



CARAVAN CHASSIS

**HANDBOOK FOR VEHICLES ON
THE AL-KO CARAVAN CHASSIS**

AL-KO CARAVAN CHASSIS

GENERAL INFORMATION

The AL-KO lightweight chassis has been perfected by many years of research and development, supported by an exhaustive test programme.

Manufactured from high quality steel, the chassis has extra deep sections to provide strength at points of maximum stress. Large elongated holes are punched in the longitudinal chassis members, to reduce weight to a minimum. Each hole incorporates a return flange to maintain the required strength and provide rigidity in the extra deep sections.

The chassis frame is of a bolted construction which allows replacement of individual parts should the need arise.

AL-KO Chassis and axles are manufactured with the fixing positions for a range of chassis accessories already included. Some of these accessories are included as standard from the vehicle manufacturer and are positioned for correct and safe usage of these products.

For further details on the range of accessory products that can be fitted and used with the AL-KO Chassis, please refer to the Accessories section at the rear of this document, pages 37 - 43.

AL-KO does not recommend the removal of standard fit accessory products to allow fitment of third party products and cannot be held responsible should the removal and subsequent fitment of third party products causes damage to the chassis components. The process of fitting third party products to the AL-KO Chassis therefore may invalidate the chassis warranty.

AL-KO CARAVAN CHASSIS

HOT DIP GALVANISATION

The chassis is Hot Dipped Galvanised. This is regarded as one of the best forms of corrosion protection. **It does however require minimal maintenance in certain circumstances.**

When new, the chassis is of a bright and shiny appearance. As the galvanising cures during the initial 2/3 month period, this will gradually change to a medium/dark grey colour. This grey finish is the ideal, giving the correct protective coating. During this curing period the surface should be protected to avoid possible **wet storage stain**, in the form of a soft, light coloured, porous, oxidation layer. If the chassis members are in contact with any salt deposits from roads this should immediately be washed off with a high pressure washer. Salt attracts moisture allowing the surfaces to remain wet, this prevents curing and also allows formation of wet storage stain.

It is recommended that the chassis/ components are washed off, using a pressure washer on an annual basis (especially after winter usage), to avoid undesirable build up of salt and dirt deposits.

The galvanised chassis should not be painted or subjected to any other protective treatment.

Should the galvanising become superficially damaged exposing the steel core, this should be cleaned and treated with a **Cold Galvanising Spray** obtainable from vehicle accessory outlets.

Damage to chassis members through impact etc, **MUST NOT** be straightened or welded. Damaged chassis members **MUST** be replaced.

AL-KO CARAVAN CHASSIS

DRILLING OR WELDING OF PARTS OR ACCESSORIES

The chassis is designed and built to precise tolerances and **must not** be drilled or welded (except in accordance with certain AL-KO Accessory Operating Instructions). Failure to comply **will invalidate all warranties**.

INDEPENDENT SUSPENSION

The AL-KO rubber suspension is designed and developed to suit all types of road conditions and is maintenance free. Three rubber elements are contained within a hexagonal axle tube. These provide suspension and have inherent damping characteristics. (Only the hubs and wheel brakes require attention - see axle section).

LOADINGS ON COUPLING HEADS, OVERRUN ASSEMBLIES AND AXLES

The permitted 'nose' weights of the coupling head/stabiliser, overrun assembly and drawbars, **must never exceed** the lowest value stamped on the assemblies.

The maximum axle loading is that stamped on the plate located in the centre of the axle, facing rearwards. The plate will be one of the three shown below - Figs 1, 1a and 2, depending on date and location of manufacture. The line marked 'Capacity' (on German plates 'Achlast') is **the maximum permitted axle loading and must not be exceeded**.

Where the Caravan Manufacturer states a maximum loading weight, then **this is the maximum permitted load**. This figure **must not exceed the maximum axle load**.

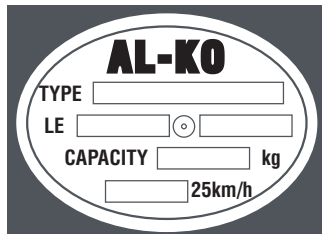


Fig 1 Axle Identification Plate



Fig 1a New Axle Identification Plate



Fig 2 Axle Identification Plate (German)

AL-KO CARAVAN CHASSIS

LOADING

Loads to be carried in the caravan should be placed directly over, or as close as possible to the axles, otherwise the handling will be impaired.

Maximum gross weight, as advised by the caravan manufacturer, must not be exceeded without approval from AL-KO.

Maximum loading is defined as the difference between ex-works weight and the permitted total weight.

Attention should be paid to the legal regulations regarding the permitted pressure exerted by the towbar on the towed unit.



Fig 3 Load Too Far Forward

Steering and braking ability reduced. Increased loading on the rear axle and chassis of the tow vehicle.



Fig 4 Load Too Far Back

High skid risk together with poor braking effect.



Fig 5 Load Over Axle

Optimum road holding together with maximum braking effect. Exceptionally heavy loads should be packed directly over the axle.

AXLE TYPES

SAFETY PRECAUTIONS

No welding is permitted on AL-KO Axles.

It is important that the wheel and hub/brake drum are compatible. This means that the PCD, wheelbolts and inset must all be compatible with both the hub/brake drum and the wheel rim. Particular attention must be paid to the recommended torque figures for the wheelbolts (page 16).

The axle type details shown on axle type plates must not be obscured or made illegible by application of any additional surface finish.

OPERATING INSTRUCTIONS

Service Brake

When the towing vehicle is braking or travelling down hill, the overrun device shaft is pushed in (dependent on the magnitude of the thrust on the shaft) and presses on the overrun lever. This acts on the Bowden cables and expander mechanism, which in turn expands the brake shoes applying the wheel brakes.

Reversing

When the towing vehicle is reversing, the overrun device shaft is pushing in, applying the brakes via the overrun lever, brake rod system, Bowden cables and the expander mechanism. The backwards rotation of the brake drum causes the secondary brake shoe to collapse cancelling out the braking effect, allowing the trailer to move backwards. At the same time the transmission lever swings back and compensates for the entire travel.

Hand Brake

With the Euro Hand Brake, pull the lever until upright. The caravan is then braked.

IMPORTANT NOTE

Please note that with the handbrake fully applied, the caravan/trailer is able to move backwards by 25 cm until the spring cylinder/gas spring takes effect.

AXLE TYPES

MAINTENANCE AND CLEANING

Maintenance of Euro-Plus/Euro- Compact and Euro-Delta.

The above semi-trailing axles come fitted with maintenance free wheel bearings (greased and sealed for life) and no adjustment is necessary.

NOTE

The hub bearing is not protected against water ingress. Check wheel brake linings for wear every 10,000 kilometres or every 12 months via the inspection hole (Fig 6/Item 1).

Adjust if necessary. Where continuous travel in hilly regions or high mileage is experienced, earlier inspection and adjustment may be necessary.

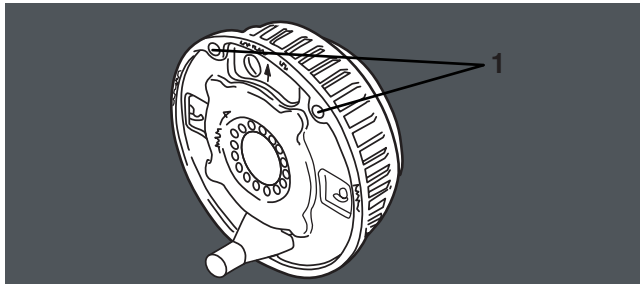


Fig 6 Checking wheel brake linings for wear via inspection holes

NOTE

The flanged hub-nut, located under the dust cap, used to keep the brake drum in situ, is a ONE-SHOT NUT (ie. must only be used once). If removed it must be replaced with a NEW flanged nut - torqued to 290 ± 10 Nm (214 ± 7.5 lbs/ft). A small amount of special mineral grease, available from AL-KO must be applied to stub axle thread prior to fitting the new flanged nut. After fitting excess grease must be removed with white spirit.

The rear hexagon cap head bolt **MUST NOT BE DISTURBED** under any circumstances. Interference with this nut will result in immediate tyre wear and damage to the braking system and **WILL INVALIDATE ALL WARRANTIES**. Should the rear nut accidentally be disturbed then the complete axle must be returned to AL-KO for resetting of the toe-in and camber.

No attempt should be made to remove the bearing. In the event of damage to the bearing or drum, only the drum complete with bearing and circlip will be available as a spare. No grease is used in the hub other than the mineral grease on the stub axle. No grease should be placed in the DUST cap. This is not a grease cap as used in all previous hubs

AXLE TYPES

'STANDARD AXLE' MAINTENANCE (TAPER ROLLER BEARINGS)

After 1500 km or 6 months

Have the axial play of the hub bearing checked and adjusted if necessary.

After 10,000 km or 12 months

Check quantity and quality of grease, renew if necessary.

With boat trailers which are driven into fresh/salt water, the hub bearing should be regreased shortly after contact with the water (with the exception of waterproof hubs). Check the wear of the wheel brake linings every 10,000 km or every 12 months through inspection hole (Fig 6) and adjust if necessary. Where continuous travel in hilly regions or high mileage is experienced, earlier inspection and adjustment may be necessary.

STANDARD AXLE MAINTENANCE (SEALED FOR LIFE BEARINGS)

AL-KO Wheel Hubs are fitted as standard with Sealed For Life bearings which are maintenance free.

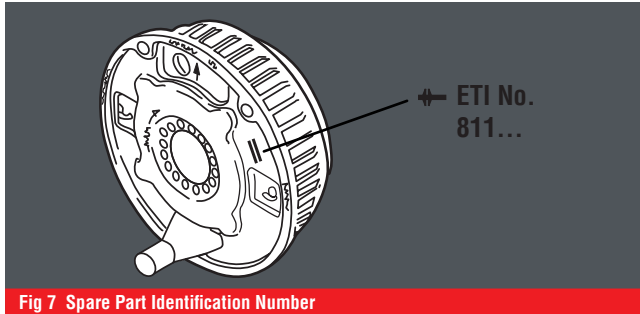
SPARE PARTS

Spare parts are safety critical parts! For this reason when fitting spare parts in our products we recommend the use of original AL-KO parts or those parts that we have explicitly approved. The reliability, safety and suitability of parts designed especially for our products, has been determined using a special test procedure. In spite of constantly monitoring the market we are unable to assess or vouch for other products.

If repair work or servicing is required, AL-KO have a large network of AL-KO service stations throughout Europe.

To establish the correct spare parts required for your axle you should always quote the axle type (axle identification plate Figs 1/2) and Spare Part Identification no. (ETI No.), which will be stamped onto the wheel brake or identification plate (Fig 7). Please establish these numbers before contacting AL-KO or a Service Agent.

AXLE TYPES



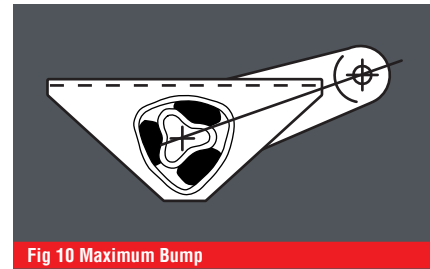
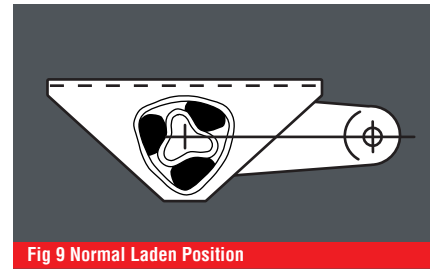
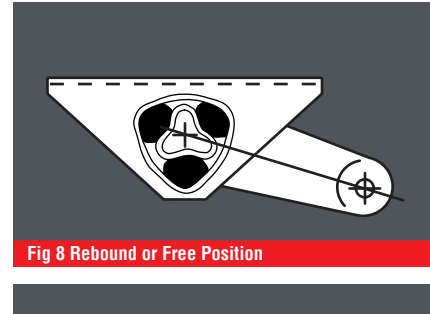
The AL-KO rubber suspension axle has been designed & developed to suit all types of road conditions and is maintenance free.

Three rubber elements are contained within an hexagonal axle tube. These provide suspension and have inherent damping characteristics.

Figs 8, 9 & 10 show the deformation of the rubber elements at the extremes of suspension movement.

The axle is designed to ride with the suspension drop arm at, or slightly below, the horizontal position.

For Trouble Shooting & Fault Finding see Table 1 on page 44.



AL-KO BRAKING SYSTEM ADJUSTMENT

1. Ensure the towing shaft with coupling head is pulled FULLY FORWARD. (Fig 11).
2. Release the handbrake to the FULLY OFF position. If the handbrake will not go down the whole way because of the fairing or any other obstruction; then the fairing must be cut away and/or the obstruction removed to achieve this desired position. It will not be possible to set up the braking system properly when the handbrake is not in the FULLY OFF position. (Fig 11).
3. Jack up one side of the caravan, using the AL-KO Side Lift Jack System. (See Jack Operating Instructions).
4. Remove the inner plastic bung from the backplate to expose the 'starwheel' adjuster access. (Figs 11 & 12).
5. ALWAYS rotating the road wheel in the forward direction - NEVER backwards; adjust the starwheel with a suitable screwdriver, in the direction of the arrow embossed on the backplate until there is resistance in the wheel rotation. (Fig 12).
6. Slacken off the starwheel adjuster until the road wheel turns freely in the FORWARD direction. (Fig 12).
7. Check the adjustment at the end of the brake cable where it is secured to the abutment (bracket), welded to the centre of the axle. When the inner cable is pulled out it should extend between 5 and 8 mm. (Fig 13a\b). (On tandem axles a double abutment (bracket) is fitted to the front axle ONLY).
8. Repeat for other wheel or wheels.
9. On tandem axles the brake cables from the rear axle should pass over this axle and cross over each other before being connected to the abutment (bracket) on the front axle. Where ATC is fitted to a tandem axle caravan, the brake cables SHOULD NOT be crossed over.
10. Ensure the balance bar (compensator) is being pulled evenly (Figs 11 & 13a\b). Excessive movement to this bar (double on tandem axles) would indicate possible incorrect adjustment (if appropriate, repeat step No. 7 - Fig 13a\b).
11. Check the brake rod support bracket, (fixed to the floor) IS supporting the brake rod evenly. The brake rod MUST ALWAYS run straight, NEVER bent or curved under any fittings. On tandem axles, using the double balance bar, a brake rod support tube (Part No. 228827) MUST ALWAYS be fitted on the end of the brake rod, passing through the centre aperture on the abutment.

AL-KO BRAKING SYSTEM ADJUSTMENT

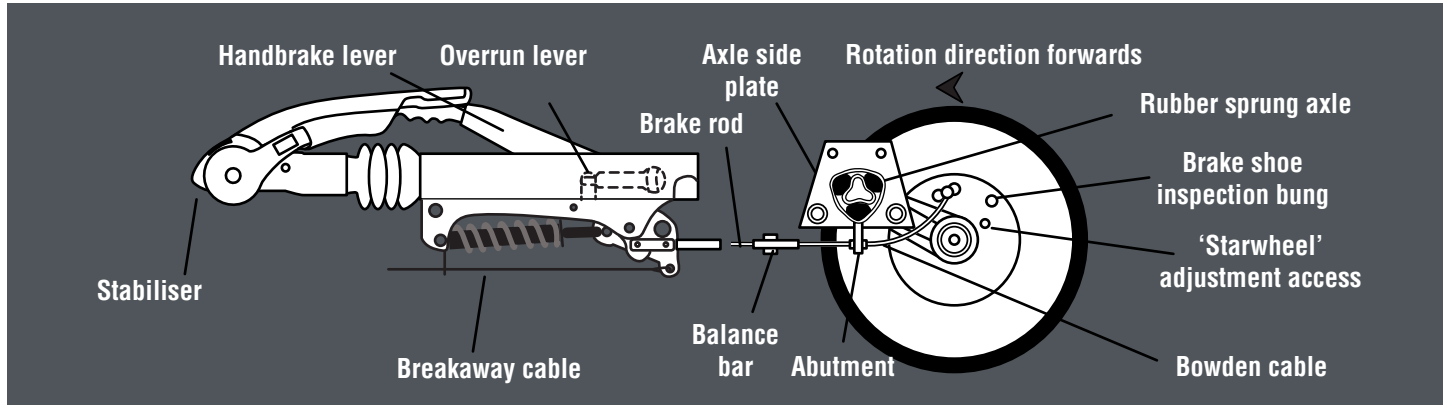


Fig 11 Brake Linkage

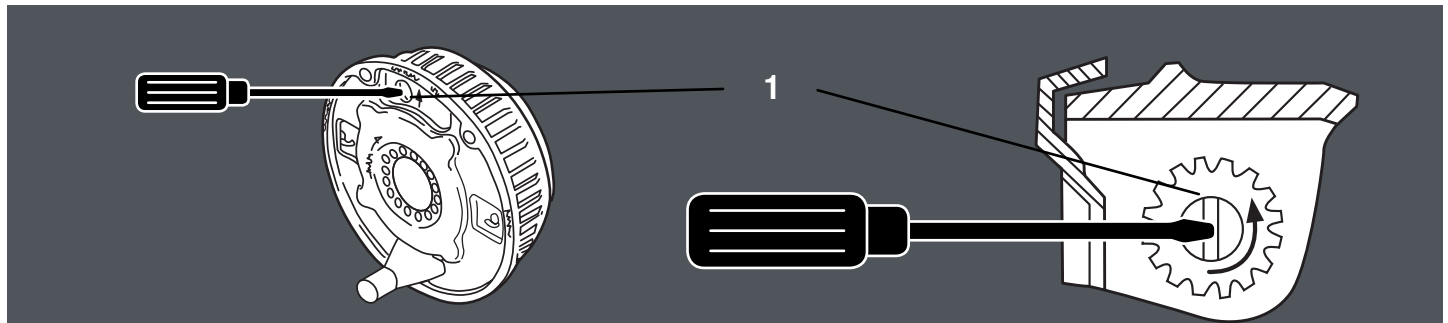


Fig 12 Adjusting the Starwheel

AL-KO BRAKING SYSTEM ADJUSTMENT

12. Remove the slack in the brake rod by adjusting the long ball nut, rear of the balance bar, ensuring the overrun lever makes contact with the end of the towing shaft.
Note! Over adjustment to the long ball nut (Fig 13/Item 2) could induce movement of the inner brake cable, reducing the effective clearance of the brake shoes. If the overrun lever will not make contact, it is possible the two lock nuts, forward of the spring cylinder, are incorrectly adjusted. Loosen the nuts and adjust brake rod as above (Figs 11, 13a\b).
13. OVER ADJUSTMENT of either the wheel brakes or linkages, will result in difficult reversing causing the wheels to 'lock-up'.
14. When parking, the handbrake lever **MUST ALWAYS** be engaged into the fully upright position (90°). If difficulty is experienced in this operation, try easing the caravan backwards with one hand while engaging the handbrake fully with the other. This manoeuvre should not be attempted on a rearwards facing slope. In this case wheel chocks should be used combined with the handbrake.
15. Finally, if the road wheels have been removed, re-tighten all M12 wheel bolts using a calibrated Torque Wrench to 110Nm for Alloy Wheels and 88Nm for steel wheels. The wheel bolts should be tightened in sequence, ie. North, South, East, West **NOT** clock or anti-clockwise (refers to steel wheels only).

Remember over-tighten is just as dangerous as under-tighten, as this can distort the wheel rims. Avoid the use of power wrenches.

IMPORTANT

The torque settings should be rechecked after 50 km. Wheel bolts should **NEVER** be lubricated.

AL-KO BRAKING SYSTEM ADJUSTMENT

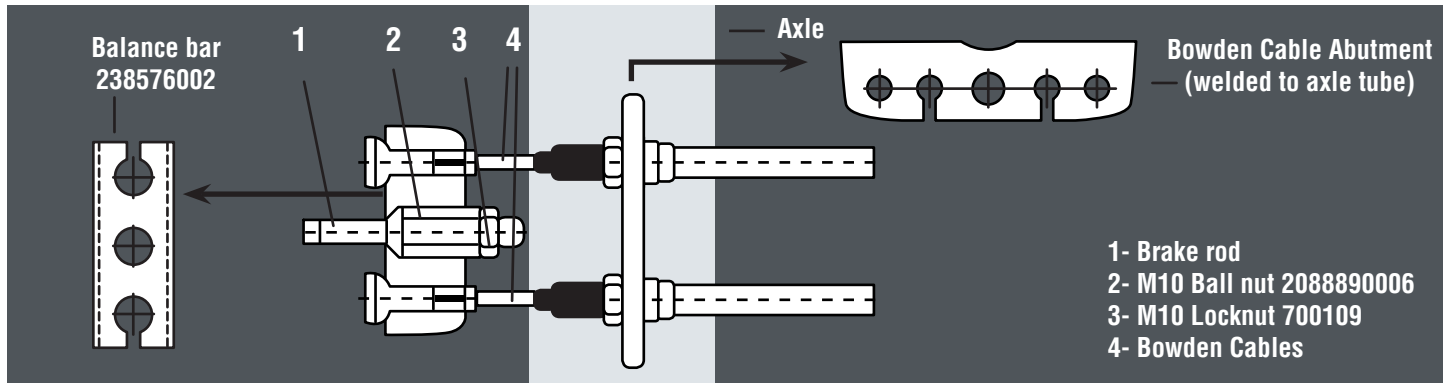


Fig 13a Standard Brake Linkage

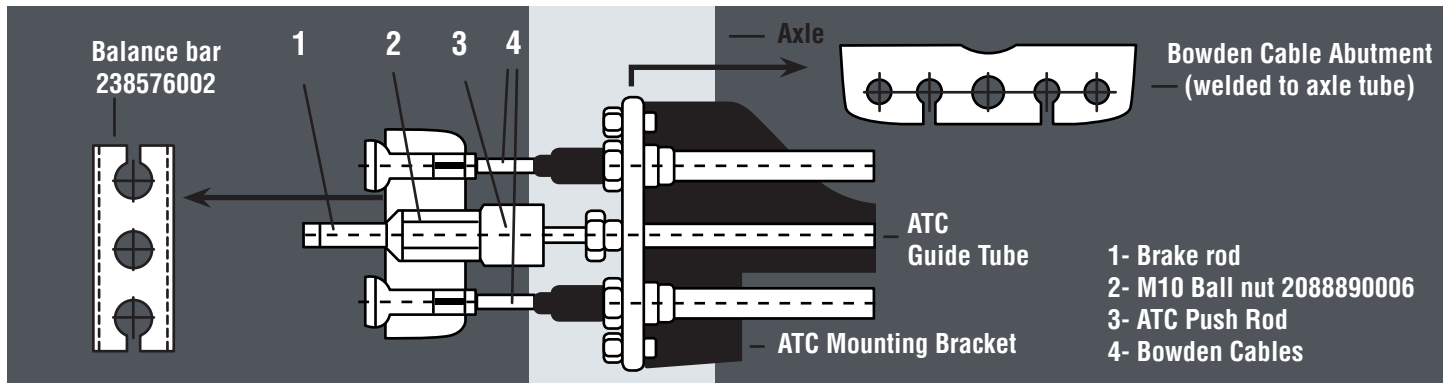


Fig 13b Brake Linkage with ATC Fitted

STABILISER AND COUPLING DEVICES

Your caravan will be fitted with either an AKS 3004 stabiliser or an AK160/300 coupling head.

SAFETY PRECAUTIONS

Always ensure that the coupling head is properly connected to the tow vehicle's towball every time you couple up. If this procedure is not carried out correctly, the caravan/ trailer may become detached from the towing vehicle! Maximum possible articulation of the coupling head must not exceed $\pm 25^\circ$ vertically and $\pm 20^\circ$ horizontally - see Fig 14.

If exceeded, components will be overloaded and the operation of the assembly adversely affected!

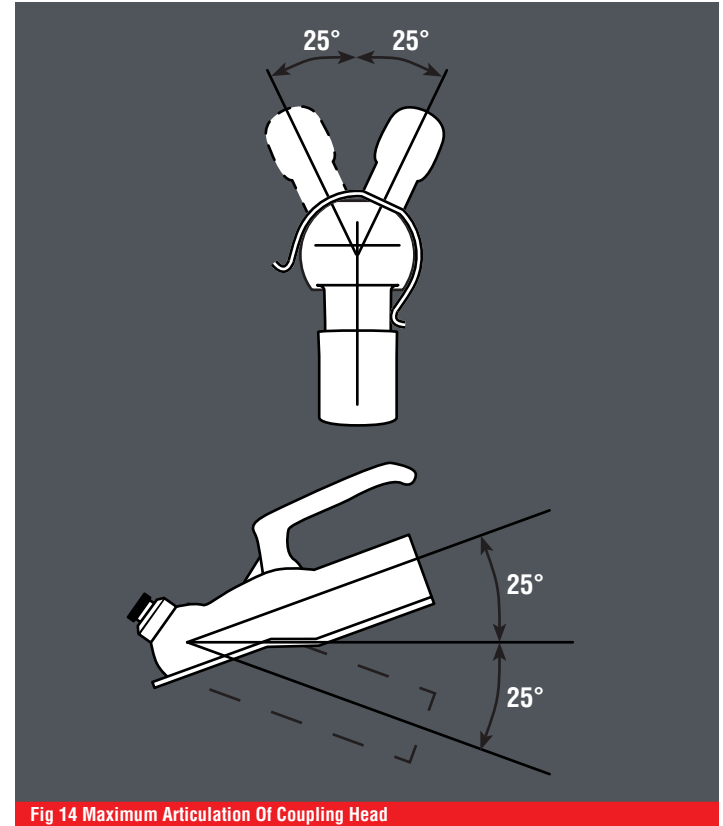


Fig 14 Maximum Articulation Of Coupling Head

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

REGULATIONS

1. The AKS 3004 must be used in conjunction with 50 mm dia. towballs which conform to EC Directive 94/20 (DIN 74058 or local equivalent).
2. Suitable for attachment to drawbars or approved overrun braking equipment for single (and tandem axle) caravan/trailers, with a minimum weight of 200 Kg and a maximum permissible weight of 3000 Kg.
3. EC design approval has been given to the AL-KO AKS 3004 coupling under permit No. e1*94/20*0930*00.



OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

RESTRICTIONS OF USE

1. The trailer coupling may only be connected to towing vehicles where the clearances for the stabiliser can be observed, in accordance with EC Directive 94/20 (DIN 74058). If these clearances are infringed by special attachments, then the use must be checked separately.

The area above the towball of the vehicle must be free from vehicle components or attachments (A) (eg spare wheels, platforms etc.)

The clearance for the stabiliser handle must be at least 330 mm (B) + the stroke movement (D) (85mm-100mm), which equates to 440 mm when used in conjunction with an AL-KO overrun.

Max. 50 mm (C) clearance between the centre of the towball and top of the overrun assembly or fairing, to ensure both coupling handle and stabiliser handle do not foul on operation.

Maintain the same clearances for other manufacturers' overrun assemblies.

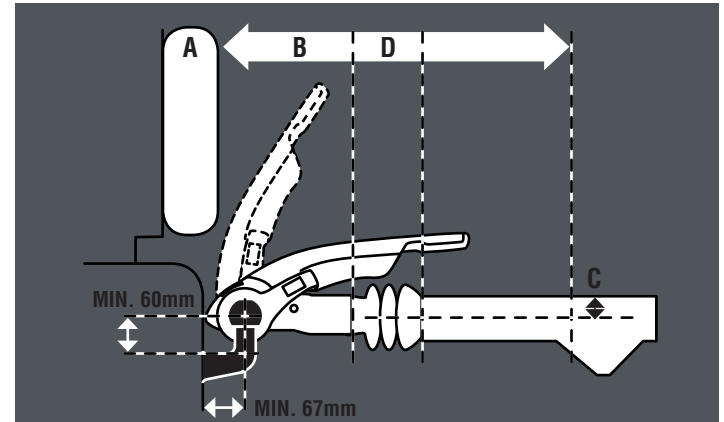


Fig 15 Necessary Clearances

2. Not suitable for use with overrun devices which can revolve above 25° (Fig 16) or BPW overruns fitted with gas strut handbrakes from 2001 model year onwards. (If in any doubt about usage consult your manufacturer).
3. Swan Neck towbars (fixed or detachable) are suitable for use with the AKS 3004 providing they comply to EC Directive 94/20 and have the required minimum 60 mm clearance, measured from the centre of the towball (Fig 16).

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

SAFETY WARNINGS

1. In accordance with EC Directive 94/20, couplings of type A 50-1 cannot be used (see Fig 17), your warranty will be invalid if this type of towball is used.
2. For UK use, use the extended neck towball (type A50-X).
3. A bolted-in type ball coupling (Fig 18) is only permissible if the thread is locked or welded.
4. The AKS 3004 cannot be used with a laterally attached reversing lever, on the left side, when facing the direction of traffic.
5. The towball must be free from grease, paint and other residue, otherwise the stabilising effect is greatly reduced.
6. If friction pads become contaminated with grease, they should be replaced.
7. The AKS 3004 should only be operated by one person, when opening or closing the handle, to reduce injury risks.

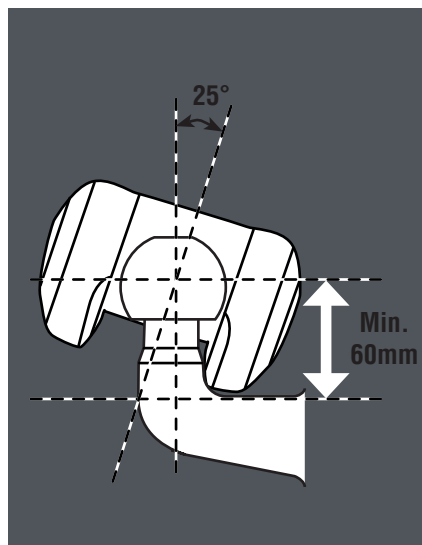


Fig 16 Max suitable rotation of overrun device is 25°



Fig 17 A 50-1 Couplings



Fig 18 Bolted In Coupling

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

AKS 3004 DELIVERY INSTRUCTIONS

Coupling Handle (Fig 20/Item 1)
Stabiliser Lever (Fig 20/Item 2)

PREPARATION FOR COUPLING/UNCOUPLING

The Stabiliser lever (Fig 20/Item 2) must be in the uppermost position (open).

COUPLING UP

Pull the coupling handle (Fig 21/Item 1) up in the direction of arrow. The coupling mechanism has an open position ie. as long as the AKS 3004 is not placed on the ball, the handle will remain open. Put the opened coupling onto the clean towball. The handle must now make an audible click and return to the flat position.

WARNING

The coupling is correctly engaged when the green edge of the safety indicator button is visible (Fig 22/Item 2).

STABILISER UNIT

To operate the stabiliser (once coupled to the towball), simply press the stabiliser handle down as far as it will go (Fig 22/Item 3).

To ensure the stabiliser is correctly coupled, check the arrowhead lines up with the black line marked 2 (Fig 22 /Item 4 and Fig 24/C).

UNCOUPLING

Pull the stabiliser handle up as far as it will go, open the coupling handle and lift the AKS 3004 from the towball. With larger nose loads, coupling and uncoupling can be made easier by using the jockey wheel to assist lifting.

NOTE

The friction pads (Fig 23/Items 1,2&3) are pressed against the towball and hence generate a stabilising/damping force. These pads are therefore subject to wear over time, however they will have a long service life (circa.30,000 Miles), provided they are well maintained and kept free of grease/dirt.

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

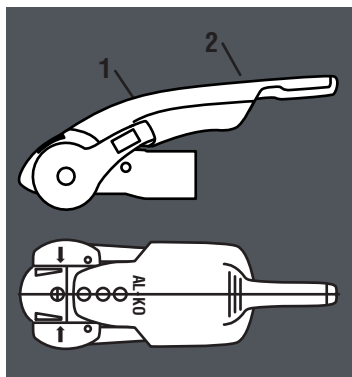


Fig 19 Coupling Handle & Stabiliser Lever

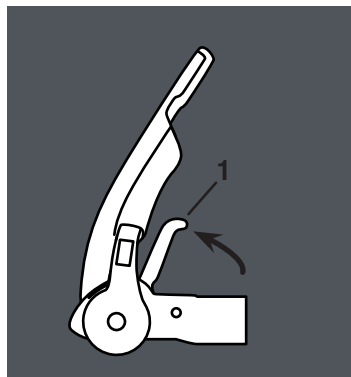


Fig 21 Pull Coupling Handle Up

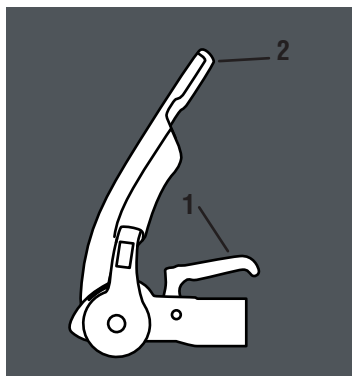


Fig 20 Raise Stabiliser Lever

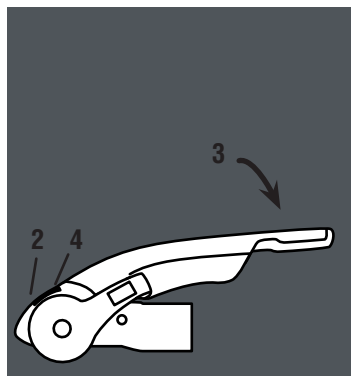


Fig 22 Correct Engagement With Towball

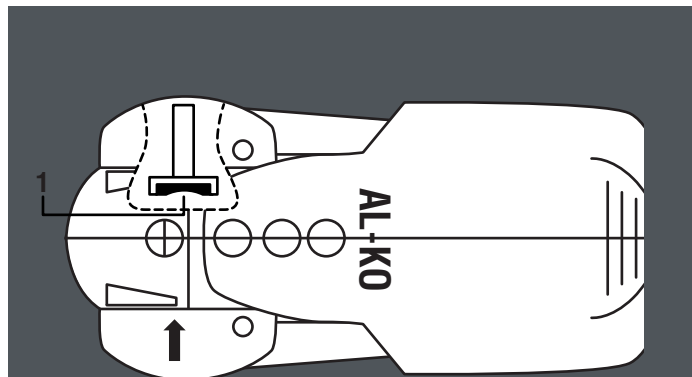
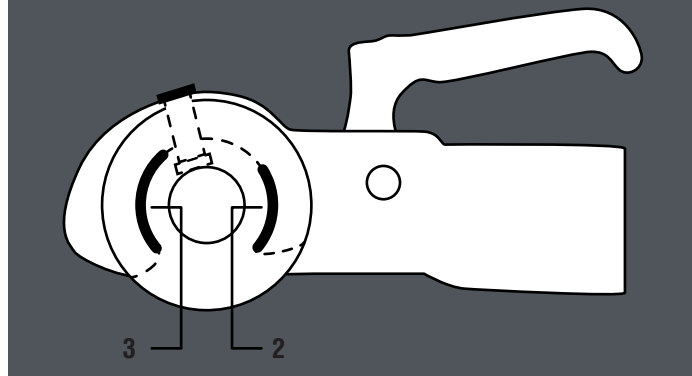


Fig 23 AKS 3004 Friction Pads



OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

CHECKING THE EFFICIENCY OF THE LEFT/RIGHT FRICTION PADS

1. Check that the stabiliser is correctly coupled by ensuring the coupling handle is fully down and the red indicator button is in the raised position.
2. Push the stabiliser handle down until resistance is felt (ie. the friction pads are in contact with the ball but not yet under pressure) (Fig 24/Item 1).
3. Check the position of the arrowhead on the arm of the stabiliser. If it lines up with the two green lines then the friction pads are still as new (Fig 24/A).
4. If the arrowhead lines up with the two red lines then the friction pads are worn and should be replaced immediately (Fig 24/B).

NOTE

When the stabiliser handle is correctly applied, the arrowhead should line up with the black line marked 2 (Fig 24/C).

NOTE

The friction pads do not require any form of lubrication and should be cleaned with a fine emery paper prior to every journey. It is not necessary to adjust the friction pads.

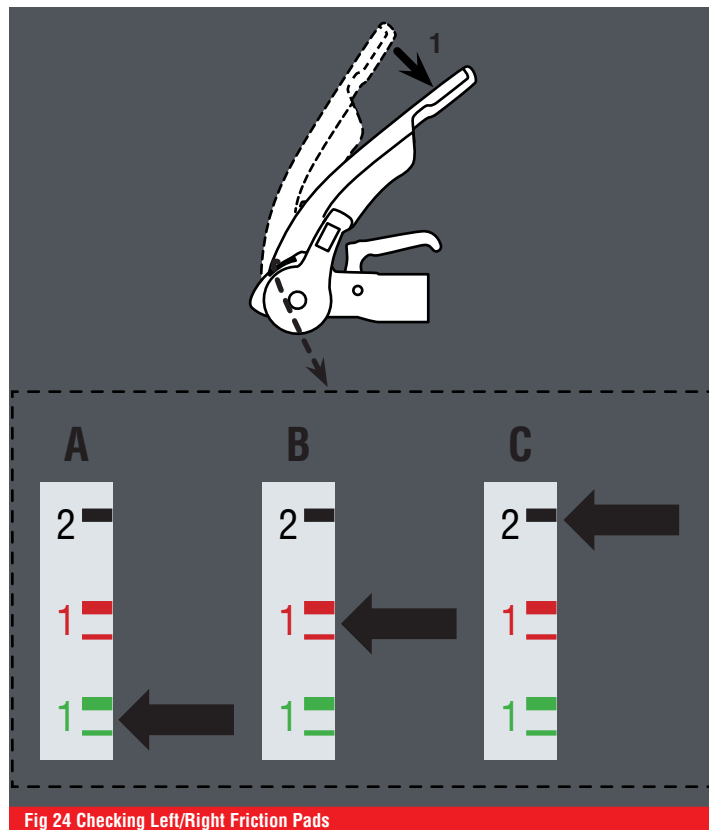


Fig 24 Checking Left/Right Friction Pads

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

MANOEUVRING

For easier manoeuvring (on campsites etc), pull the stabiliser lever to the 'up' position.

Please do not use the stabiliser lever as a manoeuvring handle. Please use the handles on the Caravan or fit the AL-KO manoeuvring handle to your jockey wheel (available separately).

1. During opening or closing, the AKS must only be operated by one person.
2. Press stabiliser lever down by hand force only **DO NOT** use your foot or an extension bar, this will damage the components (Fig 25).
3. When opening or closing the stabiliser lever, please ensure your hand does not touch the coupling handle - you may accidentally trap your fingers (Fig 25).

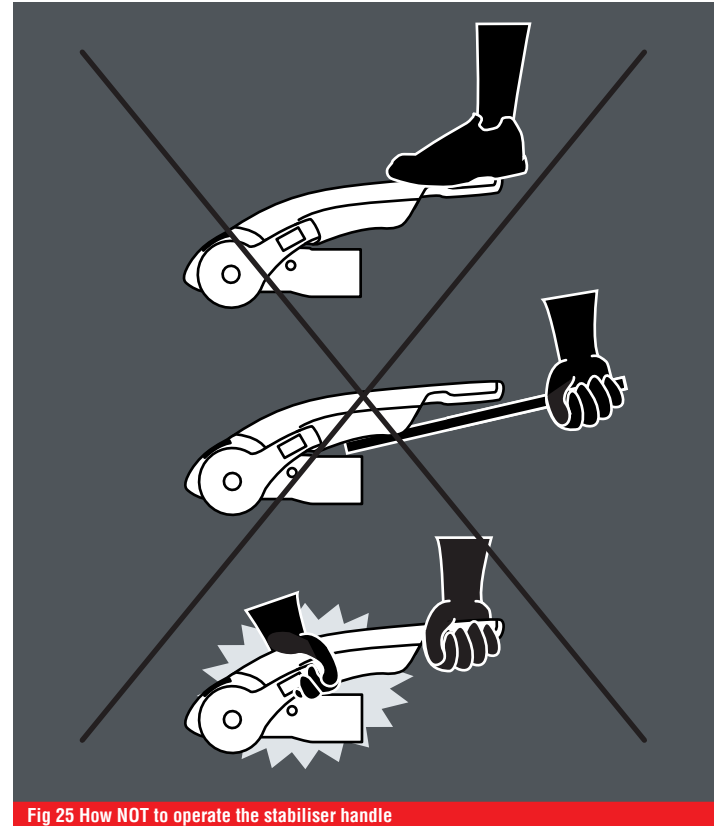


Fig 25 How NOT to operate the stabiliser handle

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

NOISES WHILST DRIVING

As a rule, the friction pads of the AKS 3004 do not make a noise during driving. Any clicking, creaking or squeaking noises that do arise may be due to the following:

- a. Foreign bodies, dirt or exhaust particle build up between the friction pad and towball.
- b. Dry operation of the drawshaft inside the overrun device.
- c. A detachable towball which has too much play in the locking mechanism.

REMEDIAL ACTION

- a. Clean the towball and friction pads before each journey by lightly rubbing the surfaces with a light emery paper (100-120 grit) or use brake cleaning fluid to remove the build up.
- b. Lubricate the drawshaft sleeve via the grease nipples. In addition, push the gaiter forward and grease (DIN 51 825 KTA 3K) the exposed part of the shaft (Fig 26).
- c. Visit a specialist workshop to have the ball holding area checked for damage and the locking mechanism for function. If necessary, change the towball.

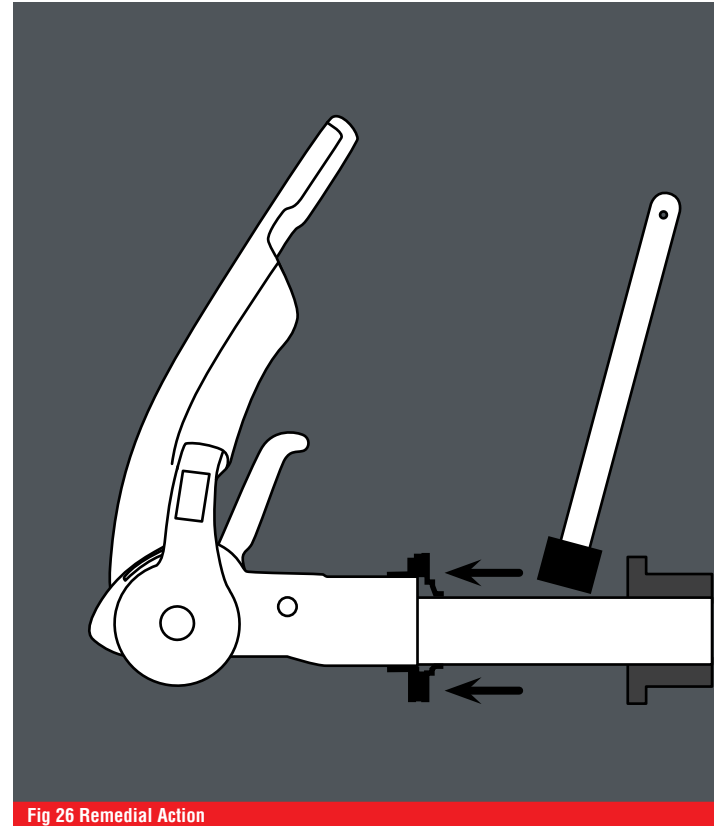


Fig 26 Remedial Action

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

SERVICING AND CLEANING

Friction Pad Replacement

(Replace one at a time)

1. Uncouple AKS 3004.
2. Remove protective caps (Fig 27/Item 1) with the aid of a small screwdriver.
3. Press worn out pad inwards and remove (use punch and hammer) (Fig 27/Item 2).
4. Insert new friction pad from below (after first re-inserting shim washers if they were present) and press in as far as it will go (Fig 27/Item 3 & Fig 27a).

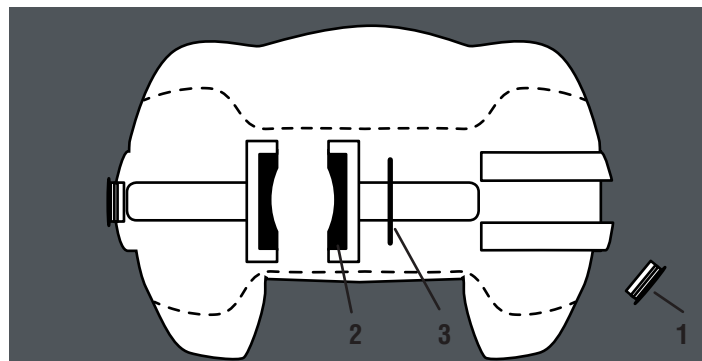


Fig 27 Remove Worn Pads



Fig 27a Insert New Pads

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

CHECKING THE EFFICIENCY OF THE FRONT/REAR FRICTION PADS

1. Couple the AKS 3004 to the towball but do not activate the stabiliser.
2. If a green indicator is visible (on the handle), then the AKS 3004 is in a new condition or the pads and towball are within the permissible limits (Fig 28/Item 2).
3. If only a red indicator is visible (Fig 29/Item 3), then this may have the following causes:
 - a. AKS 3004 is okay but the towball has reached the lowest limit of 49.61 mm.
 - b. AKS 3004 shows signs of wear.
 - c. Towball is in a new condition (50 mm) but the front/rear friction pads show a high degree of wear.

Establish the diameter of the towball so that conclusions may be drawn as to the wear of the friction pads (ball diameter must not be less than 49.61 mm).

FRICTION PAD REPLACEMENT (FRONT/REAR)

1. Uncouple the AKS 3004.
2. Remove the soft dock (pull up & off), (Fig 30/Item 1 & Fig 30a.).
3. Press the safety indicator outwards and secure with SW14 hex. spanner (not included), (Fig 30/ Item 2).
4. Remove cheese-head screws (Fig 30/Item 3 & Fig 30a), using special torx tool.
5. Press friction lining recess (Fig 30/Item 4) inwards and pull down and out.
6. Open coupling handle (Fig 30/ Item 5).
7. Remove countersunk head cap screw using special torx tool (Fig 30/ Item 6 & Fig 31).
8. Press friction pad inwards with a screwdriver and remove from ball cup.
9. Fit new linings in reverse. Tighten screws 3 & 5 to 5 Nm.
10. Replace rubber soft dock, insert top section then bottom.

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

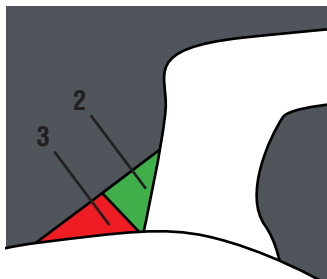


Fig 28 Wear indicator - good condition



Fig 30a Remove Cheese-Head Screws

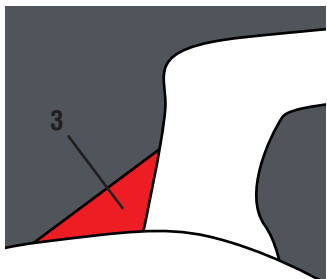


Fig 29 Wear indicator - poor condition



Fig 31 Remove Head Cap Screw

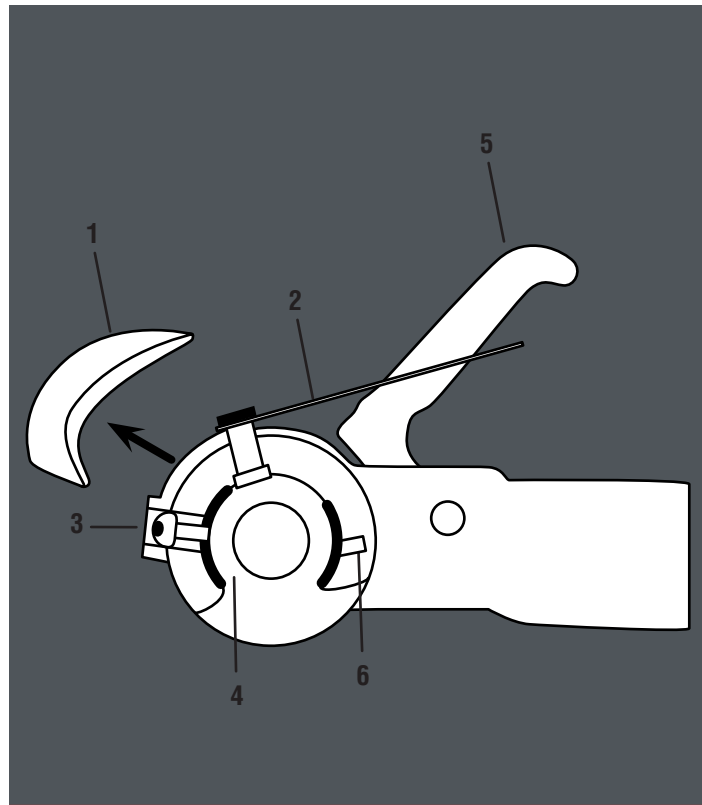


Fig 30 Friction Pad Replacement

OPERATING INSTRUCTIONS FOR AKS 3004 STABILISER

IMPORTANT MAINTENANCE & CLEANING ADVICE

1. The towball should be cleaned regularly to remove grease or other residue, the use of Thinners, White Spirit or Brake Cleaner is recommended - otherwise the stabilising effect will be severely reduced.
2. If friction pads are contaminated, they should not be cleaned but replaced.
3. The surface of the towball must be free of grooves, rust or seizing marks.
4. Towballs coated (with paint or similar) must have this surface completely removed (use 100 or 120 grain emery paper). If this is not done, increased towball wear will occur and may cause damage to the AKS 3004 stabiliser components.
5. In Winter, you should carefully spray only the visual indicator with de-icer.

LUBRICATION

Should lubrication of the stabiliser parts become necessary, then the following must be observed.

- a. Clean all parts thoroughly.
- b. Areas may only be covered with a thin film of grease (Fig 32).
- c. Use multipurpose grease DIN 51825 KTA 3K.

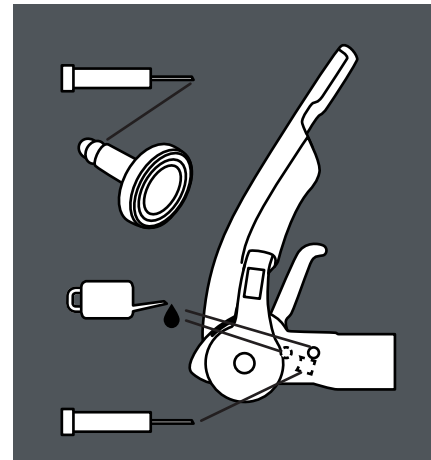


Fig 32 Lubrication points

WARNING

When lubricating, ensure none gets into the friction pad or towball holding area.

COUPLING TYPES AK160 & AK300

OPERATING INSTRUCTIONS

COUPLING UP

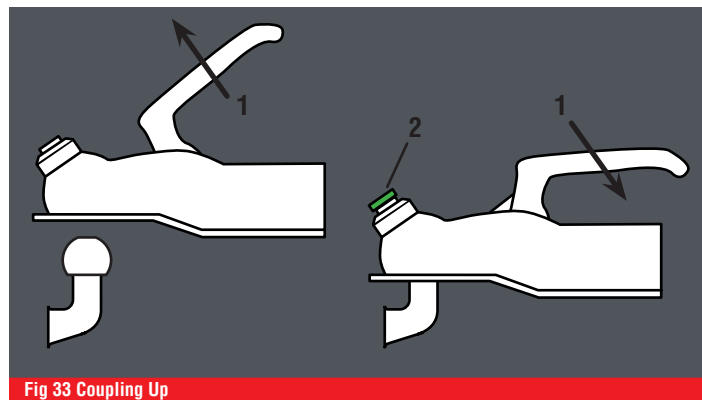
Open coupling handle. To do this pull the coupling handle up (Fig 33) in the direction of the arrow.

The coupling mechanism has a fixed open position, ie. as long as the coupling head is not placed on the ball the coupling will remain open.

Put the open coupling onto the towball. The coupling handle automatically and audibly clicks into position. In the interests of safety, press the handle down by hand (Fig 33).

The coupling head is correctly connected when the green cylinder part of the safety indicator is visible (when viewed from the side - Fig 33/ Item 2).

The coupling mechanism is correctly engaged when the coupling handle can no longer be pressed down any further (by hand).



CAUTION

If the coupling head is not correctly hitched onto the towball, then the caravan/trailer can become disconnected from the towing vehicle.

UNCOUPLING

Open the coupling handle and lift the coupling head from the towball. When there are higher nose loads, coupling and uncoupling can be made easier by using the jockey wheel.

COUPLING TYPES AK160 & AK300

WEAR INDICATOR

A wear indicator on the coupling head (Fig 34) shows whether the wear limit of the towing vehicle's towball or the trailer coupling has been reached. For this purpose, hitch up the trailer to the towball and drive the unit for approx. 500 m. This will set the coupling head adjustment. Following this, check the wear indicator as follows:

If the green indicator is visible on the coupling (with the coupling engaged Fig 34), the coupling head is in good condition or the wear on the towball is within permissible limits.

When the green indicator on the coupling handle is completely covered over and only the red portion is visible (Fig 34), this could be caused by the following:

- Towball has reached the lowest wear limit of 49.61mm dia.
- Both coupling head and towball are showing signs of wear.
- Towball is in good condition with 50mm dia, but the coupling head is showing an excessive level of wear.

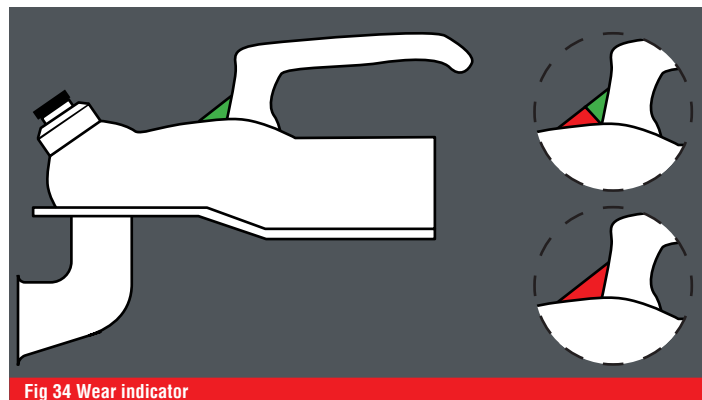


Fig 34 Wear indicator

CAUTION

Under these circumstances, the coupling head can become detached from the towball and the caravan/trailer can break away from the tow vehicle. The coupling head and towball must therefore be checked IMMEDIATELY before future use. Any faulty parts must be changed IMMEDIATELY.

All maintenance work should be carried out by AL-KO Approved Workshops.

COUPLING TYPES AK7, AK10/2 OR AK252

This type of coupling is normally fitted to trailers or older model caravans.

OPERATING INSTRUCTIONS

COUPLING UP

Push the safety lever (Fig 35/Item 1) up with the index finger and lift the handle up and forwards. Put the opened coupling onto the towball with the handle pulled up and in addition press down by hand. The coupling will close by applying a light pressure. Press the handle down by hand until the catch snaps out (Fig 35/Item 3).

The coupling head is correctly engaged when the green cylinder part of the safety indicator is visible (Fig 35/Item 2).

CAUTION

It is most important to check that the coupling head is properly engaged on the towball each time.

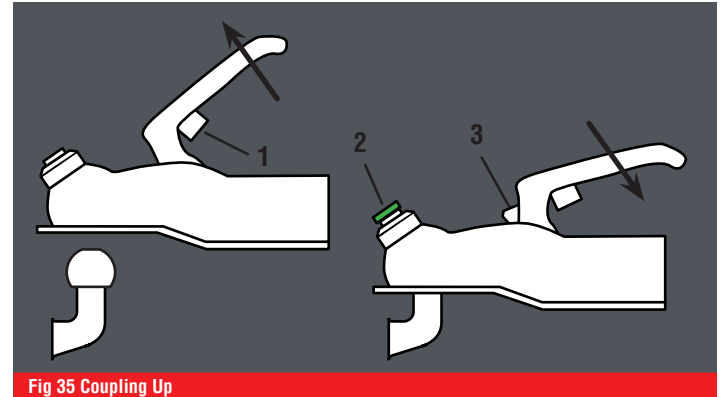


Fig 35 Coupling Up

UNCOUPLING

Lift coupling handle fully and remove the coupling head from the towball. Where there are higher nose loads, coupling and uncoupling can be made easier by using the jockey wheel.

COUPLING TYPES AK7, AK10/2 OR AK252

WEAR INDICATOR

If the handle reaches the back of the cutaway portion of the housing, when the coupling head is engaged (Fig 36) there will be play between the towball and coupling head. Automatic re-adjustment is no longer possible and the assembly will need inspecting.

CAUTION

Under these circumstances, the coupling head can become detached from the towball and the caravan/ trailer can breakaway from the tow vehicle. The coupling head and towball must therefore be checked IMMEDIATELY before future use. Any faulty parts must be changed IMMEDIATELY.

All maintenance work should be carried out by AL-KO Approved Workshops.

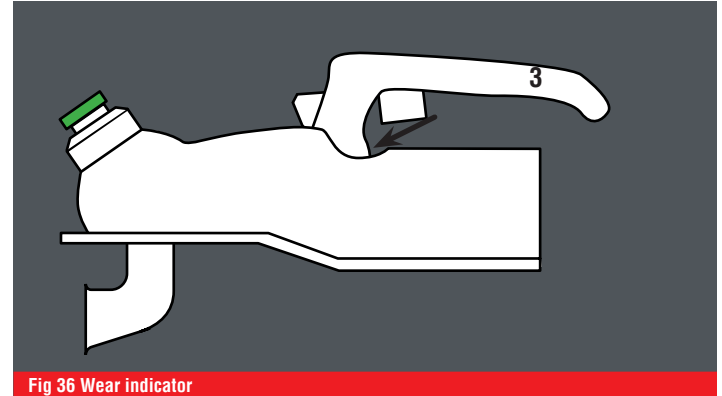


Fig 36 Wear indicator

COUPLING TYPES AK7, AK10/2 OR AK252

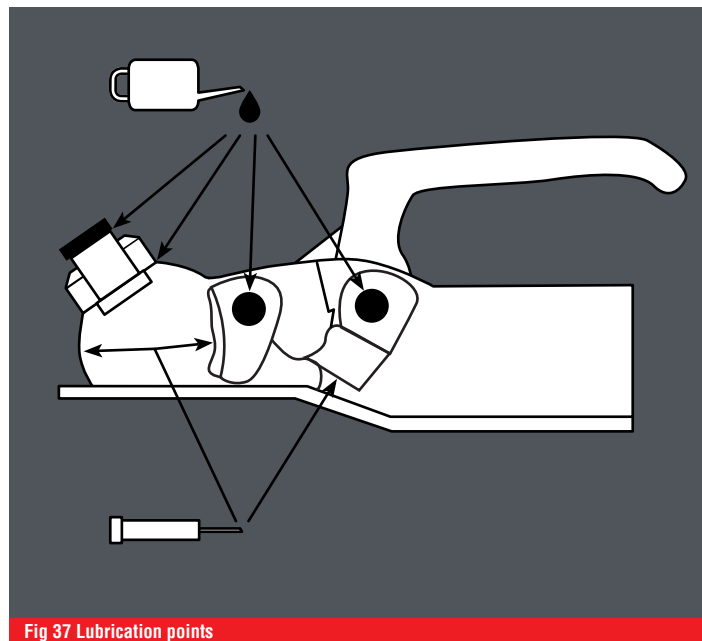
SERVICING & CLEANING

Lubrication Points (Fig 37)

Clean Towball

Lightly grease or oil ball socket, joints and bearing points as appropriate. General purpose grease to DIN 6=51825 KTA 3K.

For Troubleshooting and Fault Finding see Table 2 on page 45.



OVERRUN DEVICES

In the importance of safety, please familiarise yourself with the operation of this overrun device BEFORE using your caravan/trailer.

SAFETY PRECAUTIONS

When parking your tow vehicle and caravan/trailer on site, you must apply the caravan handbrake. If the unit is parked but disconnected from the tow vehicle, it is strongly recommended that each wheel is chocked using AL-KO or suitable wheel chocks.

If a 'detachable' type drawbar is fitted (as with catering trailers), the drawbar must not be removed from the trailer with the hand-brake applied.

CAUTION

Please note when parking the caravan/trailer, the wheelbrake auto reverse mechanism will allow the caravan/trailer to travel backwards for approximately 25 cm (please allow sufficient clearance when parking).

OPERATION

AL-KO overrun devices are a mechanical type, using a hydraulic damper.

COUPLING UP

Manoeuvre towing vehicle or trailer to coupling point.

Overrun devices fitted with 50 mm coupling head:

- Fully open coupling head handle and secure hitch onto the towball.
- Thread the breakaway cable through the breakaway cable guide provided (Fig 39) and connect it to attachment point provided on towing bracket (Fig 38). Please refer to 'Braked Trailers Use of Breakaway Cables' for further details.



Fig 38 Breakaway Cables

OVERRUN DEVICES

CAUTION

The breakaway cable operates the handbrake (emergency brake), in the event of the caravan/trailer becoming detached from the towing vehicle during towing. For this emergency brake to work correctly, it is absolutely essential that the following points are observed:

1. The breakaway cable **MUST** run through the breakaway cable guide.
2. The breakaway cable **MUST NOT** be wrapped around the jockey wheel, as this disables the emergency brake (Fig 40).
3. The cable **MUST** run as straight as possible and not be restricted.
4. Ensure the cable is long enough to allow for cornering and will not become taut or snag during use, as this could result in the handbrake operating whilst towing.

Please refer to 'Braked Trailers Use of Breakaway Cables' information sheet, supplied with your caravan/trailer.

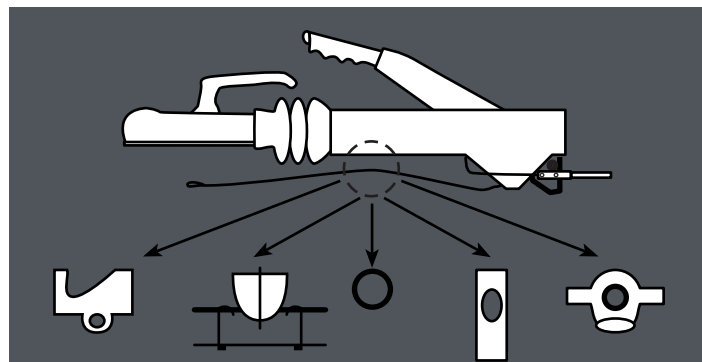


Fig 39 Breakaway Cable Guides

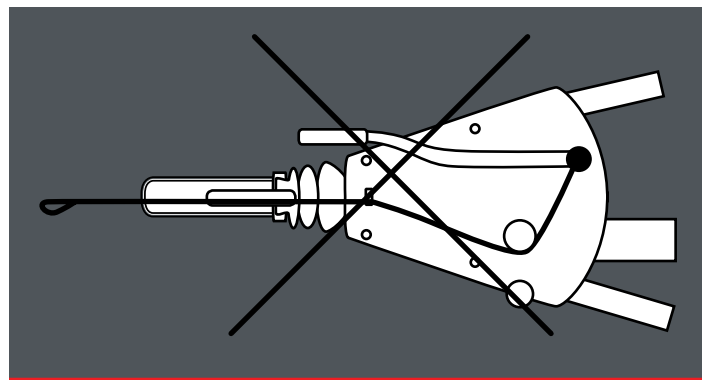


Fig 40 DO NOT wrap breakaway cable around jockey wheel

OVERRUN DEVICES

EURO-OVERRUN DEVICES FITTED WITH AKS 3004 STABILISER

Fully retract Jockey Wheel inner tube so that it locks against Jockey Wheel outer tube.

Slacken Jockey Wheel Clamp handle and raise complete assembly through cutout in body to its highest position (ensure it doesn't come into contact with the brake rod assembly), fully tighten Jockey Wheel Clamp handle to ensure the Jockey Wheel is firmly held in position.

EURO HANDBRAKE

Ensure the handbrake is fully applied to ensure that the wheel brakes will be automatically re-applied should the vehicle start to roll backwards.

CAUTION

If the handbrake is not fully applied as detailed above, there is a danger that the caravan could roll backwards.

TO RELEASE

Press the handbrake down until it is parallel with the fairing cover to ensure that the brake is correctly disengaged.

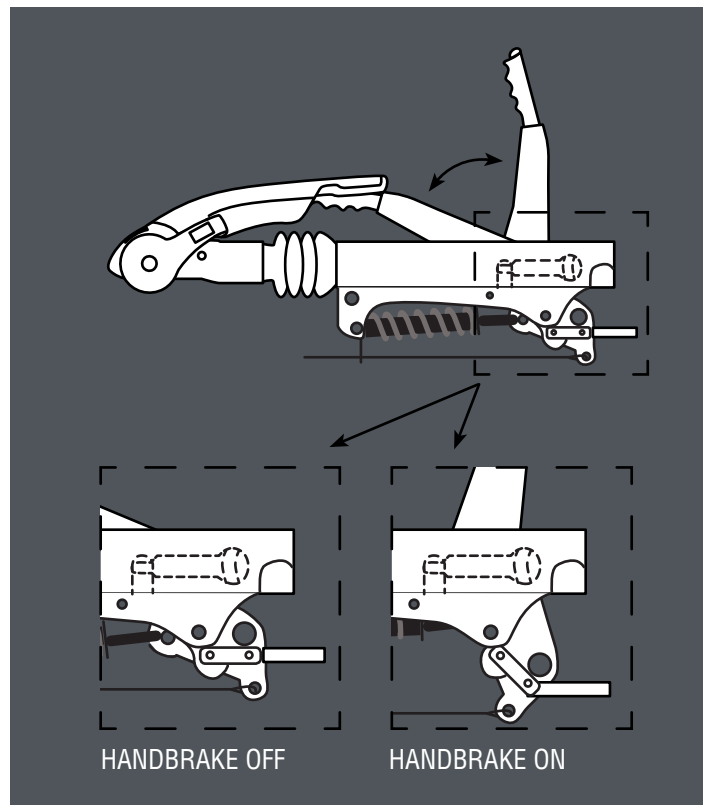


Fig 41 Handbrake lever operation

OVERRUN DEVICES

EURO-OVERRUN DEVICE FITTED WITH AK160 OR AK300 COUPLING HEAD

Connect trailer electric plug controlling lights and indicators etc. into towing vehicle socket.

Wind the jockey wheel up fully and clamp securely in position, ensuring that it does not foul the brake rod or breakaway cable. Remove wheel chocks if fitted and stow safely.

CAUTION

Failure to comply with this could result in the brakes overheating.

EURO HANDBRAKE

Ensure the handbrake is fully applied to ensure that the wheel brakes will be automatically re-applied should the vehicle start to roll backwards.

CAUTION

If the handbrake is not fully applied as detailed above, there is a danger that the caravan could roll backwards.

TO RELEASE

Press the handbrake down until it is parallel with the fairing cover to ensure that the brake is correctly disengaged.

SPARE PARTS

Spare parts are safety critical parts! For this reason when fitting spare parts in our products we recommend the use of original AL-KO parts or those parts that we have explicitly approved. The reliability, safety and suitability of parts designed especially for our products, has been determined using a special test procedure. In spite of constantly monitoring the market we are unable to assess or vouch for other products.

If repair work or servicing is required, AL-KO have a large network of AL-KO service stations throughout Europe. To establish the correct spare parts required you should always quote the model and type of overrun device in question along with the ETI No. which is stamped into the overrun device housing. The ETI number for the Euro Overrun can be found on the handbrake lever.

OVERRUN DEVICES

SERVICING

Every 10,000 - 15,000 km or every 12 months:

Lubricate/grease all sliding and moving parts of the overrun device as show in Fig 42.

Recommended lubricant

General purpose grease to DIN 51825 KTA 3KA.

Servicing and care of hot dip galvanized parts

The formation of white rust is only a surface coating and has no adverse effect on the anti-corrosion properties of galvanising. To minimise the potential for the formation of white rust the following precautions should be taken:

- Ensure there is adequate air circulation when storing hot dip-galvanized parts.
- After winter journeys it is recommended that surfaces are washed with clean water.

For Troubleshooting & Fault Finding see Table 3 on page 46.

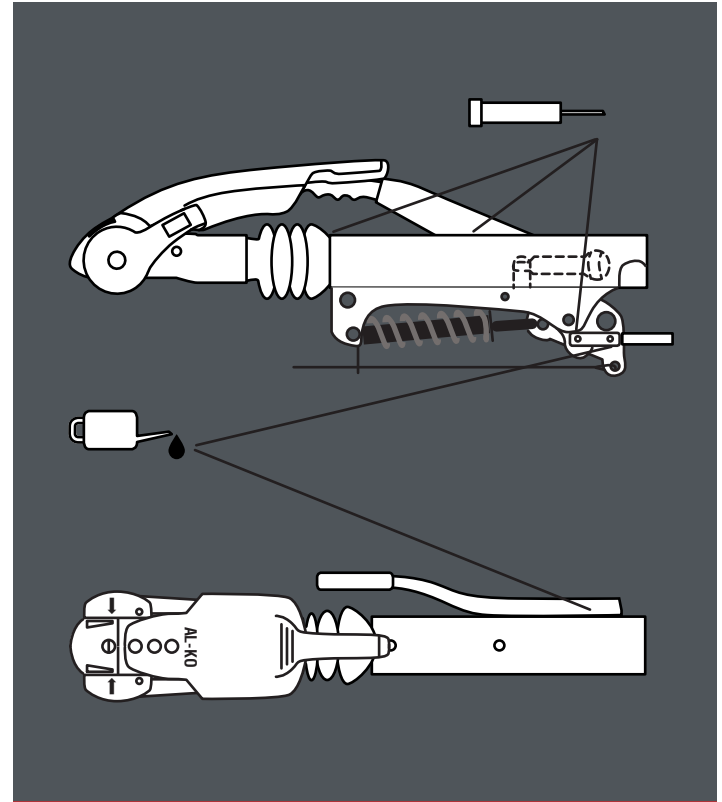


Fig 42 Lubricate/grease the parts indicated.

ACCESSORIES

AL-KO AMS MAMMUT

Mammut is the only fully integrated caravan manoeuvring system specifically designed to suit the AL-KO Chassis.

Since April 2010, AL-KO caravan chassis members have been manufactured with fixing hole positions for the AL-KO AMS Mammut Manoeuvring system pre-punched into the chassis.

For more information about the AL-KO Mammut, please visit our website at www.al-ko.co.uk.

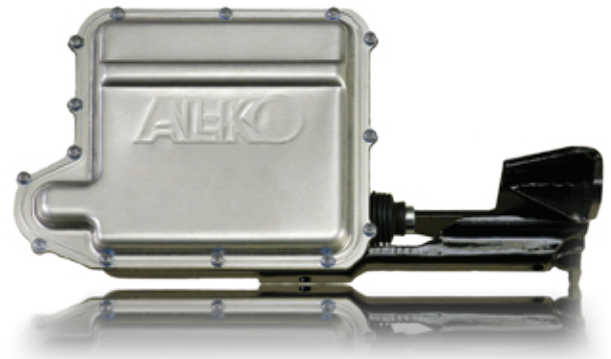


AL-KO ATC TRAILER CONTROL

ATC Trailer Control is an electronic braking device for caravans and works in a similar way to ESP on some tow cars. ATC monitors for instability and takes the necessary action to prevent the caravan from snaking by gently applying the caravan brakes, extending the distance between the tow car and caravan and bringing the caravan back into line. ATC has been fitted as standard on a wide range of caravans since its launch in 2007 and is also available for retrofit.

For more information on how ATC works, please visit our website at www.al-ko.co.uk.

For a troubleshooting guide for ATC please see Table 4 on page 47.



ACCESSORIES

AL-KO SECURE

AL-KO Secure is the Sold Secure Diamond Standard Wheel Lock for caravans with alloy wheels. Years of research and development have been undertaken to ensure that AL-KO Secure can withstand the maximum number of attack methods, and even deter thieves from approaching your caravan in the first place.

Most caravans have the AL-KO Receiver fitted to the wheel drum as standard and some manufacturers include the wheel lock kit with the caravan at the time of purchase. To increase the security provided by the wheel lock, the lozenge is designed specifically to suit the alloy aperture and is therefore wheel rim specific.

For more information about the AL-KO Secure Wheel Lock and to identify which wheel lock kit you need for your caravan, please visit our website at www.al-ko.co.uk.



FITTING AL-KO SECURE

1. We recommend the use of a Side Lift Jack for easier fitting and removal of AL-KO Secure. Lift the caravan slightly to allow the wheel to rotate freely. Align the wheel so that the receiver can be seen in the centre of the rim opening. Do not use the rim opening in which the tyre valve is fitted.
2. Unscrew the Plastic Cap from the receiver and store in the Lock Kit Box. (When AL-KO Secure is not in use, always screw the Plastic Cap in place).
3. Insert the Locking Bolt into the Rim Specific Insert.
4. Insert the Locking Bolt Socket Key.
5. Line up the Locking Bolts and assembly with the receiver.
6. **HAND TIGHTEN** the Locking Wheel Bolt using the Wheel Spanner provided as shown, or a Torque Wrench.
7. Remove the Locking Bolt Socket Key.
8. Insert Barrel Lock.
9. Push the key fully into the lock and turn to operate the lock and then remove the key.
10. The AL-KO Secure is now fitted.

ACCESSORIES

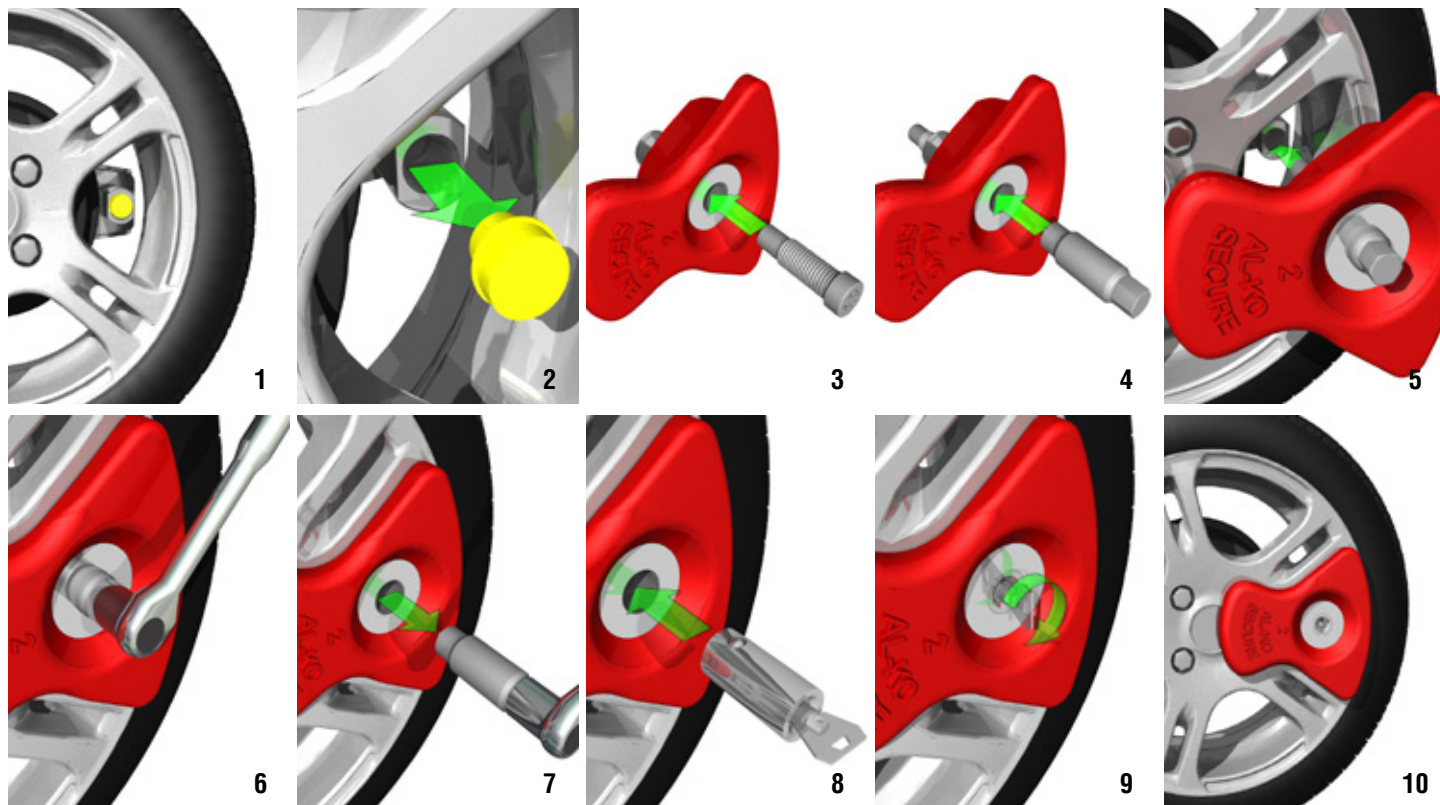


Fig 43 Fitting AL-KO Secure Wheel Lock

ACCESSORIES

CORNER STEADIES

Corner Steadies are as stated, for the purpose of steadying the caravan corners. They are **NOT JACKS AND SHOULD NEVER BE USED AS SUCH**. The screw and pivot pins should be lubricated periodically to ensure their satisfactory operation. (See also Jack Operation).

SHOCK ABSORBERS

All AL-KO chassis have pre-punched holes to accommodate Shock Absorbers, in front of the axle. On the Euro-Axle System, axle swing arms have a removable rectangular plastic cap exposing a slot to accommodate retro-fit brackets for the Octagon Shock Absorbers. (See Accessory Price List). Delta Axles have Shock Absorbers fitted as standard which **MUST NOT BE REMOVED**.



STABILISERS

AL-KO overruns can be fitted with a range of AL-KO Stabiliser devices (if not already fitted as standard), dependent on the maximum gross weight of the caravan. AL-KO stabilisers operate on a friction type basis, whereby friction pads grip onto a Dry, Grease Free Towball. It is important to note that the AKS range of stabilisers are suitable for use with swan neck, fixed or detachable type towbars or the special AL-KO Extended Neck Bolt-On Towball. We do not approve the use of any other bolt-on type towball, other than the AL-KO Towball. Failure to use the correct towball may result in product failure and will invalidate your warranty. The AKS range is available in two different models, the AKS 1300 suitable for caravans with a maximum gross weight of 1360 Kg and the AKS 3004 which is suitable for caravans with a maximum gross weight up to 3000 Kg.

Each Stabiliser can also be retro-fitted with an AL-KO Security Device and Safety ball, to ensure maximum theft deterrent (please see our accessory price list for further details). All 'Red' coloured AL-KO Security Devices have full TUV and Sold Secure Approvals and are available from good dealers or direct at www.al-ko.co.uk.

ACCESSORIES

ROAD WHEELS

In most instances the road wheels and tyres are supplied by the Caravan Manufacturer. The condition of wheels and tyres should be checked regularly, particularly for distortion of flanges and the wheel dish. Wheels that are damaged or distorted, or have wheel bolt seatings cracked or deformed **must not be repaired or used in service - these must be replaced.**

IMPORTANT NOTE

Standard AL-KO caravan chassis use M12 bolts. These must always only be tightened to the correct torque setting as recommended by the vehicle manufacturer. They should be tightened in sequence, North, South, East, West and never clock or anti-clockwise. Always use a calibrated torque wrench and do not use a corner steady brace or power or electric wrench. It is as dangerous to overtighten wheel bolts as it is to not tighten them sufficiently.

IMPORTANT NOTE

The torque settings should be re-checked after 50 km.

If other wheel bolts are used please ensure the torque settings are as follows:

M10 - 49 Nm (36 ft. lb)

M14 - 135 Nm (99.5 ft. lb)

M16 - 210 Nm (155 ft. lb)

SPECIAL NOTE - ALUMINIUM WHEELS

The standard M12 x 1.5 60o Conical Wheel bolts are NOT SUITABLE for aluminium wheel rims. Special wheel bolts should be used.

TYRES

The legal requirements for tread depth on motor vehicles, also applies to caravan and trailers.

ACCESSORIES

JACKS

The Corner Steadies should never be used to jack up the **caravan**. When jacking becomes necessary use the **AL-KO Side Lift Jack or 2-Tonne Jack system**.

NOTE

It is essential that the car and caravan are hitched together before commencing jacking.

All AL-KO chassis from 1992 onwards have 2 holes punched in the chassis members, each side (rear of the axle); to accept the brackets for the Jack(s). (See Accessory Price List). Corner Steadies may be used for stability **ONLY**, when the caravan is in the jacked position.

The caravan should never be lifted by jacking up under the chassis member.

If working under the caravan in an elevated position, axle stands must be used for safety. Wheel chocks for the opposite wheel(s) are also advisable.



JOCKEY WHEEL

All AL-KO Jockey Wheels are removable and stow neatly on the A-Frame when the caravan is being towed. AL-KO Jockey Wheels are hot dipped galvanised preventing corrosion and ensuring durability. They incorporate a thrust bearing which greatly reduces the effort required to manoeuvre the caravan.

MAINTENANCE

Lubricate screw thread and wheel spindle periodically.

THE PREMIUM JOCKEY WHEEL

The Premium Jockey Wheel is designed for use with motorised caravan movers and features extra wide, grooved rubber tyres, swing arm suspension and an integrated load indicator to gauge the noseweight of the caravan. This saves time and effort preparing for your journey.

For more information about any of the AL-KO Jockey Wheels, please visit our website at www.al-ko.co.uk.



ACCESSORIES

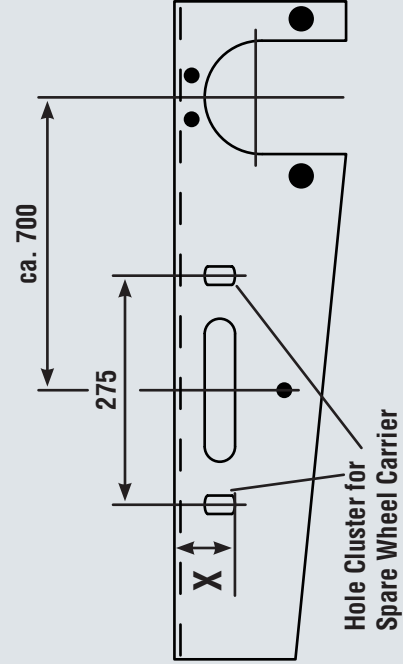
SPARE WHEEL CARRIERS

Each caravan has a set of punched holes in the chassis member to facilitate the fitting of a spare wheel carrier. The assembly is of a strong, lightweight construction and zinc plated for all-weather protection. There are 3 variants to suit most AL-KO chassis (record your tyre size on this booklet for future reference). The carriers can be fitted for left or right hand operation and are easy to fit. The telescopic frame tubes should be lubricated periodically.



RECORD YOUR SPARE WHEEL CARRIER INFORMATION HERE

Caravan Make _____
Caravan Model _____
Year of Manufacture _____
Tyre Size (eg R195 13) _____
Dimension (X) in mm (taken from the following diagram) _____



TROUBLE SHOOTING & FAULT FINDING

TABLE 1 AXLES

FAULT	CAUSE	REMEDY
POOR BRAKING	Linings worn or damaged. Brake Linings not bedded in. Brake set up incorrect.	Replace Brake Linings. Will pass after braking a few times. Reset Brakes as pages 10-12 & ensure system is lubricated.
DIFFICULTY IN REVERSING	Braking system set too tightly. Auto-Reverse lever too stiff.	Reset Brakes as page pages 10-12. Lubricate and free off Reverse Lever.
BRAKES OVERHEATING	Incorrect setting. Braking system not fully released. Overrun lever stuck. Damage or Corrosion to braking system.	Reset Brakes as pages 10-12. Check Handbrake has been released & the system is running freely. Lubricate and free off Reverse Lever. Check system as pages 10-12 and repair or renew parts as necessary.
HANDBRAKE FORCE LOW	Incorrect setting of the brakes. Linings not bedded in.	Reset brakes as pages 10-12 and lubricate as necessary. Will pass after braking a few times.
UNCOMFORTABLE RIDE OR UNEVEN BRAKING	Loose braking adjustment. Damper defective. Axle shock absorbers defective.	Reset brakes as pages 10-12. Check and replace damper if necessary. Replace shock absorber.

TROUBLE SHOOTING & FAULT FINDING

TABLE 2 COUPLING HEADS

FAULT	CAUSE	REMEDY
COUPLING DOES NOT ENGAGE ONTO BALL	Ball diameter too large. Ball could be damaged or deformed. Coupling head dirty or defective.	Change ball to correct size. Fit new ball. Clean & Lubricate coupling and replace if necessary.
DIFFICULTY IN UNCOUPLING	Ball damaged or deformed. Coupling damaged or deformed. Coupling head under pressure from damper.	Fit new ball. Replace if necessary. Pull forward a few inches to relieve pressure.
BRAKES OVERHEATING	Incorrect setting. Braking system not fully released. Overrun lever stuck. Damage or Corrosion to braking system.	Reset Brakes as pages 10-12. Check Handbrake has been released & the system is running freely. Lubricate and free off Reverse Lever. Check system as pages 10-12 and repair or renew parts as necessary.
TOO MUCH PLAY IN THE COUPLING	Coupling damaged or deformed. Ball too small.	Replace if necessary. Fit new ball.

TROUBLE SHOOTING & FAULT FINDING

TABLE 3 OVERRUN DEVICES

FAULT	CAUSE	REMEDY
POOR BRAKING	Overrun shaft tight. Overrun shaft corroded. Body housing damaged.	Lubricate overrun shaft and replace any damaged parts.
BRAKES OVERHEATING DURING TOWING	Handbrake not fully released. Braking system incorrectly set. Incorrect attachment of breakaway cable.	Release handbrake. Reset brakes as pages 10-12. Ensure correct attachment as listed on pages 32/33 or refer to Braked Trailers Use of Breakaway Cables sheet.
HANDBRAKE FORCE LOW	Defective gas strut. Incorrect setting of spring cylinder.	Replace gas strut. Reset spring cylinder as pages 10-12.
BRAKES APPLY DURING DECELERATION OR DOWNHILL TRAVEL	Overrun damper is defective.	Replace the overrun damper.

TROUBLE SHOOTING & FAULT FINDING

TABLE 4 ATC

LED COLOUR	ATC	DIAGNOSIS	WHAT TO DO	OUTCOME	STATUS
GREEN	ATC Active	Everything ok			
GREEN FLASHING	ATC Active	Self test incomplete	Drive forward to detect movement to complete self test and re check LED	Green (Constant)	Ready for journey
RED	ATC Inactive	Possible to continue journey	Remove 12S or 13 Pin plug and wait 5 seconds. Reconnect plug.	Green Red	Ready for journey ATC Error logfile memory exceeded. Caravan can be towed, but ATC will not function.*
RED FLASHING	ATC has detected a fault	Don't continue with ATC connected	Remove 12S or 13 Pin plug and wait 5 seconds. Reconnect the plug.	Green Red (Flashing)	Ready for journey ATC faulty, and cannot be driven. Remove push-rod. Contact AL-KO.
LED NOT WORKING	ATC has no power LED Faulty	Check push rod position before continuing.	Remove 12S or 13 Pin plug and wait 5 seconds. Reconnect the plug. Check for constant live - refer to system requirements.	Green Not working	Ready for journey If power ok, check push rod position: Red line visible - do not drive vehicle. Red line not visible - possible to continue journey but contact AL-KO.

* ATC stores operating errors in a logfile which over time will become full and will result in the solid red light appearing. This needs to be erased and can be done easily by connecting the caravan to a 12 volt supply for a period of 12 hours. The power required to carry out this function is minimal. Most occurrences of these errors are due to power supply problems to ATC which could be due to low voltage, or an intermittent power supply from the towbar.