



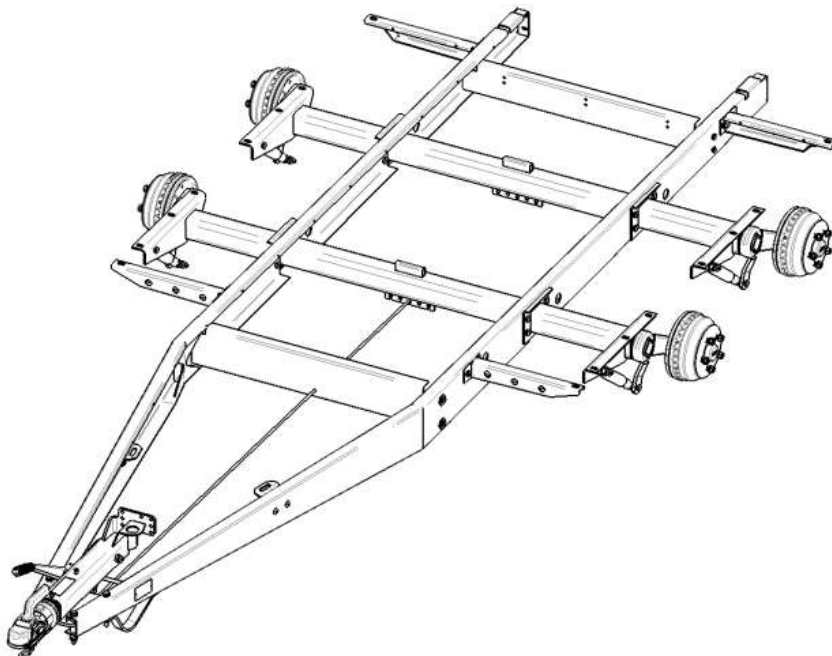
**WAP**™

Fahrzeugtechnik GmbH



**Service Manual for the Overrun Brake System with Drum Brake**  
Operating and Maintenance Instructions

**Always a safe trip with your trailer**



03/2020

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## General information:

These instructions apply to products from WAP. They are part of the warranty conditions. **The relevant operating instructions of the vehicle manufacturer and/or the manufacturers of the other parts of the vehicle must be followed.**

The legal requirements for type approved vehicle parts regulate that alterations can only be made within the scope of national and international regulations, and that they must be made by the manufacturer itself. Subsequent welding in any form is not permitted.

**To maintain the operating and road safety of the vehicle, follow the most recent maintenance instructions and perform maintenance at the prescribed intervals.** The latest version of the maintenance instructions can be downloaded at any time from [www.waptech.de](http://www.waptech.de). We can also send them to you by mail if desired.

The repair of any defects found and the replacement of worn parts should be performed by a specialist workshop if the parts are relevant to safety. When installing spare parts it is strongly recommended to only use original WAP parts. If spare parts other than original WAP parts are used, then our product liability and warranty become void.

**Note that the brakes on a new vehicle are not broken in yet and need to be broken in first. For this reason, drive carefully for the first 100 km!** Avoid overstrain caused by driving irresponsibly and/or inappropriately. Avoid shock and impact loads on the axle(s) and overrun hitch. The permissible (downward vertical) static load on the coupling joint and the permissible total weight of the trailer and towing vehicle must be observed. Adjust your driving speed to the size of your load and the road conditions. WAP products are not designed for off-road use. Off-road use means use on an unpaved road surface.

Traceability is based on the identification plates

**Overrun hitch** identification plate:

Model designations



item number

Week/year of manufacture

**axle** identification plate:

Model designation



Item number

Week/year of manufacture

## Characteristics

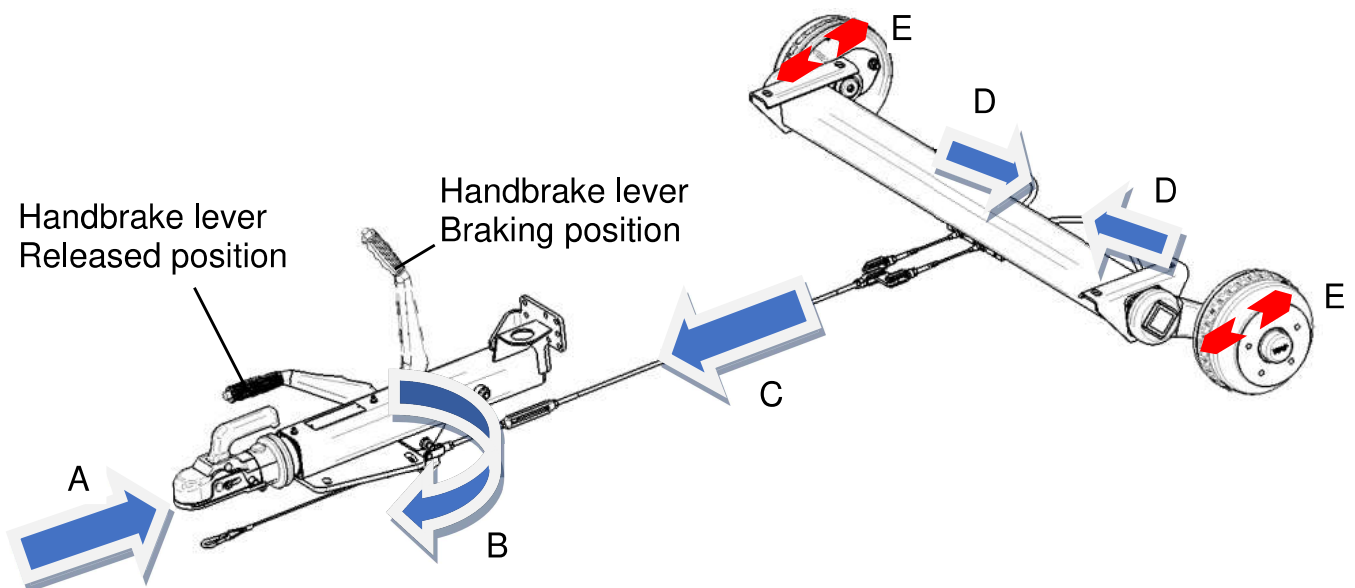
The WAP overrun brake systems are certified in accordance with the currently valid ECE regulations and are type approved. The servo brake system only requires an extremely short overrun distance of max. 40 mm. This guarantees the wheel brakes will react quickly, and therefore ensures stutter-free braking and acceleration of the trailer.

## Components of the complete brake system

The complete brake system consists of the overrun hitch, the transmission device, and the brakes. These three components form a well coordinated unit. Combinations with components from other manufacturers are only possible after prior consultation with WAP and require our approval.

## Principle of operation of the brake force distribution

When the towing vehicle is braked, the push rod is pushed into the housing (A). The push rod, which is supported by several plastic bushings, presses in this case against the reversing lever mounted in the housing. The deflection of the reversing lever (B) resulting from this motion converts the force pressing against the top end to a pulling force the bottom (C). This pulling force is transmitted by the transmission device (rod and compensate) and the brake cable assembly (D) to the wheel brake (E) and then closes the brake shoes here when braking.



## **Operating instructions:**

### **Before every trip:**

- Do not overload the vehicles. The permissible static load (vertical downward force) on the coupling joint and the permissible total weight of the trailer and towing vehicle must be observed.
- Make sure the load is properly stowed and secured. Avoid overloading on one side due to incorrect loading. Mount the load over the axle(s) and as low as possible. The load must be secured in accordance with legal requirements.
- Check tire pressure / tire condition / wheel mounting
- For height-adjustable towing devices, check if the linkage is seated tightly.
- Check the position of the trailer ball coupler (towing eye). The trailer ball coupler must fully enclose the ball of the towing vehicle and be locked in place.
- Fasten the breakaway cable to the towing vehicle.
- Raise the jockey wheel and secure in place. The jockey wheel should be turned so it is parallel to the direction of travel.
- Release the handbrake.
- Check the function of the lighting system.

### **After the first trip (see the maintenance instructions for more detailed information):**

- Check if the wheel bolts are tightly fitted using a torque wrench.
- Check the braking system and readjust if necessary.

We wish you a pleasant trip!

## Coupling:

Lift the handle up to open the trailer ball coupler. Place the now open hitch on the ball of the towing vehicle and release the handle. After placing the hitch on the ball, let the handle automatically slide back into its original position. This closes the hitch and locks it automatically.

**Caution:** After locking, the wear indicator on the side must display “OK” or "+". Other indicators must be interpreted based on the manufacturer's instructions for the particular trailer ball coupler. The ball on the towing vehicle should no longer be visible when coupled, meaning it must be fully enclosed by the trailer ball coupler.

- The breakaway cable is fastened to the towing vehicle after hitching the trailer to the towing vehicle/the hitch.
- Connect the electrical lighting plug to the towing vehicle and check the lights.
- Raise the jockey wheel fully upwards and secure. Make sure that the jockey wheel does not make contact with the brake linkage.
- Release the parking brake and, if necessary, remove the chocks under the wheels before you start driving.

**Note:** The handle of the trailer ball coupler and the handbrake lever must not be used as a maneuvering aid. There is a risk of damage to the internal components, which can then cause the coupler to malfunction.

Do not exceed the maximum load capacity of the trailer ball coupler or towing eye, overrun hitch, towing devices, or towing vehicle. There should be a load of 25 kg at a minimum on the hitch. A negative load is not permitted.

## Uncoupling:

- Disconnect the breakaway cable and electrical lighting plug
- Release and lower the jockey wheel
- Lift the handle of the ball hitch upwards first and then pull it forward.
- Lift the hitch off the ball or push it up and off the ball using the jockey wheel.

**Caution:** The trailer must be secured with chocks or by setting the parking brake using a force of 600 N (60 kg)!

## Maintenance instructions

Components relevant to safety must be inspected by qualified personnel in a specialist workshop. This includes inspection of all the components in the brake system and the wheel bearings.

A detailed description can be found in the following pages (numbers in red circle)	Before every trip	After changing wheels	After the first 50 kilometers	After the first 500 kilometers or the first year	Every 5000 kilometers or annually
<p>① Check the trailer ball coupler.</p> <p>② Check the condition of the tires.</p> <p>③ Check the wheel bolts to make sure they are tight.</p> <p>④ Check the brake lift clearance and adjust if necessary.</p> <p>⑤ Check the thickness of the brake pads.</p> <p>⑥ Check the play of the wheel bearings.</p> <p>⑦ Check the overrun control device.</p> <p>⑧ Check the hub caps to make sure they are securely in place.</p>	<p>⊗</p> <p>⊗</p>	<p>⊗</p>	<p>⊗</p>	<p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p>	<p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p> <p>⊗</p>

## 1 Check the trailer ball coupler:

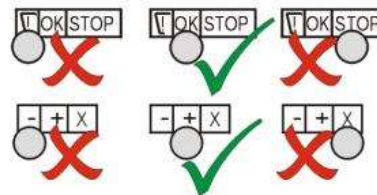
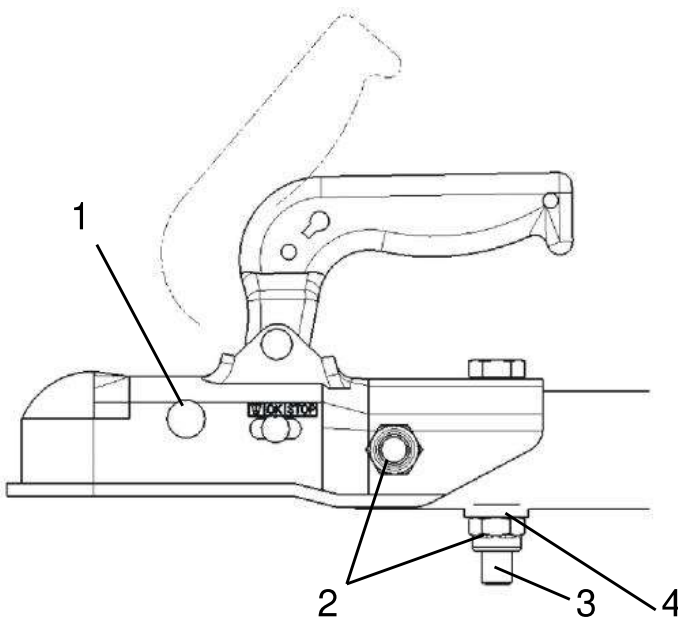
Oil the movable parts of the trailer ball coupler at regular intervals.

Perform a function test.

Check the trailer ball coupler for wear and dirt.

The wear indicator must be in the "OK" or "+" range when coupled.

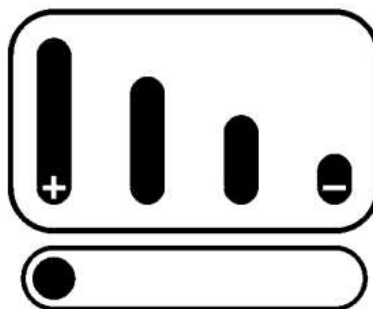
Check if the bolts (2), (3) are tight.



Shown; crosswise pattern  
if necessary. parallel pattern  
See the following table for the tightening  
torques.

### Additional wear check for safety couplings

After coupling and activating the stabilizing device, the condition of the friction linings can be checked. The triangular wear indicator with the +/- signs found on the operating lever uses a slot that is parallel to the lever and points in the direction of motion to indicate the wear. The trailer ball coupler is set up in the factory so that the head of the bolt seen in the slot is below the + sign marked in the triangular bar diagram. The friction linings must be replaced no later than when the bolt is near the - sign.





## Tightening torques for bolt connections on the trailer ball coupler or towing eye

Towing connection on push rods for overrun hitches	<b>Tightening torque (Nm)</b> <b>This torque must be applied on the nut of the bolt!</b>
	<b>M12 / M14, 8.8. / 10.9.</b>
<b>For trailer ball couplers</b>	
With sheet metal housing	35 +/- 2
With cast housing	60 - 65
WS 3000 H/L/LB	75 - 80
WS 3000 D	85 - 95
WS 3500 D	85 - 95
<b>For towing eyes</b>	85 - 95

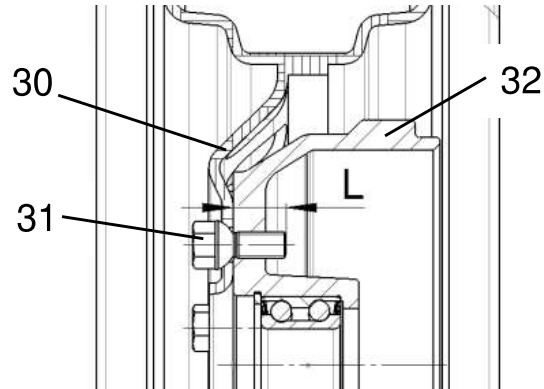
### **2** Checking the condition of the tires

Check the condition of the tires (e.g. for cracks, porous areas).

Measure the depth of the tire treads in the middle of the tire. Inspect the rims for visible damage and change the tires on an axle when necessary or repair the tire.

### 3 Checking the tightness of the wheel bolts

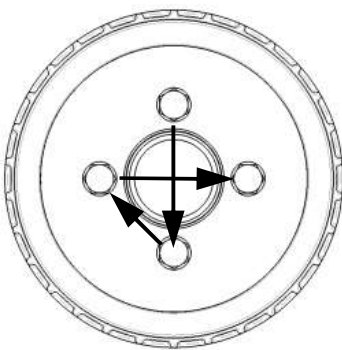
Tighten the wheel bolts or lug nuts with a torque wrench to the **tightening torque for wheel bolts specified by the vehicle manufacturer or the manufacturer of the rims**. The following specifications are only recommendations because WAP cannot know the design and/or materials used in the rims (30) mounted. Accordingly, you must check the thread depth L of the wheel bolt. The thread depth for wheel bolts (31) in brake drums (32) must be between a min. of 17 mm and a max. of 22 mm.



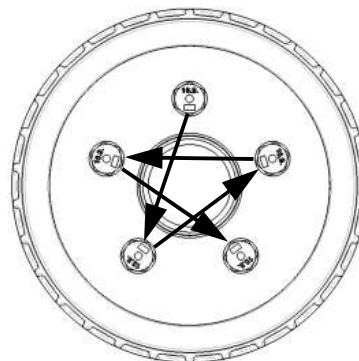
Thread	Recommended tightening torque	Max. tightening torque for the brake drum material
M 12 x 1.5	90 – 100 Nm	130 Nm
M 14 x 1.5	110 – 120 Nm	150 Nm

Tightening pattern

4 wheel bolts

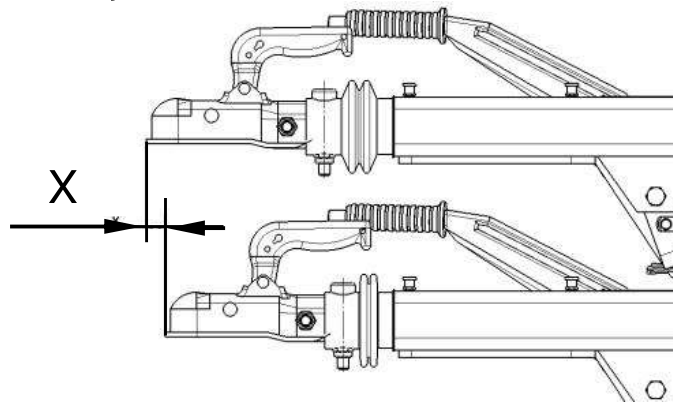


5 wheel bolts



#### 4 Checking the brake lift clearance

Check by conducting a visual inspection of the overrun distance (x) of the overrun hitch. As soon as this is found to be greater than 20 mm during a braking test, then the brake system must be adjusted.



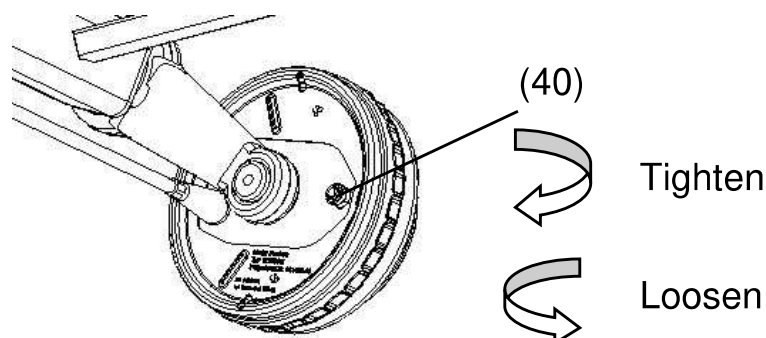
#### Setting / adjusting the wheel brake

When adjusting/readjusting the disc brakes it is important that the drawbar of the overrun hitch is fully extended and the handbrake lever is in the released position. The adjustments must be made when the wheel brake / brake drums are cold.

**Caution: It is absolutely necessary to prevent the vehicle from rolling away using wheel chocks!**

The transmission device can be removed by releasing the tension in the brake linkage. The vehicle should be jacked up high enough so that it is possible for the wheel to rotate freely. Tighten the adjustment nut (16) by turning it to the right while constantly rotating the wheel in the forward direction until the wheel is tight. This centers both brake shoes in the brake drum. After that, loosen the adjustment nut by turning it to the left until the wheel is just able to rotate freely again. You can use a plastic hammer to tap lightly on the brake drum or wheel to allow the brake shoes to move. Repeat this procedure on all remaining wheels. The transmission linkage is only tensioned again until there is no more slack after all wheel brakes on the trailer have been adjusted/readjusted (a description of this can be found in the following pages).

**Caution: Tightening/adjusting the wheel brakes or transmission linkage too tightly can prevent the wheel brakes from rotating freely when driving in reverse! Never adjust the wheel brake using the transmission linkage!**



## Adjusting the transmission linkage

Before installing the transmission linkage, screw the brake cable assemblies of the braked axles onto the thrust bearings on the axle tube. Mount the equalizer (41) together with the brake cable assemblies. It must be ensured that the equalizer is positioned at a right angle to the transmission linkage (42) and parallel to the axle beam (43). If necessary, this must be corrected by adjusting the brake cable assembly (44). After that, fasten the transmission linkage with the fork head (45) to the reversing lever of the overrun hitch. Move the handbrake lever (46) 3 times so that the entire transmission device settles into place.

Now move the handbrake lever to the released position and tighten the tension rod (42) until there is no more play (0 to 1 mm) in the brake system. It can also be tightened using the turnbuckle (47). **The wheel brakes may not be spread open beforehand!**

All bolted connections must be secured with locknuts!

**Caution: It is not permitted to adjust the brakes using the transmission linkage (42)!**

Diagram of the transmission device in the form of a tandem axle compensation (41) with fork head (48) / also available as a single axle compensation.

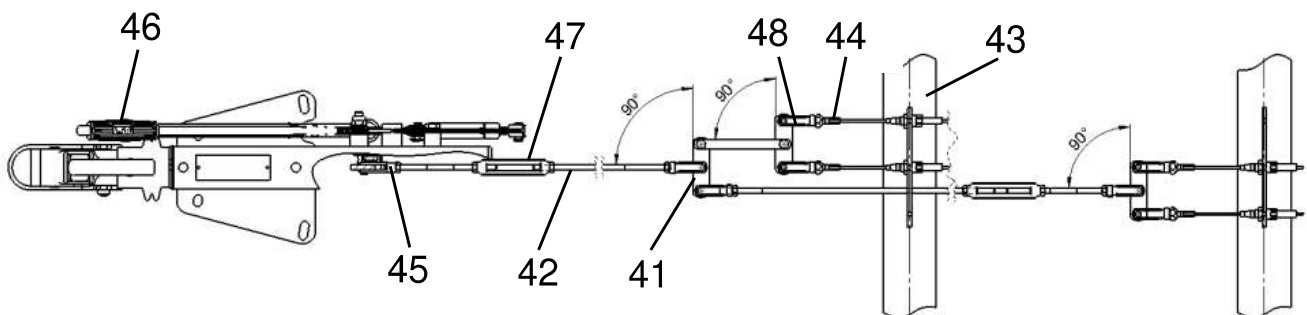
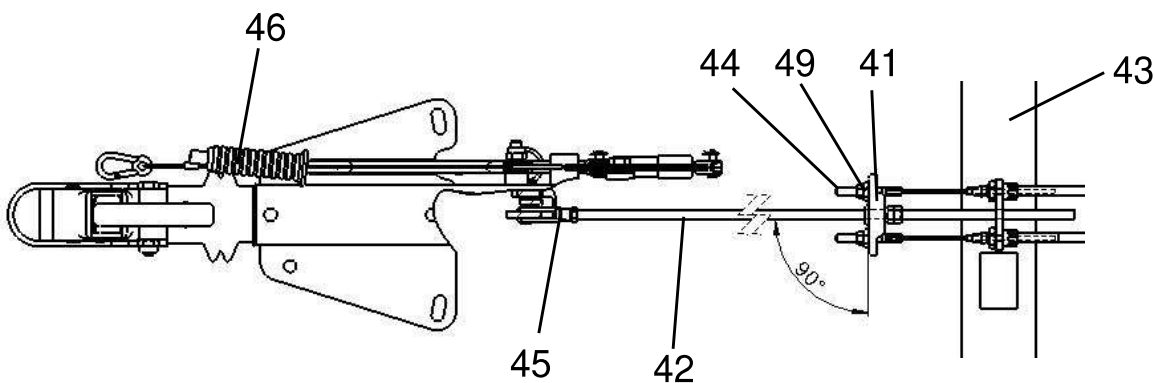


Diagram of the transmission device in the form of a single axle compensation (41) with ball nut (49) / also available as a tandem axle compensation.

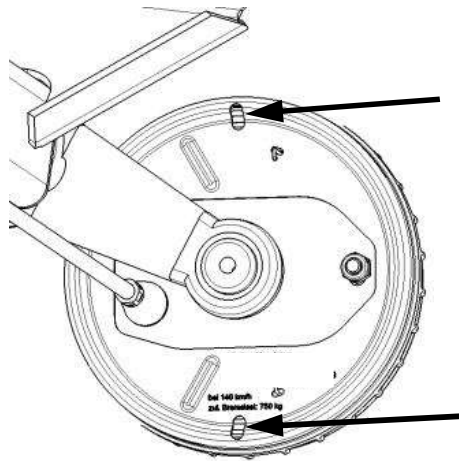


## Brake tests

For a final test of the brake system setting, brake the vehicle several times to a full stop with a load on the trailer. For brand new trailers or after replacing the brake shoes, you should drive short distances with the handbrake applied slightly. This wears the brake pads down slightly so they can achieve the optimal braking effect. The brake system has been adjusted correctly when the drawbar of the overrun hitch slides back by about half of the maximum overrun distance (40 mm) when braking heavily.

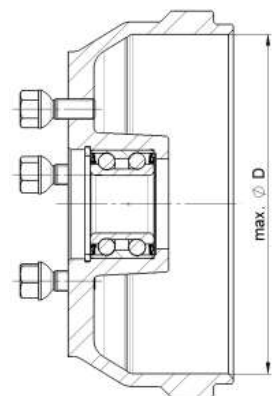
### 5 Checking the thickness of the brake pads

The thickness of the brake pads can be inspected by looking through the 2 holes on the outer edge of the brake shield.



The brake pad thickness may not be less than 1.5 mm. If they are thinner, then the brake shoes absolutely must be replaced. The brake drum should be replaced when its inner diameter is greater than the corresponding value in the follo

Brake type	Wear limit of the brake drum
W 184 RS	D max. Ø 181 mm
W 205 RS	D max. Ø 201 mm
W 234 RS	D max. Ø 231 mm
W 235 RS	D max. Ø 231 mm



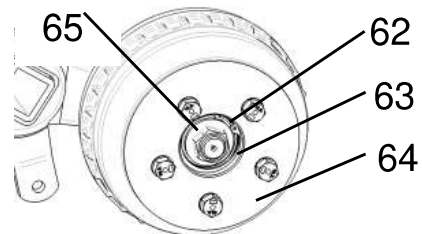
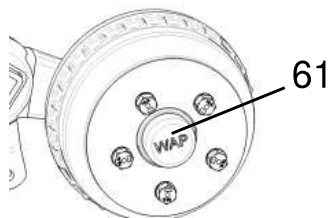
**Caution: Brake pads must be replaced as a set together with the return springs on all brakes. After changing the brake shoes, it will take some time for the braking performance to reach its maximum. For this reason, drive carefully for the first 100 km!**

## 6 Checking the play of the wheel bearings

Jack the trailer up and secure it to prevent it from rolling away. You can then release the handbrake. Check the lateral wheel bearing allowance by turning and shaking the wheels. If you can feel any play, then the bearings need to be readjusted. There are two ways to adjust the wheel bearings.

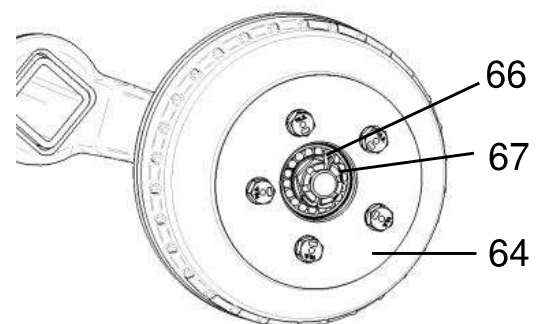
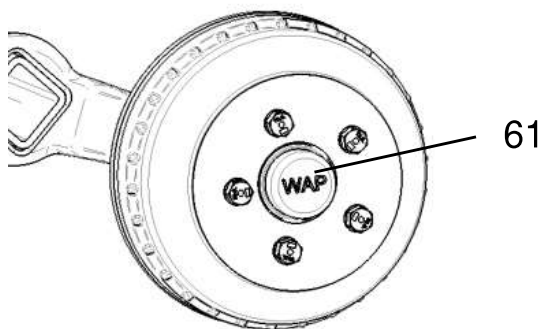
### Compact bearing

If you have an axle with model W205RS wheel brakes or an axle with "ECO" in the axle designation, then the bearings are compact bearings. Remove the hub cap (61) to adjust the bearing. You can now see the compact bearing (62) under the hub cap. It is held in place in the brake drum (64) by a retaining ring (63). Tighten the axle nut to a **tightening torque of 280 Nm**. The axle nut must be replaced after it has been retightened 5 times. It is not necessary to check the bearing grease since the bearing forms a closed unit that does not require any maintenance. If an oil film forms outside of the bearing due to overheating of the bearing grease, then the bearing must be replaced.



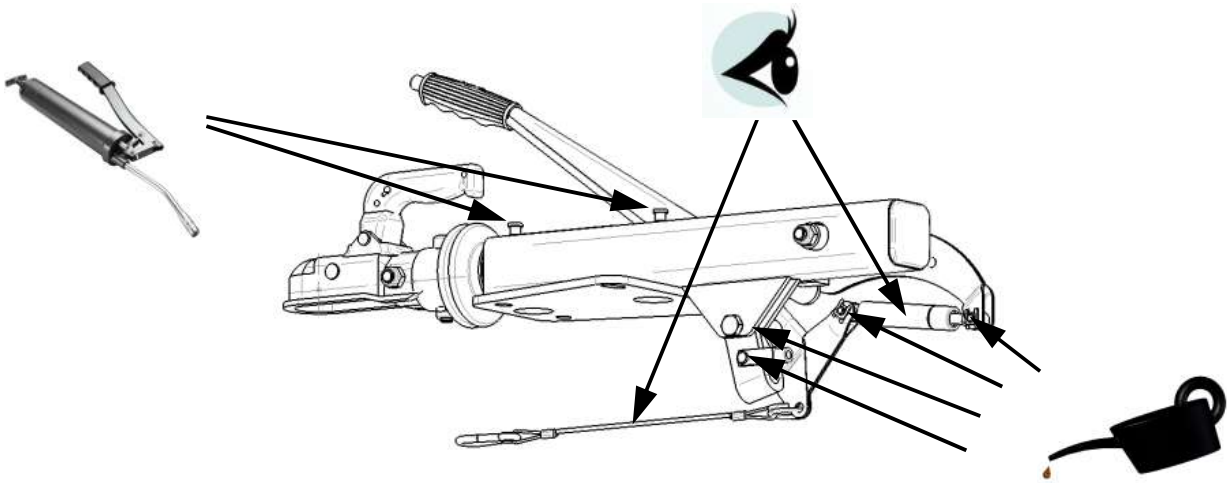
### Taper roller bearings

All other axles contain a taper roller bearing in the brake drum. It should be ensured that the grease in the hub cap and bearing is not dirty and has the appropriate consistency. Replace if necessary. Remove the hub cap (61) before adjusting the bearing. After removing the cotter pin (66), tighten the castle nut (67) until the rotation of the brake drum (64) is slightly braked. Then turn the axle nut back to the next hole available for the cotter pin (max. 30 degrees). Insert a new cotter pin and bend the ends apart. Check if the brake drum rotates freely and replace the hub cap.



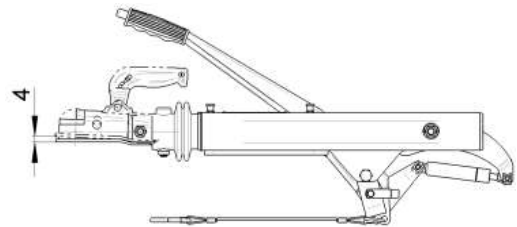
## 7 Overrun hitch

Lubricate the overrun hitch using the grease nipples provided. Check to make sure all movable parts move freely and lubricate if necessary. This also applies to the parts of the transmission device, including the brake cables. Visually inspect the breakaway cable and pneumatic spring for damage and leaks.



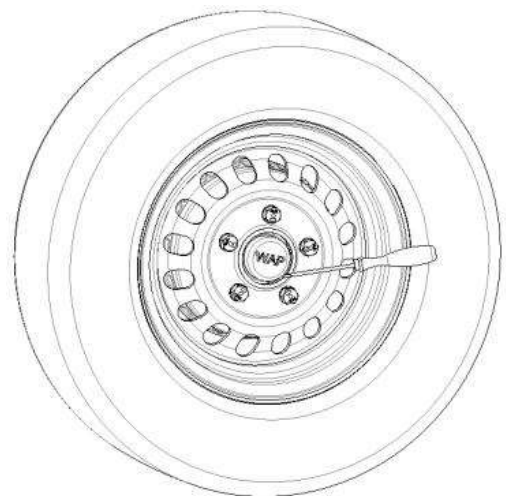
When checking the overrun shock absorber, you must put the handbrake lever in the braking position. After that, press the push rod about 30 mm into the housing of the overrun hitch. After releasing the push rod, the push rod should return automatically to its starting position.

The vertical play of the push rod is checked by moving the trailer ball coupler up and down. The vertical play may not exceed 4 mm.



## 8 Checking if the hub cap is tight

Check if the the hub cap (hub dust cap) is tightly in place using a screwdriver.



## Elimination of malfunctions

<b>Error</b>	<b>Possible cause</b>	<b>Solution</b>	<b>Eliminated by</b>
Jerky braking and handling while driving	Free travel (play) in the brake system, drawbar gets pushed in too far	Readjust entire brake system according to the operating instructions	Specialist workshop
	Drawbar can be moved back and forth manually without any resistance	Shock absorber is defect and must be replaced	Specialist workshop
Braking effect is too low	Free travel (play) in the brake system, drawbar gets pushed in too far	Readjust entire brake system according to the operating instructions	any
	Transmission linkage difficult to move, gets caught and/or jammed	Free up the transmission linkage, grease/oil all movable parts	any
	Brake cable assemblies jam or are bent	Oil/grease the brake cable assemblies and replace any bent brake cable assemblies	any
	Drawbar of the overrun hitch is too difficult to move	Lubricate the drawbar according to the operating instructions	any
	Brake shoes are worn, oily, or greasy	Replace the brake shoes, possibly including replacement of the wheel bearing seal	Specialist workshop
Uneven braking effect	Wheels brake unevenly	Readjust the wheel brakes and transmission linkage according to the operating instructions	any
	One brake cable assembly too stiff or damaged	Oil/grease the brake cable assemblies and replace any bent brake cable assemblies	any
	Brake shoes in one wheel brake are worn, oily, or greasy	Replace the brake shoes on both sides	Specialist workshop
It is difficult to push the vehicle back	Transmission linkage too stiff	Readjust the transmission linkage according to the operating instructions	any
	Wheel brake is set too tight	Readjust the wheel brake according to the operating instructions	any
	Brake cable assemblies jam or are bent	Oil/grease the brake cable assemblies and replace any bent brake cable assemblies	any
	Spring cup package in the wheel brake is jammed and will not release	Lightly oils/grease the spring cup package	Specialist workshop



## Service interval record

### Inspection after 500 km

Date:

Company stamp:

### Inspection every 5000 km or annually

Date:

Company stamp:

### Inspection every 5000 km or annually

Date:

Company stamp:

### Inspection every 5000 km or annually

Date:

Company stamp:

### Inspection every 5000 km or annually

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