

WAP™

Fahrzeugtechnik GmbH

WAP disc brake technology

Assembly, operating and maintenance instructions



Number MA-025
Date 22.07.2010

Please read this operating and service manual before starting the vehicle. It forms part of the warranty conditions.

Table of contents

Operating instructions	3
Handling	4
Descriptions	5
Characteristics	
Components of the complete brake system	
Mode of action	
Checking the overrun shock absorbers	
Drawing	7
Assembly and instructions for adjustment	8
Installation of the brake system to the vehicle	
Adjustment/readjustment of the disc brake	
Brake tests	
Maintenance instructions	10
Maintenance works ball-head hitch	11
Elimination of malfunctions	12

Operating instructions:

Before every trip:

- Do not overload the vehicle. The maximum permitted total weight and support load must be strictly adhered to.
- Make sure the load is fastened adequately. Avoid overloading at one side by incorrect loading. Mount the load as low above the axle(s) as possible. The load must be secured in accordance with legal requirements.
- Check tyre pressure / tyre condition / wheel mounting.
- Check the position of the ball hitch (towing eye). The ball hitch must fully enclose the ball of the towing vehicle and be locked in place.
- Fasten the breakaway cable at the towing vehicle.
- Raise jockey wheel fully upwards and secure. The carrying wheel should be aligned parallel with the direction of travel.
- Release the handbrake.
- Check the function of the lighting system.

We wish you a pleasant ride!

During every trip:

Avoid overstrain caused by irresponsible and inappropriate driving. Avoid shock and impact loads on the axle(s). Adjust your driving speed to load and road conditions.

After the first trip (details on page 8):

- Check with a torque wrench that the wheel bolts are tightly fitted.
- Check braking system and readjust as required.

Important notes:

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

When installing spare parts it is strongly recommended to only use original WAP-parts. If products of other manufacturers are used, the product liability and warranty becomes void.

The repair of defects or the exchange of worn parts should be assigned to a specialist workshop.

Handling

Coupling:

Lift the handle to open the ball coupling. Place the so opened hitch on the ball of the towing vehicle and release the handle. After this allow the handle to automatically slide back in its original position. With this the hitch is locked and automatically secured.

Caution: After locking, the wear indicator at the side must indicate "OK" or "+". The ball head should no longer be visible when coupled, but must be enclosed by the coupling.

Connect the electrical lighting plug to the towing vehicle and check the lighting.

Raise jockey wheel fully upwards and secure.
Release parking brake before setting off.

Note: The handle of the ball hitch and the handbrake lever must not be used as a manoeuvring aid. There is a risk of damage to the internal components, proper function can be impaired by this.

The maximum bearing load of the ball hitch must be strictly adhered to. A minimum bearing load of 25 kg should be given. Negative bearing load is not permitted.

Uncoupling:

Disconnect breakaway cable and electrical lighting plug.
Release and lower the jockey wheel.
First lift handle of the ball hitch, then lift forwards.
Lift the hitch of the ball or lift out with the jockey wheel.

Caution: The trailer must be secured with chocks or by activating the parking brake!

Descriptions

Characteristics

The **WAP** disc brake system has been certified in accordance with EC regulation 71/320 in its current adjustment regulation 98/12, and its design has been approved for driving speeds up to 140 km/h.

The **WAP** disc brake system is the sole overrun disc brake with operates mechanically only. Thus the handling by the user is as easy as with the well known drum brakes.

Components of the complete brake system

The complete brake system is composed of the overrun hitch (A), available optionally as flange or drawbar with towing eyelet, the transmission device (B) and the disc breaks (C), which are attached optionally to rubber suspension, torsion bar or a coil spring axles (D). These components form a well coordinated unit. Combinations with components of other manufacturers are only possible after prior consultation with **WAP** and require our approval. If required, **WAP** will issue calculations assessing that the brake system matches the characteristics of a trailer, which may have to be presented at the vehicle registration office.

Mode of action

Forward travel

When braking the towing vehicle, the trailer rises with the towing vehicle. Thus the push rod (1) of the overrun device will slide into the housing (2). The drawbar, embedded in the housing with two bushes, pushes so with its back end on the reversing lever (3) embedded in the housing. Through the resultant turning of the reversing lever the compressive force is transmitted by the transmission device (usually rods) at the lower end of the reversing lever to the equalizer (4) of the disc brake. From there the overrun force is transmitted by the cable assembly (5) of the disc brake to the clamping levers (6), which have a reverse effect. These clamping levers affect a cylindrical sliding element (7), which presses the internal brake shoe (8) against the friction plate (9). Simultaneously the external brake shoe (10) is pressed against the friction plate via the float frame.

Backward travel

The sliding of the drawbar into the overrun hitch when travelling backwards creates a transmission as described above. By means of the opposite rotary direction, the brake shoe pressed against the friction plate is moved in rotary direction of the wheel. The articulated lever (11), which joins the sliding element and the internal brake shoe, drops sideways over its outer mounting points. Thus the application distance runs out. The braking effect is reversed. When subsequently travelling forward, the brake shoes will return to the original position by the recoiling spring (12).

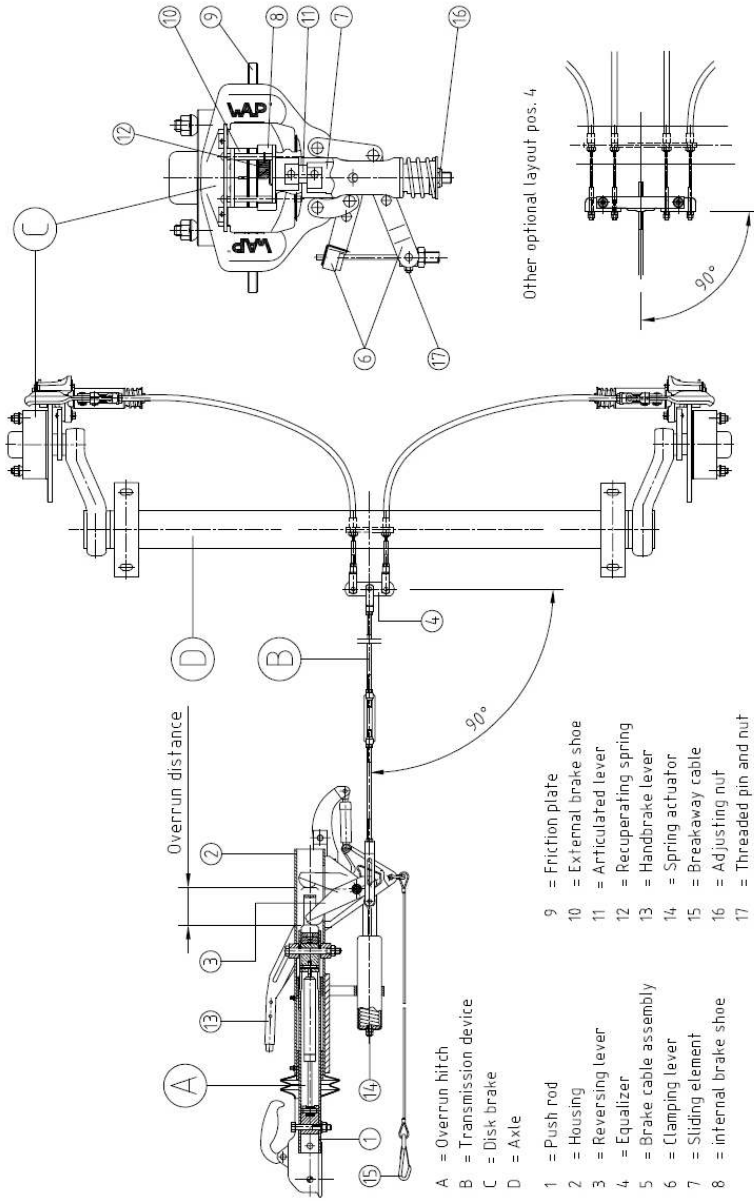
Parking brake / security brake

Owing to the greater application distance of the parking brake (13) in comparison with the service brake, the internal braking shoe also engages with the brake shoes when in reverse. For this purpose the handbrake lever (13) has must be fully pulled. By this a braking effect, as described before, can be achieved again. Also, by pulling the handbrake lever the spring actuator (14) embedded in the brake linkage also gets prestressed. Hence an unintentional releasing of the brakes in down gradient can be avoided. In this case the spring actuator loosens and readjusts the braking force. Before the trip, the breakaway cable (15), which is fitted to the handbrake lever, must be connected with its strap to the hitch hook of the towing vehicle. In the event of the trailer disconnecting from the towing vehicle, the breakaway cable will be activated through the parking brake.

Checking the overrun shock absorbers

The ball hitch together with the push bar has to be pushed into the housing, after the relief the push bar must move forward on its own and extend into normal position.

Drawing



Assembly and instructions for adjustment

Installation of the brake system to the vehicle

- a. Mount overrun hitch and axle(s) to the chassis.
- b. Mount brake cable assembly (5) in the clamping levers (6) and fix by bolt and nut (17).
- c. Screw together brake cable assemblies of the axles in the thrust bearing (welded to the axle tube).
- d. Assemble equalizer of the transmission linkage with the brake cables.
- e. Join transmission linkage with the reversing lever of the overrun hitch by using the fork head.
- f. Pull handbrake lever to the second notch.
- g. Tighten the clamp lock of the transmission linkage to the extent to obtain a clearance of max. 2 mm within the brake system. **When doing this the spring actuator must not be prestressed by any means.** Secure clamp lock with hexagon nut against detachment.

Caution! Make sure all equalizers are at right angles to the transmission linkage (see page 7).

Adjustment/readjustment of the disc 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 release position. Secure vehicle with chocks. Release transmission device by opening the clamp lock. Jack up the wheel. Move the adjustment nut (16) to the right by constantly rotating the wheel in forward direction until the wheel is tightened. Through this the two brake shoes get centred onto the friction plate. Consequently re-release the adjustment nut until the wheel is just running free again. Repeat procedure in the same way for remaining wheels. Only after all disc brakes at the trailer have been adjusted/readjusted, the transmission linkage will be refastened until a clearance of max. 2 mm is achieved.

Caution! A too right adjustment/readjustment of the disc brakes and/or the transmission linkages and/or the spring actuator impairs the mobility of the brakes during reversing. Never readjust the brake system only through the brake linkage. Always first readjust the disc brakes as described, then restress the transmission.

Brake tests

For a final check of the brake system setting, some brake stops with the loaded trailer should be performed. As for brand-new trailers, or after exchange of braking shoes, short distances with a lightly applied handbrake should be driven. This way the brake shoes get slowly worn in and adjust to the braking surface and friction plate. The setting of the brake system is correct if the drawbar of the overrun hitch slides back by about half of the maximum overrun distance (usually 80 mm) when braking heavily.

Maintenance instructions

	After the first 50 kilometres	Every 3000 driven kilometres or annually
Check wheel bolts for firm seating. (tightening torque 95 Nm)	⊗	
Check brake lift clearance, adjust if necessary.	⊗	⊗
Lubricate drawbar-bearing at the overrun hitch at the grease nipples provided for this purpose.		⊗
Check all movable parts for mobility and grease or oil if necessary.		⊗
Check wheel bearing allowance. For brake axles with up to 1500 kg axle load, the axle is equipped with a compact bearing. This does not require regreasing or readjustment.		⊗
Check brake wear. The shoes should be replaced at a layer thickness of at least 3 mm.		⊗
Check hub cap for firm seating.		⊗
Check tyre wear.		⊗

General information

Do not clean the disc brake with a high-pressure cleaner. Should this undertaken, all parts must be regreased and/or oiled. It must be checked whether the wheel bearing gaskets are still functioning. After contact with saltwater or chemical cleaning products, we recommend to rinse all brake parts with fresh water.

Maintenance works ball-head hitch:

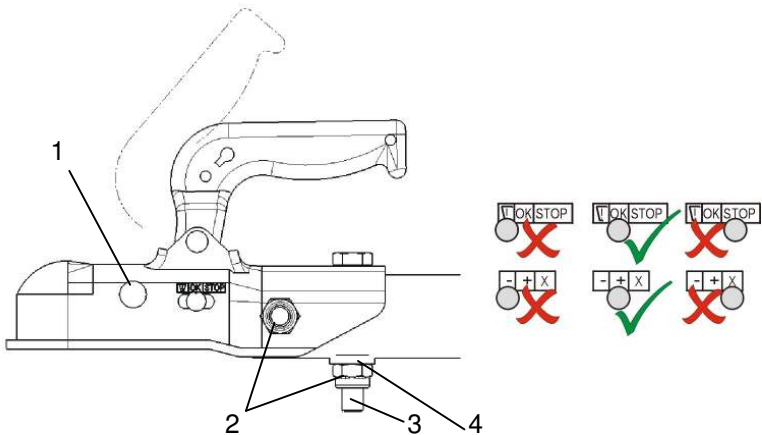
Oil the movable parts of the ball hitch in regular intervals.

Perform function test.

Check ball coupling for wear and dirt.

The wear indicator must be within the "OK" or "+" range when engaged.

Check screw joints for firm seating.



Disassembly:

Unscrew locking nuts (2), pull out screws.
Remove coupling.

Assembly:

Push back shock absorber holder, mount ball hitch and bring hole in the drawbar in line with the hole in the ball hitch.
Assemble ball hitch with screws (3), half round plate (4) and self locking nuts (2).

Caution: Only use new locking nuts (2).
Tightening torque of ca. 80-90 Nm required.

Elimination of malfunctions

Error	Possible reason	Elimination
Jerky braking and driving behaviour	Empty run (brake slack) in the brake system, pulling rod slides back too far	Readjust complete braking system following operating manual
	Pulling rod can be manually moved back and forth without any resistance	Shock absorber is defect, has to be replaced
Braking effect is too low	Empty run (brake slack) in the brake system, pulling rod slides back too far	Readjust complete braking system following operating manual
	Transmission linkage too stiff, hooks and/or jams	Free transmission linkage, grease/oil all movable parts
	Brake cable assemblies jam or are bent	Oil/grease brake cable assembly, replace bent brake cable assembly
	Pulling rod of the overrun hitch is too stiff	Lubricate pulling rod according to operating manual
	Brake shoes are worn, oily or clogged	Replace brake shoes, maybe replace wheel bearing gasket
Uneven braking effect	Wheels brake unevenly	Readjust wheel brakes and transmission following operating manual
	One brake cable assembly too stiff or damaged	Oil/grease brake cable assembly, replace bent brake cable assembly
	Braking shoes at one wheel brake are worn, oily or clogged	Replace braking shoes on both sides
It is difficult to move vehicle back	Transmission linkage too stiff	Readjust transmission linkage following operating manual
	Wheel brake fitted too tightly	Readjust wheel brake following operating manual
	Brake cable assemblies jam or are bent	Oil/grease brake cable assembly, replace bent brake cable assembly
	Sliding element in caliper jams, does not release	Mobilise and grease/oil if necessary