system has an extensive monitoring of the system. All connected components are checked electronically after short periods of time. So e.g. after the ventilation of a bellow it is checked whether the Innenlader is lifted as expected.
There is a green indicator lamp at the front left hand side in driving direction.
Should there be any defect, this is shown by the flashing of the indicator lamp. The ECAS system is not fully functioning any more.
The indicator lamp lights when the Innenlader is out of the normal level, and for some seconds after switching on the ignition.
Please keep an eye on the indicator lamp when switching on the ignition. When the light goes out after some seconds, the function of ECAS is alright.

The power for ECAS is supplied from the ABS plug. Therefore the Innenlader can only be operated with tractors equipped with ABS and an ABS connection line according to ISO 7638.

The ECAS system has several functions on the Innenlader:

- Diagonal stabilisation of the Innenlader.
  For the diagonal stabilisation, the air bellows on one axle line are activated independently from one another.
  This ensures that the Innenlader is in a position parallel to the axle even when the load is not distributed evenly.

Before changing the air suspension level by means of the ECAS control unit the ignition of the trailer must be switched on.

- Automatic adjustment when loading and unloading (unloading by crane)

Lowering and lifting the air suspension for loading and unloading the Innenlader

Due to the geometry of the axle fixation there is a movement in longitudinal direction of the vehicle when lifting resp. lowering the Innenlader. Therefore you have to release the parking brake of the semitrailer during this procedure by operating the yellow button (at the front left hand side in the side flap). The parking brake of the tractor remains activated.

Description of the ECAS control unit

! If the Innenlader is brought to a position outside the driving level set by operating the buttons “Lift / lower vehicle”, there is no axle load compensation. The Innenlader may only be driven with walking speed in this position.

1. Driving position
   After operating this button, the Innenlader is lifted to driving position.

2. Lifting the left side
   When operating this button, the left vehicle side is lifted.

3. Lifting the right side
   When operating this button, the right vehicle side is lifted.

4. Lowering the left side
   When operating this button, the left vehicle side is lowered.

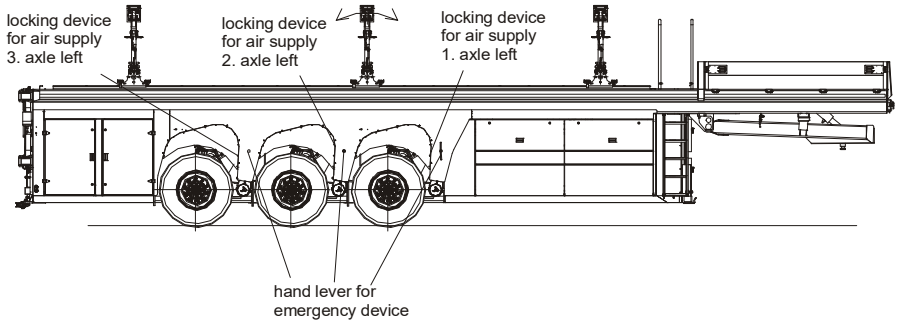
5. Lowering the right side
   When operating this button, the right vehicle side is lowered.

Lowering and lifting the air suspension via the WABCO Smartboard

For this, pay attention to the separate instructions of the manufacturer.

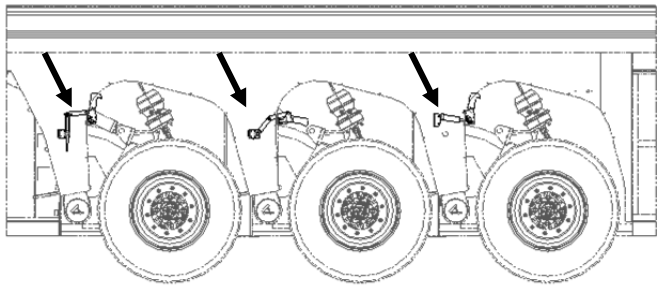
3.9 Hydraulic axle assembly

The Innenlader is equipped with hydraulic axle load compensation.
Each axle is supported on the left and right hand side with a hydraulic cylinder to the frame. All hydraulic cylinders of the left as well as the right vehicle side are connected each with a compensation line. In case of road unevenness the hydraulic oil is displaced from one hydraulic cylinder according to the axle position because of increased axle load and supplied into the hydraulic cylinder of the axle which is less loaded just as long until the hydraulic pressure in all hydraulic cylinders is compensated. The hydraulic pressure is additionally used for controlling the automatic brake force control (ALB).
As suspension element two hydro tanks filled with nitrogen are connected to each compensation line.
For driving with lifted axle or in case of damages on the suspension cylinders it is possible to cut off the oil supply. Pay attention that it is not possible to have any axle compensation (suspension) if the cylinders are cut off.



3.9.1 Emergency device and axle restraint device on the hydraulic axle assembly

1. Manual emergency device



The emergency device can be switchen on / off by means of the key.
For this the key has to be pressed in and at the same time has to be turned by approx. 45°.
When the emergency device is switched on (driving position), the square is flush with the vehicle.

Emergency device in driving position

Emergency device „opened“
(vehicle can be lowered)

2. Pneumatically operated emergency device
   In this version the emergency devices of all axles are switched on / off at the same time via the mounted compressed air cylinders. The button for that can be found behind the side cover at the front left side in driving direction.

Axle restraint system with emergency device

When the Innenlader is empty or partially loaded, there is the possibility of lifting the first and third axle line on three-axle vehicles. Pay attention to the national regulations here. The allowed axle loads must not be exceeded.

When the axle is not lifted, the restraint system serves as emergency device and has to be operated as described above.

The second rear axle is the socalled „main axle“ for the regulation of the automatic blocking device. If you drive with only one wheel here, there will be an error indication of the ABS and this would lead to a switch off. On air suspended vehicles also the range sensor of the electric air suspension is mounted on this axle. If you lift one axle side here, it would be possible, besides the problems with the ABS, that the vehicle falls over due to the unregulated air suspension.

To lift the first and/or third axle line, proceed as follows:

1. Ensure that the parking brake is not operated and that the combination is secured against rolling away by putting chocks under the trailer.

2. Lower the hydraulic axle assembly as described in point 3.9.

3. Cut off the oil supply to the hydraulic cylinders of the 1rst axle line by closing the cut-off cocks.

4. Operate the axle restraint device.

4. Lift the hydraulic axle assembly of the Innenlader in driving position.

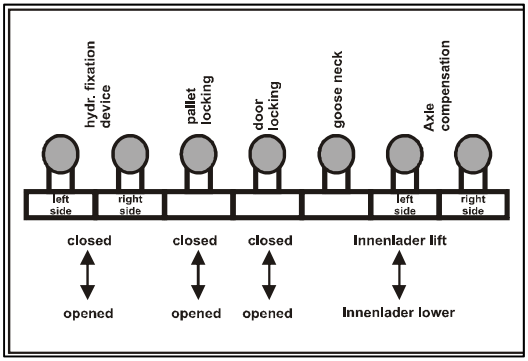
Switching off the restraint device is made in the same order.

3.9.2 Lowering and lifting the Innenlader

The hydraulic suspension of the Innenlader can be lowered completely for loading/unloading. The control valves can be found at the front left side in driving direction behind the side panelling.

The electric motor is equipped with an overheating protection switch. Please make sure that sufficient cooling phases are observed between operating procedures.
To lower the Innenlader , it is not necessary to keep the pump running for the entire period. By shortly operating the pump, the corresponding valves are activated. The oil from the chassis cylinders is then pushed back into the oil tank by the dead weight of the Innenlader.

Because of the geometry of the axle fixation there is a movement in longitudinal direction of the vehicle when lifting resp. lowering the Innenlader. Therefore you have to release the parking brake of the semitrailer for this action by operating the yellow push button (at the front left hand side in the side flap). The parking brake of the tractor remains operated for this action.



For lowering the Innenlader completely, you have to proceed as follows:

1. Switch off the emergency device (point 3.9.1)

2. Switch on the ignition and the parking light to ensure the voltage supply of the electro pump assembly.

3. Switch on the electro pump assembly by means of the key switch.

4. By operating the button and at the same time putting both control levers to the rear, the cylinders of the hydraulic axle assembly are retracted, that means the Innenlader is lowered.

5. After having finished the loading procedure, the Innenlader must be lifted to driving height, approx. 1,990 mm from the ground to the upper edge of the longitudinal member (also see point 3.1.1 “Adjusting the driving height”).

3.10 Transporting parts exceeding the loading length

It is allowed to transport concrete parts exceeding the loading length on public roads only with exception permit.

For this the legal and technical conditions must be kept to.
For driving on not public roads (on the premises) the technical conditions (points 4 to 6) must be guaranteed.

Attention! When driving with parts exceeding the loading length, the following must be paid attention to:

1. The effectiveness of the underride protection is no longer given.

2. The visibility of the lights does not correspond to the legal regulations. If necessary, an additional light beam must be fixed to the load.

3. The vehicle length and possibly the vehicle width are exceeded.

4. There is the danger for the Innenlader because of its construction that the rear axles are overloaded. This fact is even intensified by shifting the centre of gravity of the load to the rear.
   Before driving the actual axle loads must be checked. It is not allowed to exceed the permissible axle loads!

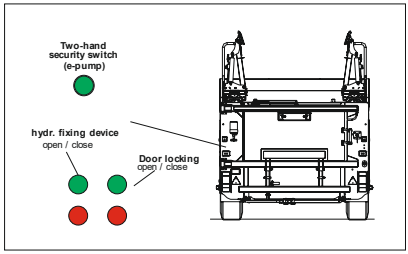
5. To avoid damages on the Innenlader, it must be held together by corresponding technical devices – approved by the company Langendorf – in the rear area. These devices must prevent the loading area from “bending” and being “pressed”. Depending on the equipment of the Innenlader and the kind of load, possibly several measures must be taken.
   These might be: pallet locking / transverse bar and upper fixation device (hydraulic or mechanic) and sufficient load securing.

6. The door must be secured against lateral swinging and bumping.

If the door is opened by 90°, the permissible vehicle length is exceeded.
If the door is opened by 270°, the permissible vehicle width is exceeded.

3.11. Hydraulic door locking

The control valves for the door locking can be found at the left side of the vehicle in the rear area. Before the door locking can be opened, the mechanic securing device must be released.



To open the door, proceed as follows:

1. Switch on ignition and parking light to ensure voltage supply of the electro pump assembly.

2. Switch on the electro pump assembly by means of the key switch or the hydraulic drive of the tractor.

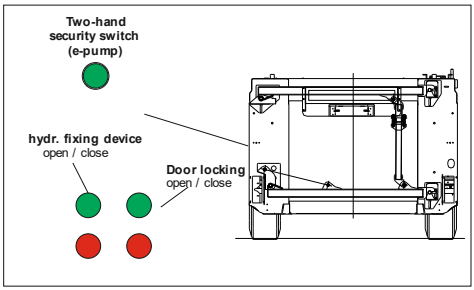
3. The door locking is opened by pushing / turning the corresponding keys.

After having unlocked the door, it can be opened by hand. By moving the upper bar, the door can be fixed in open position (at 90° and 270°).
Take care that the Innenlader stands straight for closing the door and that both locking hooks are in due position.

3.11.1 Hydraulically pivoted rear wall

The Innenlader can optionally be equipped with a hydraulically pivoted rear wall.

Pay attention that for opening the rear wall the Innenlader has to stand horizontally!



The control valves for the pivoted rear wall can be found on the left vehicle side in the rear area. Before you can open the rear wall, the two mechanic safety devices (locking pins) have to be released.

To open the rear wall, proceed as follows:

1. Switch on ignition and parking light to ensure the voltage supply of the electro pump assembly.

2. Switch on the electro pump assembly by means of the key switch or switch on the hydraulic drive of the tractor.

3. The rear wall is opened / closed by pushing / turning the correspondant button.

3.12 Hydraulic pallet locking

The control valve for the pallet locking can be found in driving direction at the front left side behind the side panelling and/or on the right side of the vehicle rear.
After having taken the pallet, operate the pallet locking so that the catching hooks of the locking clasp the round steel on the pallet and the pallet is secured against getting out of place by this. Check if both catching hooks have duly clasped.
To close the pallet locking, proceed as follows:

1. Switch on ignition and parking light to ensure the voltage supply of the electro pump assembly.

2. Switch on the electro pump assembly by means of the key switch or the hydraulic drive of the tractor.

3. The pallet locking is closed by pushing the button and at the same time putting the control lever to the front.

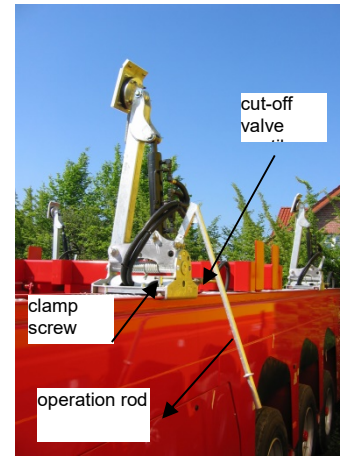
3.13 Hydraulic fixing

The pressure plates can be shifted on the longitudinal member and are installed in pivoted way. To shift a plate, only the front clamp screw has to the released. The tension plate can be pivoted by means of the operation rod from the bottom. Pay attention that the bold is safely locking.
The control valves for the hydraulic fixation can be found on the right and left vehicle rear part.
After picking up the pallet and adjusting the plates extend these plates as far as the concrete parts are fixed on the rack.

The hydraulic fixation serves only for adjusting the concrete parts and must not be used as sole load securing device.

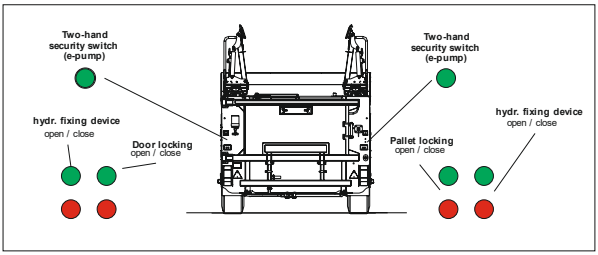
The hydraulic fixation is controlled separately for the left and right side. For operation please proceed as follows:

1. Switch on ignition and parking light to ensure voltage supply of the electro pump assembly.



2. Switch on electro pump assembly by means of the key switch or power take-off on the tractor.

3. By pushing the corresponding button the fixation is closed / opened.



3.13 .1 Mechanic fixing

The mechanic fixation serves only for adjusting the concrete parts and must not be used as sole load securing device.

The tension plates are mounted on the longitudinal member to be shifted and pivoted.
To shift a plate, only the front clamp screw has to be released.

Pivoting of the tension plate can be made by means of the operation rod from the bottom. Pay attention that the bolt safely locks.
For the mechanic fixation pay attention to the following:

1. Before loading the Innenlader, all plates have to be completely opened.

2. After having loaded the Innenlader, the tension plate can be adjusted and unscrewed with the spindle.

3.14 Due use of a concrete part pallet

- the pallet must be desinged fort he transport in Langendorf Innenladers
- for the transport with other pallet manufacturer, the relevant dimensions have to be checked in advance
- the max. side play between Innenlader and pallet must not exceed 35 mm
- the contact width of the longitudinal member of the pallet must be at least 65 mm per side
- the contact surface of the longitudinal member of the pallet must be „even“ and have contact with the whole surface!

3.14.1 Safety hints for loading a concrete part pallet

- The pallet may only be put on solid, carrying and even ground.

- The pallet must be fixed on the crane only in empty condition and with the eyes and lifting accessories designed for that

- Pay attention that during the whole loading procedure there are no persons in the area of danger. This refers to the possible tilt over area of concrete parts as well as to the swing and working area of the loading crane.
  Pay attention also to possible “swing movements” e.g. due to wind.

  Only pallets in technically perfect condition may be loaded and used. The same counts for the corresponding guide block.
  Both parts build one unit and have to be secured against unintentional releasing by bolts and splint.

- To have a load possible low of the guiding bolt, the concrete part pallets have to be placed always just up to the very front on the guide block.

- It is forbidden to load or unload pallets with strong wind (from wind force 5 on).

Wind force Beaufort degree	Designation	Wind speed „ v “ m/s	Surface load by the wind N/m²	Loading procedure
0	calm	0 up to 0,2	0 up to 0,025	harmless
1	soft draught	0,3 up to 1,5	0,04 up to 1,4	
2	light breeze	1,6 up to 3,3	1,6 up to 6,8	
3	soft breeze	3,4 up to 5,4	7,2 up to 18,2	
4	moderate breeze	5,5 up to 7,9	18,9 up to 39,0	
5	fresh breeze	8,0 up to 10,7	40,0 up to 71,6	forbidden
6	strong wind	10,8 up to 13,8	72,9 up to 119,0	
7	stiff wind	13,9 up to 17,1	120,8 up to 182,8	
8	stormy wind	17,2 up to 20,7	184,9 up to 267,8	
9	storm	20,8 up to 24,4	270,4 up to 372,1	
10	heavy storm	24,5 up to 28,4	375,2 up to 504,1	
11	violent storm	28,5 up to 32,6	507,6 up to 664,2	
12	hurricane	32,7 up to 36,9	668,3 up to 851,0	

Force on surface depending on wind speed v

3.14.2 Loading of a concrete part pallet

For loading a concrete part pallet following hints have to be paid attention to:

1. Pay attention that there is sufficient place in front of the pallet – normally approx. 20 m.

2. When loading wall pallets the first one is approached in the middle on the pallet carefully to the guide block and set down but not detached from the crane (ropes/chains still must be tight). Pay attention in any case that the concrete parts are standing vertically.

   The bolts have to be approached to the concrete part in the guiding rail and tightened with a tightening torque of **400 Nm** (40 kgm). This tightening torque is obtained for example if you pull on a tool with a lever arm of 1 m with approx. 40 kp.

   If necessary you have to use appropriate wooden wedges between concrete part and locking bolt as compensation. Only if the concrete part is safely loaded on the pallet, the palett can be detached from the crane.

Other wall pallets are loaded correspondingly, but by turns one on the left and one on the right side so that at the end the total center of gravity is in the middle in longitudinal sense.

3. You have to place vertically wooden pieces between each concrete part at the rear end with corresponding thickness so that the load builds one unit when transporting and cannot be damaged by the hydraulic fixation.

4. With plane contact the concrete parts can be set down without additional wooden pieces on the wooden floor.
   If wall parts have to be supported (e.g. with exceeding reinforcements), the forces may only be in the area of the traverse member.

5. Wall pallets must not have any recesses or other weak points in the area of the locking bolts.
   In fact the wall pallet must be able to take up the forces of the tipping moment in this area.

3.15. Loading a concrete part pallet

Before taking up a pallet, check following points:
(Points 1 and 2 are also valid for empty pallets)

1. The guiding truss must be secured with the pallet by bolts and pins against unintentional releasing.

2. The locking bolts must be firmly tightened.

3. The wall plates must **stand vertically** on the pallet.

4. You have to put sufficiently strong wooden pieces between the concrete parts in the rear area so that the load can be safely loaded by the hydraulic fixing.

5. Take care that if loads have been supported (e.g. if parts are jutting out), the force may only be in the area of the cross members.

It is not allowed to transport loads and pallets which cannot be taken and loaded safely.

Concrete part pallets may only be put down on surfaces with sufficiently even and carrying ground approved by the local building supervisor.

Loading a concrete part pallet is made as follows:

1. Place the Innenlader in a way that it can be driven backwards under the concrete part pallet without large steering angles.

Because of the geometry of the axle fixation there is a movement in longitudinal direction of the vehicle when lifting resp. lowering the Innenlader. Therefore you must not operate the parking brake. The combination has to be secured by putting the chocks under the tractor.

2. Open the rear gate. By moving the upper bar the gate is fixed in open position.

3. Ensure that the hydraulic fixing device is opened.

4. Switch off the emergency device (point 3.5.1).

5. Lower the vehicle front part via the lift arm (point 3.4).

6. Lower the hydraulic axle assembly so far that the Innenlader can pick up the concrete part pallet. Avoid contact to the ground.

7. Drive the Innenlader under the concrete part pallet so that it lies in front of the stop of the front wall. Note that it is not possible to have large steering angles when the lift arm is lowered.

8. Lift the Innenlader just that high that the concrete part pallet does not have any more contact to the ground.

9. Switch on the pallet locking, if existing.

10. Close and lock the rear door. To avoid an unintentional opening of the rear wall, use the additional safety device for the rear wall locking.

11. Only for use without “load securing certificate”
    Fix the concrete parts by means of suitable fixing rings and ropes. The hydraulic fixing device only serves for aligning the concrete parts and must not be used as load fixation.

! It is possible that the Innenlader does not lift proportionately; therefore it is important to secure the load as soon as possible.

12. Lift the Innenlader by means of the hydraulic axle assembly and lift arm just to driving position.

13. Switch on the emergency device.

14. After having closed the rear gate the combination is ready for driving.

Unloading of a concrete part pallet has to be made in the same order.

 After having put down the pallet at the building site, the local building supervisor / crew leader takes responsibility for the safety of standing and unloading.

! For crane unloading, the Innenlader has to be lowered just up to the emergency devices so that the suspension system is completely discharged.

Please observe following hints:

1. Let the Innenlader pallets only be put down on even and carrying ground.

2. Check if the guiding truss (rake) is connected firmly to the pallet and secured against unintentional releasing by plug-in bolts before the concrete parts get contact.

3. Also check all locking bolts for firm seat

4. Only if one part is hung to the crane and the ropes are lightly stretched, the locking bolt of the concrete part to be taken may be released.
   The standing safety of the whole pallet must be guaranteed in every state of loading (danger of falling over!), therefore the concrete parts must be taken by turns (one time from the left hand side, one time from the right hand side and so on) from the outer side.

5. The pallet may only be used with the crane in empty condition and using the suitable eyes and corresponding devices.

6. After having unloaded, the locking bolts must be firmly re-tightened.

3.16 Wheel change

When changing a wheel on the Innenlader, following security hints have to be paid attention to:

Spare wheels older than 2 years must no longer be taken for the constant use as permanent wheel. They have to be exchanged as soon as possible against a new wheel and then can be used again as spare wheel.

When checking the air pressure of the wheels, always also the air pressure of the spare wheel has to be checked.

The spare wheel can be found on the Innenlader at the right side in driving direction, behind the front side panelling. The wheel change aid is fixed on the spare wheel. You can do without a jack because of this helping device.

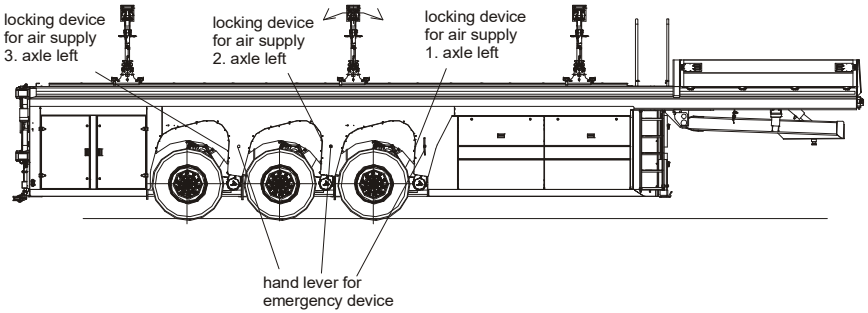
If the wheel change takes place on a loaded vehicle, the load securing system has to be closed.

To change a wheel you have to proceed as follows:

When changing the wheel on public roads make sure that the vehicle is sufficiently secured. Ensure that you are not in the area of traffic (area of danger) during the whole procedure of the wheel change!

1. Secure the vehicle against rolling.

2. Remove the side panelling at the spare wheel.



3. Lower the vehicle just to the emergency devices.

4. **Shut off the suspension cylinder / air bellow of the wheel to be changed.**

5. Hang in the wheel change aid on the vehicle frame and on the axle swing as shown.

! **Attention: Only use the wheel change aid supplied with the vehicle**.


Wheel change aid on hydraulically suspended Innenlader

This is designed in such a way that only the smaller shackle is destroyed in the event that the suspension cylinder / air bellows is not shut off. If other parts are used, there is a risk that the vehicle frame, parts of the air suspension and the axle swing will be damaged. The vehicle must not be moved with the wheel change aid attached!


Wheel change aid on air suspended Innenlader

6. Release the wheel nuts and unscrew them except three wheel nuts arranged opposite to each other.

7. Lift the vehicle just that high that the wheel to be changed does not have any more contact to the ground.

8. If the wheel sticks on the bolts without tension, the remaining three nuts can be removed. Pay attention that you do not damage the bolt threads when taking away and putting on the disc wheels.

Before putting on the disc wheels, clean the contact surface of the brake drum, the rim and the wheel nuts from corrosion and dirt. Check centring of the wheel.

9. Tighten the wheel nuts crosswise with the help of a torque wrench to the tightening torque indicated. (Pay attention also to the corresponding instructions of the axle manufacturer)

10. Lower the vehicle just to the emergency device..

11. Take away the wheel change aid.
Attention: The vehicle must not be driven with the wheel change aid attached!

12. Fix the damaged wheel to the vehicle by means of the spare wheel holder and remount the side panelling.

13. Open the shut-off valve of the suspension cylinder / air bellow.

14. Lift the Innenlader to driving position.

3.17 Central lubrication system (special equipment)

The vehicle can be equipped, if requested, with a central lubrication system. The central lubrication system is filled with grease of "Li" quality. Please note when refilling the system, that grease of the same specification is used. For progressive systems we recommend grease with EP additive (extreme pressure). Grease of that kind keeps its lubricity also at high pressures. Some surplus grease will come out at some points because of the different grease consumption. In order to avoid tamping at these points, we recommend clearing away this surplus grease regularly (every three months).

Vogel progressive central lubrication system with piston pump KFGS

The Vogel central lubrication system is a progressive system which can supply grease up to NLGI Kl. 2 **(use grease with EP additives).** Progressive means that the greasing points of a central lubrication system are all greased one after the other. Due to this greasing of the greasing points in succession it is possible to control a progressive central lubrication system very easily by means of a pressure relief valve. If a greasing point would not take any grease from the distributor, the progressive distributor blocks and in the central lubrication system a pressure of 280 bars is built up. Over a pressure relief valve on the pump the grease is sprayed.

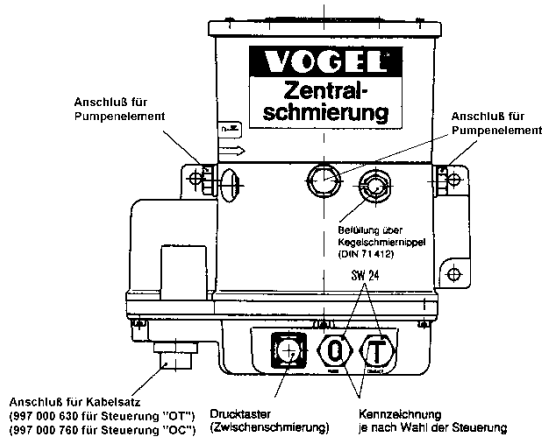
Structure of the Vogel central lubrication system:
The electrically driven piston pump KFGS has 3 grease outlets for the connection of 3 progressive distributor circuits which are independent from each other. For each outlet a separate pump element is required.

There are fixedly adjusted and adjustable pump elements. The adjustable pump elements are used if a loading crane shall be connected to the central lubrication system.

The task of these pump elements is to distribute the grease to the progressive sub-distributors in the right relation. The progressive sub-distributors then supply the grease to the individual greasing points.

The electric control of the stop time and greasing time of the pump can be done in two different ways (depending on time or on pulse).

The filling of the supply reservoir is done via a conical grease nipple according to DIN 71412.



Pay attention to cleanness when filling!

!

Function and adjustment of the system
(execution "OC" – pulse [brake light] controlled)
For this kind of central lubrication system the supplied grease rate depends on the frequency of the braking because the pump is controlled through the brake light. With every brake operation – lighting up of the stop lamps - , the pulse counter in the control unit is increased by one. That means that depending on the use and the driving style an individual adjustment of the supply rate must be done. For vehicles which are used for long distances or which are equipped with a wear free brake (retarder) for example smaller stop times (pulse number) or longer contact times (pump running time) can be adjusted than for vehicles which are mainly used in the town traffic.

The duration of the stop time (pulse number) between two greasing procedures (1-200 pulses) can be adjusted by means of a screwdriver behind the screw plug labelled with "O" on the front side of the pump assembly, the pump running time (1-22 min.) behind the screw plug labelled with "C".

Before changing the values which were adjusted in the factory, you should write them down. This might be useful for finding an average value at a later point of time.

Pulse number:_____pulses
Pump running time:_____minutes

Intermediate greasing
When the ignition is switched on and the brake is operated (stop lamp lights), an intermediate greasing can be activated with the push-button on the housing of the pump. During the whole greasing procedure the brake must remain operated.
This greasing pulse should be done directly after each car wash.

The adjustment in the factory is based on experimental values. We recommend to check the central lubrication system in the first weeks after putting into operation for following points and to adapt the adjustment according to your wishes.

- **Sufficient dosage on the bearing points – grease collar (depending on the construction of the bearing and the conditions of use).**
- **Check piping (greasing points, torn off hoses, leaks).**

Ventilation of the system

If the grease reservoir was inadvertently completely emptied, it might be necessary to ventilate the system.
This is done as follows:

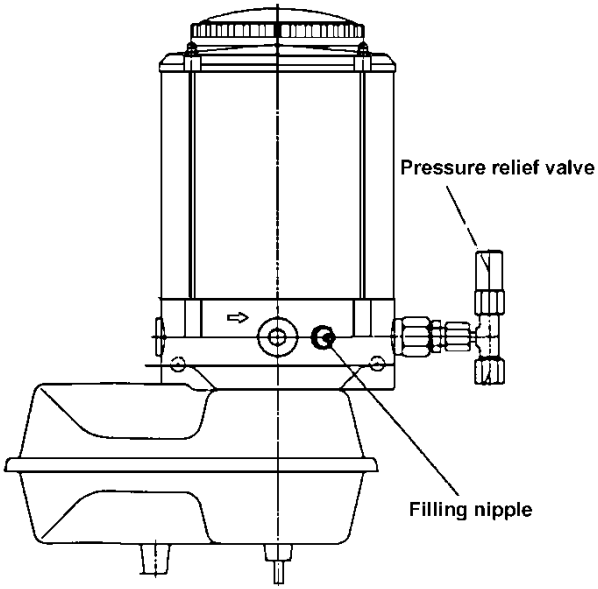
1. Unscrew the main line form the pump outlet.
2. Activate the additional greasing pulse until bubble-free grease escapes the pump outlet.
3. Reconnect the main line.
4. Activate additional greasing pulse.

BEKA-MAX progressive central lubrication system with electric pump EP-1

The BEKA-MAX central lubrication system is a progressive system which can supply grease up to NLGI Kl. 2 (use grease with EP additives). Progressive means that the greasing points of a central lubrication system are all greased one after the other. Due to this greasing of the greasing points in succession it is possible to control a progressive central lubrication system very easily by means of a pressure relief valve. If a greasing point would not take any grease from the distributor, the progressive distributor blocks and in the central lubrication system a pressure of 280 bars is built up. Over a pressure relief valve on the pump the grease is sprayed.

Structure of the BEKA-MAX central lubrication system:

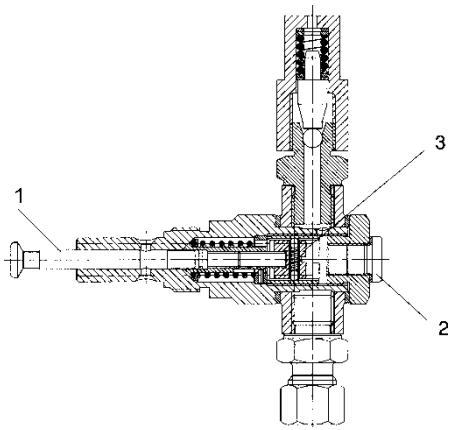
An electrically driven piston pump EP-1 supplies the grease to the main progressive distributor. The task of this main distributor is to distribute the grease to the progressive sub-distributors in the right relation. The progressive sub-distributors then supply the grease to the individual greasing points**. It is possible to mount on request an electrical control unit controlling the stop time and greasing time of the pump.**
The filling of the supply reservoir is done via a conical grease nipple according to DIN 71412.

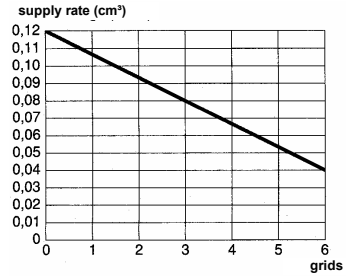


Adjusting the progressive central lubrication system, type BEKA-MAX
Regarding this kind of central lubrication system, the quantity of grease depends on the frequency and duration of the braking actions because the pump is controlled via the stop light. That means that there must be an individual adjustment of grease quantity according to use and kind of driving. E.g. vehicles which run long distance must be adjusted with a higher supply rate per braking than vehicles which are used mainly in city traffic.
The adjustment is made at the pump element adjustable as regards the quantity. This is mounted directly at the pump. It is possible to adjust from 0.12 cm³ per pump lift (max.) to 0.04 cm³ per lift. The optimum adjustment should be in a way that after one week of driving there is a small collar of surplus grease (approx. 2 mm) at a greasing point, e.g. at the brake shaft of the axle.
The factory setting of the system is the max. supply rate (0.12 cm³/per lift).

Adjusting the supply rate

For adjusting the supply rate, you must keep to the following instructions.
- Remove screw plug (2) by means of hexagon socket spanner (spanner size 5).
- Adjusting the adjustment disc (3) is made by a screwdriver.
- Turning in clockwise direction reduces the supply rate.
- Turning in anti-clockwise direction increases the supply rate.
- Max. lift of the adjustment disc = 2.4 mm = 6 grids
- 1 rotation of the adjustment disc = 0.8 mm = 2 grids
- Tighten screw plug (2) incl. joint ring.





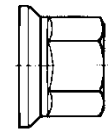
4. National obligations

The corresponding national regulations must be observed!

5. First inspection

After 50 km driving, check the fixed seat of the wheel nuts. Check it again after 50 km loaded driving (also after each wheel change).

BPW axle with spigot alignment	630 Nm
SAF axle with spigot alignment	600 Nm



M 22x1,5

Wheel nut with pressure disc

A first inspection of your trailer / semitrailer must be carried out after 500 – 1000 km loaded driving. It should be made, so far as the location of the trailer makes it possible, in our work, otherwise a competent motor vehicle workshop must be called on.
To carry out the first inspection, special technical knowledge and experience with Langendorf vehicles is required, which cannot be given by these short instructions.
For add-on components such as axles, slack adjusters etc. the separate maintenance instructions of the manufacturer in question are valid independently from these instructions.

! If you exceed the time for the first inspection considerably or if it is not carried out at all, any guarantee claims cannot be accepted.

The following check list for the first inspection must be filled in by the workshop which carries out the inspection, and it must be confirmed by signature and company stamp that the inspection has been made.

For any guarantee claim, this completed list and the corresponding invoice for the first inspection must be presented to the Langendorf service agency where you are lodging the claim.

Check list for the first inspection

Works to be carried out	without defect	does not belong to equipment	defect repaired	Notes
Check fixed seat of the wheel nuts (600/630 Nm)				
Visual check of the axle assembly				
Check suspension (hydraulic) cylinders for tightness and damage				
Check hydraulic accumulators according to the manufacturer's instructions. Check gas precharge pressure (www.hydac.com)				
Check shock absorbers and their fixation				
Check air bellow for damage				
Check grease filling in the axle swing bearing				
Check axle swing bearing				
Check sliding guide of the axle swings				
Check emergency device / axle restraint system				
Check slack adjuster				
Check axles according to the instructions of the manufacturer				
Check lighting system				
Check function of brake system; check connections for tightness				
Check brake-piston stroke				
Check function of parking brake				
Make brake balance for road train between tractor and trailer.				
Check bearing of front lift arm				
Check and bleed hydraulic cylinder of the lift arm				

Works to be carried out	without defect	does not belong to equipment	defect repaired	Notes
Check hydraulic system for function and tightness				
Check electro-hydraulic pump assembly				
Check oil level in the hydraulic tank (filled with mineral oil type “HLP 22 acc. to DIN 51524 part 2” by the factory)				
Check fixed seat of king-pin.				
Visual check of vehicle frame				
Check fifth wheel plate; grease it				
Check bearing of rear wall				
Check rear wall locking for function and damage				
Check pallet locking for function and damage				
Check fixing device for function and damage				
Retighten all screwed connections with directed tightening torque				
Check tyres regarding pressure/pattern/damage				
Grease all lubrication points				
Grease the parts which are stressed with friction (without nipple)				
Check and adjust central lubrication system				
Driving test				

Notes regarding the first inspection: _____

_____

_____

_____

First inspection – Service Card

Dear Customer

Please have confirmed the execution of the first inspection by your Langendorf service workshop with date, signature and stamp.

Should the unlikely case of a complaint arise and you claim any guarantee service, you must present this confirmation to the Langendorf service agency where you are claiming the damage.

Vehicle type: _____

Chassis number: _____

Date of first registration: _____

Vehicle owner

Company: _____

Street: _____

Place: _____

Industry: _____

The due first inspection of the above-mentioned vehicle was made

on _____

(Stamp / Signature of the service workshop)

6. Maintenance and inspections

6.1 General indications concerning maintenance and inspection works

! - Before carrying out any maintenance and inspection works on the unhitched trailer, please pay attention that the vehicle is standing stable. The trailer must be secured against rolling away.

- When working on or under movable parts, these parts have to be secured or supported accordingly.

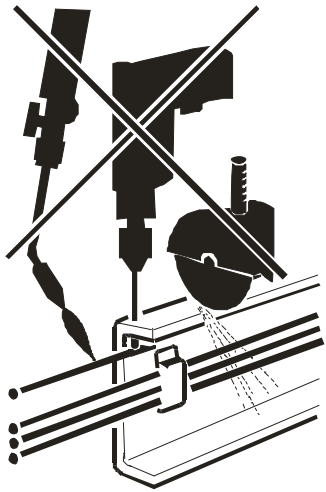
- For carrying out examination and maintenance works, certain special knowledge is required which cannot be given within the scope of these instructions.

- If the service and maintenance works are carried out on your own account, you must pay attention to certain pollution control measures. The legal directions must be kept to for the removal of operation and auxiliary material.

- For welding or adjusting works on the chassis, please ask for our instructions because the trailer has been manufactured by using high-quality special steel.

- For all welding works the air bellows, the parts of the air suspension, plastic and electric lines must be protected against flying sparks and weld splashes.

- When welding, drilling or grinding near plastic and electric lines, safety measures such as covering or removal of the lines have to be taken.



Minimum bending radii for plastic lines indest

Line ø mm	Material thickness mm	Minimum bending radius mm
6	1,0	40
8	1,0	40
12	1,5	60
15	1,5	90

- **The maintenance intervals depend on the operation of your trailer.**

  We understand by "*normal* operation conditions":
  - regular "single-shift" operation
  - paved roads
  - temporary operation under full load
  - central European climate

  We understand by "*extreme* operation conditions":
  - "multi-shift" operation
  - long immobilisation time
  - non-paved (bad) roads
  - uneven ground
  - continuous operation under full load
  - extreme climate (humidity, temperature)

6.1.1 Cleaning of the vehicle

For cleaning the vehicle note following indications:

- Do not clean any electric parts (lamps, keys, solenoid valves, junction boxes etc.) with steam-jet tools.

! - Never point the high-pressure cleaner directly at greasing and bearing points.

- Do not point the high-pressure cleaner at the sealing area of the insulating panels.

- Do not use high-pressure or steam-jet tools during the first three months. Clean only with cold water without additives during this time.

- Wash with a lot of clear water in order to avoid scratches in the paintwork.

- Avoid water temperatures over 60° C.

- Only use ph-neutral detergent (ph-value 5-8).
  Pay attention to the fact that, especially with aluminium parts, aggressive (acid or alkaline) detergents destroy the protecting oxide coat. This may lead to corrosion or / and to blisters in the paintwork .

- Damages in the paintwork have to be repaired professionally without delay.

- The distance of a dirt blaster or a flat spray nozzle from the vehicle must be at least 30 cm. Round jet nozzles must have a distance of at least 70 cm.

- Tyres, air bellows and parts made of rubber must **not** be cleaned with a round jet nozzle.

- Cleaning or rubbing off of chromium-plated piston rods with steam-jet tools or detergents which contain sodium carbonate (alkaline detergents) damage this chromium-plate and destroy the protection against corrosion.

! After having used high-pressure or steam-jet tools, all grease points have to be greased until escaping of grease. With this the possibly entered water is pressed out.

6.2. Regular maintenance and examination works

The following instructions refer to normal operation conditions. In case of extraordinary conditions the maintenance works must be carried out more often. The repair of noted damages or change of wearing pieces must be made in a competent workshop if the owner of the vehicle has not the corresponding experts and the required devices to do it in his own facilities.

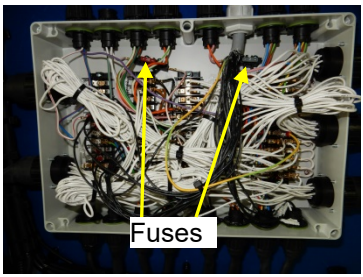
6.3. Examinations before driving

Each driver should make a habit to check his vehicle every day before driving with regards to traffic and functional safety. The careful execution of the following examinations is the condition for a long durability of the vehicle, for the safety of the driver and all other road users.

- **Check tyres**
  The air pressure of all wheels incl. spare wheel must be checked according to the instructions of the tyre manufacturer in dependence with the axle load. Regular visual examinations must be made on tyres for damage and pattern.

- **Water of condensation**
  If there is no air pressure drier or if no automatic drainage valves are installed, you must drain off the water of condensation every day in the air tank of the brake system and air suspension. Especially when the weather is cold and wet, there is a lot of water during driving. This might lead to difficulties for releasing the brake cylinders, higher corrosion and freezing of the brake parts.

- **Lighting system/Power consumer**
  Check the function of all power consumers of the electrical system and especially of the lights. Defective bulbs must be exchanged immediately. We recommend having a range of bulbs and fuses always available in the vehicle. Take care that after opening the main distribution box the sealing is in an impeccable condition (if necessary, use a new sealing).
  In the upper part of the main distributor there are also 2 fuses.
  The left fuse (10A) is responsible for the complete control. The right fuse (2A) protects the central lubrication system and the lift arm indicator lamp.



- **Cleaning chromium-plated piston rods**
  It is recommended to wipe with hydraulic oil piston rods which are not completely retracted in parking position, regularly once or twice a week depending on use.

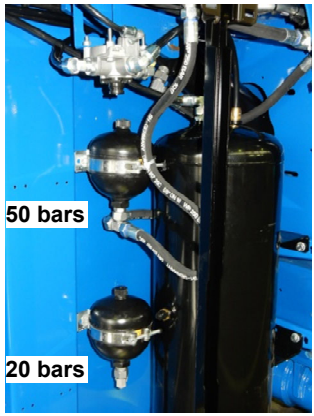
- **Check axle restraint system / emergency device**
  Before driving you must check the switch position and the trouble-free function of the axle restraint system and the emergency device on all axles. Please note also operation hints of paragraph 3.7.

- **Check adjustment of the central lubrication system**
  Before driving you should visually check different lubrication points. At these lubrication points you should see a small collar of grease. Heaps of grease show an overlubrication, dry bearing points show an insufficient lubrication. In both cases you have to check in detail the system and adjust it. Please note operation instructions in paragraph 3.16 or contact our after-sales service.

- **Check gas precharge pressure on the diaphragm hydraulic accumulators**
  The diaphragm hydraulic accumulators are decisively responsible for the driving and suspension characteristics of the hydraulically suspended Innenlader. If the precharge pressure of the accumulators was too low, the laden Innenlader would not sufficiently "absorb" any more and all impacts and shocks would be directly transmitted into the chassis and the chassis frame, which could lead to larger damages in the long run. A precharge pressure which is too high would have negative effects when driving with the empty Innenlader.

  The hydraulic accumulators are mounted in front of the first axle on the left and right side (behind the covering panels). The upper accumulator is factory-adjusted to a precharge pressure of 50 bars.
  The lower accumulator is filled with 20 bars.

  Please take notice also of the maintenance instructions of the manufacturer which can be found at www.hydac.de.

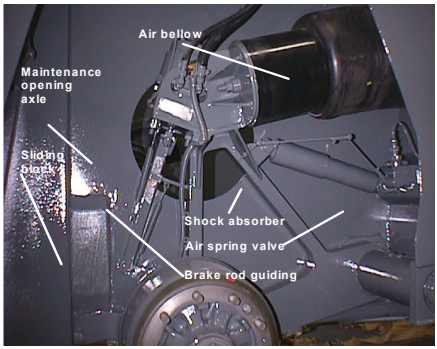


6.4 Maintenance works to be done every 3 months

Following maintenance works have to be done every 3 months (quarterly).

- **Visual check of axle suspension**
  All independent wheel suspensions must be checked carefully for damage.

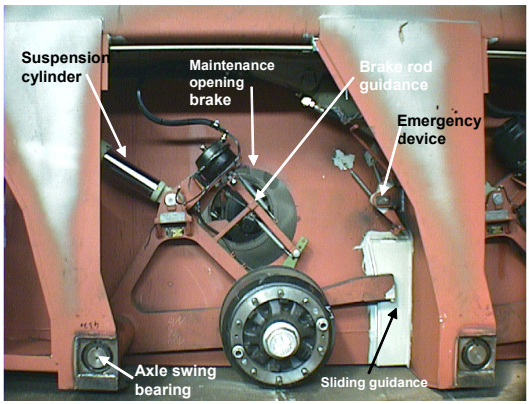
- **Check shock absorber and shock absorber fixation**
  All shock absorbers must be checked carefully for leaking oil or damages. Defective shock absorbers must be replaced immediately.
  Check fixed seat of lower and upper shock absorber fixation. Tightening torque with M24 M_A = 400 – 450 Nm



- **Check air bellows for damage**
  For doing so, the air suspension of the Innenlader must be completely lifted. All air bellows must be examined carefully for fabric damages or crack points. It should also be checked that the air bellows are duly bending in when the air suspension is lowered.

- **Check suspension (hydraulic) cylinders for damage**
  The hydraulic cylinders must not show any damage or leaky points. The cylinder bearings must not be worn.

- **Clean axle swing sliding guidance and check for wear**
  For examining the sliding plates, the unloaded Innenlader must be placed on an even ground in straight position. The free space between axle swing and sliding plate should be between 3 and 8 mm. If this is not the case, a track control must be made immediately. Please contact our after-sales service for that.



If there is not any excessive wear, the sliding pieces must slightly be greased with a lithium saponified multipurpose grease.

- **Check brake rod**
  The brake rods must be checked on all axles for damage and free travel. The function of the retracting springs must be ensured. In the area of the guidance the brake rod should slightly be greased.

- **Check emergency device and axle restraint system for damages (optionally with pneumatic or manual control)**
  The function of the emergency device and the axle restraint system must be ensured. All parts including fixation, fastening springs, setting cylinder etc. must be in impeccable condition. All points stressed with friction should slightly be sprayed with spray oil.

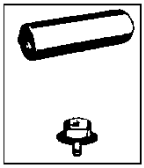
- **Check axles according to the instructions of the manufacturer**
  The inspection must be made depending on axle type and axle manufacturer according to their instructions.

- **Check brake system**
  According to German legislation, investigations of the brake system on trailers have to be made periodically. These investigations according to § 29, annexe VIII, may only be made by the manufacturer or by officially authorised brake service workshops.
  For the operation of the vehicle in other countries, please observe the valid legal obligations accordingly.

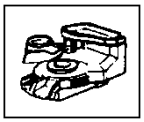
Maintenance and repair works on the brake system may only be made by qualified persons.
For all maintenance works you have to observe the legal regulations. Please be especially careful when welding, burning and boring near brake lines.

The brake system must in general be checked visually. Following criteria should be paid attention to and checked.
- Tube and hose lines as well as coupling heads must not be damaged or corroded at the outside.
- Dust-protection cups, e.g. on brake cylinders, must not be damaged.
- Joints, e.g. on fork heads, must duly be secured, free-moving and not worn.
- Cables and cable pulls must be guided flawlessly, must not show any cracks and must not be knotted.

- Check brake linings, the minimum thickness must be given.



- Air bellows
  For vehicles being equipped with manual water-drainage valves, the reservoirs must be drained daily.
- Pressure reservoirs must not be damaged. There must not be any outer corrosion damages.



- Coupling heads
  Before coupling it must be ensured that the sealing washers are in flawless condition. Damaged washers must be exchanged.

- Brake power regulator
  The adjusting shaft of the control valve must be free-moving. Pay attention to possible damages of the trailing device.

Check the pressure decrease with full braking when the vehicle is standing. The pressure decrease must not exceed 0.8 bars as maximum for the two-line brake system. If the pressure decreases by more than 0.8 bars or if the travel of the brake cylinders reaches 2/3 of the total travel, the wheel brake must be adjusted.

Clean piping filters of brake system
The piping filters must be cleaned normally every 3 to 4 months depending on the operation conditions. For doing so, the filter cartridge must be taken out and blown out with compressed air. Damaged filter cartridges must be replaced.

Slightly oil joints on brake valves, brake cylinders and brake linkages.

Check the tightness of the compressed air system
For doing so, the brake system must be activated with the normal operation pressure. The pressure decrease must not exceed max. 0.1 bar within 10 minutes with the tractor engine switched off. Otherwise wipe cable system with soap-suds. Seal leaky points or/and exchange leaky valves or screwings. If in case of a repair the WIRA plug connections must be released or exchanged, the following ***"Mounting instructions for WIRA plug connections"*** must be observed.

Mounting of the plastic tube into the plug connection

Cut off right-angled the plastic tube with tube nippers. The cutting points must be cleaned so that there are no sharp edges inside and outside.

Mark the depth to be put in with an adequate pin or with band on the plastic tube. The depth to be put in can be determined on the union nut (length E) or can be taken from below table.

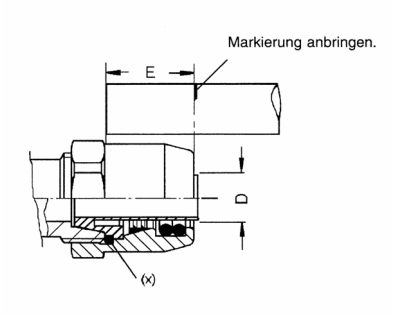
Insert the plastic tube over the total depth to be put in up to the stop. The marking should then be exactly at the bottom hole of the union nut, if not, the tube was not inserted deep enough.

After the mounting, pull back the plastic tube strongly to check if a perfect tube fixation was achieved.

The plastic tubes to be placed must fit with their dimensions exactly to each plug connection. That means e.g. that in plug connections for plastic tube 10 x 1.5 only plastic tube 10 x 1.5 and not 10 x 1.25 or 10 x 1 may be mounted.

Plug connections must not be used for plastic lines with brake function between frame and axle.

Connection	Tightening torque	Depth to be put in (E)
6L	14 Nm	18,0 mm
8L	17 Nm	18,0 mm
10L	22 Nm	19,5 mm
12L	30 Nm	19,5 mm
15L	38 Nm	19,5 mm
16LL	40 Nm	20,5 mm
18L	48 Nm	22,5 mm



Mounting of loose plug-in-units

Screw the plug-in-unit manually on the screwing union and after that tighten it with wrench. When doing so, the tightening torque indicated in above table must be observed.

Demounting of the plug connection

If a separation of the pipe from the installation connection is required, the plug-in-unit can be unscrewed from the union by means of a wrench. After having mounted the installation again, the plug-in-unit can also be installed again as described above.

Demounting of the plug-in-unit

Remove the o-ring (x) with a special needle (can be supplied by us) or simply with a safety-pin from the thread recess. Push back the union nut on the tube and pull out the support sleeve. Then cut off the tube on the clamp ring to the union nut and draw off the clamp ring from the piece of tube which was cut off.

The plug-in-union after that can be put together again and used. However, it must be taken special care that the clamp ring has its initial stress and is not damaged. The o-ring (x) can be pressed into the thread recess again easily with the handle of the special needle.

- **Check bearing of front lift arm**

  Visual check of the connection consoles and the connection bolts. Damaged parts must be replaced immediately. Grease bearing pins.

- **Check and bleed hydraulic cylinders of lift arm**

  The hydraulic cylinders must not show any leaky points. The cylinder bearings must not be worn.

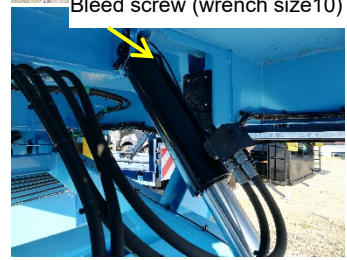
  Since air (micro-bubbles) can always accumulate in the hydraulic cylinders over time, it is very important that they are regularly bled. Otherwise, damage to the cylinder seals and thus leaks will inevitably occur.

The lift arm is moved via two cylinders, each of which must be bled on the piston and ring sides. (4 bleeding points).

We recommend the following procedure:

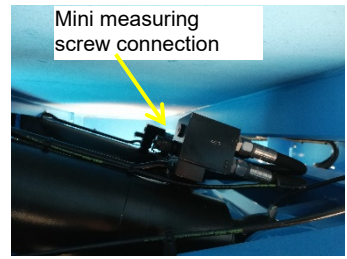
- First, the piston sides of both cylinders must be bled.
- Lower the lift arm completely (cylinder extended).
- Carefully open the bleed screw (wrench size 10) slightly so that air can escape with a small amount of oil. Collect escaping oil!
- Bleed second cylinder in the same way.

Bleed screw (wrench size10)



- To bleed the cylinders on the ring side, the lift arm must be fully lifted. (cylinder retracted)
- The cylinder is bled by screwing the mini measuring screw connection onto the connection on the load holding valve. The cylinder should be bled until the oil comes out without bubbles.
  (Collect escaping oil)

Mini measuring screw connection



When both lift arm cylinders have been bled, check the oil level in the oil reservoir and fill it up accordingly if necessary.

- **Check kingpin**

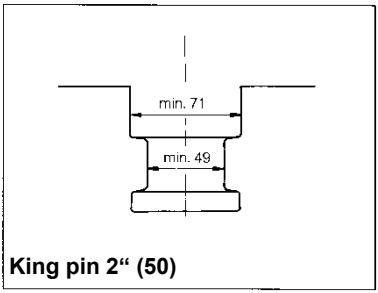
Kingpins are subject to approval with reference to construction and are parts connecting vehicles which highest demands regarding safety are made on. Damaged or deformed as well as repaired (e.g. welded) components must no longer be used because otherwise the operational and traffic safety is in danger and the type approval becomes extinct

The fifth wheel locking and kingpin are subject to a certain wear. The pin must be checked for tight seat and wear with the unhitched trailer.
The fastening screws must be checked with the tightening torque according to below table.

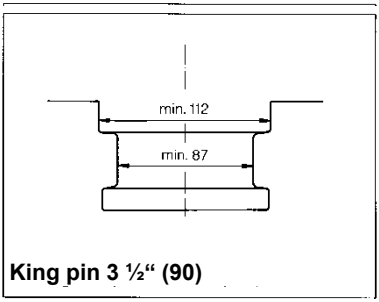
Manufacturer / Designation	**Check tag**	**Size**	**Screw**	**Tightening torque M_A=**
Georg Fischer +GF+ 662 101 109	D: M 4623 EG: e1-00-0475	2“ (50)	M14x1,5 SW 22	190 Nm
JOST KZ 1012-01	D: F3148 EG: e100-0145	2“ (50)	M14x1,5 SW 19	190 Nm
JOST KZ 1412-01	D: F3191 EG: e100-0147	3 ½ “ (90)	M14x1,5 SW 19	190 Nm
JOST KZ 1016-01	D: F3188 EG: e100-0150	3 ½ “ (90)	M20 SW 30	500 Nm
JOST KZ 1516-01	D: F3203 EG: e100-0148	2“ (50)	M20 SW 30	500 Nm

The type designation can be found on the lower end of the kingpin.
In case the kingpin mounted in your vehicle cannot be found in above table, please get in contact with our after-sales service.

If the limiting values mentioned below are fallen under, the kingpins must be replaced by original parts.



King pin 2“ (50)



King pin 3 ½“ (90)

- **Check bearing of rear wall**
  The rear wall bearing should not show any wear indications or damages. The door must be easily turning and it must be possible to secure it duly when opened. Worn or damaged bearing parts must be exchanged immediately.

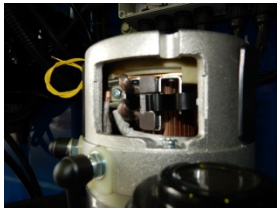
- **Check rear wall locking for function and damage**
  The locking has to function duly. The setting parts must be free-moving; connections (e.g. fork joints on the cylinder) must not have any deviation. The cylinder must not show any leaky points or damages. All moving connection points must slightly be greased with spray grease.

- **Check pallet locking for function and damage**
  The locking has to work without any problems. The setting parts must be free-moving; connections (e.g. fork joints on the cylinder) must not have any deviation. All moving connection points must slightly be greased with spray grease.

- **Check fixing device for function and damage**
  The fixing device has to work without any problems. The bearing parts must not show any damage and must not have any deviation.

- **Check oil level in the oil tank of the electro pump assembly**
  To check the oil level, all hydraulic cylinders must be completely retracted, i.e. the Innenlader must be completely lowered. In this position the oil level has to be between the upper and lower mark.
  The oil filter must be replaced according to the contamination indicator, but at least once a year.
  Please refer to the type plate of the oil filter for information on the filter element.
  The oil tank is filled with a mineral oil type “HLP 32 acc. to DIN 51524 part 2” in the factory. When refilling pay attention that oil of the same type is used. Every 1,000 operation hours or every year the oil has to be changed.

- **Check carbon brushes on the motor of the electro pump assembly**
  Check regularly the carbon brushes on the motor of the electro pump assembly.
  Worn caron brushes must be immediately replaced.



- **Check hydraulic system for function and tightness**
  Works on the hydraulic system must only be made by trained persons who know the dangers. The hydraulic system must be totally without pressure before starting repair works. Parts held or moved by hydraulic cylinders have to be secured mechanically.
  Before starting the repair works the Innenlader must be completely lowered and the "emergency lowering valve / pressure release valve of the hydro tanks" must be completely opened.
  When working on the hydraulic lift arm or its valves or hoses, you have to carry out additionally a pressure release for this area.
  For this the ventilation screws (spanner size 13) on both lift arm cylinders must carefully be loosened.

The hydraulic oil pouring out must be caught in an adequate container.
After completion of the work, the entire system must be vented.

- **Grease complete vehicle**
  Please pay attention to the lubrication plan in chapter 9.

6.5 Maintenance works to be done every 6 months

Following maintenance works have to be done in addition to the quarterly maintenance every 6 months (half-yearly).

- **Check grease level in the axle swing bearing**
  For checking the grease level, the screw plug must be turned out. The filling orifice must be filled with grease just to the upper edge. If necessary, refill grease of NLGI class 000.

- **Check axle swing bearing**
  To check the axle swing bearing, proceed as follows:

  1. Place the road train on even, firm ground.
  2. Jack the Innenlader in the rear area, under the pick-up rails.
  3. Completely lower the air suspension of the Innenlader.
  4. Jack the axle swing to be checked just as high until the wheel can freely be turned. This can be made by means of an oil-pressure device (jack). For doing so, there is a suitable locating on the underside of the axle swing.
  5. Check if there is any clearance in the axle swing bearing by moving the gliding piece and the axle swing.
  6. If there is any clearance, you have to get in contact with a specialised workshop immediately. If not, continue with the next axle swing in the same way.

  ! Before starting to drive you must ensure that all cut-off cocks are opened and the air bellows are duly filled with air.

- **Check slack adjusters**
  To check the slack adjusters please pay attention to the instructions given by the manufacturer (www.meibrakes.com)

- **Check axles according to the manufacturer's instructions**
  Please note the separate instructions of the axle manufacturer.

- **Check fixed seat of the brake cylinder fixation**
  The tightening torque is M_A = 210 Nm for thread M16

- **Check, clean and grease fifth wheel plate**
  Unhitch the vehicle; clean the fifth wheel coupling and plate. Grease the fifth wheel plate, wear parts, contact surfaces of the kingpin and the kingpin with high pressure grease (EP) with MoS2 or graphite additive (e.g. BP L21 M, BP HTEP 1, Esso multipurpose grease M, Shell Retinax AM).

- **Observe national legal directives**

6.6 Maintenance works to be done every 12 months

Following maintenance works have to be done in addition to the quarterly and half-yearly maintenance every 12 months (yearly).

- **Check axles according to the manufacturer's instructions**
  Please note the separate instructions of the axle manufacturer.

- **Check air suspension assembly**
  Lift the vehicle on the frame so that the axle suspension is discharged. Check whether the air bellows are fully extending. Check bellows for wear indications on the connections points between bellow and cover sheets. Remove carefully soiling on the edges of the cover sheets. Check shock absorbers for oil loss and damages. After having done so, charge the suspension again; the normal driving height (1,820–1,830 mm from the ground to the upper edge of the longitudinal member when the vehicle is empty) must adjust itself. If this is not the case, please contact a specialised workshop or our after-sales service.

- **Check hydraulic hoses**
  According to the regulations (ZH 1/74) of the government safety organization all hydraulic hoses have to be checked at least once a year.
  Should you notice one of the defects mentioned in the following, the corresponding hose has to be replaced immediately.
  - Damage of the outer layer up to the filler, such as chafe marks, cuts, cracks etc.
  - Embrittlement of the outer layer (crack formation in the hose cover).
  - Deformation not corresponding to the natural shape of the hose line. This is valid for the condition without pressure as well as with pressure or at bending. E.g. delamination, blistering, crushing or kink points.
  - Leaky points.
  - Damage or deformation of the hose fitting.
  - Working loose of the hose out of the hose fitting.
  - Corrosion of the hose fitting reducing the function or the stability.
  - Exceeding of the period of use of 6 years. You can find the corresponding date of manufacture on the hose fitting.

- **Check shock absorbers**
  Experience has shown that shock absorbers should be replaced after 150,000 km at the latest.

- **Observe national legal directives**

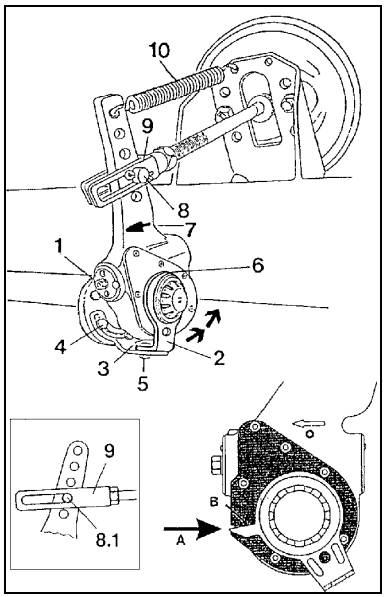
6.7 Make road train brake balance between tractor and trailer

The brake systems of tractor and trailer / semitrailer are adjusted to each other. Amongst others setting values such as e.g. advance and empty pressure of ALB (brake system with automatic load-dependent brake-power distribution) are checked and, if necessary, adjusted.
This examination and adjustment should be made every time when there are problems with the braking retardation. Following points might hint at an insufficient adjustment:

- Very different wear on brake linings on tractor and trailer
- When braking, the trailer overruns; i.e. the tractor is braked harder than the trailer.
- When braking, the road train is strongly stretched; i.e. the trailer is braked harder than the tractor.

If one of above-mentioned points occurs, the road train must be checked and adjusted in an authorised workshop.

6.8 Adjusting the automatic slack adjusters, type HALDEX



- Cams and brake shoes are in zero position.

- Fix the slack adjusters on the camshaft.
  Axial clearance: Adjust the nominal value of 1.0 mm by means of the adjustment plates (6).
  Arrow mark (7) points to brake direction.

- Install the fixed point clip (3); use 2 fixing screws (4) in any case. Do not yet tighten the fixing screws (4).

- **Diaphragm brake cylinder**
  Before mounting it has in any case to be ensured that the brake cylinder is in starting position.

  But the spring cylinders have to be under full operation pressure (at least 6 bars).

  Important: If you do not pay attention to that, the basic adjustment is wrong!

- Turn the adjustment screw (1) until the boring at the slack adjuster 8.1 corresponds to the boring in the yoke end (9) (see drawing).

- Set in and secure split pin (8).

- Hang in the return spring (10).

- Press the control arm in turning direction of the arrow (operation direction of the slack adjuster) into its final position **without** resort to force.

  Remark:
  The stop must not be effected at one of the two fixing screws (4) of the fixed point clip (3). Should the occasion arise, displace the fixed point clip (3) in the fixing (4).

  Tighten strongly all fixing screws (4) and the pin screw (5) in this final stop of the control arm (2).

7. Instructions for a long time immobilisation of the vehicle

For a longer immobilisation of the vehicle, lubricate it every 4 weeks and move or operate the corresponding pieces. Drain all air tanks before immobilisation. Every 4 weeks, give pressure into the air pressure system and let it operate, so that the valves are working regularly and cannot settle.

8. Tightening torque in Nm

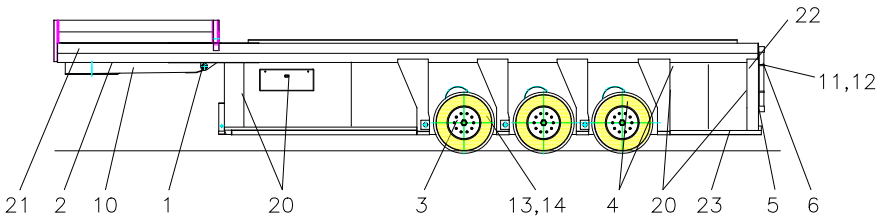
for screws and head support according to DIN 912,931 etc

These tightening torques are only valid if no other values are indicated in the maintenance instructions or documents from the supplier companies (for example axle manufacturer).

Thread	spanner size	material		
		8.8	10.9	12.9
M 8	SW 13	25	35	41
M 8 x 1		27	38	45
M 10	SW 17	49	69	83
M 10 x 1		52	73	88
M 12	SW 19	86	120	145
M 12 x 1,5		90	125	150
M 14	SW 22	135	190	230
M 14 x 1,5		150	210	250
M 16	SW 24	210	300	355
M 16 x 1,5		225	315	380
M 18	SW 27	290	405	485
M 18 x 1,5		325	460	550
M 20	SW 30	410	580	690
M 20 x 1,5		460	640	770
M 22	SW 32	550	780	930
M 22 x 1,5		610	860	1050
M 24	SW 36	710	1000	1200
M 24 x 2		780	1100	1300
M 27	SW 41	1050	1500	1800
M 27 x 2		1150	1600	1950
M 30	SW 46	1450	2000	2400
M 30 x 2		1600	2250	2700

Approximate values for tightening the screw connection with tightening torque key, lubricated thread. Impact wrench not permissible.

9. Lubrication plan



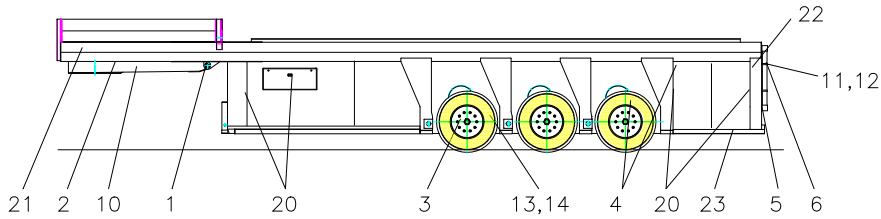
Explanations regarding the lubrication plan

This lubrication plan serves as complement to the maintenance plan of chapter 6.

In case the trailer is equipped with a central lubrication system, following positions need not being lubricated because they are connected to the central lubrication. But in this connection these lubrication points should be checked (see also page 6 – 4).
This concerns positions 1, 2, 3, 4, 5 and 6.

1. Nipple lubrication
   Lubricate the lubrications nipples mentioned in the following by means of a suitable grease pump with lithium multipurpose grease just until fresh grease escapes from the bearing points.

Pos.	Designation	Qty.	Lubrication periods
1	Lift arm bearing	2	Weekly
2	Lift arm cylinder bearing	4	Weekly
3	Axle – brake camshaft	6	Quarterly
4	Axle swing cylinder bearing	12	Weekly
5	Rear wall bearing	2	Quarterly
6	Rear wall locking	2	Quarterly



2. Lubrication by coating
Clean surfaces carefully and remove old grease completely.

Pos.	Designation	Qty.	Maintenance periods
10	Guiding sheets on the lift arm		Yearly
11	Slides on the rear wall		Quarterly
12	Locking hooks on rear wall (between hook and tube)		Quarterly
13	Slide guiding on axle swing		Quarterly
14	Brake rod guiding		Quarterly

3. Drop lubrication by means of oil can or spray oil

Pos.	Designation	Qty	Maintenance periods
20	Hinges on the flaps of side covering		Monthly
21	Hinges and locks of front wall		Monthly
22	Total locking mechanism of rear wall		Monthly
23	Total mechanism of pallet locking		Monthly

! After having used steam jet cleaners and high-pressure washing installations, especially with chemical additives, all lubrication points must immediately be greased.

A. Check list for periodical test and maintenance works

The following schedule shall serve as supplementary overview for the maintenance works indicated in chapter 6.

Works to be done Further information on the works please find in chapter 6 of these instructions	Before driving	Every 3 months	Every 6 months*	Every 12 months*	Remarks
Check fixed seat of wheel nuts (600 / 630 Nm)		X			Additionally after every wheel change
Visual examination of the axle suspension		X			Page 74
Check suspension (hydraulic) cylinder for tightness and damage		X			Page 74
Check shock absorbers and fixation					Page 74
Replace shock absorbers					aevery 2 years
Check air bellow for damage		X			Page 74
Check electro-hydraulic pump assembly Check carbon brushes on the motor		X			Page 82
Check oil level in the hydraulic tank	X	X		X	Page 81
Check grease level in the axle swing bearing			X		Page 82
Check axle swing bearing			X		Page 83
Check brake rod		X			Page 75
Clean and check axle swing slide guide		X			Page 74
Check emergency device / axle restraint system	X	X			Page 75
Check/grease slack adjusters	X	X	X	X	Manufacturer's instructions
Check axles according to the manufacturer's instructions	X	X	X	X	Manufacturer's instructions
Check lighting system	X				Page 72
Brake system; check tightness of connections		X			Page 75
Clean piping filters of brake system		X			Page 76
Check function of operation and parking brake	X				According to legal regulations

* Serves as supplement to the maintenance works to be done every 3 resp. 6 months.

Works to be done Further information on the works please find in chapter 6 of these instructions	Before driving	Every 3 months	Every 6 months*	Every 12 m. *	Remarks
Check fixed seat of brake cylinder fixation (M_A=210 Nm for M16)			X		Page 83
Inspection of trailer acc. to § 29 StVZO (German legislation)			X		National legal regulations
Main inspection acc. to § 29 StVZO (German legislation)				X	National legal regulations
Road train brake balance between tractor and trailer					If required
Check / grease bearing of front lift arm		X			Page 78
Check / bleed hydraulic cylinder of lift arm		X	X		Page 78
Check fixing device	X	X			Page 81
Check fixed seat of kingpin		X			Page 80
Check, clean and grease fifth wheel plate			X		Page 83
Check bearing of rear wall		X			Page 81
Check rear wall locking for function and damage		X			Page 81
Check pallet locking	X	X			Page 81
Check hydraulic hoses				X	Page 84
Check hydraulic system for function and tightness		X			Page 82
Visual examination of vehicle frame		X			
Retighten all screwed connections with directed tightening torque.			X		Page 89
Check tyres regarding pressure/pattern/damage	X				Page 71
Greasing of all lubrication points		X			Page 90
Grease the parts which are stressed with friction (without nipple)		X			Page 91
Check and adjust the central lubrication system	X				Page 72
Clean chromium-plated piston rod	X				Page 72

* Serves as supplement to the maintenance works to be done every 3 resp. 6 months.

Record of the inspections which have been carried out

Below list shall assist you for planning the inspections to be carried out.

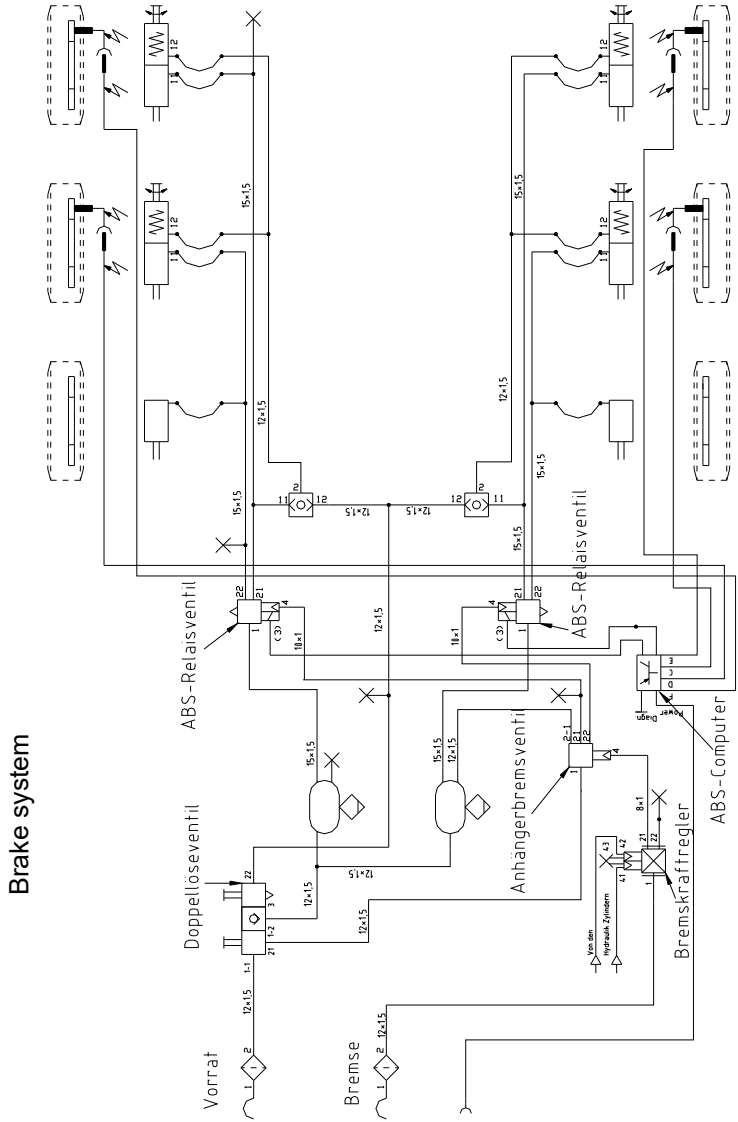
Date of first registration: _____

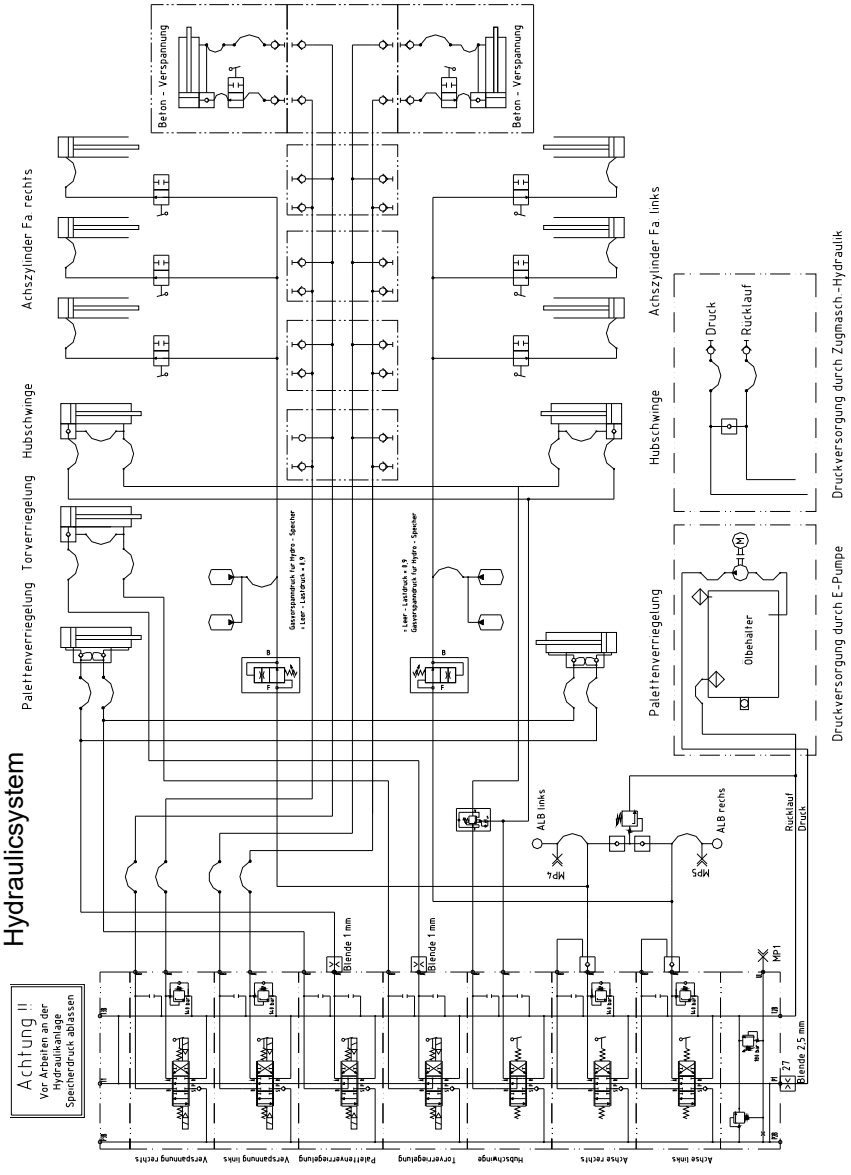
	after 3 months	after 6 months	after 9 months	after 12 months
1rst year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
2nd year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
3rd year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
4th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
5th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
6th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
7th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
8th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
9th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)
10th year of operation	(Date, Signature)	(Date, Signature)	(Date, Signature)	(Date, Signature)

B. Supplements

On the following pages all changes (additional mountings and modifications) on the vehicle must be documented. The aim is that when selling the vehicle the new owner can operate and maintain the vehicle without any danger.

C. Wiring schemes




Hydraulicsystem
Achtung !!
Vor Arbeiten an der Hydraulikanlage Speicherdruck ablassen
Beton - Verspannung
Beton - Verspannung
Achszylinder Fa rechts
Hubschwinge
Palettenverriegelung
Torverriegelung
Palettenverriegelung
Hubschwinge
Achszylinder Fa links
Druck
Rucklauf
Ölbehälter
Druckversorgung durch E-Pumpe
Druckversorgung durch Zugmasch.-Hydraulik
ALB links
ALB rechts
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MP5
MP1
Rucklauf
Druck
Blende 1 mm
Blende 1 mm
Blende 2,5 mm
Verspannung rechts
Verspannung links
Palettenverriegelung
Torverriegelung
Hubschwinge
Achse rechts
Achse links