

Operating and maintenance instructions

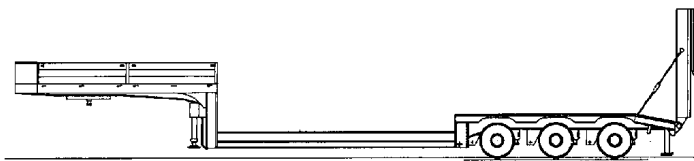
Low-bed semitrailer



LOW-BED SEMITRAILER

Type of vehicle:

Vehicle identification number:



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

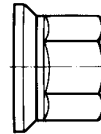
Tightening torques

BPW axle with spigot alignment

630 Nm

SAF axle with spigot alignment

600 Nm



M 22x1,5

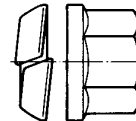
Wheel nut with pressure plate

BPW axle with bolt centre

510 Nm

SAF axle with spigot alignment

430



M 22x1,5
Nm

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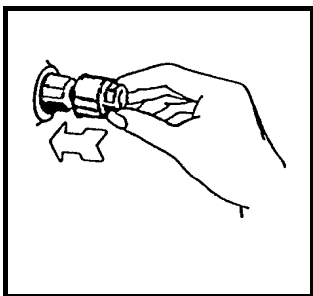
Protecting cover for wheel nuts

Installation

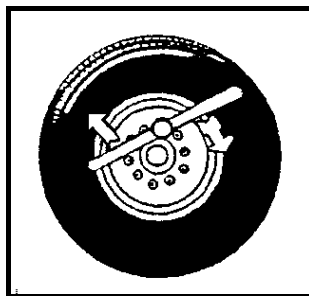
The protecting cover is attached by hand to the wheel nut to be protected and is tightened by means of the same key as the wheel nut by a clockwise rotation of approx. 15° to a stop. At the first tensions the click into place can be noticed clearly by a SNAP. At the same time with the rotation you should 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.

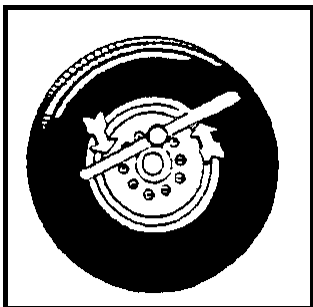
Attaching - very easily - without adhesion



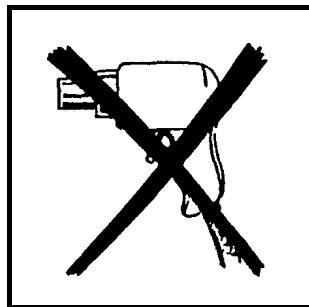
Tensioning with the key 15° to the right hand side



Disassembly with the key 15° to the left hand side



But do not use any impact screw driver



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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 long vehicle endurance; many necessary repairs can be avoided by respecting the regular 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

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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 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 for operating the trailer

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 stop period of the trailer

In this chapter you will find information on a long time stop period of the trailer.

Chapter 8 Tightening torques

In this chapter you will find information on the tightening torque 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, air suspension and electric wiring schemes.

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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**.

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These instructions contain texts, prescriptions, pictures and drawings of technical kind which must not be copied, processed or utilised without authorisation to the purpose of competition and made known to other persons.

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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 only 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 due 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.

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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 clothes of the operator shall fit narrowly. Avoid loose clothes.
6. Keep the system clean in order to avoid fire danger.
7. 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. Observe 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)

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Hydraulic system

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

1. There is a 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.
4. Components moved by hydraulic cylinders have to be secured mechanically before working on the hydraulic system.

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 tires

1. Check that the vehicle is parked safely and secured so that it can not roll away (chocks) for works on the tires.
2. Repairs on the tires 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 tires!
4. Check the air pressure regularly!
5. Tighten the wheel screws with the corresponding tightening torque! (see page)

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2. * Technical data

Weights:

Please find the current weights in the vehicle documents

Perm. semitrailer total weight: _____ kg
Perm. fifth wheel load approx. _____ kg
Perm. semitrailer axle load _____ kg
Dead weight approx. _____ kg
Payload with irregular load distribution approx. _____ kg

Dimensions:

Kingpin to vehicle rear end, without ramps... _____ mm
Loading length including 900 mm drive-up slope _____ mm
Loading length platform _____ mm
Loading width _____ mm
Laden loading height with full capacity approx. _____ mm

Department for delivery:

(date, signature)

* All dimensions are approximate values and may vary depending on the technical design!

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3. Operating the semi-trailer



These instructions also describe several functions and equipments 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.

3.1 Hitching and unhitching of the semitrailer



Semitrailers with retractable gooseneck (type SATAH) may be equipped with dolly for increasing payload. The following instructions for hitching and unhitching are valid not only for the dolly but also for the semitrailer. It has to be paid attention that the supply lines are connected correspondingly. I.e. that for driving with dolly, the electrical, air and hydraulic connections have to be made from tractor to dolly and from there to the semitrailer via further connecting couplings.



If semitrailer and dolly shall be separated, the semitrailer may not be fully lowered. We recommend to support the semitrailer on wooden planks with approx. 120 mm thickness.

Hitching:

Before hitching, proceed as follows:

1. Secure the wheels of the semitrailer (operate the parking brake and put the chocks under).
2. The semitrailer platform must be approx. 50 mm lower than the fifth wheel height of the tractor. If a support device is mounted, pay attention that it is retracted or pulled out accordingly.
3. Open the fifth wheel coupling.
4. The coupling is then ready for hitching and locks automatically by driving the tractor under the semitrailer.

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

5. After a successful operation, check the locking mechanism and suspend the cab hooks. If it is not possible to suspend the cab hooks, repeat the hitching operation.
6. 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. If a support device is mounted, retract it to the stop and secure the hand lever.
8. Release the parking brake of the semitrailer.
9. 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.



You have to pay special attention when unhitching the loaded semitrailer. This should only be made in exceptional cases, e.g. when there are defects at the tractor. There is the danger, especially for vehicles with air suspension, that the supports are damaged resp. that the supports break! Do not park the trailer for a longer period of time when loaded. Take special care that the ground under the support plates has enough carrying capacity; if necessary, put wooden planks under it. The carrying loads indicated on the type label of the support winches must not be exceeded.

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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 semitrailer by means of the support device (if equipped) or by means of a workshop winch just as far as there is still sufficient pressure contact of the fifth wheel plate on the fifth wheel coupling of the tractor.
4. Remove electric, pneumatic and hydraulic lines.
 - 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 semi-trailer. The coupling is releasing automatically.

3.2. Loading

The semitrailer has been designed for transporting construction vehicles and mixed cargo. The construction vehicles have to be loaded over the ramps; driving onto the semitrailer from the side is only permitted if the semitrailer is designed particularly for that (special equipment). Mixed cargo can be loaded with fork lift, portal crane or other corresponding devices.

Keep within the permissible total weights and within the permissible axle loads of the tractor as well as of the semitrailer. Overloading reduces life of tyres, axles, springs and chassis frame. In addition the braking distance becomes longer than usual and the safety is here-with reduced. Please make sure that the load is **sufficiently fixed**.

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All accessory parts, such as lashing chains, tools, wooden planks, loose floors, widening planks, supports for long material etc., also have to be secured and fixed according to regulations. Pay attention to the fact 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 Supports for compensating the offset height

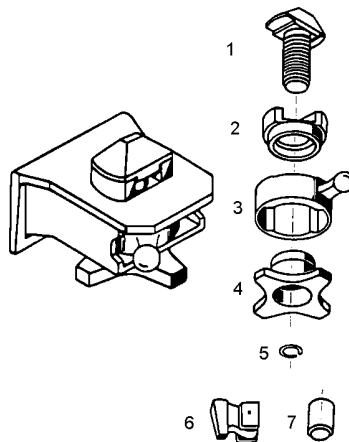


For transporting long parts, special supports can be fixed on the vehicle rear part. These supports are unsuited for taking lateral forces, but only serve for compensating the height difference between the front platform and the low-bed. Load-securing, also for taking the lateral forces, has to be made always between load and chassis.

3.2.2 Loading a container

To load the semitrailer with a container, proceed as follows.

1. Open the four container locks (fully lowerable execution) and lift the rotatable tensioning bolt 1.
2. Put the container onto the trailer with a suitable device (e.g. portal crane or fork lift) so that the container is centred over the tensioning bolts.
3. After the container is put down, the tensioning bolt 1 has to be turned by 90° until it falls into guide bushing 2. Tighten clamping nut 4 and secure it against loosening by means of the drop securing 6 (or ball securing 7).



To release the container locking you have to proceed in reverse order.

To countersink the tensioning bolt 1, the grooved bushing 3 must be turned so that the guide bushing 2 countersinks in the grooved bushing 3. With the guide bushing also the tensions bolt countersinks completely.

Tighten clamping nut 4 and secure it against loosening by means of the drop securing 6 (or ball securing 7).

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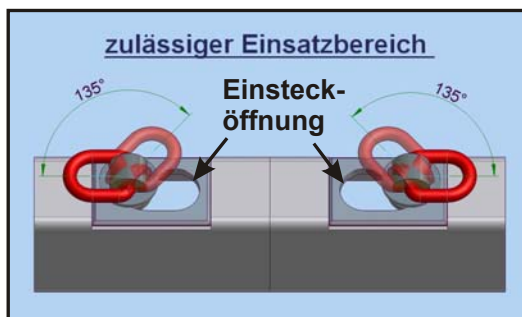


3.2.3 Use of the plug-in lashing rings

The plug-in lashing rings may only be used on the positions marked on the semitrailer as shown in the drawing. Pay attention that the lashing rings must fit closely in the narrow part.



The use of the lashing rings in the insert hole is not permitted.



3.3. Axle lift



Acc. to §32d paragraph 1 line 1 of the German regulations, vehicles and trains must be built and constructed in a way that the torus of a circular course of 360° with an outer radius of 12.50 m has a width of not more than 7.20 m.

This must be observed also when the axle is lifted.

If this is not the case, an exceptional approval can be given if in lowered condition the regulation is fulfilled and if the lifted axle can be lowered also when driving.

The axle lift on the 1st axle works fully automatically. That means that the axle is automatically lifted when driving without load. When loaded, the axle is automatically lowered. At the same time the driving height is lifted by 40 mm with lifted axle.

In addition there is the possibility of lowering the 1st axle for the empty low-bed semitrailer. It is switched via a button from the driver's cab of the tractor or directly on the semitrailer with a block ball cock according to the signage.

3.3.1. Axle ventilation as starting assistance

There is the possibility (only for 3-axle semitrailers) to ventilate the air suspension of the 1st axle. This is not valid for public roads but is only allowed on the construction site for increasing the fifth wheel pressure on the tractor. It has to be paid attention to the fact that

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the driving speed must be less than 20 km/h because otherwise the perm. tyre carrying capacity and the perm. axle load carrying capacity would be exceeded. It is switched via a button from the driver's cab of the tractor according to the signage.

3.4. 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. If existing, check the lever position of the lifting/lowering device or the level adjustment of the ECAS system. Do not drive in any case with air bellows without pressure or partially ventilated air bellows because there is not any balance between the axles or an insufficient balance, and parts of the air suspension might be damaged.

When there is a defect of the air suspension system, the vehicle must be stopped as soon as this is possible without danger, and the air suspension system has to be repaired.



Because of the sinking of the air suspension, the total trailer weight presses on the spring stops in the air bellows. The vehicle should be driven out of the traffic with walking speed subject to the traffic situation. Please consider that the damages to be expected at the bellows resp. in the air suspension system are increasing considerably the faster you drive and the longer the driving distance is.

Lifting or lowering the air suspension via the WABCO control box

The driving height can be changed by means of the WABCO control box. This might be required, for example, for loading or unloading or for passing through bridges and gateways. By pressing the arrow keys the driving level can be changed correspondingly. Pay attention that outside the normal driving height no axle compensation is made. In this case, when driving over obstacles, the total trailer weight may be carried by one axle. Therefore the vehicle may only be driven at walking speed and must be brought back to driving height (green button) as soon as possible. The normal driving height is automatically adjusted at a speed of 20 km/h.



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Electronic adjustment of the air suspension via the WABCO SmartBoard

If your vehicle is equipped with a WABCO SmartBoard, please read the separate operating instructions of the producer.

Air suspension type ECAS, electronically controlled

The air suspension of your semitrailer is equipped with an electronic adjustment type ECAS (producer WABCO).

The ECAS system has an extensive control 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 semitrailer 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 if the semitrailer is outside the normal level I, II or III 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 semitrailer 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 semitrailer:

1. Automatic control of the lift axle (special equipment)

When the semitrailer is empty or partially loaded, the lift axle is automatically lifted. At the same time the driving height is lifted to normal level I in case that it is in the lower position because only then it is guaranteed that the lift axle has sufficient ground clearance.

2. Adjustment of three different driving levels (driving heights).

The ECAS system is adjusted in a way that three different driving heights can be taken.



When driving outside the normal level I (middle driving height), you must inspect increase tyre wear.

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



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

Adjusting the driving height is done via the ECAS control unit. The following combinations must be pressed for adjusting the vehicle to the different driving heights:

NN I	=		+		Normal level 1 = middle driving height
NN II	=		+		Normal level 2 = lowered driving height
NN III	=		+		Normal level 3 = lifted driving height
TRACTION HELP	=		+		Traction help
STAND BY	=		+	IGNITION OFF	Automatic adjustment when loading and unloading

3. Lowering and lifting the air suspension for loading and unloading or for driving through bridges or gateways.



When the air suspension is completely lowered, the total semitrailer weight weighs on the stops in the air bellows. These stops would be overloaded and damaged by driving moves. Therefore the semitrailer must not be driven with fully lowered air suspension.

4. Traction help for equipment with lift axle

If the semitrailer is equipped with a lift axle, it can be lifted on the construction site when the semitrailer is loaded for better traction. When reaching the driving speed of 30 km/h, this function is automatically switched off. To switch off this function, the buttons „*lift axle*“ and „*STOP*“ have to be operated.

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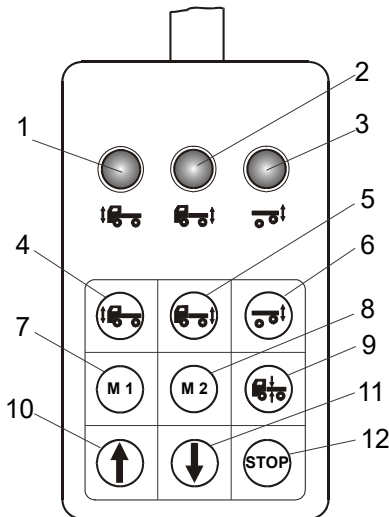
5. STAND BY – Operation for loading and unloading the semitrailer with the ignition switched off

This mode must be set if the semitrailer is parked for loading / if the ignition is switched off.



After having set the mode by pressing the STOP button and switching off the ignition at the same time (IGNITION OFF), the ECAS system can adapt the pressure in the air suspension system to the actual loading condition. This counts for a period of time of 60 minutes if during this time the system is provided with voltage. That means that the semitrailer must remain electrically connected to the tractor for loading and unloading.

Description of the ECAS control unit



1. Indicator light „preselection front axes“
(only for drawbar trailer)

The flashing of the indicator light shows that the ECAS system is switched on and that the front axle(s) can be operated.

2. Indicator light „preselection rear axes“

The flashing of the indicator light shows that the ECAS system is switched on and that the rear axes can be operated.

3. Indicator light „preselection lift axle“

The flashing of the indicator light shows that the ECAS system is switched on and that the lift axle can be operated.

4. Preselection button „front axes“
(only for drawbar trailer)

By operating this button the control unit for lifting

and lowering the front axes is switched on.

5. Preselection button „rear axes“

By operating this button the control unit for lifting and lowering the rear axes is switched on.

6. Preselection button „lift axle“ (special equipment)

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By operating this button the control unit for lifting and lowering the lift axle is switched on. Lifting or lowering of the axle is made via the arrow keys.

If the lift axle is lifted with loaded trailer, it remains lifted only for 90 seconds. This should make it easier to drive through very narrow turns.



You have to observe a pause of 50 seconds between two operations (lifting of the axle).

7. Button „Memory 1“

By pressing this button, a stored position (height) is taken.

8. Button „Memory 2“

By pressing this button, a stored position (height) is taken.

9. Button „normal level“

For this button see the above description for the adjustment of the three normal levels.

10. Button „lifting the vehicle“

By pressing the button, the preselected axles are lifted. Stop pressing the button means that the operation ends.

11. Button „lowering the vehicle“

By pressing the button, the preselected axles are lowered. Stop pressing the button means that the operation ends.

12. „STOP“ button

By pressing this button, all lifting and lowering operations are stopped without delay.

Storing a memory level M 1 or M 2

By pressing the button „STOP“ and after that additionally one of the memory buttons „M1“ or „M2“, the level adjusted before can be stored as memory level.

By touching slightly again the memory button, the Innenlader is taken to the level stored.

For further information and when searching for defects, please pay attention to the separate operation instructions of the ECAS system.

In case of problems abroad, contact one of the following contact partners.

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In addition, the WABCO service agencies are at your disposal as contact partner. Addresses and phone numbers please find on the internet at www.wabco-auto.com.

3.6. Brake system

Automatic load-dependent two-line compressed air brake including parking brake according to EU regulations; with ABS system, including sensors for the axles.

3.6.1 Parking brake

The parking brake can be designed as screw brake or as spring brake.

Screw brake

The screw brake is a cable brake which is operating on the wheels of the axle(s). The braking force is transmitted via the cable from the crank up to the guide pulleys on the braking levers of the axle(s).



In driving condition the crank must be completely released.

Spring brake

This kind of parking brake is a linkage-free brake 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 by means of the change-over cock. By this the power of the spring effects on the brake via the piston rod. When there is no air supply, the spring brake can be released by a mechanical emergency device.



Before releasing the spring brake, the semitrailer must be secured against rolling, because neither the brake system nor the parking brake are working.

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

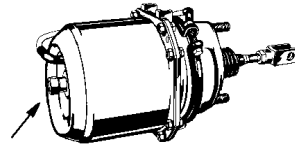
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Typ1

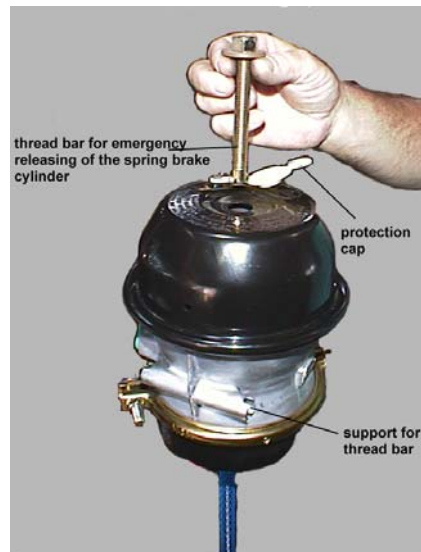
For emergency releasing of the spring parking brake, the hex bolt (spanner size 24) at the cylinder has to be screwed out entirely.



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.



3.7 Antilock 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

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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 electronical control unit.
In this connection it is assumed, that no mechanical and/or 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.

3.8. Hydraulic equipment

The hydraulic pressure for loading ramps, supports, operation of winches, loading areas to be lifted and lowered hydraulically, detachable gooseneck and hydraulic steering can be built up by different systems.

- by the hydraulic system of the tractor
The semitrailer is fed by the tractor.
Before it is possible to operate the hydraulic control valves, the engine of the tractor and the auxiliary drive have to be switched on. For this pay attention to the operation instructions of the tractor manufacturer
- by an electric pump assembly (not possible for equipment with hydraulic winch)
The hydraulic pressure is produced by an electric pump on the semitrailer.
Additionally the button for the electric pump assembly has to be operated during the operation of the hydraulic control valves.
Note that when the semitrailer is equipped with batteries, the battery main switch has to be switched on.
In case of voltage supply by the tractor, the corresponding supply cable has to be connected.
- by hand pump
The required pressure can be produced via a hand pump mounted in the semitrailer.
This kind of supply is most of the time intended for emergency operation on the un-hitched semitrailer..

These kinds of pressure supply can be connected to each other. The change-over between the different systems is made via block ball cocks (for this please note the signage on the vehicle).

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The change-over between the systems must be carried out as a basic principle for the pressure line and the return line (2 separate ball cocks), because otherwise it would come inevitably to an overflow of the oil reservoir on the hand pump or to a damage of the hydraulic system in the tractor when operating the tractor hydraulics.

When connecting a pressure supply system (motor vehicle hydraulic system or pump assembly) to the hand pump there might be problems under certain conditions. The following example shall serve for better understanding.

The vehicle is parked and the hydraulic pressure supply is switched to hand pump operation. The ramps are folded down by operating the hand pump. Due to the lowering the cylinders on the ramps are retracted and the oil situated there flows back into the oil reservoir of the hand pump. If the operation would be stopped at this point and the ramps lifted by means of the hydraulic system of the tractor, the oil level in the reservoir remains unchanged. That means that when lowering the ramps by the hand pump next time, the oil level in the reservoir would increase so that the reservoir would overflow.

To avoid this we recommend completing each commenced working motion in one operation circuit. That means that the lifting **and** lowering motion of a cylinder is carried out by operating the hand pump.

If this should not be possible because of a defect, note the oil level in the reservoir of the hand pump and adjust it correspondingly by letting off or refilling some oil. In driving condition of the trailer the oil level should be $\frac{2}{3}$ of the reservoir volume.



In the following description it is assumed that the „hydraulic pressure supply“ is provided from the tractor. If other supply systems are installed, these ones have to be treated analogically.

3.9. Hydraulic support

The hydraulic support serves for increasing the stability and for relieving the axles when loading and unloading. Before lowering the ramps the supports must be pulled out as far as they have ground contact. The supports shall avoid that the last axle is overloaded during loading. For this pay attention that the ground under the support feet has sufficient carrying capacity; if necessary, put wooden planks under the supports.

The support cylinders are controlled via the hydraulic valves mounted in the rear area under the outer frame (for this, please note the signage on the vehicle). For safety reasons the cylinders should be moved only one by one.

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3.9.1 Hydraulic support for docking the spreading ramps to a loading ramp

This hydraulic support serves for lifting the vehicle rear part in order to be able to dock the spreading ramps to a loading ramp. Pay attention that the ground under the support feet has sufficient carrying capacity; if necessary, put wooden planks under the supports.



Important hint for telescopic low-bed semitrailers:

Before supporting the low-bed semitrailer, it must be completely retracted.

The support cylinders are controlled via the hydraulic valves mounted in the rear area under the outer frame (for this, please note the signage on the vehicle). For safety reasons the cylinders should be moved only one by one.

To support the low-bed semitrailer, proceed as follows:

1. Place the vehicle on even, carrying ground.
2. To avoid a continuous adjusting of the air suspension, the ECAS system must be switched to "STOP" position. Please note the instructions in paragraph 3.5
3. Place aluminium jacks under the support cylinders.
4. Lift the vehicle evenly by operating the hydraulic control valves. The control valves for doing so can be found on the right hand side in driving direction.

To lower the vehicle, pay attention to following points:

1. Lower the vehicle via the hydraulic control valves just as far as the wheels have ground contact.
2. Switch the ECAS system to driving position (normal levels I, II or III). Visual check of the air bellows!
3. Retract the support completely and take away the aluminium jacks.

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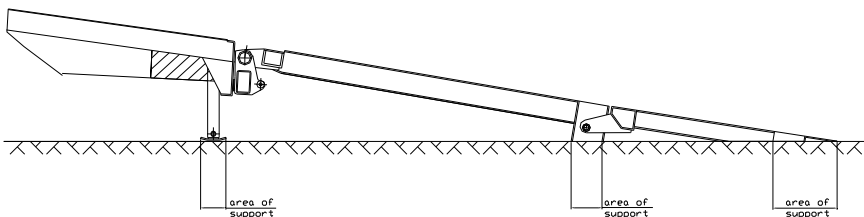
Low-bed semitrailer



3.10 Important hints for using the hydraulic loading ramps

For driving on the loading ramps, the following hints must be paid attention to:

1. If the illumination equipment is hidden when the ramp is folded down, the other road users must be warned. This can be made e.g. by means of the warning triangle or the yellow revolving lamp.
2. The loading ramps have to be shifted laterally in a way that they correspond to the wheel track of the vehicle to be loaded. One-sided loading of the ramps leads inevitably to damages on the ramp and the ramp bearing.
3. Loading ramps covered with floor grid may be driven on with track-type vehicles only when laying an appropriate cover (e.g. conveyor belt rubber) between chain and floor grid.
4. For driving on the loading ramps the air suspension should be in driving position in normal case so that part of the load is taken by the air suspension. The air suspension must in no case be lowered completely.
5. The place for loading / unloading of the low-bed trailer should be chosen in a way that the ramp tips, the ramp middle sections and the support feet have a firm, even contact surface.
Depending on the local circumstances this can possibly be made by putting wooden planks under or by changing slightly the vehicle height via the lift/lower valve.



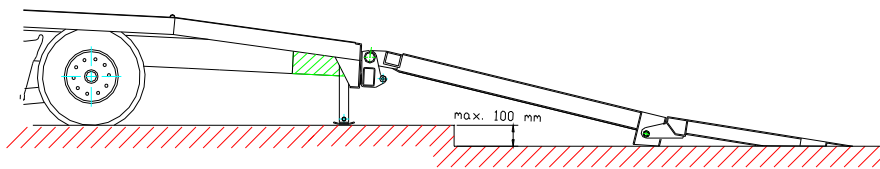
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6. To avoid an overload of the last axle, the support must be folded down / telescoped before driving onto the loading ramps. Pay attention to following points:

- The ground under the support feet must have sufficient carrying capacity; if necessary, put wooden planks under
- When the support foot is folded down / telescoped, the distance between support plate and ground must not be larger than the remaining suspension travel of the axle; if necessary, compensate by putting under wooden planks



- When driving onto the ramp, the vehicle rear part is compressed and the load has to be carried by the support legs.
- After the normal driving height is adjusted in the air suspension, the supports can be retracted / pulled in without difficulty.

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3.10.1 Folding down the loading ramps

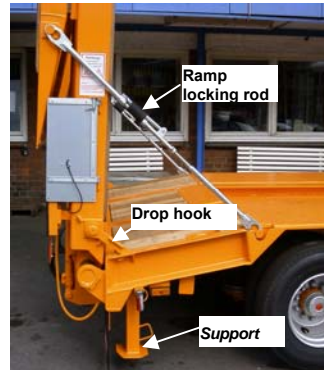


It is forbidden to stay in the area of danger of the ramps!

The ramps must have a firm, safe support in folded down condition, not lower than the tyres are standing. The vehicle must not be driven with folded down ramps.

To fold down the ramps, proceed as follows:

1. Make sure that the vehicle rear part is supported safely to avoid an overloading of the last axle.
2. Release the ramp locking
Push up rubber sleeve, open turnbuckle and hang out ramp locking rod. Or remove lashing strap.
3. Operate the ramp control valve shortly into direction „lower ramp“. When doing so, the ramp no longer leans against the drop hook and the hook can be pulled up.
4. After the ramp is no longer locked, it can be folded down completely. When doing so, the ramp is automatically spread by the expanding rod. The ramp control valves are mounted in the rear area under the outer frame.



For safety reasons it is allowed to move the ramps only one by one. When

folding down the ramps pay attention that there is nobody or nothing in the pivoting range of the ramp. If you cannot see one of the ramps because of loaded goods, a second person must assist as observer.



5. The ramps are folded up in reverse order.

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Before starting to drive the ramp securing device must be locked and duly secured again because otherwise the ramp and the ramp mounting could be damaged.

Due to decreasing hydraulic pressure on the ramp cylinders, the ramp is moving after some time. Depending on driving behaviour and road conditions hard chocks and pushes can occur leading to damages on the ramp bearing / breaking off of mounting parts.

3.10.2 Hydraulic ramp shifting device



The ramps must be shifted in vertical position only.

To shift the ramps, proceed as follows:

- Release ramp locking
- Operate the ramp control valve shortly into direction „lower ramp“. When doing so, the ramp no longer leans against the drop hook and the hook can be pulled up.
- Only when equipped with twofold block (by means of the switch valve (block ball valve) the ramp to be shifted can be pre-selected)
- This ramp can be shifted now by operating the corresponding control valve.
- Before starting to drive the ramps must be brought back to driving position (drop hook lying in the recess), and the ramp securing device must be locked and duly secured.

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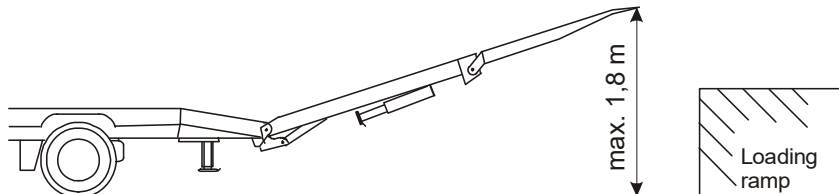


3.10.3 Docking the ramps to a loading ramp (special equipment)

Pay attention that for docking the spreading ramps to a loading ramp an additional support is required.

To dock the spreading ramps to a loading ramp, proceed as follows:

1. Place the vehicle with a distance of at least 5 m to the loading ramp.
2. Fold down ramps as described under point 3.10.1.
3. Lock spreading joint of the ramp with bolts.
4. Lift the ramps by operating the hydraulic control valves just that high that the vehicle can be backed up to the loading ramp.

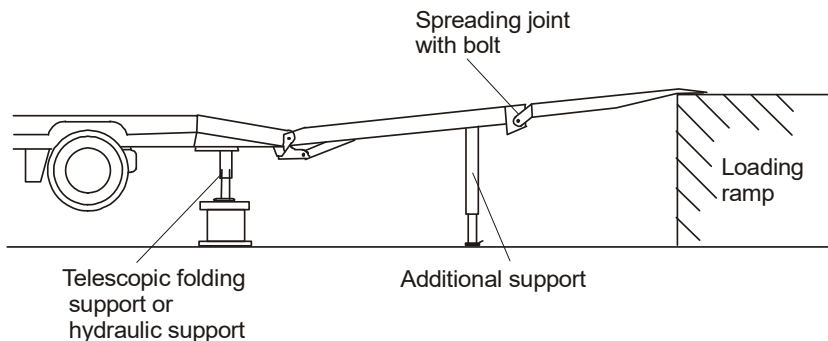


The ramp must be lifted only that high that the ramp tip is max. 1.8 m above ground. Otherwise there is the danger that the spread rod loosens out of its bearing.

5. Drive the vehicle to the ramp; if necessary, ask someone for assistance.
6. Fold down additional support on the ramp and pull out to corresponding length.

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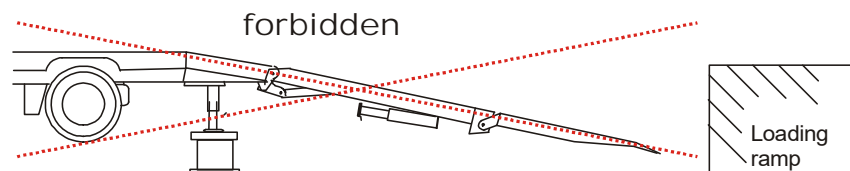
Low-bed semitrailer



Important hint for telescopic semitrailers:

Before putting supports under the semitrailer, it must be completely retracted.

7. Lower spreading ramp and lift the vehicle via the hydraulic support until you have safe seat on the loading ramp.



It is forbidden to lower the ramp completely when the low-bed semitrailer is supported because the ramp spreading rod would inevitably be damaged.

3.11. Important hints for using the servo loading ramps

For driving on the loading ramps, the following must be paid attention to:

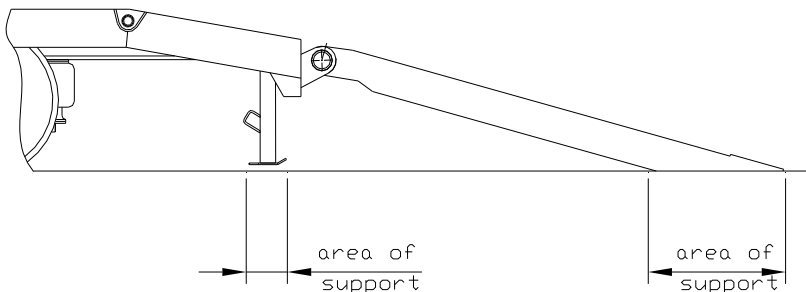
1. If the illumination equipment is hidden when the ramp is folded down, the other road users must be warned. This can be made e.g. by means of the warning triangle or the yellow revolving lamp.

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2. The loading ramps have to be shifted laterally in a way that they correspond to the wheel track of the vehicle to be loaded. One-sided loading of the ramps leads inevitably to damages on the ramp and the ramp bearing.
3. Loading ramps covered with floor grid may be driven on with track-type vehicles only when laying an appropriate cover (e.g. conveyor belt rubber) between chain and floor grid.
4. For driving on the loading ramps the air suspension should be in driving position in normal case so that part of the load is taken by the air suspension. The air suspension must in no case be lowered completely.
5. The place for loading / unloading of the low-bed trailer should be chosen in a way that the ramp tips, the ramp middle sections and the support feet have a firm, even contact surface.
Depending on the local circumstances this can possibly be made by putting wooden planks under or by changing slightly the vehicle height via the lift/lower valve.



6. To avoid an overload of the last axle, the support must be folded down / telescoped before driving onto the loading ramps. Pay attention to following points:
 - The ground under the support feet must have sufficient carrying capacity; if necessary, put wooden planks under
 - When the support foot is folded down / telescoped, the distance between support plate and ground must not be larger than the remaining suspension travel of the axle; if necessary, compensate by putting under wooden planks
 - When driving onto the ramp, the vehicle rear part is compressed and the load has to be carried by the support legs.

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- After the normal driving height is adjusted in the air suspension, the supports can be retracted / pulled in without difficulty.

3.11.1 Folding down the loading ramps



Before moving the ramps, it must be ensured that there are no persons or things in the swivelling area of the ramps. The ramps must have a firm, safe support in folded down condition, not lower than the tyres are standing. The vehicle must not be driven with folded down ramps.

To fold down the ramps, proceed as follows:

1. Make sure that the vehicle rear part is supported safely to avoid an overloading of the last axle.
2. Release the ramp locking. For doing so, the turnbuckle on the ramp locking rod must be released and the rod hung out.
3. The ramp can be folded down when releasing the hook (2nd safety device) at the same time.
4. Folding up the ramps is made in reverse order.
5. Before driving, the ramp safety device must be locked and duly secured.

3.11.2 Shifting the loading ramps

The servo ramps can be shifted by means of the rod. For shifting, the ramp must be in vertical position and the ramp locking must be released.

Attention: The ramp is no longer secured and might fold down; do not enter the swivelling area of the ramp.

3.12. Important hints for using the ramps

For driving on the loading ramps, the following must be paid attention to:

1. If the illumination equipment is hidden when the ramp is folded down, the other road users must be warned. This can be made e.g. by means of the warning triangle or the yellow revolving lamp.

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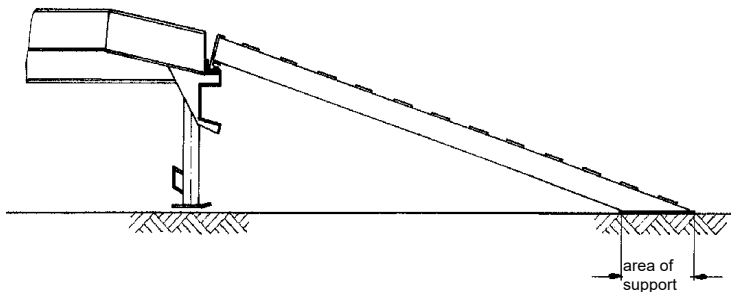


2. The loading ramps have to be shifted laterally in a way that they correspond to the wheel track of the vehicle to be loaded. One-sided loading of the ramps leads inevitably to damages on the ramp and the ramp bearing.
3. The ramps must be secured against slipping. According to the directive of the German trade association a gradient of 30% (16.5 degrees) must not be exceeded.



Loading ramps made of aluminium may be driven on with track-type vehicles only when laying an appropriate cover (e.g. conveyor belt rubber) between chain and floor grid.

4. For driving on the loading ramps the air suspension should be in driving position in normal case so that part of the load is taken by the air suspension. The air suspension must in no case be lowered completely.
5. The place for loading / unloading of the low-bed trailer should be chosen in a way that the ramp tips and the support feet have a firm, even contact surface in order to avoid a "wobbling". Depending on the local circumstances this can possibly be made by putting wooden planks under or by changing slightly the vehicle height via the lift/lower valve.



6. To avoid an overload of the last axle, the support must be folded down / telescoped before driving onto the loading ramps. Pay attention to following points:
 - The ground under the support feet must have sufficient carrying capacity; if necessary, put wooden planks under
 - When the support foot is folded down / telescoped, the distance between support plate and ground must not be larger than the remaining suspension travel of the axle; if necessary, compensate by putting under wooden planks

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- When driving onto the ramp, the vehicle rear part is compressed and the load has to be carried by the support legs.
- After the normal driving height is adjusted in the air suspension, the supports can be retracted / pulled in without difficulty.

3.12. Ramp to be lifted and lowered hydraulically for driving to front platform



The control valve for lifting or lowering the ramp can be found on the right side in the control box. In driving position the ramp must be in lowered position or in lifted position manually secured by bolts. The ramp must be lifted or lowered only in **unloaded** condition with released bolt. Before driving over the ramp with a load of max. 3 t it must be secured mechanically with bolts.



Danger of bruise when operating the ramps to drive over!



Make sure that there are no persons or objects in the area of danger during lifting or lowering of the ramp.

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3.12.1 Ramp to be lifted and lowered hydraulically to drive over to the rear platform

The control valve for lifting or lowering the ramp can be found on the right side of the gooseneck. In driving position the ramp has to be in lowered position. Pay attention that the bridge is not loaded one-sided. When lifting the ramp this would lead to torsion and therefore to damages. The cylinders are designed for a max. lifting load of 20 t with regular load distribution.



Danger of bruise when operating the ramps to drive over!

Make sure that there are no persons or objects in the area of danger during lifting or lowering of the ramp.

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3.13. Extendible loading bed with pneumatically operated locking

The vehicle frame is designed in an extendible way. That means it consists of a telescopic central beam in case construction. The beam is connected by two bolts which can be moved each by one spring cylinder. To telescope the vehicle, proceed as follows.



The semitrailer has to be telescoped on even, adhesive ground in **unloaded condition**.

1. Operate the parking brake
2. Give pressure to the spring cylinders by switching the block ball cock. By this the bolts on the central beam are unlocked. This can be checked visually with the control rod. When the bolt is unlocked, there is a coloured pin jutting out over the outer frame of the vehicle on both sides.
If the bolts do not unlock, e.g. due to strains in the beam, the unlocking can be achieved by driving carefully “jerkily” back and forth.
3. By driving slowly **evenly** back and forth the vehicle frame can be telescoped.



Before retracting the vehicle frame make sure that no persons or objects are in the area of danger. Danger of bruise!

4. Shortly before reaching the requested locking position, the telescope procedure must be interrupted and the block ball cock has to be closed.
5. When continuing the telescope procedure, the locking bolts are sliding over the rails of the inner case profile just to the next locking position. The locking in place of the bolts can be seen on the control rod. The control pins have to be flush with the outer frame.
6. Release the parking brake. The vehicle is ready to drive. Observe the legal regulations for the telescoped vehicle.



For semitrailers with low-bed the last axle(s) must be ventilated before retracting. To ventilate the axle(s) the lift/lower valve has to be switched to “STOP” position and the ventilation valve has to be switched according to the signage.

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3.14. Mechanic forced steering

The steering impulse is carried out via the fifth wheel coupling by means of the steering wedge and from there via steering rods and steering arms on the wheels of the rear axles.

For stabilization when driving straight-on, a steering stabilizer is mounted in the vehicle rear part. If the complete semitrailer is aligned straight, the roles of the stabilizer must abut on the slot of the guiding curves.

The steering is adjusted before collection of the vehicle by the works. The mechanic forced steering must only be adjusted in a specialised workshop. In case of failures please immediately make an appointment with our customer service for the purpose of new adjustment.

3.15. Hydraulic forced steering



If the lowbed trailer is equipped with a V_S_E steering system, please note the separate operating instructions of the manufacturer..

The steering impulse is carried out via the fifth-wheel coupling by means of the steering wedge on the steering segment and from there via the hydraulic system on the segment in the vehicle rear part. This segment is mechanically connected to the steering wing of the rear axles with steering rods.

For stabilization when driving straight-on, a steering stabilizer is mounted in the vehicle rear part. If the complete semitrailer is aligned straight, the roles of the stabilizer must abut on the slot of the guiding curves.

The steering is adjusted before collection of the vehicle by the works. Please, at disturbances make an appointment for the purpose of new adjustment with our customer service immediately.

The hydraulic part consists of a dual-circuit positive-displacement steering.

The dual-circuit system effects that the steering remains able to work at failure of one circuit so that you can drive to the next specialised workshop. In this case you must drive with strongly reduced speed since driving and steering behaviour change negatively.



To ensure a trouble-free function of the steering, following points have to be checked each time before starting to drive.

1. Check hydraulic oil level in the tank
2. Check (set up) pressure (paragraph 3.15.1)
3. Check key switch

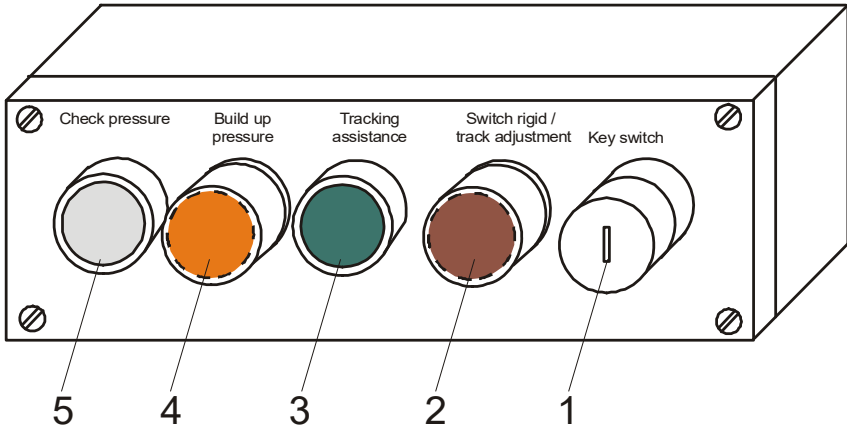
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Description of the control unit of the hydraulic steering

All switches and indicator lights required to build up pressure and to align the semitrailer are mounted in this control unit.



1. Key switch

With this key switch and switching on the ignition and the parking light, all listed functions are put on stand-by. During the normal driving conditions the key must be removed and kept safely.



The voltage supply must be ensured during the complete process.

If during the alignment of the semitrailer the voltage supply is interrupted, e.g. by turning off the light, the ignition or the key switch, all valves already activated are reset to starting position. Continuing the process is not possible. The planned process must be started again from the beginning. This means ignition, parking light, key switch and the corresponding button must be switched on once more.

2. Button "track adjustment" with red indicator light

This button must be operated for "track adjustment" or when using the hydraulic remote steering. Through this the steering circulation between the tractor and the rear axles is interrupted. The information is given by the red indicator light.

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3. Indicator light "tracking assistance" green

This indicator light shows the „alignment“ of the trailer axles.

4. Button "build up pressure" with yellow indicator light

This button must be operated to set up the pressure. The information is given by the yellow indicator light.

5. Indicator light "check pressure" white

This indicator light shows that the pressure is too low.

3.15.1 Checking the pressure of the steering

A pressure checking device is mounted in the line system of the steering of the semi-trailer. In case of a pressure drop in the system this device signals a disturbance or a too low working pressure to the driver by a white indicator light. The indicator light is installed on the front wall of the platform on the semitrailer and in the driver's cab of the tractor.

3.15.2 Adjusting the pressure of the steering

The procedure for building up the pressure in the hydraulic steering depends on the type of steering and the pressure supply. Generally the build-up of the pressure should be carried out in "aligned condition" and in "straight position" on even ground.

Hydraulic steering without additional steering

Building up pressure with hand pump

To build up pressure with the hand pump, proceed as follows:

1. Switch on ignition and parking light to ensure voltage supply of the electric control unit.
2. Switch on control unit via key switch.
3. Operate the button with integrated indicator light (yellow) for "build up pressure".
4. Build up pressure by operating the hand pump. Approx. 20 strokes.
5. Switch off control unit via key switch; switch off vehicle light. The yellow indicator light must go out.

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Building up pressure with motor vehicle hydraulic or electric pump assembly

1. Make hydraulic connection to tractor.
2. Switch on ignition and parking light to ensure voltage supply of the electric control unit.
3. Switch on control unit via key switch.
4. Switch on button with integrated indicator light (yellow) for „build up pressure“ for approx. 15 seconds. By this the connection between pump and the steering circuits is made. The white indicator light “pressure too low” must go out.
5. The steering circuits are closed by switching off the control unit. Switch off vehicle light. The yellow indicator light has to go out.

Hydraulic steering with additional steering

For this equipment the connection to the motor vehicle hydraulic or to a pump assembly is required. For building up pressure proceed as follows:

1. Make hydraulic connection to the tractor or switch on electric pump assembly.
2. Switch on ignition and parking light to ensure voltage supply of the electric control unit.
3. Switch on control unit via key switch.
4. Operate button with integrated indicator light (yellow) for „building up pressure“. By this the connection between pump and the steering circuits is made. The white indicator light “pressure too low” must go out. After approx. 15 seconds the connection can be separated by switching off the control unit (key switch).
5. Switch off vehicle light and hydraulic pump.

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3.15.4 Track adjustment

Generally the adjustment of the track must be made by the driving motion. All tensions between the ground and the wheel and the cylinder pick-up points can be deleted only by the driving motion to reach an optimum adjustment.

If a new adjustment of the track must be carried out, then the procedure is as follows:

1. Switch on ignition and parking light to ensure voltage supply of the control unit.
2. Switch on control unit by means of key switch
A green indicator light serves as alignment assistance shining when the axle assembly is aligned (straight position). The indicator light can be watched in the mirror of the tractor.
3. Align the axle assembly of the semitrailer by the driving motion straight so that the indicator light of the tracking adjustment shines. The steering stabiliser in the axle assembly has to fit completely in the notch of the stabiliser wing. When the track is misaligned, now the tractor is standing slantingly to the semitrailer. There is an arrow marking on the turntable for help.



In production the steering is aligned to the arrow marking on the turntable. This adjustment is only valid for the semitrailer. There might be differences in connection with the tractor caused by tolerances within the fifth-wheel coupling. It is recommended to carry out an adjustment of the arrow marking between tractor and semitrailer.

4. Operate button "track adjustment". The integrated indicator light (red) shows that the steering of the trailer axles is separated from the tractor. That means when driving with the tractor the trailer axles are locked in this position.
5. Align the tractor to the semitrailer. This should be usefully made by driving along the middle line of a straight street or, if this should not be possible, by means of the arrow markings on the turntable. Please make sure that no other road users are handicapped or endangered.
6. Switch off control unit with key switch to finish the process of adjustment.
7. Build up pressure according to paragraph 3.15.2.

Operating and maintenance instructions

Low-bed semitrailer



3.15.5 Break-down of the steering system



In case of defects on the steering system these defects have to be repaired immediately by a specialised workshop.

After repair works the steering system has to be newly adjusted and ventilated.

3.15.6 Ventilation of the steering system

After repair works on the steering hydraulics, the system must be ventilated. When ventilating the system, ventilation hoses have to be connected to the above connections of the cylinders. The position “build up pressure” has to be switched on the control unit of the semitrailer. Operate the hydraulic pump of the motor vehicle until the oil flows out of the ventilation hoses without bubbles. When doing so, the oil level in the hydraulic tank has to be observed. If necessary, refill oil. This procedure has to be made on all steering cylinders.



Catch the hydraulic oil in suitable collectors and after oil reclaiming (filtration, dehydration and examination of the oil purity) bring it again into the cycle or dispose of environmental-friendly.

After that the pressure and the trace have to be checked; if necessary, adjust them. If the driving behaviour is not satisfying, the ventilation procedure has to be repeated.

3.16 Additional steering

The vehicle can be equipped with an electrically operated additional steering. Then the rear axles can be steered independently of the position of the tractor via a cable remote control or a radio control.



The additional steering of the semitrailer must only be used for speeds up to max. 20 km/h.

Putting into operation of the additional steering

- Switch on the ignition and parking light to produce the voltage supply of the control unit.

Operating and maintenance instructions

Low-bed semitrailer



- Switch on the control unit with the key switch
Operate button "track adjustment". The integrated indicator lamp (red) shows that the steering of the trailer axles is separated from the tractor.
- The requested steering movements can be made by using the cable remote control plugged into the socket on the vehicle or by using a radio control.



When equipped with a hydraulic winch, it can be controlled with the same radio control. For this please note the description of the "hydraulic winch" in paragraph 3.20.

- Before starting normal drive, the track of the vehicle has to be adjusted as described under point 3.15.4.
- Take out the remote control of the steering and stow it away.
- Switch off the control unit with the key switch.
- Build up pressure.

Adjustment of the track via the additional steering

Alternatively the track can be adjusted also via the additional steering. This kind of adjustment has to be taken as makeshift adjustment. The exact adjustment is achieved by the measures described under point 3.15.4. Proceed as follows.

1. The vehicle has to be placed in a way that the tractor is standing straight to the semitrailer. Pay attention to the arrow marking on the turntable.
2. Switch on ignition and parking light to ensure voltage supply of the control unit.
3. Switch on control unit with key switch.
4. Operate button "track adjustment". The integrated indicator light (red) shows that the steering of the trailer axles is separated from the tractor.
5. Connect remote control for additional steering. Align the rear axles straight with the buttons of the remote control until the indicator light (green) of the control unit shines.
6. Switch off control unit with key switch to finish the process of adjustment.

Operating and maintenance instructions

Low-bed semitrailer



7. Build up pressure according to paragraph 3.15.2.
8. Switch back the change-over valve to „low-bed trailer operation“.

3.17. Trailing steered axle

The semitrailer can be equipped with a trailing steered axle.

The stabilisation for driving straight-on is made over compressed air cylinders which get pressure depending on the load and therefore counteract the steering motion.

When cornering, a steering angle of the axle is produced by the lateral forces occurring. To avoid this steering angle, e.g. when backing-up, the axle must be blocked. For this the axle has to be in “straight” position. Depending on the equipment the axle can be blocked optionally from the tractor via an electric switch or directly on the trailer by a block ball cock (according to the signage). The steering linkage of the axle is locked by a bolt moved by a compressed air cylinder.



To avoid an uncontrolled steering angle of the axle, it must be blocked before backing-up.

Operating and maintenance instructions

Low-bed semitrailer



3.18. 1 Folding loading bed widening

The low-bed semitrailer can be equipped with a loading bed widening by up to 250 mm per side. When driving with loading bed widening following safety measures have to be paid attention to:

1. All widening planks have to be fixed and secured with the bolts in a way that under ordinary driving situations they cannot slide or fall down.
2. The excess width has to be marked with warning signs or other safety identifications according to DIN 30710.
In addition the corresponding road regulations have to be observed. Driving with excess width requires an exceptional approval.
3. When driving without loading bed widening pay attention that all folding supports are folded in and are locked in this position by means of the retaining spring. The widening planks have to be safely fixed on the vehicle.

3.18.2 Telescope loading bed widening

The semitrailer can be widened in the loading bed from 2,750 mm to 3,000 and 3,250 mm. Observe following instructions:

1. Take out loose floors and the corresponding spars.
2. Remove safety bolts of the telescope supports.
3. Pull out/pull in support into the corresponding position and secure it by bolts.
4. Put in and secure spars and loose floors.



With the loading widths of 3,000 mm and 3,250 mm there is a free space between the excavator bridge and the loose floors.



The excess width has to be marked with warning signs or other safety identifications according to DIN 30710.

In addition the corresponding road regulations have to be observed. Driving with excess width requires an exceptional approval.

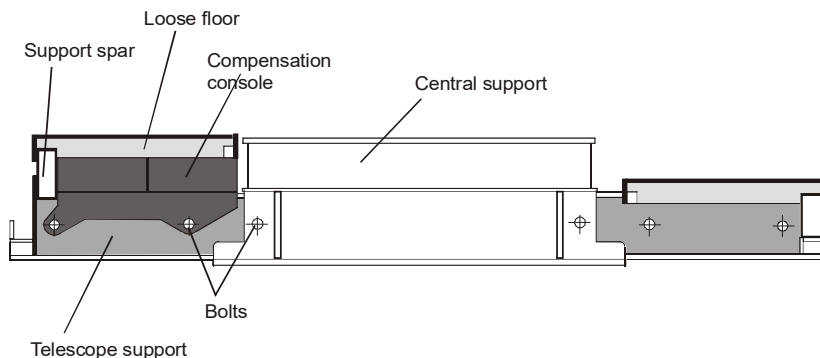
Operating and maintenance instructions

Low-bed semitrailer



3.18.3 Loose floors with height compensation

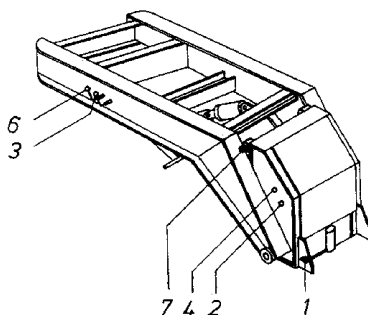
The lateral loose floors can be mounted depending on the load optionally on the same height with the central beam or lowered by approx. 130 mm. The compensation console has to be inserted according to the sketch. Pay attention that all parts are locked with the corresponding bolts.



3.19. Detachable gooseneck

To disconnect the gooseneck, proceed as follows:

1. Operate the parking brake of the semitrailer.
2. Release safety pin (pos.1) of the bed locking bolt.
3. Open the bed locking by operating the switch pos. 2 (switch remains in switched position).
4. Lift the gooseneck by operating the lever pos. 3 that high that the safety bolts pos. 7 are released.
5. Retract the safety bolts pos. 7 by operating the switch pos. 4 (switch remains in switched position).



Operating and maintenance instructions

Low-bed semitrailer



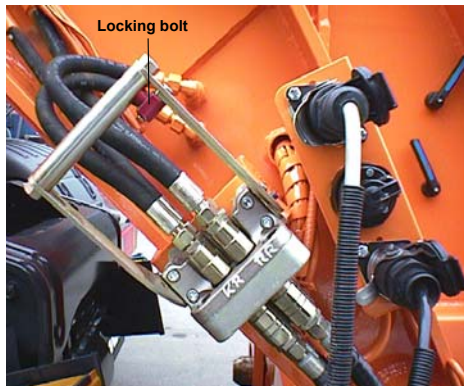
- Lift the gooseneck by operating the lever pos. 3 that high that the loading bed lies on the ground. Pay attention that the ground has sufficient carrying capacity; if necessary, put wooden planks under.
- Support the gooseneck to the tractor by operating the lever pos. 6 until the weight of the neck is carried.

When equipped with hydraulic forced steering, a pressure release must be carried out in the line system of the steering between gooseneck and loading bed before releasing the hydraulic couplings. For this the control unit of the hydraulic steering has to be switched on and the button “build up pressure” has to be operated (according to paragraph 3.15). By this the pressure release is carried out and the hydraulic couplings can be released.



- Release connection lines to the loading bed.
For releasing / locking the hydraulic coupling, the locking bolt has to be pulled.
- Detach gooseneck.

Connecting the gooseneck has to be made in reverse order.



Pay attention that the hydraulic connections are connected according to their marking (R → ring side connection of the steering cylinder; K → piston side connection of the steering cylinder). Otherwise malfunctions of the hydraulic steering are caused (steering angle to the wrong side)!

If equipped with hydraulic steering, the pressure has to be built up before starting to drive. See paragraph 3.15.2.

Operating and maintenance instructions

Low-bed semitrailer



3.20 Hydraulic winch

For the equipment with hydraulic winch please note the separate operating and maintenance instructions of the winch manufacturer.



Please note that before putting into operation of the winch the separate leak-oil pipe must be connected (not required for Ramsey winches).

The winch can be controlled by three different ways.

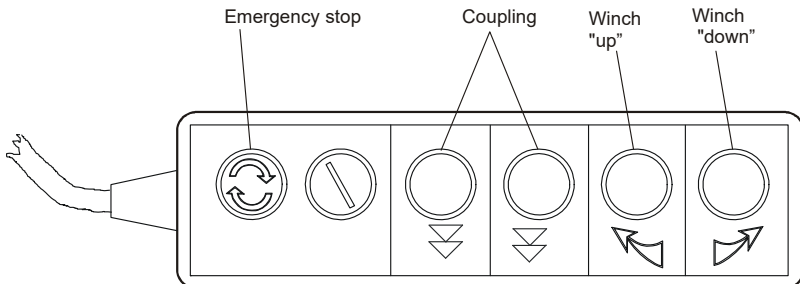
1. By the hydraulic control valve,

mounted on the right side in driving direction under the outer frame. Here the movements “up” and “down” are possible. The wider the control lever is brought out of its neutral position, the higher the rope speed.

2. By the cable remote control (special equipment).

To produce the voltage supply for the remote control, the parking light and the key switch of the control unit for the hydraulic steering have to be switched on.

The remote control can be connected to one of the two sockets mounted in the middle of the vehicle. The steering options are winch “emergency stop”, “up” and “down” and “coupling”. For operating the coupling both buttons have to be pressed and kept pressed at the same time. Now the rope can be pulled from the winch manually by a helping person.



Operating and maintenance instructions

Low-bed semitrailer



3. By the radio control



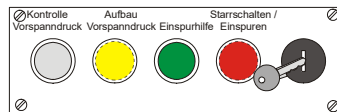
Additional equipment for the operation using radio control for steering and winch



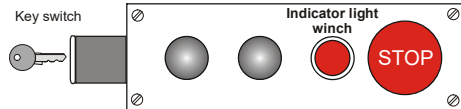
If the vehicle is equipped with an additional steering **and** a hydraulic winch operated by a joint radio control, it must be changed over accordingly.

For this an additional control box is mounted on the left vehicle side. In the basic position (key switch on "0") the function for the additional steering is switched on. To change over to winch operation, proceed as follows:

1. Switch on ignition and parking light to produce the voltage supply of the control units.
2. Switch on the key switch of the control box for the hydraulic steering.
3. Switch on key switch of the additional control box. The red indicator lamp flashes. The winch is ready and can be operated using the radio control.



Control unit of hydraulic steering (in driving direction front left side on front side)



Additional control unit for change-over to hydraulic winch (in driving direction on left side in front of offset)



When operating the winch by the radio control it comes to a delayed "switching on" and "off" of the winch; that means that the winch is running for some seconds (approx. 30 cm rope) after releasing the button of the radio control.

The receiver with „emergency stop switch“ of the radio control is mounted on the left side on the additional control unit. It can be controlled winch "coupling", "up" and "down".

Operating and maintenance instructions

Low-bed semitrailer



3.21 Lubrication assistance

If equipped with a lubrication assistance, all lubrication points of the steering mechanism difficultly accessible are shifted to the outside. There are lubricating nipples for filling the lubrication line.



For lubrication, carry out max. 3 strokes with a usual grease-gun. Otherwise the pressure in the line system might increase so that the lines burst.

3.22 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 KI. 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.

Operating and maintenance instructions

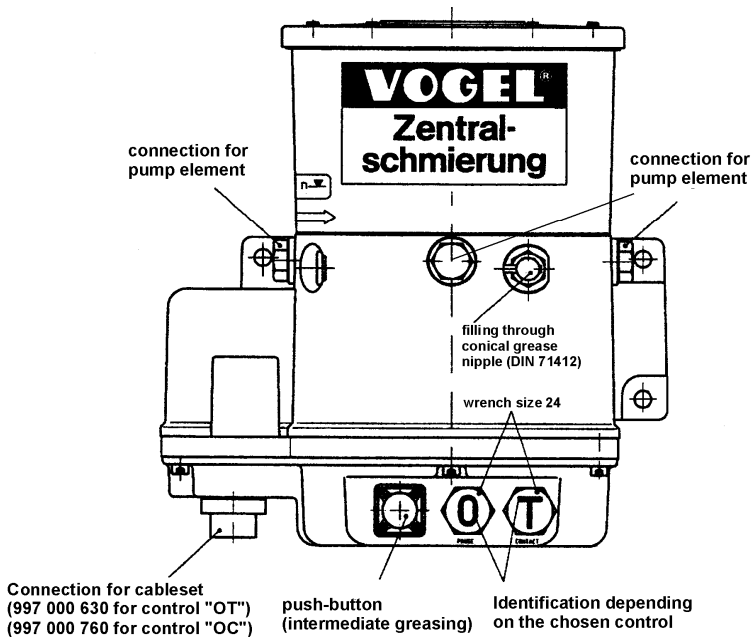
Low-bed semitrailer



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 cleanliness when filling!

Operating and maintenance instructions

Low-bed semitrailer



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)

Operating and maintenance instructions

Low-bed semitrailer



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 from 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.

Function and adjustment of the system (execution “OT – time controlled”)

The system works fully automatic. Greasing is made dependent on the operation hours of the vehicle (= on period of the ignition). When the ignition is switched on the operation hours are added up and saved when the ignition is switched off.

The duration of the stop time between two greasing procedures (0.25 up to 14 hours) 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 “T”.



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.

Stop time: _____ hours

Pump running time: _____ minutes

Operating and maintenance instructions

Low-bed semitrailer



Intermediate greasing

When the ignition is switched on, an intermediate greasing can be activated with the push-button on the housing of the pump.

This greasing pulse should be done directly after each car wash. For the optimum distribution of the grease on the crane foot the crane must be swung several times during the greasing pulse.

For the equipment with loading crane it is possible to install alternatively 2 adjustable pump elements on the pump; a pump element which is not adjustable for the greasing of the trailer and each 1 adjustable pump element for the greasing of the crane foot and crane arm.

When adjusting the central lubrication system the following must be paid attention to:

1. **First of all the adjustment for the semitrailer must be done.** For this the greasing time (running time of the pump) and the stop time are adjusted. These adjustments must be chosen in a way that the semitrailer is duly greased.

When parking the vehicle the greasing and stop times are interrupted and the accumulated data are saved. When switching on the ignition again, the functional flow begins at the point of interruption. The optimum adjustment should be in a way that after one week of operation there should be a narrow (approx. 2 mm) grease collar on a greasing point, e.g. on the brake camshaft of the axle.

2. The adjustment for the loading crane is done by a quantity regulation on the pump elements. Here different grease quantities for the crane foot and crane arm can be adjusted. The pump elements are directly mounted on the pump. An adjustment range of 0.8 cm³ per minute (min.) up to 2.4 cm³ per minute is possible. The optimum adjustment should be in a way that after one week of operation there should be a narrow (approx. 2 mm) grease collar on a greasing point.

In the factory, the system is adjusted to the maximum supply rate (2.4 cm³/minute).

When changing the greasing times for the semitrailer the grease quantities for the crane must also be adapted, if necessary.



If for example the stop time is reduced, the more often grease is supplied from the pump to the distributors. In case that the greasing on the crane should remain the same, the supply rate on the pump element must be reduced.

Operating and maintenance instructions

Low-bed semitrailer



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.

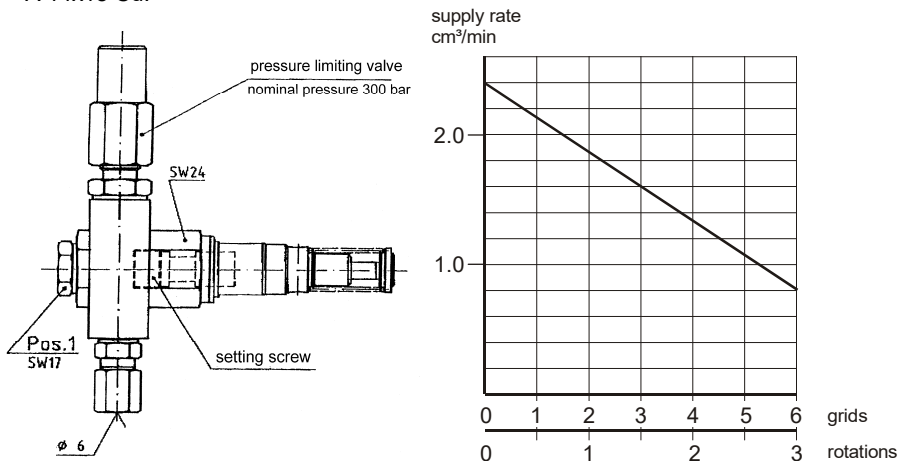
This is done as follows:

1. Unscrew the main line from 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.

Adjusting the supply rate on the adjustable pump elements

For adjusting the supply rate, you must keep to the following instructions.

- Remove screw plug pos. 1 by means of hexagon socket spanner (spanner size 17).
- Adjusting the setting screw is made by a hexagon socket spanner (spanner size 8).
- Turning in clockwise direction reduces the supply rate.
- Turning in anti-clockwise direction increases the supply rate.
- Max. lift of the setting screw = 3 rotations = 6 grids
- 1 rotation of the setting screw = 1 mm = 2 grids
- After the adjustment attach and tighten screw plug pos. 1 with sealing ring DIN 7603-A 14x18 Cu.



Operating and maintenance instructions

Low-bed semitrailer



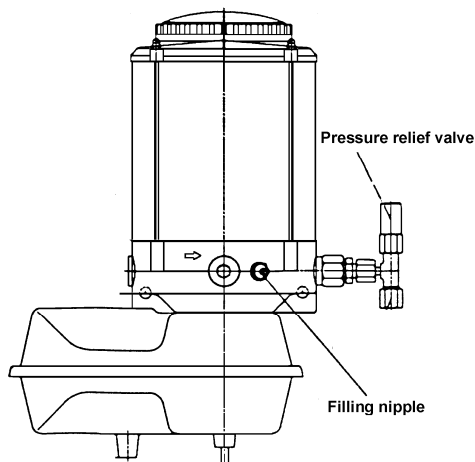
BEKA-MAX progressive central lubrication system with electric pump EP-1

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.



Operating and maintenance instructions

Low-bed semitrailer



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.

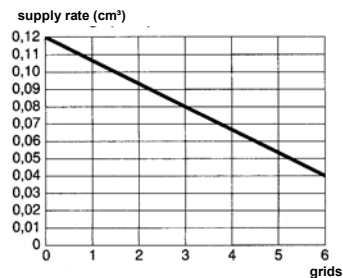
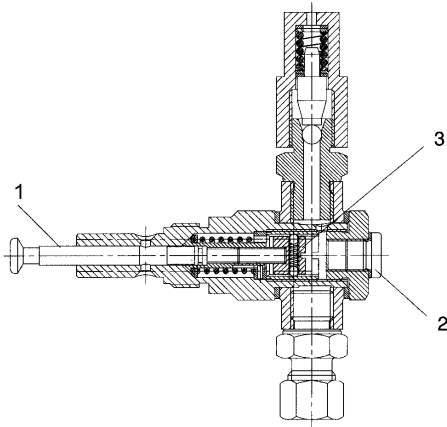
The adjustment is made at the pump element adjustable as regards the quantity. This is mounted directly at the pump. It is possible to adjust from 0.12 cm³ per pump lift (max.) to 0.04 cm³ per lift. The optimum adjustment should be in a way that after one week of driving there is a small collar of surplus 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.



Operating and maintenance instructions

Low-bed semitrailer



BEKA-MAX progressive central lubrication system with electric pump EP-1 and integrated control unit S-EP 4

The BEKA-MAX central lubrication system is a progressive system which can supply grease up to NLGI Kl. 2 (only 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 3 main progressive distributors. The task of these main distributors 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 stop time and grease time of the pump is controlled by an electronic control unit.

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



Pay attention to cleanliness when filling!

Operating and maintenance instructions

Low-bed semitrailer



Pressure relief valve

Not adjustable pump element

Filling nipple

Button for intermediate greasing, red

Electronic control for stop and grease time

Function and adjustment of the Beka-Max central lubrication system

The Beka-Max central lubrication system works fully automatically and depending on the operation hours. The grease time (operation time of the pump) and the stop time are adjusted. These adjustments must be chosen in a way that the semitrailer is duly greased. The factory setting of the grease and stop time can be found in the enclosed instructional note.

If e.g. a grease time of 3 minutes and a stop time of 8 hours are adjusted, the central lubrication pump is switched on every 8 operation hours for 3 minutes. When parking the vehicle the greasing and stop times are interrupted and the accumulated data are saved. When switching on the ignition again, the functional flow begins at the point of interruption. The optimum adjustment should be in a way that after one week of operation there should be a narrow (approx. 2 mm) grease collar on a greasing point, e.g. on the brake camshaft of the axle.

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.

Operating and maintenance instructions

Low-bed semitrailer



- **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)**

Intermediate greasing

When the ignition is switched on, an intermediate greasing can be activated with the red push-button on the housing of the pump. During the greasing process the yellow LED in the window control lights.

This greasing pulse should be done directly after each car wash.

Ventilation of the system

If the grease reservoir was inadvertently completely emptied, it might be necessary to ventilate the system.

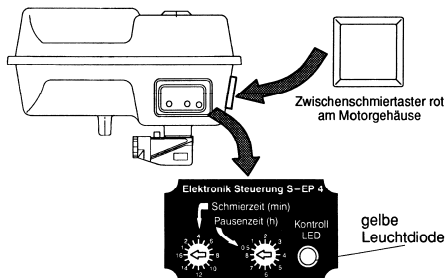
This is done as follows:

1. Unscrew the main line from 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.

Adjustment of the stop and grease time

To adjust the stop and grease times, proceed as follows:

1. Remove the red frame of the control unit on the housing of the pump with a flat screwdriver and remove the 4 cross-head screws as well as the transparent lid.
2. Adjust the stop and grease time on both switches by means of a screwdriver.
3. If you do not duly close the control unit, water might penetrate. In this case the guarantee expires.



Operating and maintenance instructions

Low-bed semitrailer



Operating and maintenance instructions

Low-bed semitrailer



4. National obligations

The corresponding national regulations have to be observed.

Operating and maintenance instructions

Low-bed semitrailer



Operating and maintenance instructions

Low-bed semitrailer

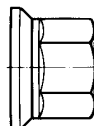


5. First inspection

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

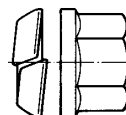


M 22x1,5

Wheel nut with pressure plate

BPW axle with bolt centring 510 Nm

SAF axle with bolt centring 430 Nm



M 22x1,5

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 or if it is not carried out at all, 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.

Operating and maintenance instructions

Low-bed semitrailer



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 shock absorbers and their fixation				
Check air bellow for damage				
Check tightening torque on the spring clips (SAF axle – 700 Nm for thread M24) (BPW axle – 650 Nm for thread M24)				
Check tightening torque of screws M30 – 1100 Nm				
Check slack adjuster				
Check axles according to the instructions of the manufacturer				
Check fixed seat of king-pin				
Check and grease fifth-wheel plate				
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 lighting system				
Visual check of vehicle frame				
Check oil level in hydraulic tank				
Check function and tightness of hydraulic system				
Exchange hydraulic filter				
Ventilate steering hydraulic				

Operating and maintenance instructions

Low-bed semitrailer



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)

Operating and maintenance instructions

Low-bed semitrailer



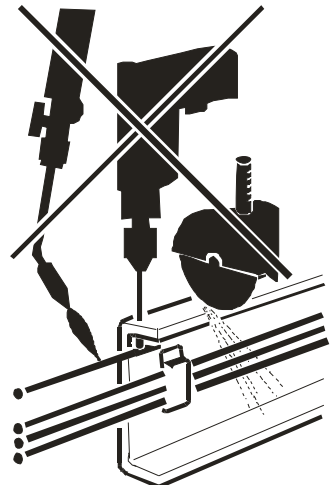
6. Maintenance and inspections

6.1 General indications concerning maintenance and inspection works



For all maintenance and inspection works, please also observe valid national regulations.

- ! - 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.
- Before working on or under movable vehicle bodies or body parts in open or lifted position, these parts have to be duly secured or supported against unintentional falling down or closing.
- 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

Line \varnothing in mm	Material thickness mm	min. bending radius mm
6	1,0	40
8	1,0	40
12	1,5	60
15	1,5	90

Operating and maintenance instructions

Low-bed semitrailer



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

We understand by “ <i>normal</i> operation conditions”:	We understand by “ <i>extreme</i> operation conditions”:
<ul style="list-style-type: none">- regular “single-shift” operation- paved roads- temporary operation under full load- central European climate	<ul style="list-style-type: none">- “multi-shift” operation- long standing times- 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 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 between spray nozzle and vehicle must be 30 cm at least.
- 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.

Operating and maintenance instructions

Low-bed semitrailer



6.2. Regular maintenance and examination works

The following instructions refer to normal road conditions. In case of extraordinary conditions the maintenance works must be made 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 technical devices to do it in his own works.

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 tires

The air pressure of all wheels incl. spare wheel must be checked according to the instructions of the tire manufacturer in dependence with the axle load. Regular visual examinations must be made on tires 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. Defect bulbs must be exchanged immediately. We recommend having always a range of bulbs and fuses available in the vehicle.

- 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.

- Pressure of the hydraulic steering

To achieve the optimum track and steering behaviour, we recommend building up the pressure before starting to drive. Please see also our instructions in paragraph 3.15 "Hydraulic forced steering".

Operating and maintenance instructions

Low-bed semitrailer



- 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 are showing an overlubrication, dry bearing points are showing an insufficient lubrication. In both cases you have to check in detail the system and adjust it. Please note operation instructions in paragraph 3.12 or contact our after-sales service.

6.4 Maintenance works to be done every 3 months

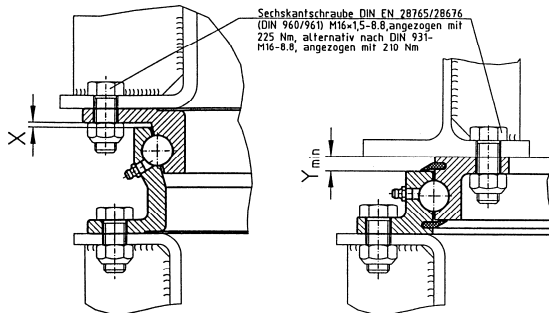
Following maintenance works have to be done every 3 months (quarterly).

- Check ball bearing turntable

For maintenance, the ball bearing turntable has to be lubricated at least every 8.000 to 10.000 km or once a month, with high-quality rolling bearing grease (with lithium mixed-base, NLGI consistency grade 2) by swinging it at the same time so that a grease collar escapes on the sealing lips over the whole length.

The screwed connections have to be checked for the prescribed tightening torque.

Steering turnplates are wear parts. All-important for durability is a regular and effective greasing. The end clearance max. permissible of 3,5 is reached when at some circumference point the horizontal running gap is $X = 0$ mm or $Y_{min.} = 7,5$ mm.



Operating and maintenance instructions

Low-bed semitrailer



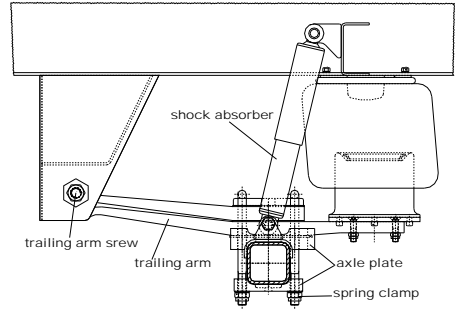
- Visual check of axle suspension

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 $M_A = 400 - 450 \text{ Nm}$



- Check tightening torque on the spring clamps

The axle plates and spring clamps must be checked carefully for damage and correct fitting. Damaged parts must be immediately replaced.

Tightening torque BPW axle $M_A = 650 \text{ Nm}$ for thread M24

Tightening torque SAF axle $M_A = 700 \text{ Nm}$ for thread M24

- Check tightening torque on the suspension screws (only Langendorf air suspension)

All axle supports and suspension parts must be checked carefully for damages. Damaged parts must be immediately replaced.

Tightening torque for suspension screws (M30) $M_A = 1.100 \text{ Nm}$

For the equipment with complete axle assemblies (BPW, SAF, Gigant, DB etc.) pay attention to the instructions of the manufacturer.

- Check air bellows for damage

For doing so, the air suspension of the semitrailer 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 axles according to the instructions of the manufacturer

The inspection must be made depending on axle type and axle manufacturer according to their instructions.

Operating and maintenance instructions

Low-bed semitrailer



- 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.

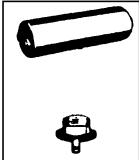


Maintenance and repair works on the brake system may only be made by qualified persons.

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 existing.



- 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.

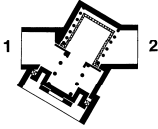
- Brake power regulator

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.

Operating and maintenance instructions

Low-bed semitrailer



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.



Semitrailers with detachable gooseneck are equipped with a second pair of piping filters. These filters are mounted behind the connection to the gooseneck and serve for holding back the possibly existing soil particles coming into the system when coupling/uncoupling.

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 screwed connections. 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 is mounted.

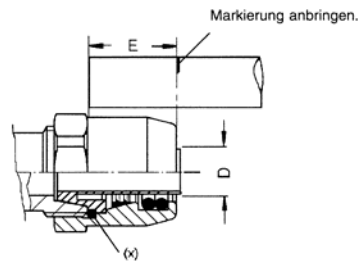
Operating and maintenance instructions

Low-bed semitrailer



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 torques 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 function and tightness of hydraulic system

Works on the hydraulic system must only be made by persons especially trained for that and who know the dangers. Before repair works on the system, it must be free of pressure. Parts hold or moved by hydraulic cylinders must be secured mechanically.

Operating and maintenance instructions

Low-bed semitrailer



- 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.

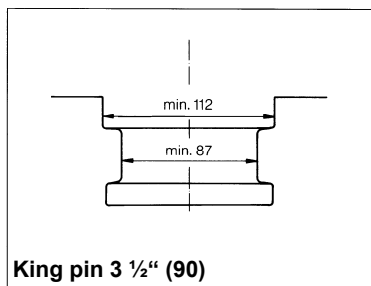
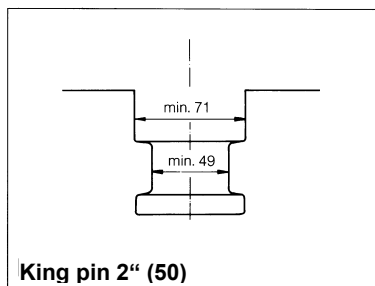
The fastening screws must be checked with the tightening torque according to below table.

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.



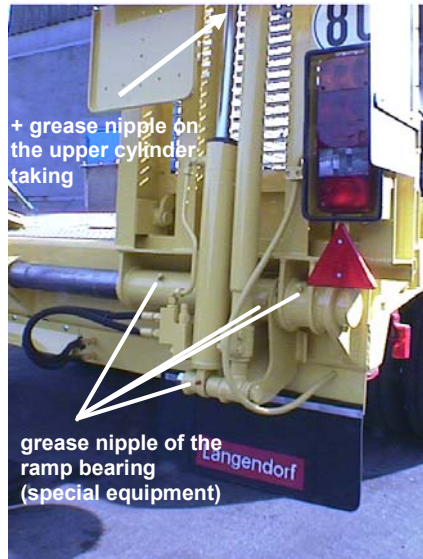
Operating and maintenance instructions

Low-bed semitrailer



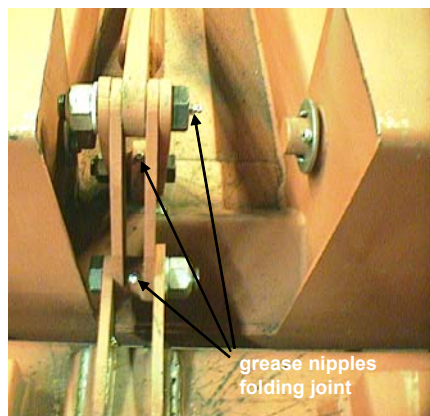
- Check and grease ramp bearing, ramp shaft and ramp safety device

Ramp bearing, ramp shaft and the ramp safety device must not be damaged or worn. For greasing the ramp shaft it must be covered with mixed-based lithium multi-purpose grease. Depending on the customer's wish the loading ramp can be equipped with grease nipples. The upper and lower cylinder taking have grease nipples.



- Check folding joint of the spreading ramp

The folding joints of the spreading ramp must be free moving and in faultless condition. The bolt connections must not be worn. The greasing is made over three grease nipples.



Operating and maintenance instructions

Low-bed semitrailer



- Check hydraulic lift

The bearing of the hydraulic lift – including all fixation parts – must not be damaged at all. The sliding rails must be carefully cleaned and covered with a mixed-base lithium multi-purpose grease.

The cylinder bearings have grease nipples.

- Grease locking of the central beam

These 2 grease points (per vehicle side) are not connected to the central lubrication system and have to be greased monthly using a customary grease-gun. For the better spreading of the grease, the locking has to be operated several times during greasing.



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 and grease steering mechanic

The durability of the steering mechanic depends substantially on the regular care and maintenance. This pays off especially regarding possibly repair works. The exchange of parts such as steering cylinders, steering rods etc. with “seized bearings” is considerably more extensive and therefore also more cost-intensive. Therefore the bearing points mentioned below should be checked and greased with greatest care. If you recognise any clearance in the bearing points, they have to be repaired immediately, because the larger the clearance in the bearings, the worse the steering behaviour.

Even if equipped with a central lubrication system, it has to be checked regularly if all bearing points are sufficiently supplied with grease.

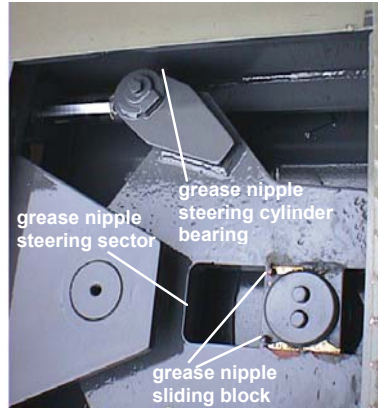
Operating and maintenance instructions

Low-bed semitrailer



Check and grease sliding block

The sliding block can be reached through the maintenance opening in the platform. It has to be checked for clearance half-yearly or in case of not satisfying steering behaviour. If the clearance between sliding block and steering sector becomes too large, this continues for the whole steering. The effect would be e.g. a jerky steering of the rear axles or the semitrailer would continuously run out of track. The durability of the sliding block depends on the quality of the greasing. At the same time also the steering sector bolt must be greased.



Check and grease steering cylinder taking

The front steering cylinder taking (on the steering sector) can also be reached through the maintenance opening. The rear steering cylinder fixation (on the vehicle frame) can be reached from below when the vehicle is unhitched.



Check and grease steering wedge

The steering wedge can be reached from below when the vehicle is unhitched.



Operating and maintenance instructions

Low-bed semitrailer



Check and grease steering dome

To grease the steering domes in the vehicle rear part, the semitrailer has to be driven onto a pit. On the steering domes the grease points are laid to the bottom over a line system.

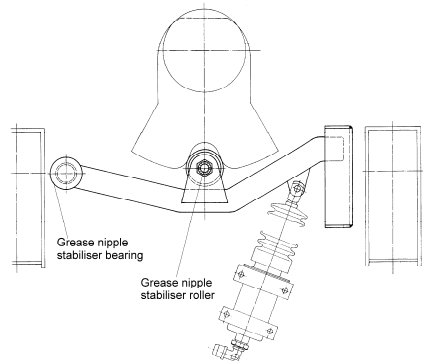


Check and grease steering cylinder bearings in the vehicle rear part

The taking up eyes of the steering cylinder have each one grease nipple. The cylinder bearing have to be greased over these grease nipples until clean grease escapes from the gaps.

Check and grease steering stabiliser

For maintenance and check of the steering stabiliser, the vehicle has to be driven onto a pit. When the axles are standing "straight", the guide pulley of the steering stabiliser has to fit in the notch of the stabiliser lever.



- **Check and grease support winches**

Check support winches and fixation parts for damages. Check all fixation screws for safe seat.

All wear part, especially spindle and nut of the telescope support device, have to be checked and, if necessary, exchanged (at the latest after four years operation).

The spindle is greased over the lower grease nipple laterally on the shaft. For this, use spindle grease JS 12 from BP. Grease the spindle when the support device is fully extended and during the slow retracting.

Operating and maintenance instructions

Low-bed semitrailer



- Check slack adjusters

To check the slack adjusters please pay attention to the instructions given by the manufacturer.

- 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 $M_A = 210 \text{ Nm}$ 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 must adjust itself. If this is not the case, please contact a specialized workshop or our after-sales service.

- Check shock absorbers

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

- Observe national legal directives

Operating and maintenance instructions

Low-bed semitrailer



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 authorized workshop.

Operating and maintenance instructions

Low-bed semitrailer



6.8. Adjusting the automatic slack adjusters, type HALDEX

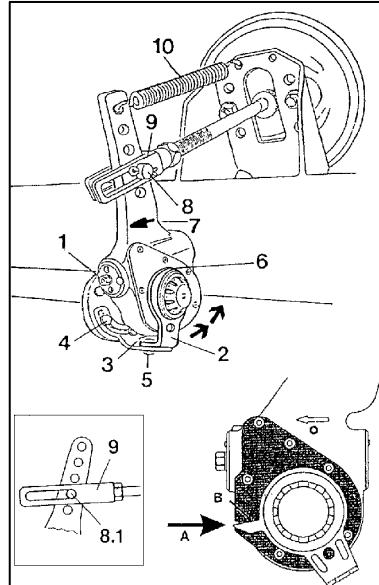
- Cams and brake shoes are in zero position.
- Fix the slack adjusters on the camshaft.
Axial clearance: Adjust the nominal value of 1.0 mm by means of the adjustment plates (6).
Arrow mark (7) points to brake direction.
- Install the fixed point clip (3); use 2 fixing screws (4) in any case. Do not 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).

Operating and maintenance instructions

Low-bed semitrailer



HINT FOR TRAILING STEERED AXLES

Weld fixed point clip (3) in this position.

- Adjust air clearance of the brake lining by turning the adjustment screw (1) until the brake lining has contact to the brake drum. Turn back the adjustment screw (1) until an empty stroke of the piston rod of 15-18 mm is reached. By this an air clearance of approx. 0.7 mm is adjusted in the brake shoe centre.
- In case of a faultless function of the adjustment coupling, a tightening torque of at least 20 Nm has to be noticeable when turning back the adjustment screw (1); a noise can be clearly heard when doing so.
- Operate the service brake several times, check free running of the brake drum, check air clearance; if necessary, repeat adjustment of the slack adjuster.

For other slack adjuster types please take note of the corresponding instructions of the manufacturer.

Operating and maintenance instructions

Low-bed semitrailer



Operating and maintenance instructions

Low-bed semitrailer



7. Hints for a long time stop period of the vehicle

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

Fill hydraulic oil reservoir completely. Clean hydraulic cylinders and conserve piston rods with acid-free grease. Before taking again into operation, clean carefully all hydraulic parts.

Operating and maintenance instructions

Low-bed semitrailer



Operating and maintenance instructions

Low-bed semitrailer



8. Tightening torque in Nm

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



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

Thread	SW	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

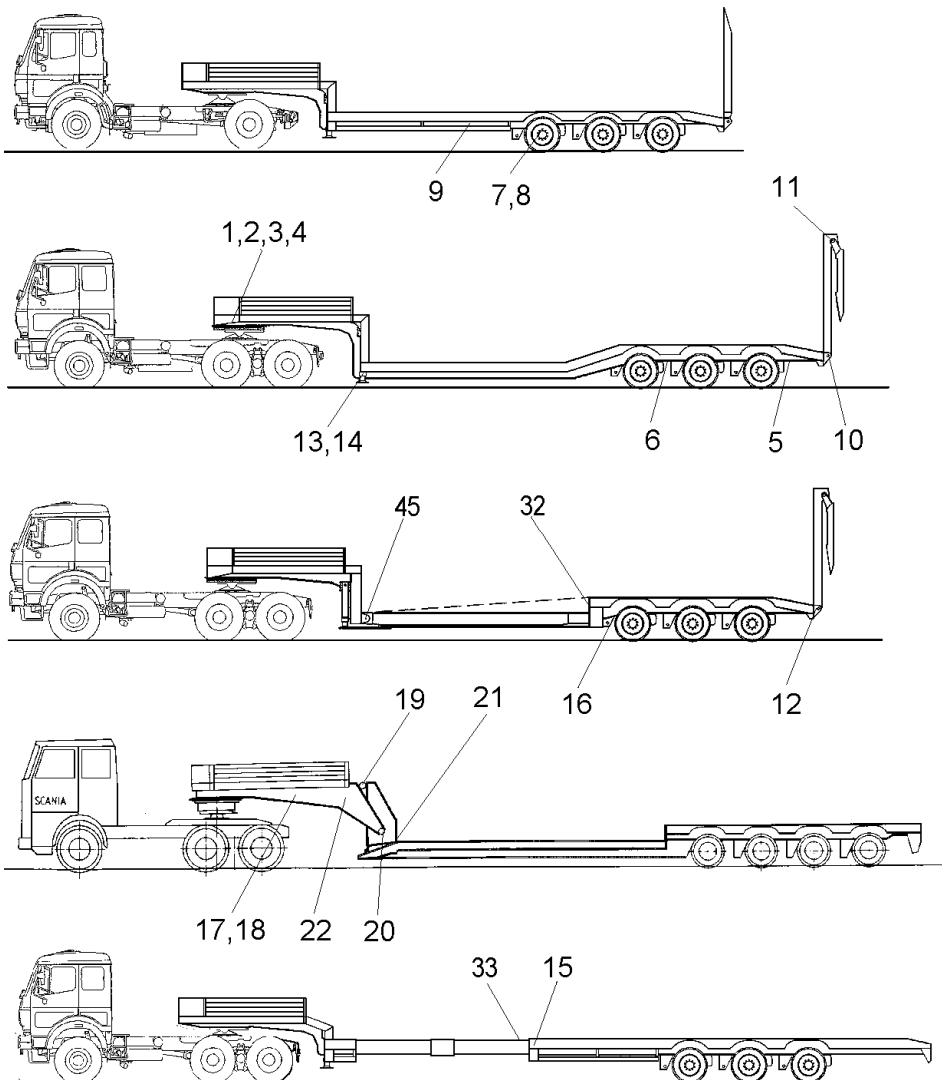
Approximate values for tightening the screw connection with tightening torque key, lubricated thread. Impact wrench not permissible.

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9. Schmierplan



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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.

Following points are connected: 1,2,3,4,5,6,7,8,13,15¹,16,17,18,19,20,21,22,

I. 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	pcs.	Grease intervals
1	Sliding block	2	weekly
2	Steering sector of hydraulic steering	1	weekly
	Steering sector of mechanic steering	2	weekly
3	Hydraulic cylinder of steering	2 per cyl.	weekly
4	Ball bearing turntable	8	weekly
5	Steering stabiliser	2	weekly
6	Turn dome	4 per dome	weekly
7	Axle	X	see instructions
8	Brake	X	of manufacturer
9	Spindle hand brake	1	quarterly
10	Ramp lifting cylinder	2	quarterly
11	Folding joint on spreading ramp	3	monthly
12	Loading ramp (only ramp to be shifted hydr.)	2	as required
13	Support winch	2	quarterly
14	Gear of support winch (only Jost)	1	yearly
15	Locking bolt central beam	3	as required
16	Axle lift	1	weekly
17	Support cylinder gooseneck	2	weekly
18	Support bearing gooseneck	1	weekly
19	Neck locking bush	2	weekly
20	Neck bearing	2	weekly
21	Bed locking	1	weekly
22	Lifting cylinder (per cylinder)	2	weekly

¹ not for semitrailers with detachable gooseneck

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II. Greasing by covering

Thoroughly clean surfaces and remove completely old grease

<u>Pos.</u>	<u>Designation</u>	<u>pcs</u>	<u>Grease intervals</u>
30	Ramp shafts		weekly
31	Support profile of warning sign		quarterly
32	Sliding rail lifting bed		as required
33	Sliding rail central support		as required
34	Rear support		weekly

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

<u>Pos.</u>	<u>Designation</u>	<u>pcs.</u>	<u>Grease intervals</u>
40	Folding joint of spreading ramp		monthly
41	Folding joint of warning signs		monthly
42	Folding mechanism of side protection		monthly
43	Hinges of tool box		monthly
44	Folding supports of loading bed widening		as required
45	Bearing shaft lifting bed		quarterly



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

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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 tight seat of wheel nuts		X			Additionally after every wheel change
Check ball bearing turntable		X			Page 6 – 4
Visual check of axle suspension		X			Page 6 – 4
Check shock absorber and fixation		X			Page 6 – 5
Exchange shock absorber					Every 2 years
Check air bellow for damage		X			Page 6 – 5
Check lift ramp		X			Page 6 – 6
Check ramp bearing, ramp shaft and ramp securing		X			Page 6 – 6
Check and grease steering mechanic			X		Page 6 – 7 to 6 – 8
Check and grease support winches			X		Page 6 – 8
Check slack adjusters	X	X	X	X	Manufacturer's instructions
Check axles acc. to instructions of manufacturer	X	X	X	X	Manufacturer's instructions
Check lighting system	X				Page 6 – 3
Brake system; check tightness of connections		X			Page 6 – 5
Clean line filter of brake system		X			Page 6 – 5
Check function of service and parking brake	X				According to legal regulations
Check tight seat of brake cylinder fixation ($M_A=210$ Nm for M16)			X		Page 6 – 9

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

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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
Inspection of trailer acc. to § 29 StVZO (German legislation)			X		Legal regulations
Main inspection acc. to § 29 StVZO (German legislation)				X	Legal regulations
Road train brake balance between tractor and trailer					As required; p. 6-10
Check tight seat of kingpin		X			Page 6 – 5
Check, clean, grease fifth-wheel plate			X		Page 6 – 9
Check hydraulic winch	X	X	X	X	Manufacturer's instr.
Check function and tightness of hydraulic system		X			Page 6 – 6
Visual check of vehicle frame		X			
Check air suspension assembly				X	Page 6 – 8
Retighten all screwed connections with directed tightening torque			X		Page 8 – 1
Check tyres regarding pressure/pattern/damage	X				Page 6 – 3
Greasing of all lubrication points		X			Page 9 – 1
Grease the parts which are stressed with friction (without nipple)		X			Page 9 – 2
Check and adjust central lubrication system	X				Page 6 – 4
Clean chromium-plated piston rods	X				Page 6 – 3

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

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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
1st 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)

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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

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