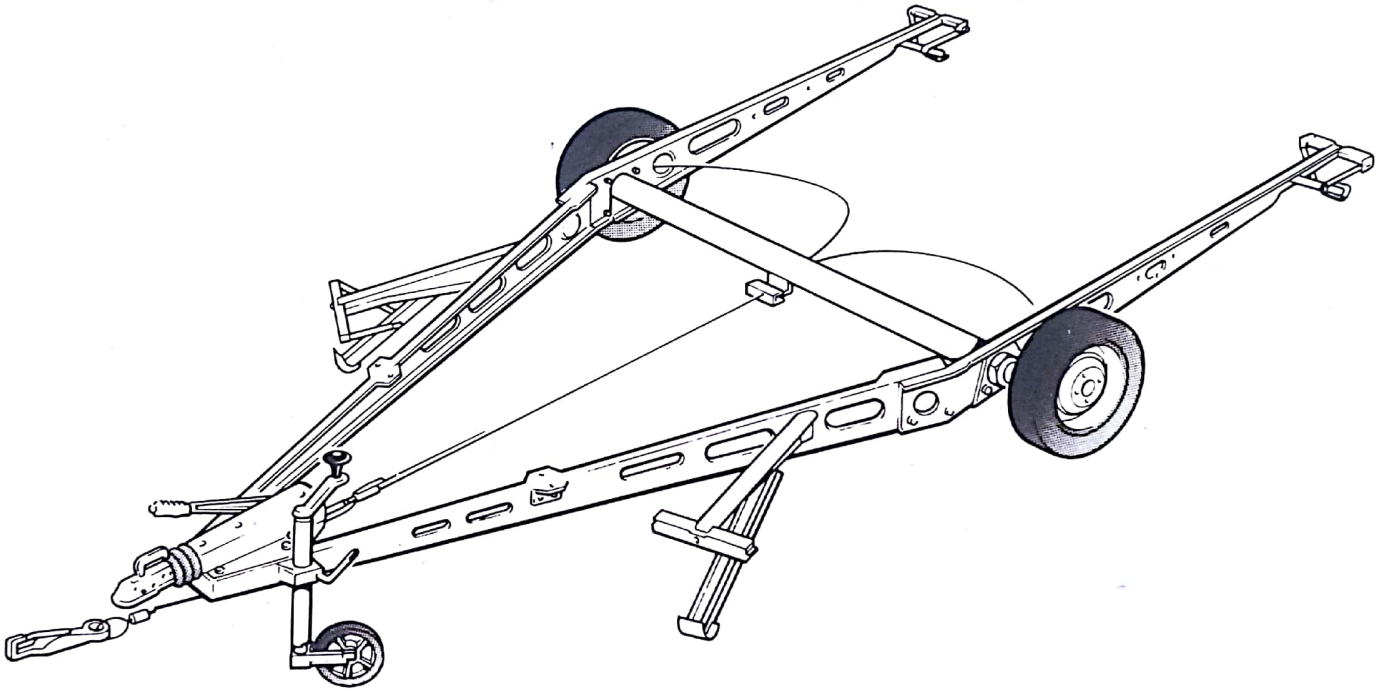
AL-KOmatic

Service and Maintenance Instructions
Spare Parts List



AL-KO chassis fitted with the automatic reversing system

Part No. 356 705

Introduction

This handbook is designed to help caravanners and other users of the chassis to drive the unit safely. The handbook also supplies information to enable the user to give all the care and attention necessary to maintain the reliability of the chassis.

The first section of the handbook details the correct procedure for connecting the chassis to the towing unit, loading the towed unit, handling the combined vehicle and applying the handbrake.

The second section outlines the maintenance philosophy and presents detailed instructions for servicing routines together with their recommended periodicity.

Servicing must be carried out by an authorised dealer throughout the period covered by the chassis warranty.

The third section contains sufficient information to carry out minor repairs.

These can be carried out by the enthusiastic owner, providing he has the correct tools, or your dealer will happily undertake the work for you.

All repairs must be carried out by an authorised dealer throughout the period covered by the chassis warranty.

The fourth section of the handbook comprises a fault finding table which details the fault, the possible cause and remedial action.

The remaining sections facilitate the identification and ordering of spare parts.

The owner should carefully read this handbook before attempting to operate or maintain the vehicle and should keep it handy for reference as required.

Chassis specifications may vary according to market requirements. ALKO's policy of constantly improving their product may involve major or minor changes to the chassis or its accessories. The manufacturer reserves the right to alter specifications, with or without prior notice, at any time.

Whilst every effort has been made to ensure the accuracy of the information contained within this handbook, no liability can be accepted by the manufacturer for incorrect use or interpretation of this information.

Damage to the chassis caused by an incorrectly mounted body or by the body itself will negate the terms of the warranty. Unauthorised or poorly executed work carried out on the chassis will also render the terms of the warranty null and void.

All Warnings, Cautions and Notes used in this handbook are set in **BOLD** type and may be upper or lower case.

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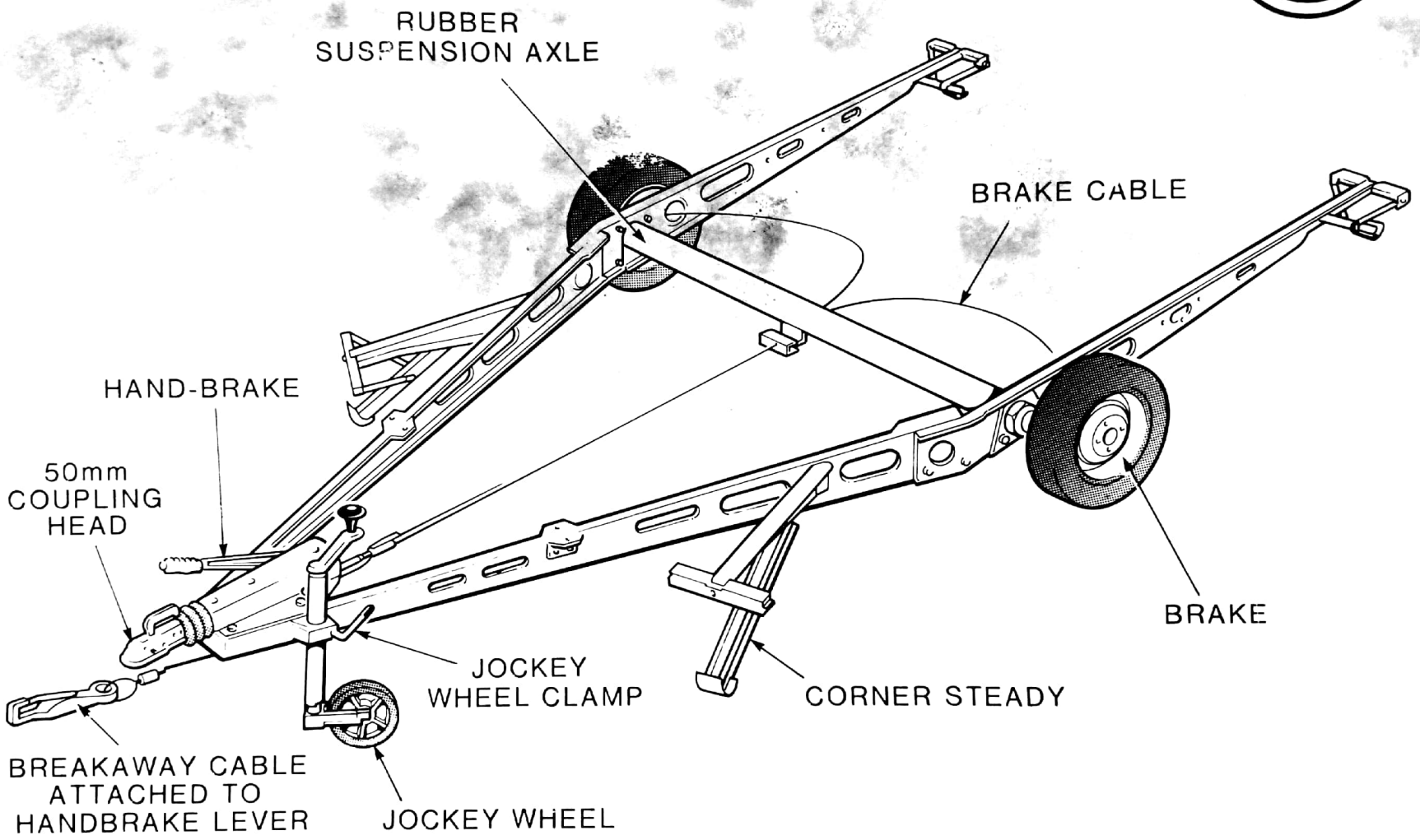


FIG. 1 CHASSIS

SECTION 1

DESCRIPTION AND OPERATION

1.1 The Chassis (Fig. 1)

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. Chassis members are hot dip galvanised for added protection.

Large elongated holes are located in both main longitudinal and 'A' frame members to reduce weight to a minimum. Each hole incorporates a return flange to maintain the required strength and to provide rigidity in extra deep sections.

Holes should not be drilled into the chassis without approval from AL-KO.

The lightweight chassis frame is of bolted construction which allows for easy renewal of individual parts should the need arise.

Each AL-KO caravan chassis has a set of punched holes immediately behind the axle to enable fitting of an AL-KO telescopic spare wheel carrier.

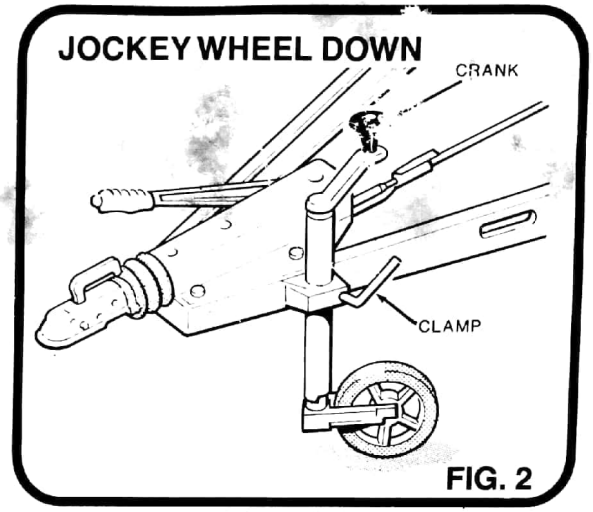


FIG. 2

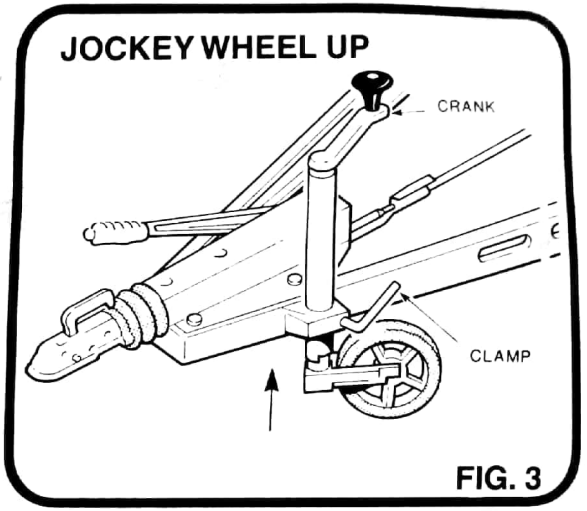


FIG. 3

1.2 Handling

Strict attention must be paid to the limits and operating strictures when handling the trailer. These concern the trailer jockey wheel, the trailer nose weight and loading.

Trailer Jockey Wheel (Figs. 2 and 3)

Before commencing a journey, the trailer jockey wheel must be cranked fully home to its stowage stop and secured with the clamp provided.

Trailer Nose Weight

The trailer nose weight must be checked prior to the start of any journey.

The permitted trailer nose weights of the coupling ball, towing ball coupling and overrun device must never exceed that value stated on the data plate or sticker. A low or negative trailer nose weight will adversely affect the handling of the unit.

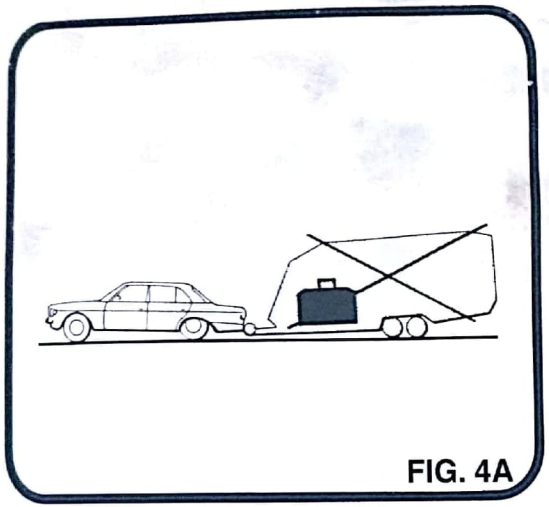


FIG. 4A

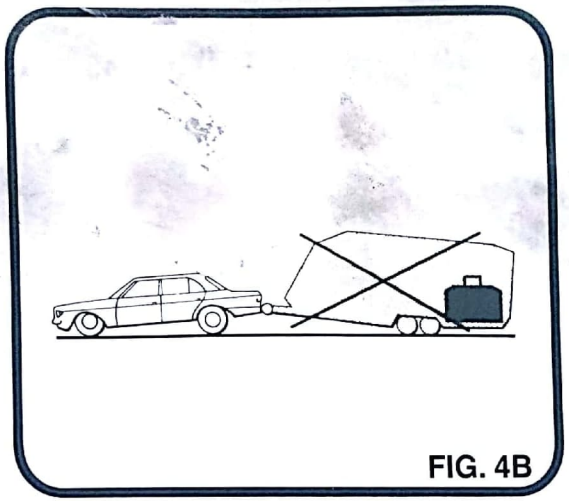


FIG. 4B

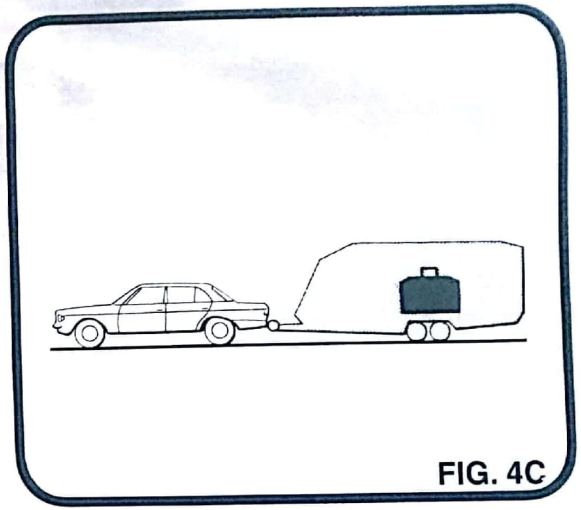


FIG. 4C

Loading

Loads to be carried in the trailer 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 tare weight and the permitted total weight.

Load Too Far Forward Fig. 4a

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

Load Too Far Back Fig. 4b

High skid risk together with poor braking effect.

Load Over Axle Fig. 4c

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

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

1.3 Coupling Head

Description

The coupling head is designed to engage automatically with the international 50mm towing ball recommended by the following:

British Standards Institution
National Caravan Council
Society of Motor Manufacturers and Traders
ISO

Coupling heads should never be drilled.

AL-KO produce several types of coupling head each having provision for an anti-theft device which is an optional extra and consists of a brass insert. The anti-theft device comes complete with two keys.

Securing the locking button inhibits movement of the handle, making it possible to lock the coupling whether or not the towing ball is connected:

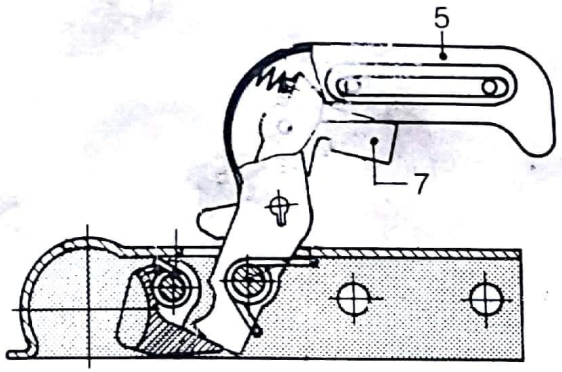
Operation

All coupling head types are designed for one hand operation.

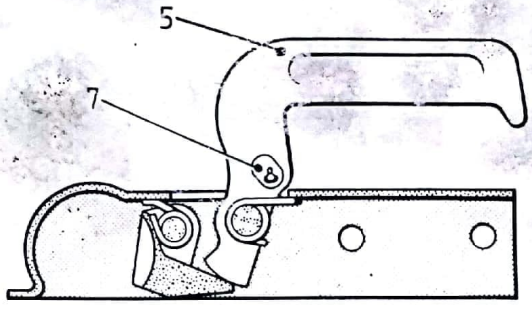
Coupling Up – all types

Lower the jockey wheel to the ground.

Reverse the car to the trailer or move the trailer forward to the coupling point.

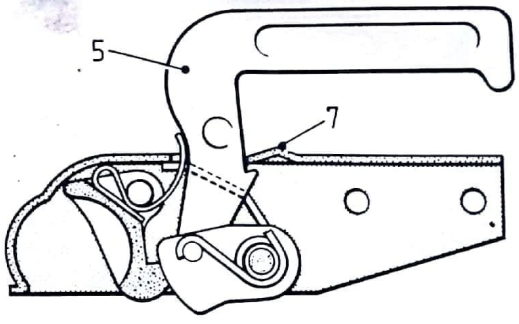


AK7



AK10/2

FIG. 5



AK21

FIG. 6

Types AK7 : AK10/2 (Fig. 5)

Depress the locking button (7) on the lever mechanism and lift the handle (5) upwards and forward.

Place the unlocked coupling head onto the towing ball and apply slight downward pressure. The head will automatically lock onto the ball.

Ensure that the locking button (7) has returned to its free position before attempting to tow.

Connect the breakaway cable and lighting plug to the towing vehicle. Raise the jockey wheel to its stowed position.

Types AK13/1 : AK21 (Fig. 6)

Lift the handle (5) upwards and forward to disengage the security tooth(7). Place the unlocked coupling head onto the towing ball and apply slight downward pressure. The head will automatically lock onto the ball.

Ensure that the security tooth is fully engaged before attempting to tow.

Connect the breakaway cable and lighting plug to the towing vehicle. Raise the jockey wheel to its stowed position.

Uncoupling – all types

Lower the jockey wheel to the ground. Disconnect the breakaway cable and lighting plug.

Operate the handle and manually lift the coupling head clear of the towing ball or raise the telescopic jockey wheel to achieve the same effect.

Serious damage will occur unless the locking button is depressed first and the handle lifted forward before the caravan is lifted manually. This prevents the nose weight being transmitted through the locking button.

The trailer towing ball coupling of the chassis has been type tested; the maximum support load at the coupling point must not be exceeded.

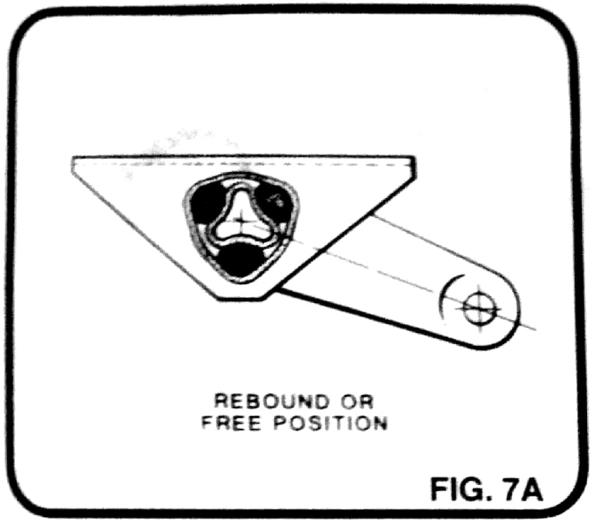


FIG. 7A

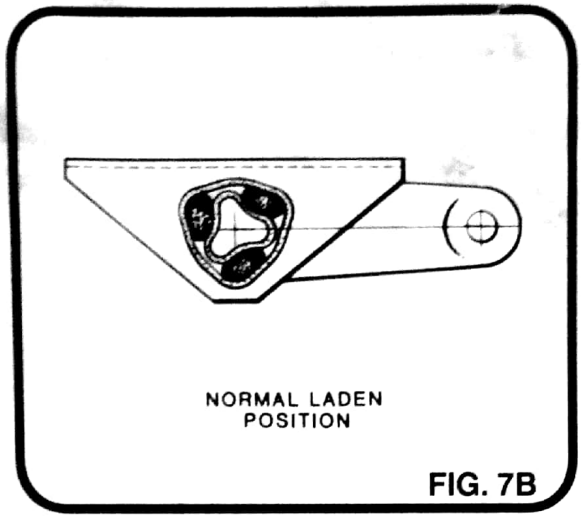


FIG. 7B

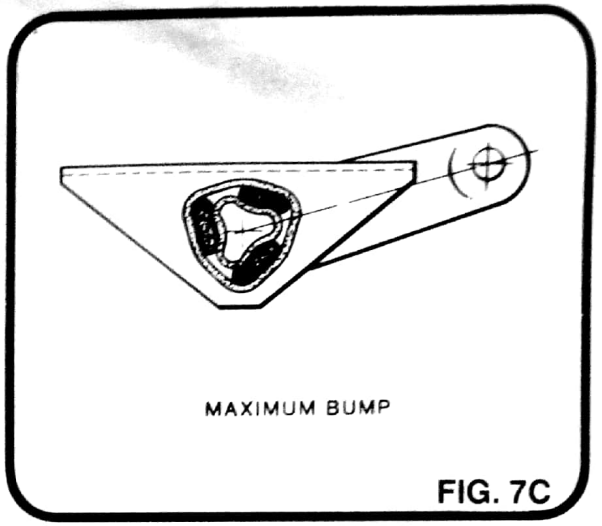


FIG. 7C

1.4 The Axle (Fig. 7)

The AL-KO rubber suspension axle has been designed for new standards of spring comfort and is maintenance free.

Three rubber elements are contained within an hexagonal axle tube. These provide suspension and have inherent damping characteristics which eliminate the requirement for independent shock absorbers.

Figures 7(a), (b) and (c) 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.

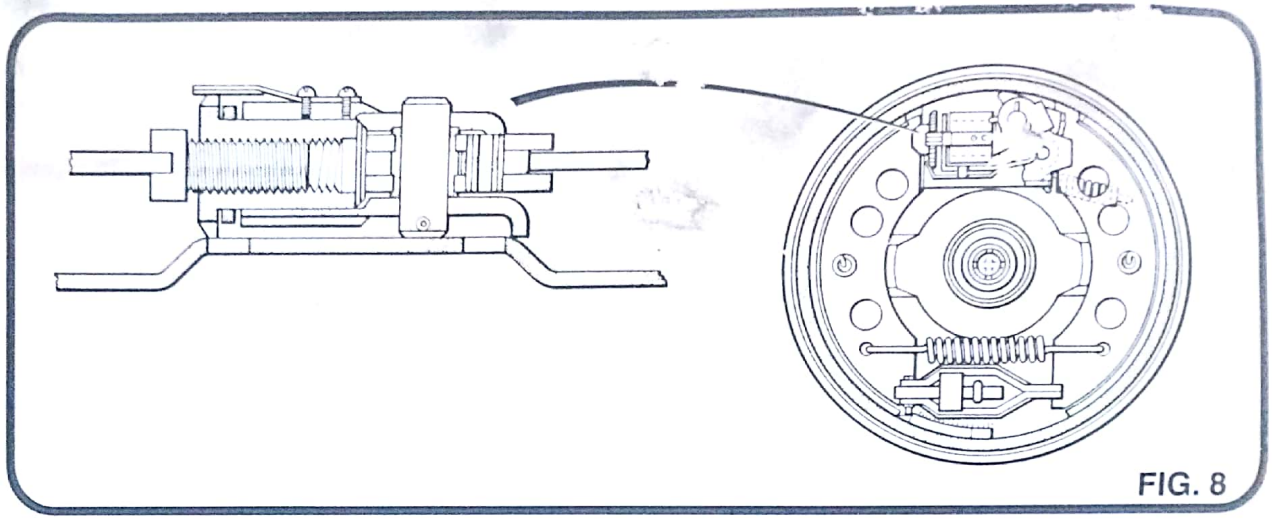


FIG. 8

1.5 Braking System (Fig. 8)

The AL-KO automatic reversing wheel brake system comprises, duplex twin loading shoes acting against a drum. The shoes are actuated by a fully floating expanding clutch, which when operated, forces the shoes into contact with the drum. The system also contains an adjuster box to arrest directional motion of the expanding clutch and shoes when the brake is engaged, and a spring-loaded reverse lever which collapses when reverse braking is applied.

Description (Fig. 9)

Some brake units are fitted cable over and some cable under to cater for differing positions of the expanding clutch; thus, for a correct view, Figure 9 may need to be rotated through 180 degrees.

The wheel hub brake unit comprises , a wheel hub backplate (12), handed left or right, assembled to a central axle stub shaft. The plate is drilled to accept various items of the brake unit.

A handed transmission lever (16) is attached to the adjuster box by a floating pivot pin (18) secured by a split pin (17). The fulcrum of the transmission lever (pivot pin) is set to work against a tensioned spring (21) attached to the backplate.

An adjusting nut (13), commonly called the starwheel, slots into the other end of the adjuster box and is held in place by an adjusting screw (14).

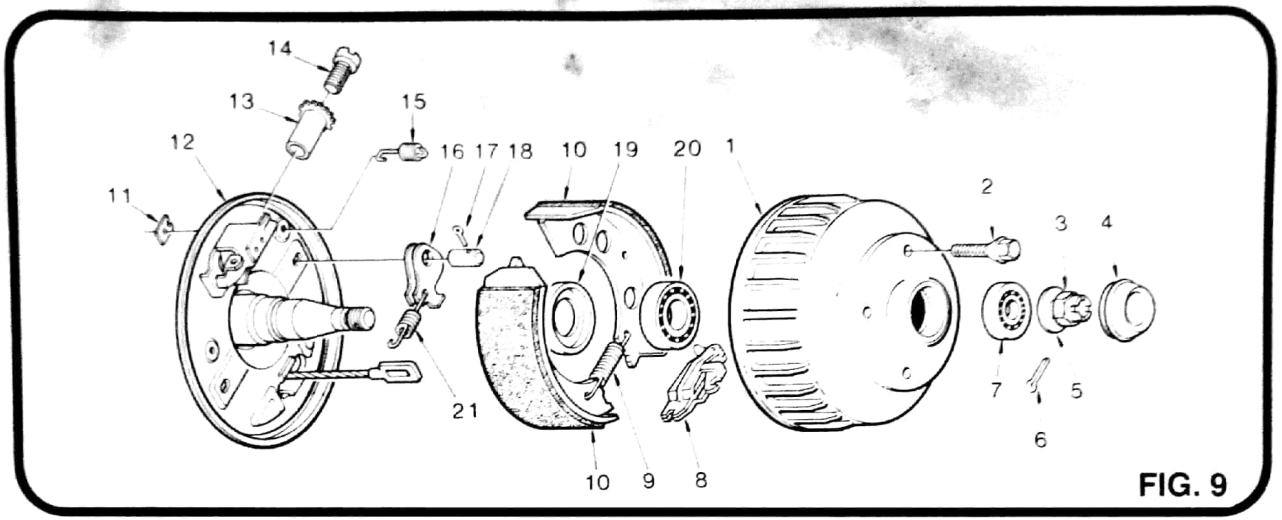


FIG. 9

This sub-assembly forms the spring-loaded auto-reverse mechanism. Its various functions are entirely dependent upon the position of the fulcrum in relation to the expanding clutch and brake shoes.

The brake shoes (10), joined together by a tensioned spring (9), are secured to the backplate using pressure springs (15) held in place by cover plates (11). The expanding clutch (8) is inserted between the trailing edges of the shoes and is floating. The eye on the end of the Bowden cable attaches to a hook fitted as part of the clutch.

An oil seal (19) and bearing (20) are fitted to the brake drum hub before the brake drum (1) is fitted over the shoes and secured to the backplate.

Finally, a taper roller bearing (7) is fitted to the stub shaft and held in place by a lock washer (5) and castellated nut (3) secured by a split pin (6). This sub-assembly is covered by a grease cap (4). Axial play of the wheel hub bearing can be removed by adjustment of this castellated nut.

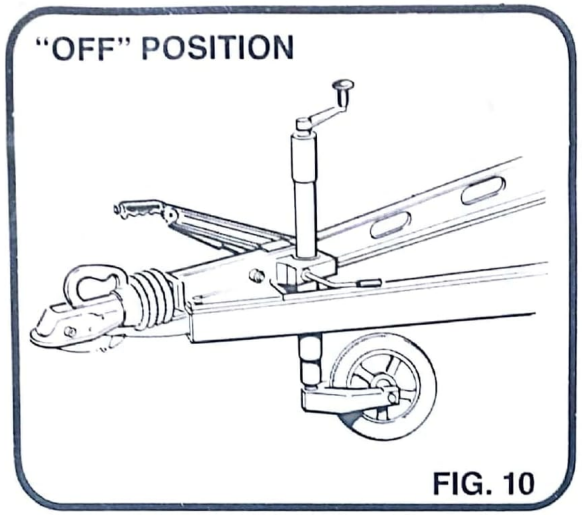


FIG. 10

Operation (Figs. 10 and 11)

Forward Braking

In the free position, with the handbrake fully forward in the OFF position, the drawshaft of the overrun device is fully extended and the shoes are clear of the drum.

As the towing vehicle brakes, or starts to drive downhill, the drawshaft of the overrun device is depressed toward the unit being towed. This action imparts linear motion to the main shaft of the overrunning device which is transmitted via the overrun lever, brake rod and Bowden cable to the expanding clutch. This mechanism forces the leading brake shoe and, by reaction, the trailing shoe outwards into contact with the drum.

Friction between the brake shoes and the drum creates a tendency for both shoes and the expanding clutch to move in the direction of forward rotation until they abut against the adjuster box. This ensures that both shoes remain in the braking position.

Reversing

When the towing vehicle reverses, the drawshaft is pushed backward, moving the overrunning device through its full travel. This movement is transmitted in the normal manner to the expanding clutch.

The clutch forces both shoes into contact with the drum. Initial friction between

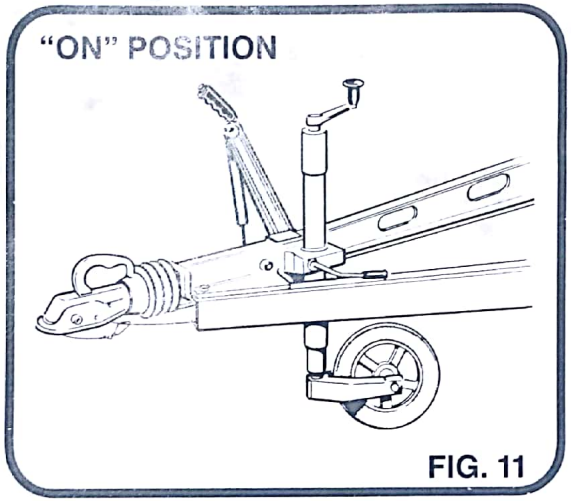


FIG. 11

these creates a tendency for the shoes and expanding clutch to move in the direction of wheel rotation i.e. reverse. This movement imparts pressure to the spring-loaded auto-reverse lever, causing it to collapse. Thus, friction between the shoes and drum is almost eliminated, allowing the trailer to reverse in concert with the towing unit.

Slight forward movement of the chassis will allow the coiled spring to reassert itself, enabling the reverse lever to recover to its normal position. Normal braking is then immediately available.

Parking

The AL-KO parking brake system incorporates a patented device for added safety when parking on a reverse-sloping site or steep hill.

The AL-KO parking brake system comprises a handbrake lever mechanism actuating a Bowden cable which operates a brake unit assembly contained within the wheel hub.

AL-KO provide two types of parking brake system on their trailers, with the Bowden cable and the wheel hub brake unit being common to both types.

The difference between the systems is the handbrake mechanism used to actuate the Bowden cable.

AL-KO's unique parking brake system requires a source of stored energy to lock the wheel brakes should the trailer start to move after it has been uncoupled from the towing unit.

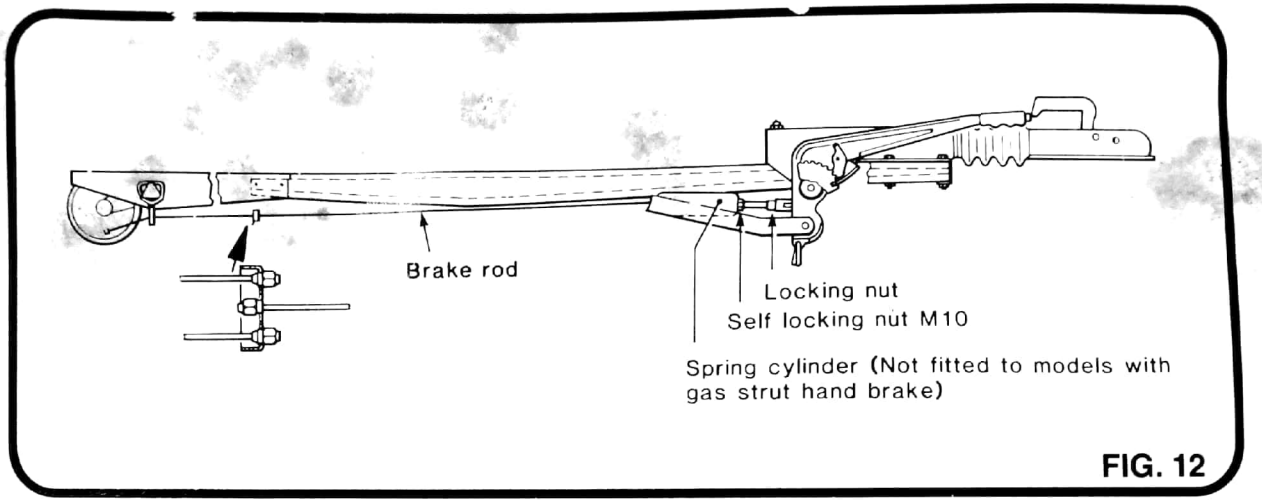


FIG. 12

This energy source can be provided by either a spring cylinder charged by hand or by a gas filled cylinder acting as an energy store.

Each system requires a slightly different method of operation when parking the trailer, though they both operate in the same manner when forward or reverse braking is applied.

Spring Cylinder Type

Description (Fig. 12)

A spring cylinder is attached to the link between the handbrake lever and the central brake rod. Full application of the handbrake lever (such that the lever is vertical) to the last tooth of the ratchet compresses a steel spring inside the steel cylinder and energy is stored.

The action of the brake lever imparts motion to the brake rod, the Bowden cable and the expanding clutch. This mechanism forces both shoes into contact with the drum.

At this stage, the brake unit is latent, the mechanism waiting to see in which direction the trailer will start to move.

If the trailer starts to move backwards, the stored energy in the spring will be released. The trailing brake shoe and by reaction, the leading shoe together with the expanding clutch will tend to move in the direction of rotation (reverse) and abut against the stop. Thus the trailer is braked.

However, if the handbrake is NOT fully applied to the last tooth (i.e. vertical) and is set to some lesser position than the full vertical, then problems will almost certainly arise after the trailer has been uncoupled from the towing unit.

If the trailer is parked on a reverse slope or if it is pushed backwards, then the brake mechanism will act as though the trailer is being reversed by the towing unit. The shoes and expanding clutch will tend to move with the direction of rotation (reverse) which imparts pressure to the spring-loaded reverse lever, causing it to collapse. Thus, friction between the shoes and the drum is almost eliminated and the trailer will run away.

Operating the Handbrake

Some people may find it difficult to set the handbrake lever to its full vertical position without a great deal of physical effort.

However, AL-KO have designed their system so that the average user need not do so.

For successful parking on a reverse slope or steep hill, the operator need only apply the handbrake with one hand while gently but purposefully inching the caravan or trailer a small distance backwards with the other.

The user must supply this small but essential backward movement to ensure that the fulcrum of the transmission lever moves past the point of reverse, thus preventing the lever from collapsing as it would normally do when reversing.

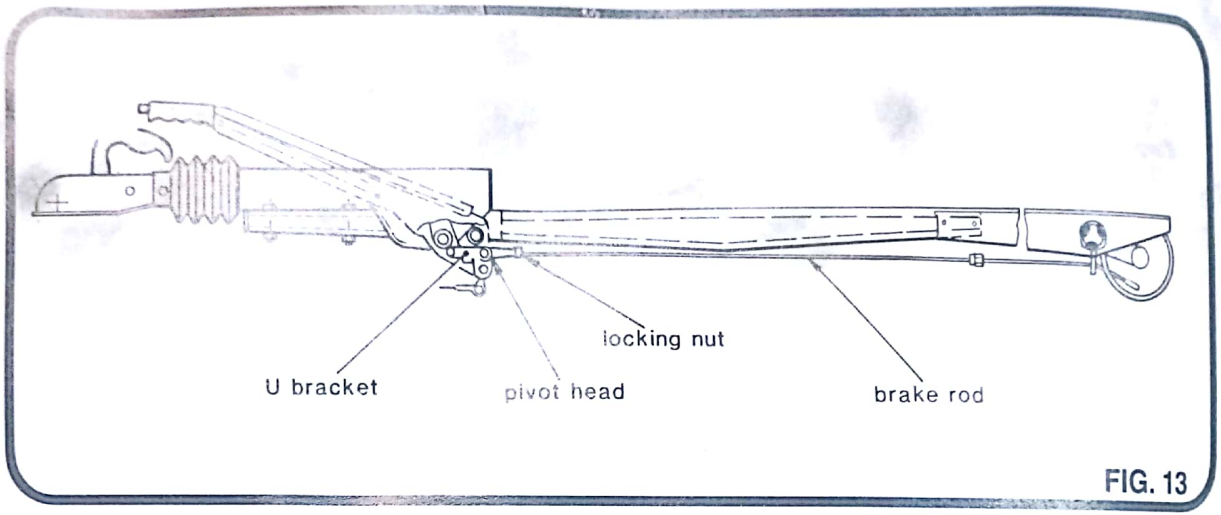


FIG. 13

Most users will find it easier to stand facing the towing unit while applying the handbrake and at the same time gently push the caravan an inch or two backwards with their posterior.

Gas Cylinder Type (Fig. 13)

A gas cylinder, acting as an accumulator of stored energy, can be fitted to the handbrake lever to provide the same effect as a spring cylinder.

This system is much more user friendly, as the handbrake lever need only be applied until it passes a clearly detectable dead point for it to render parking on reverse slopes or steep hills absolutely safe.

It takes minimal effort from the operator to move the handbrake lever past this dead point.

If the caravan or trailer starts to move when uncoupled from the towing unit, then the energy stored in the cylinder is released and the brakes applied in the normal manner.

Important Points to Remember

It is absolutely vital that the slight backwards push of the caravan or trailer is applied before it is uncoupled from the towing unit.

It is also important to check that the brake has in fact operated correctly as soon as the caravan has been uncoupled.

If the caravan or trailer is to be parked on a steep slope or on loose or slippery surfaces, it is advisable to chock the wheels.

Where possible, always ensure that the handbrake lever is in the fully vertical position.

When the handbrake has been applied, it is possible for the caravan or trailer to roll back as much as 25cm before the full force of the brake takes effect.

Installation

The correct functioning of the AL-KO braking system is totally dependent upon the correct installation of the wheel brake components.

This sub-section comprises advice on installing different items of the two types of braking system and how to set them to work.

All components of both the overrun device and the wheel brakes must be those manufactured by AL-KO as the braking and reversing systems must be matched to ensure optimum braking performance.

Combining parts manufactured by AL-KO with those produced by other suppliers will invalidate any guarantee entered into by AL-KO.

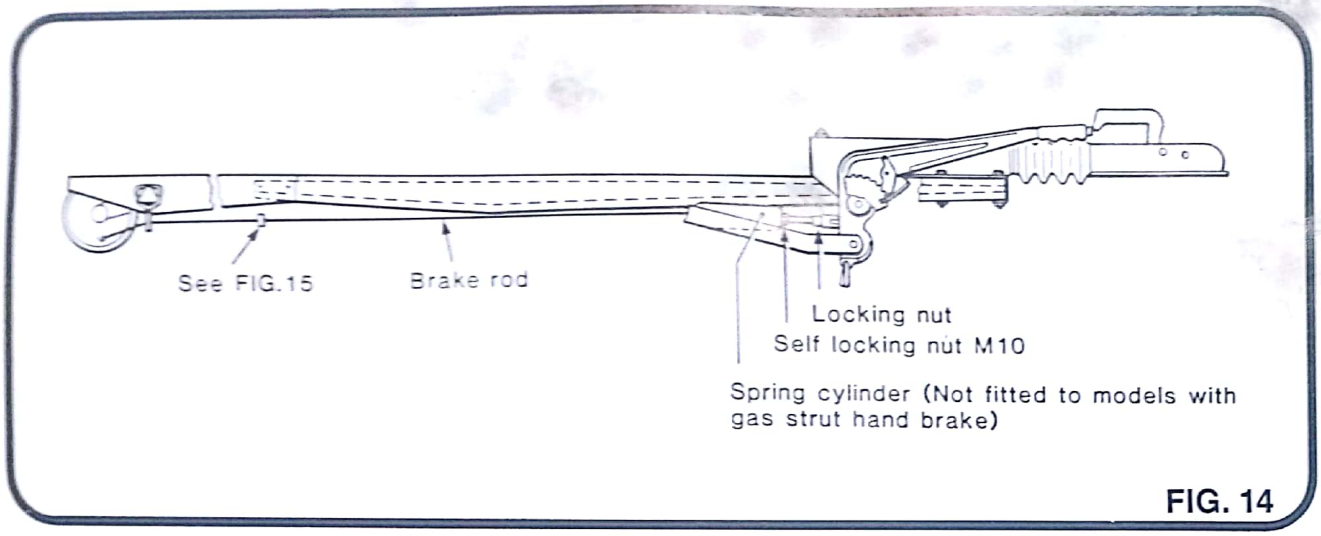


FIG. 14

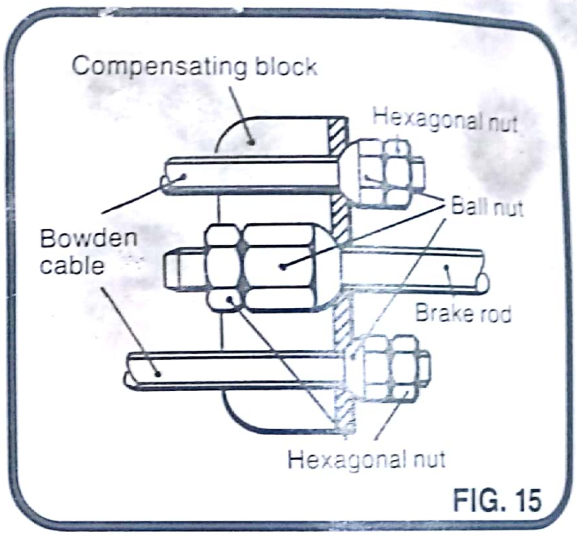


FIG. 15

Spring Cylinder Type (Figs. 14 and 15)

(a) Assemble the overrun device and axle to the chassis.

(b) Screw the handbrake stirrup then the spring cylinder onto the brake rod.

(c) Attach the brake rod to the fork head and secure using the hexagonal nut.

(d) Using the ball nut, connect the brake rod to the Bowden cables via the compensating bracket. Fit and hand tighten the hexagonal securing nut.

(e) Adjust the brake rod using the ball collar nut until there is between 5 and 8mm free play in the Bowden cable.

(f) Adjust the self-locking nut on the spring cylinder until there is no further play. The maximum play between the stirrup and the nut should be 1mm.

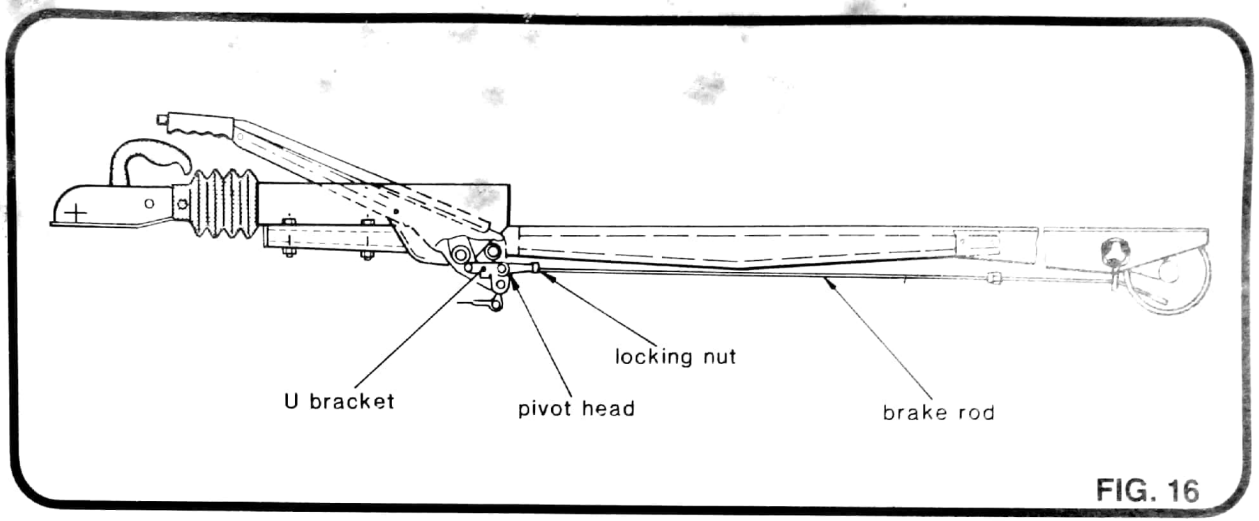


FIG. 16

Gas Cylinder Type with Pivot Head Transmission (Fig. 16)

(a) Assemble the overrun device and the axle to the chassis. Ensure that the drawshaft is fully extended.

(b) Screw the brake rod into the pivot head and secure using an M10 nut.

(c) Using the ball nut, connect the brake rod to the Bowden cables via the compensating bracket. Fit and hand tighten the hexagonal securing nut.

(d) Tighten the M10 ball nut on the brake rod until there is no further play in the transmission unit.

(e) Confirm that the wheels run freely in the forward direction of rotation. Fully tighten the hexagonal nut.

Correct adjustment of the brake and dead point can be checked by ensuring that the dead point is passed when the handbrake lever latches the pawl in the second tooth.

Important Note:

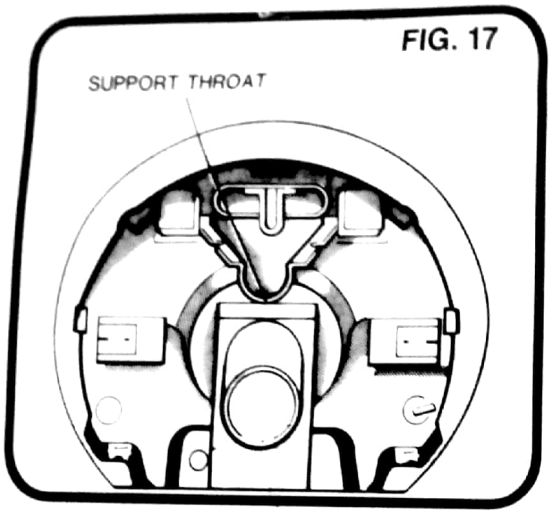
The torque settings to be used on AL-KO brake systems are:

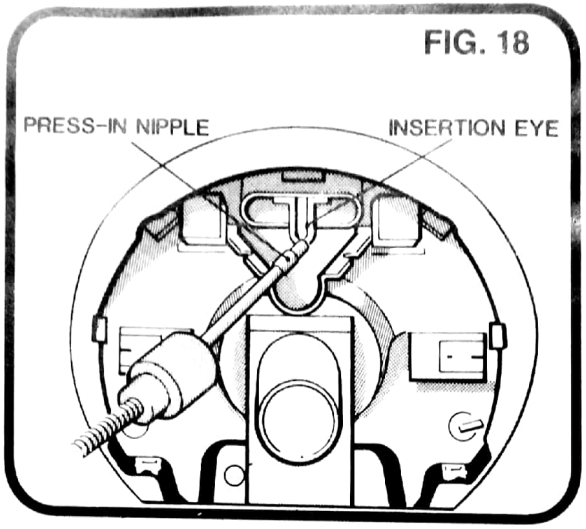
M10 – 49Nm (36ft. lb)

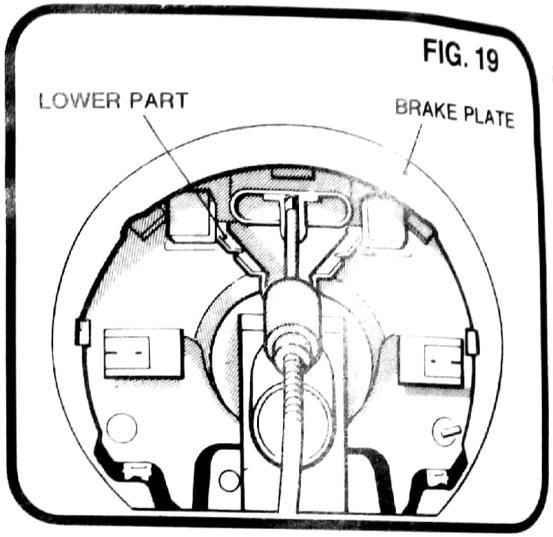
M12 – 86Nm (63.5ft. lb)

M14 – 135Nm (99.5ft. lb)

M16 – 210Nm (155ft. lb)







Fitting a Bowden Cable (Figs. 17 – 21)

The Bowden cable for the new asbestos free wheel brakes can be inserted externally.

Only an original AL-KO Bowden cable should be used for this task. These are embossed with the legend, AL-KO.

(a) Remove the steel sleeve from the support collar and detach the upper part of the Bowden cable support (Fig. 17).

(b) Insert the press-in nipple of an AL-KO Bowden cable into the insertion eye. Pull back the outer sheath of the cable so that the nipple engages correctly with the eye (Fig. 18).

(c) Insert the upper part of the Bowden cable support into the opening of the brake plate. Ensure that it is fitted flush with the welded, lower portion of the cable support (Fig. 19).

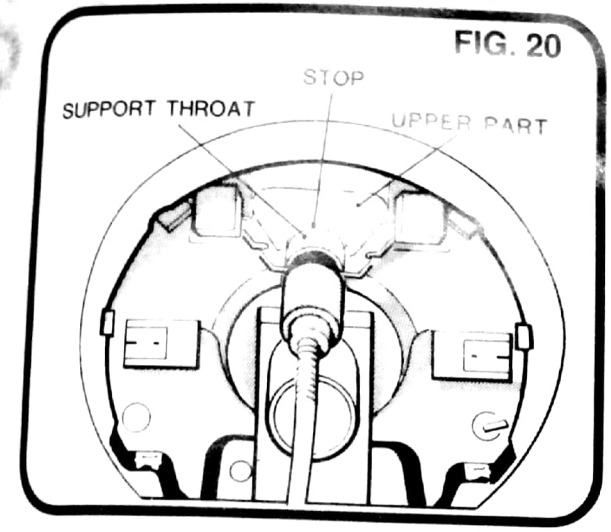


FIG. 20

(d) Push the Bowden cable end bush over the complete support throat of the collar until it can go no further (Fig. 20).

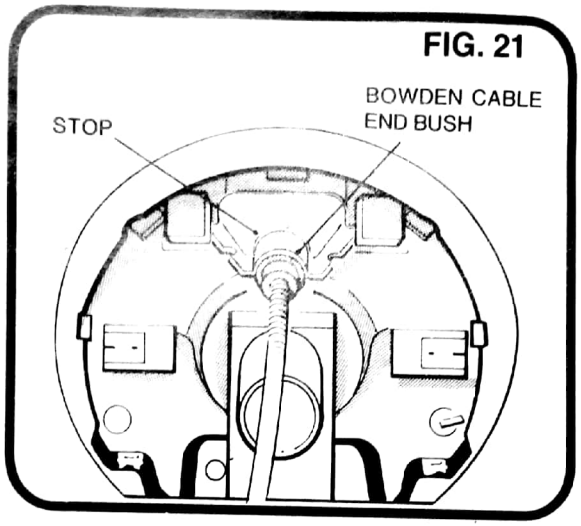


FIG. 21

(e) Visually confirm that the nipple is inserted correctly, then tighten the wire of the Bowden cable (Fig. 21).

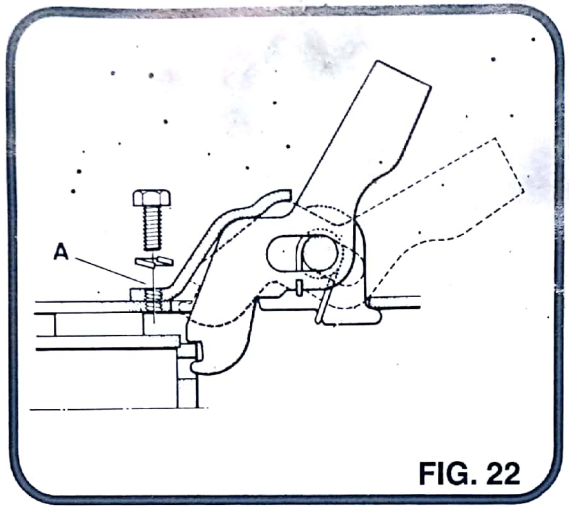


FIG. 22

Fitting a Auto Reverse Lock (Fig. 22)

A mechanical auto reverse lock can be installed as a retrofit to the overrun device on the 1615 and 2515 models only.

(a) Remove the sealing cap from the upper side of the housing.
(b) Using the housing as a template, drill a 6.6mm hole (A) into the overrun device housing.
(c) Cut a thread in the hole using an M8 tap.
(d) Insert the nose of the auto reverse lock into the overrun device housing and secure using the hexagonal bolt and spring washer.

Functional Test

This test should be carefully carried out to ensure that the braking unit remains fully operational.

(e) To engage the auto reverse lock, push in the drawshaft of the overrun device. The auto reverse lock should slide into the long hole.

(f) Pull out the drawshaft. The auto reverse lock should release automatically as the spring lifts the lever.

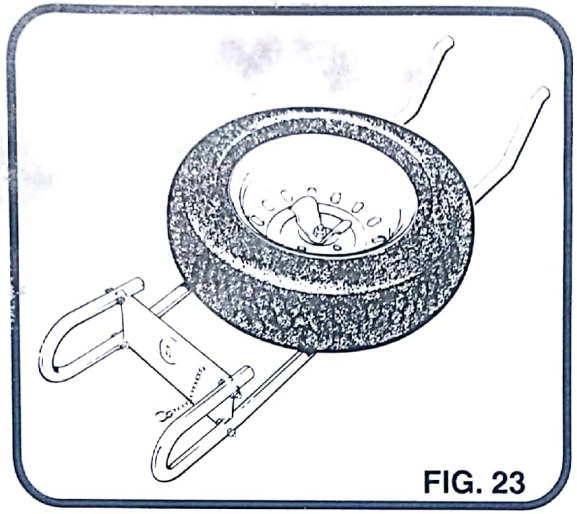


FIG. 23

1.6 Wheels and Tyres (Fig. 23)

Wheels

The AL-KO chassis is supported on road wheels fitted with pneumatic tyres. The size of wheel fitted to the chassis is dependent upon the load to be towed.

Each AL-KO caravan chassis has a set of punched holes immediately behind the axle to enable fitting of an AL-KO telescopic spare wheel carrier (Fig. 23).

The carrier is of extra strong, lightweight construction and zinc plated for all-weather protection. It is easy to fit and accepts all conventional wheel sizes.

Each chassis is provided with an adjustable jockey wheel which can be clamped inboard or outboard to one member of the 'A' frame close to its apex, or directly to the overrunning device. The jockey wheel provides stabilisation and can be fitted with a pneumatic or solid tyre.

Tyre	Load/axle (Kg)		Pressure Bar (P.S.I.)(ETRTO Recommended)	
	Up to 100 Km/hr	Up to 130 Km/hr	Up to 100 Km/hr	Up to 130 Km/hr
145SR13	825	750	2.4 (35 P.S.I.)	2.2 (33 P.S.I.)
155SR13	935	850	2.4 (35 P.S.I.)	2.2 (33 P.S.I.)
165SR13	1045	950	2.5 (37 P.S.I.)	2.3 (34 P.S.I.)
175SR13	1166	1060	2.5 (37 P.S.I.)	2.3 (34 P.S.I.)
175SR13 Reinf	1276	1160	3.1 (46 P.S.I.)	2.9 (43 P.S.I.)
175SR13C6 Ply	1407	1340	3.75 (55 P.S.I.)	3.75 (55 P.S.I.)

Tyres

Pressures

It is customary for manufacturers to mark tyres with load and inflation data. This information relates only to the use of the tyre on cars. For use on caravans, BS AU50, Part 1, Section 1, allows for an increase of 10% in load carrying capacity, with a corresponding increase in tyre pressure.

It is dangerous to drive with under-inflated tyres. The pressures (cold) recommended by the manufacturers and included above as Table 1, should be regarded as minima.

Pressure checks, including those on the spare tyre, should be made with the tyres cold and using an accurate pressure gauge. The checks should be carried out before each journey and at regular intervals during storage. If a jockey wheel is fitted with a pneumatic tyre, the pressure should be 25 to 30psi (1.7 to 2 bar).

Tyre Wear and Damage

The legal requirements for tread depth on motor vehicles tyres applies also to caravans. Similarly, it is not permitted to mix cross-ply and radial tyres on the same axle. A redundant tyre must be replaced by one of the same size and construction.

Wheels should be balanced and changed round occasionally to equalise wear and prolong the life of the tyres.

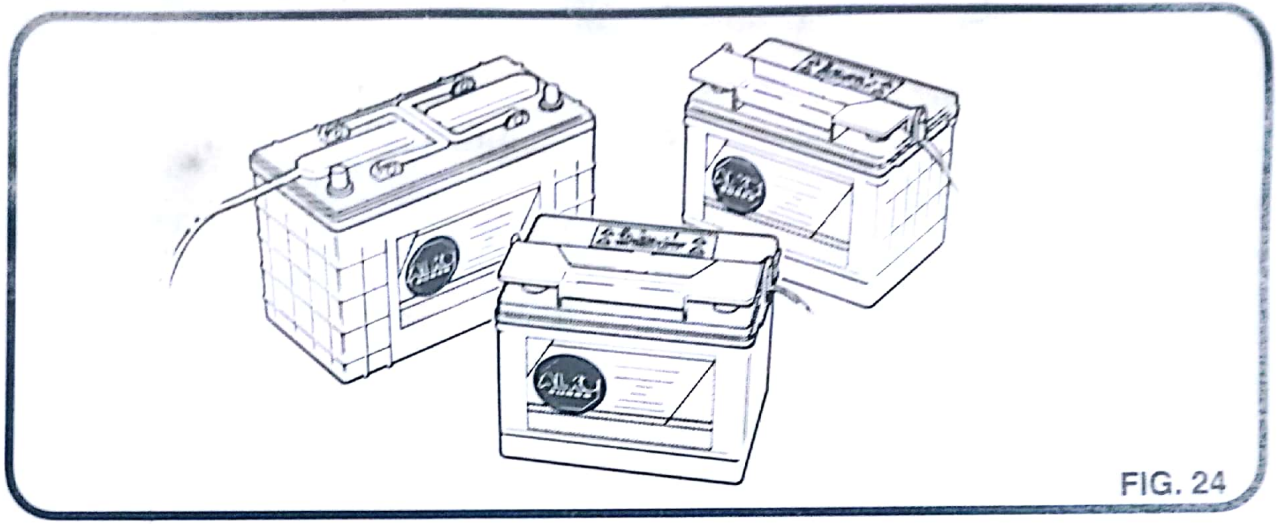


FIG. 24

It is very dangerous to neglect tyre damage. A tyre should be renewed if a blister, rupture or cut exposing the casing is detected. If the tyre has suffered violent impact (eg. against a kerb), it should be examined by a specialist as soon as possible.

1.7 Batteries (Fig. 24)

AL-KO B & B can supply a range of high energy batteries to power the caravan electrical equipment. Capacities available are 50, 60 and 90 ampere hour.

AL-KO batteries are manufactured under a BSI approved quality assurance system to provide a safe and reliable source of energy.

They are specifically designed to provide deep cycling characteristics. This means that the battery will discharge the power you need when you need it and then recharge without affecting its capacity or lifespan.

The batteries have strong, moulded cases complete with carrying handles for safe portability. They are reliable, easy to maintain and can be grouped to provide the total power requirement for all your leisure activities.

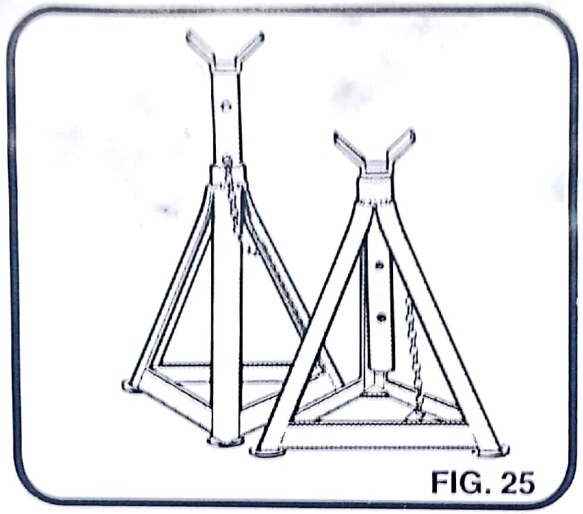


FIG. 25

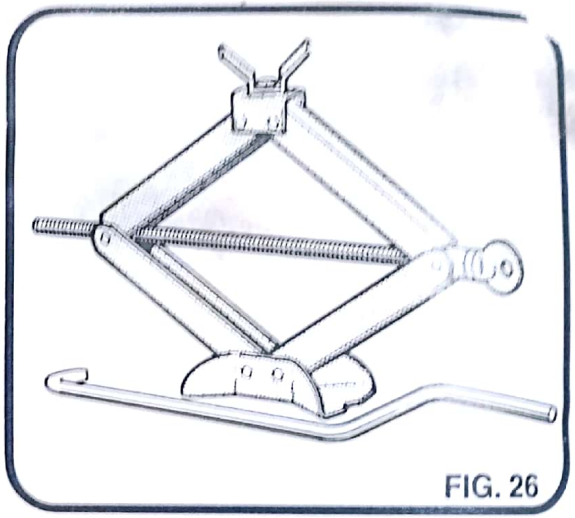


FIG. 26

1.8 Accessories

AL-KO offer a comprehensive range of accessories for use with all their caravan trailers. The list includes axle stands, scissor jacks, corner steadies, chocks and a combi brace to aid the servicing and maintenance task.

Axle Stands (Fig. 25) Part No. 356 859 (pair)
Rugged, pressed steel stands with four adjustment holes for height and heads contoured to accept an AL-KO shaped axle. Each stand will support a safe working load of 1200kg.

The stands provide added safety when working underneath the caravan and are ideal for winter storage purposes.

Scissor Jacks (Fig. 26) Part No. 356 858
The jack, fitted with a contoured head, will lift caravans weighing up to 1500kg to a height of 15in. Manufactured with a rugged pressed steel frame, the jack is supplied with a heavy duty steel brace and stows away flat.

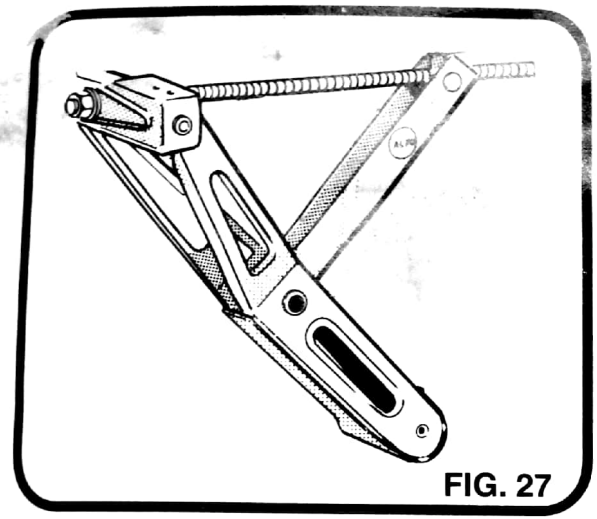


FIG. 27

Corner Steadies (Fig. 27) Part No. 205 712

Specially designed with a leg profile that ensures stability, the steadies can be supplied with fixed or swivel feet. They are also available in system-chassis or Stabilform configuration. A corner steady brace with 19mm hexagonal head is also available.

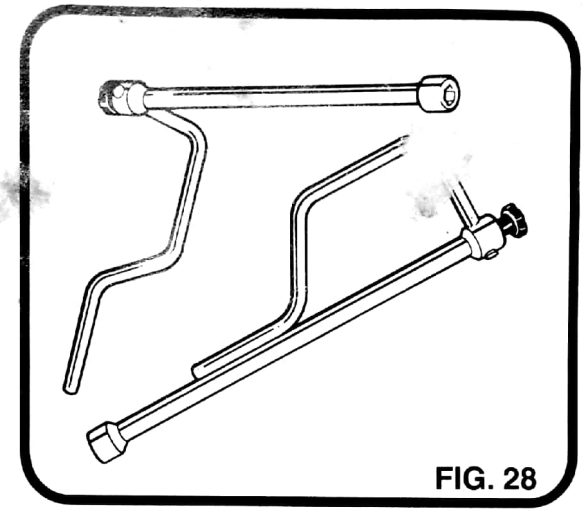


FIG. 28

Combi Brace (Fig. 28) Part No. 293 398

A combined corner steady and wheel brace designed to extend beyond the corner steadies. The unit folds to provide extra leverage and for stowage purposes. It is of long-lasting construction and has a plated finish.

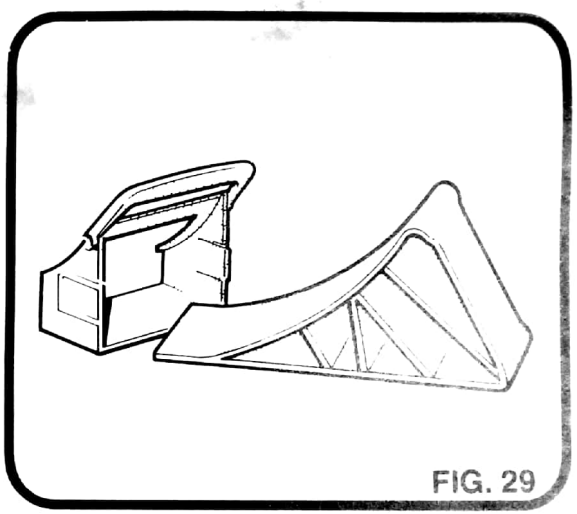


FIG. 29

Chocks (Fig. 29) Part No. 209 251

Heavy duty plastic chocks for small trailers supplied complete with carrier. The chocks are radiused to suit most wheels and are easy to handle.

SECTION 2 SERVICING

2.1 *Servicing Philosophy*

The AL-KO lightweight chassis has been designed to be maintained at its optimum performance level with minimal servicing. Servicing philosophy embraces lubrication, inspections and adjustments carried out in accordance with a schedule based on mileage. However, if the mileage is not attained, servicing should be carried out on a periodic basis.

2.2 Servicing Schedule

After First 500 Miles

Check wheel bearing adjustment

Check and adjust the brake shoes and the brake linkage

Every 500 Miles or 2-monthly

Inspect all wheels

Examine and lubricate the ball coupling

Inspect and lubricate the overrunning device

Lubricate the jockey wheel

Lubricate the brake linkage

Lubricate the corner steadies

Service the battery

Every 1500 miles or 6-monthly

Check and adjust the axial play of the wheel hub bearings

Visually check the axle for damage

Every 3000 Miles or Annually

Check wheel bearing adjustment

Measure the towing ball

Grease the overrunning device

Check and adjust the brake shoes and the brake linkage.

Grease the torsion bar axle

Every 6000 Miles or Biannually

Repack the wheel bearing hubs with grease

Adjust the axial play of the wheel hub bearings

Check the brake linings and brake shoe pull-off springs for wear or fatigue

Check and adjust the brake shoes and the brake linkage

Grease the running nuts on the brake linkage

Lubricate the pivot points of the running brake system

After Use Servicing

After journeys during winter; hose down to wash the salt off

After the trailer has been immersed in water; hose down to remove any corrosive substance that may attack the chassis.

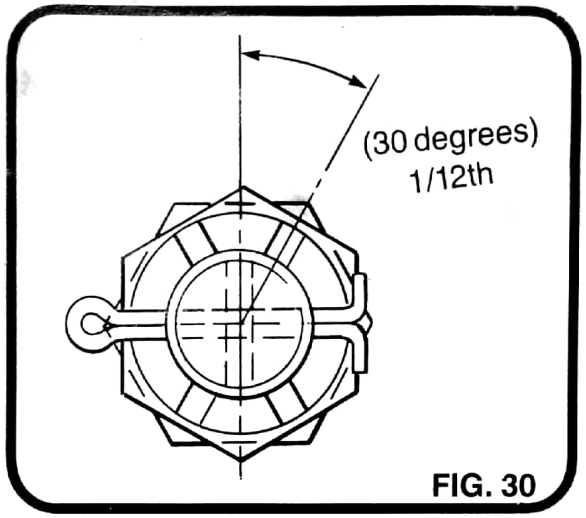


FIG. 30

Recommended Lubricants

Mobilgrease MP is recommended for all greasing routines. A good all-purpose oil is recommended for general use.

2.3 Wheel Bearing Adjustment (Fig. 30)

After the first 500 miles and at intervals of 3000 miles thereafter, examine the wheel bearing hubs for side play.

(a) Remove the push-in grease cap. (It may be freed by tapping lightly around its edge).

(b) Remove the split pin and tighten the castle nut (right hand thread) until free rotation of the drum is impaired.

(c) Slacken off the castle nut 1/12th of a turn (30 degrees) until one of its slots is aligned with a cross hole in the stub axle.

(d) Using a new split pin, secure the castle nut.

(e) Ensure that the drum is free to rotate.

Incorrect adjustment will result in bearing damage or excessive wear.

(f) Refit the push-in grease cap.

2.4 Check and Adjust the Brake Shoes and the Brake Linkage

The AL-KO automatic reversing brake system and its linkage should be periodically adjusted to compensate for wear of the brake shoe lining and subsequent stretching of the bowden cables.

The trailer brake will be subject to greater wear when used on continuous mountain journeys.

The corner steadies should never be used to jack up the unit. When jacking becomes necessary, use a bottle, screw or scissor type jack. (AL-KO Part NO. 356858 with axle shaped head is recommended.) Place the jack plate under the axle tube as near as possible to the main longitudinal member.

NEVER USE THE CHASSIS MEMBERS AS A JACKING POINT.

Recommended Adjustment Procedure

(a) Jack up the axle to raise the road wheel clear of the ground. Place a chock under the grounded wheel.

(b) Ensure that the drawshaft is fully extended (in the towing position) and the handbrake is OFF (fully forward position). Confirm that there is some end float in the rod and spring cylinder.

The brakes must be adjusted first and then, but only if necessary, the brake linkage.

During wheel brake adjustment, the drum must only be turned in the direction of forward rotation.

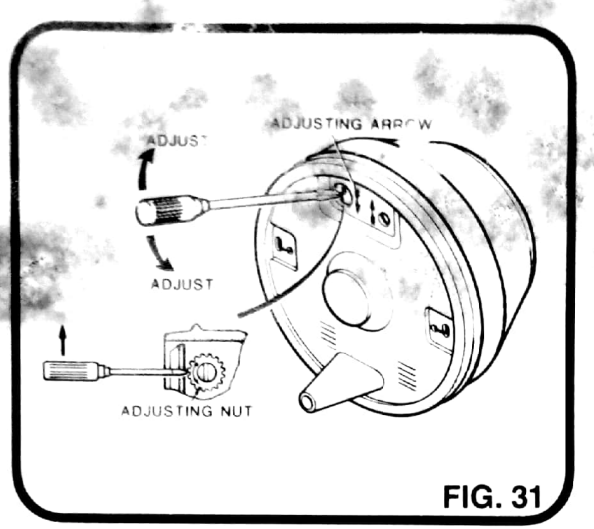


FIG. 31

Do not use excessive force during adjustment.

Wheel Brake Adjustment (Fig. 31)

(c) Remove the plastic bung at the rear of the brake back plate and insert a suitable screwdriver into the hole.

(d) Adjust the starwheel in the direction of the arrow until there is resistance to wheel movement.

(e) Slacken until the brake drum turns freely in the forward direction.

(f) Check for correct adjustment at the chassis end of the bowden cable. When pulled, the cable should extend between 5 and 8mm.

(g) Check for uniform response by both wheel brakes when the handbrake is operated. Adjustment must be made on the wheel brake, not on the brake linkage.

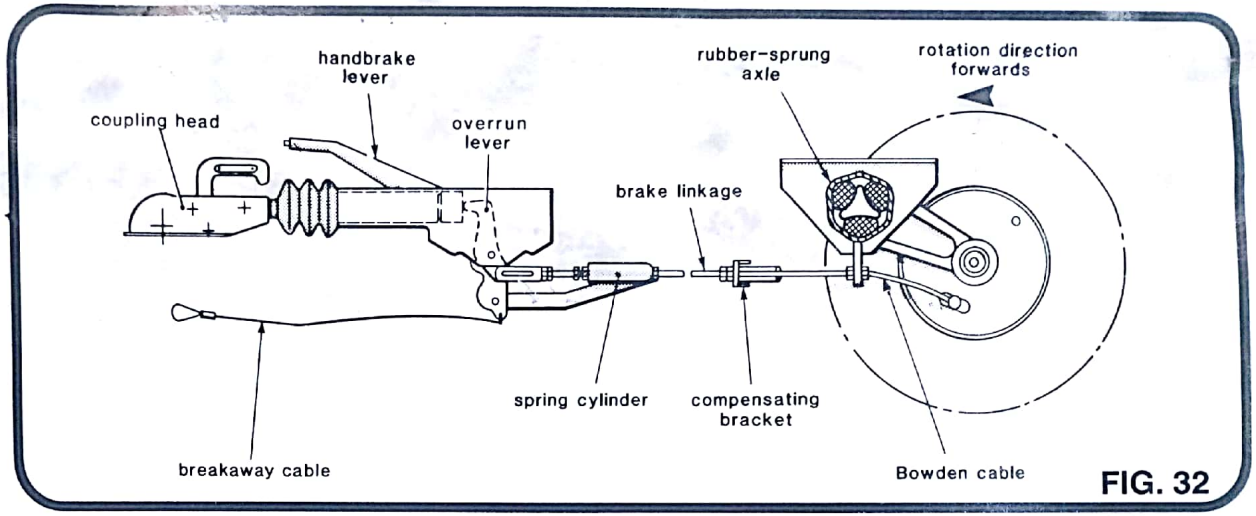


FIG. 32

Brake Linkage Adjustment (Fig. 32)

(h) Apply the handbrake two or three times to ensure that the brake shoes are centralised on the drum. Recheck shoe clearance at the wheel brake.

(i) Centre brake rod – check that there is full thread engagement in the fork end of the overrunning device. Secure the locking nut.

(j) At the axle, ensure that the compensator plate is parallel to the axle by adjusting the nuts on the bowden cables. Lock the nuts.

(k) Adjust the centre brake rod at the rear nut so that there is no clearance between the overrun lever and the drawshaft and plate. Secure the locknuts.

(l) Correct adjustment of the linkage is checked by operating the handbrake lever so that it engages the second tooth of the ratchet and confirming that a slight braking force is felt at the wheels.

(m) On completion, tighten the self locking nut to give 1mm clearance between the nut and the spring cylinder. (Ignore this instruction if a gas strut type handbrake lever is fitted).

Reversing will be difficult if either the wheel brake or the brake linkage is over-adjusted.

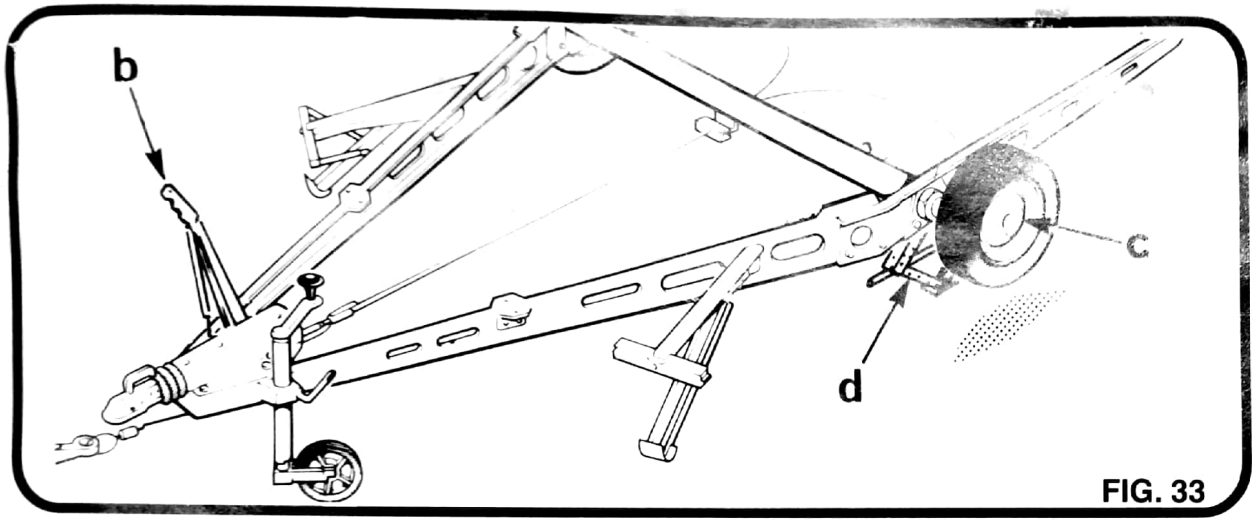


FIG. 33

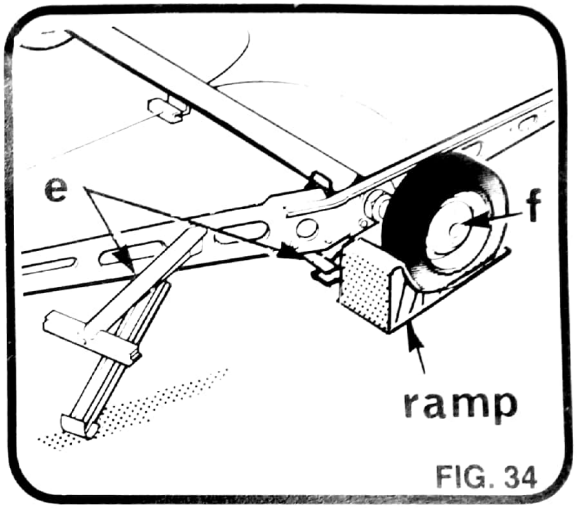


FIG. 34

2.5 Inspecting/Changing the Wheels

(a) Inspect all wheels (including the spare) for damage and distortion, paying particular attention to the flanges and wheel dish. Confirm that the wheel bolt seatings are not cracked.

Damaged or distorted wheels must be renewed immediately.

Changing a Wheel (Figs. 33 and 34)

The corner steadies must not be used to jack up the caravan. They can be lowered to touch the ground only as a safety measure to stabilise the caravan.

(b) Apply the handbrake fully as for parking.

Do not forget to give the caravan or trailer a slight rearwards push to stop the reversing lever collapsing.

(c) Slacken off the wheel bolts on the wheel to be changed.

(d) Jack up the caravan with the jack under either the axle tube or the axle mounting plate.

Do not use the chassis as a jacking point.

If there is lack of ground clearance because of a flat tyre, gently move the caravan onto some ramping boards.

(e) Support the weight of the caravan on axle stands or ramping boards. Lower the corner steadies.

(f) Remove the wheel bolts and remove the redundant wheel.

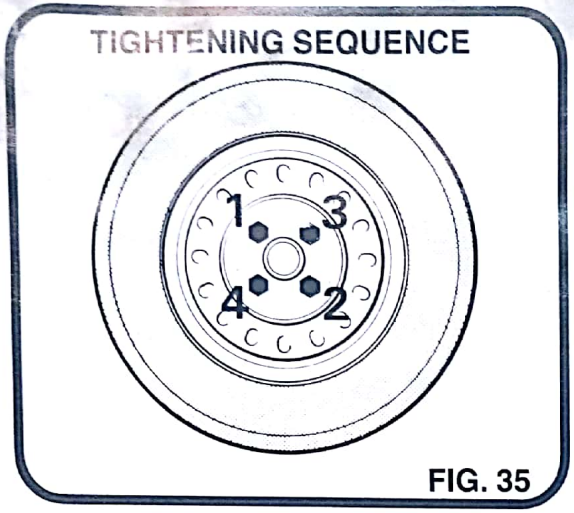


FIG. 35

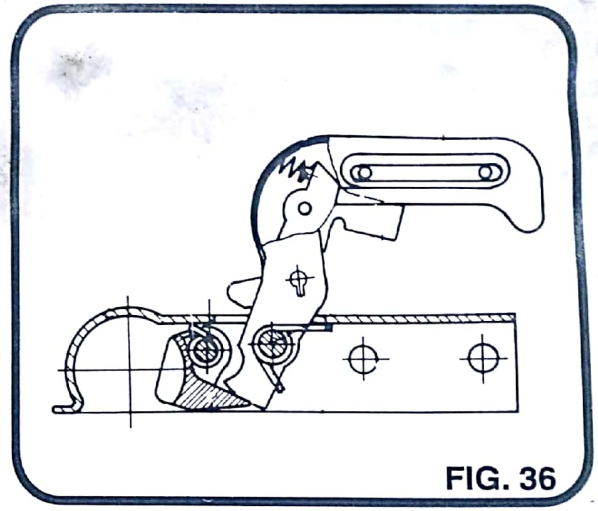


FIG. 36

Before fitting a new wheel, examine it for distortion or other damage. Ensure that all mating surfaces are clean and dry, including bolt/nut seats.

ALWAYS USE THE CORRECT BOLTS OR NUTS TO SECURE THE WHEEL.

A corner steady brace is not to be used for the next step.

(g) Fit the new wheel and refit the wheel bolts.

After the nuts have been screwed on as far as possible by hand, each nut should be tightened gradually in sequence. The wheels of the trailer will not rotate during tightening as they are held rigid by the wheel hub brake unit.

Using an AL-KO Combi brace or suitable socket wrench, sequentially tighten the wheel bolts to a torque of 9kg/m (65lb/ft) following the procedure shown in Fig. 35.

(h) Raise the corner steadies. Take the weight of the caravan onto the jack and remove the axle stands or ramping boards.

(i) Lower the caravan to the ground.

Wheel NUTS are tightened to 8kg/m (62lb/ft).

The torque settings should be rechecked after the first 20 miles of use, and every 3000 miles thereafter.

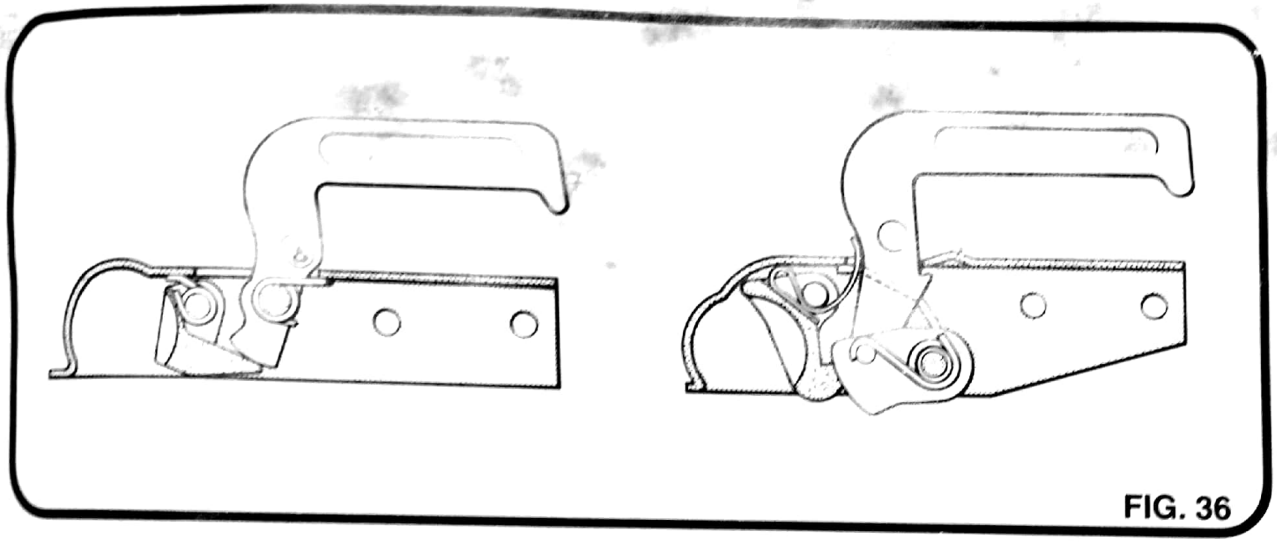


FIG. 36

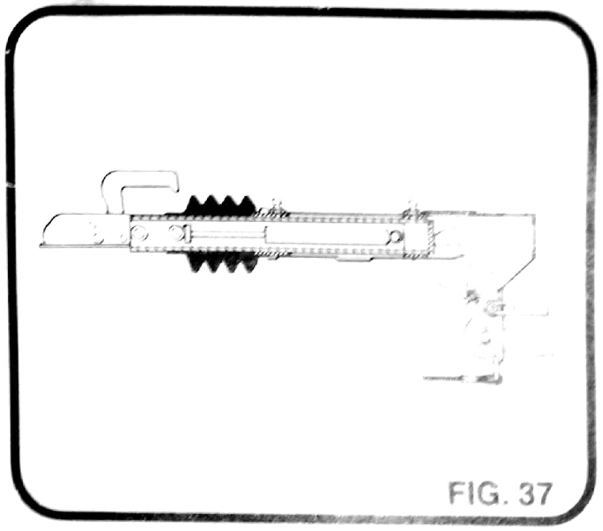


FIG. 37

2.6 Examine and Lubricate the Ball Coupling. (Fig. 36)

(a) Examine all moving parts and the locking feature for wear and correct operation.

(b) Clean off and grease the spherical seat, bearing points and pivot pins.

Torque for securing bolts of ball couplings:

60S – AK7	60Nm(13.5lbf)
90S – AK10	80Nm(18lbf)
161S – AK10	90Nm(20lbf)
251S – AK26	90Nm(20lbf)

2.7 Examine and Lubricate the Overrunning Device. (Fig. 37)

(a) Examine all pivot pins and levers for correct operation and lubricate with oil.

(b) Check the handbrake ratchet for correct operation and lubricate with oil.

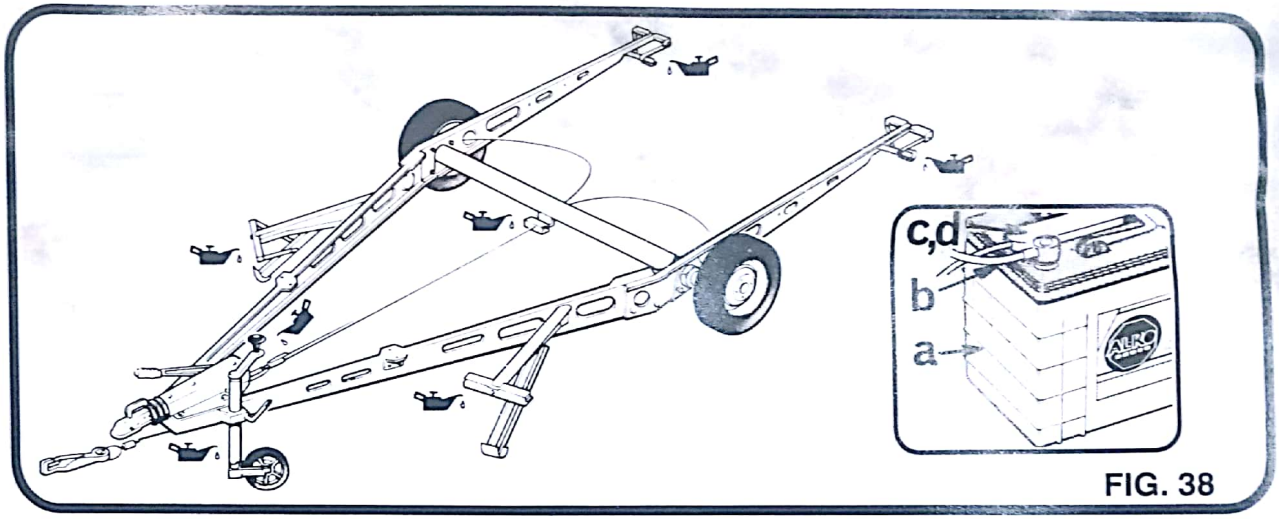


FIG. 38

Lubrication (Fig. 38)

2.8 Lubricate the Jockey Wheel

Lightly oil the wheel axle and screw thread.

2.9 Lubricate the Brake Linkage

Lightly oil all moving parts.

2.10 Lubricate the Corner Steadies

Lightly oil the screw and pivot pins.

2.11 Service the Battery (Fig. 38)

(a) Examine the battery casing for cracks or damage.

(b) Check that the battery leads are securely attached to the terminal posts. Lightly grease the posts and connectors with petroleum jelly.

(c) Inspect the electrolyte level in each cell. Top up as necessary with distilled or demineralised water.

(d) Clean off excess grease and water from the battery top, using a clean dry rag.

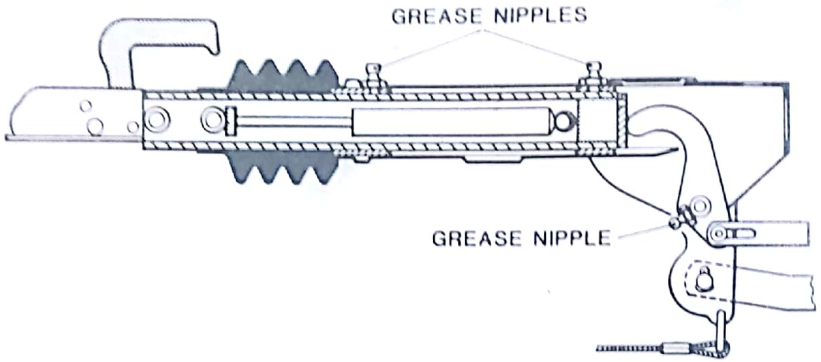


FIG. 39

2.12 Measure the Towing Ball

Using a suitable gauge, confirm that the diameter of the towing ball measures 50mm maximum, 49.61mm minimum.

A WORN BALL SHOULD BE RENEWED WITHOUT DELAY.

2.13 Grease the Overrunning Device (Fig. 39)

Grease the shaft bearing via the nipples provided.

2.14 Repack the Wheel Bearing Hubs with Grease

(a) Remove the grease cap. Remove the split pin and unscrew the hub nut.

(b) Set the handbrake lever to the OFF position.

(c) Remove the hub/drum. A light tap with a mallet may be required.

(d) Thoroughly clean out all the old grease from the wheel bearing hub.

(e) Repack the hub with multipurpose grease (to DIN 51825 KTA 3K).

The wheel bearing hubs must not be overpacked with grease.

(f) Refit the hub/drum and secure with the hub nut.

(g) Insert the split pin and refit the grease cap.

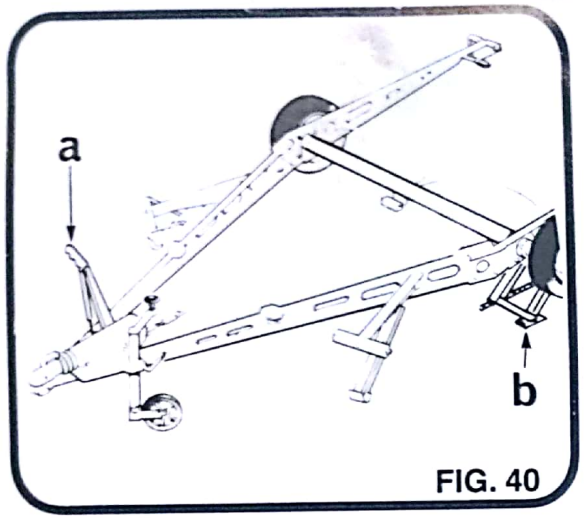


FIG. 40

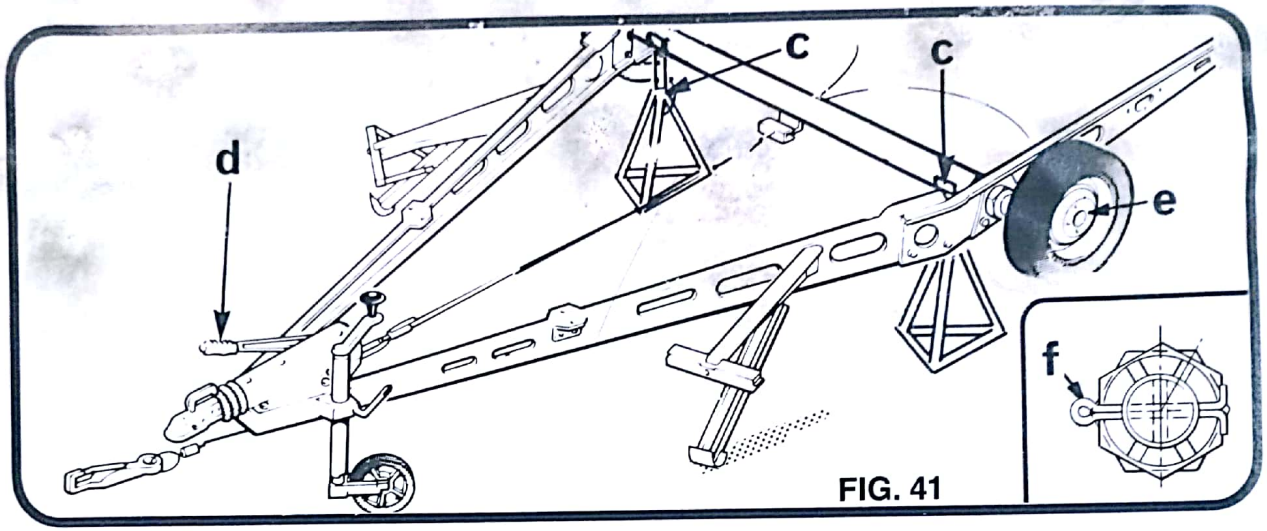


FIG. 41

2.15 Check and Adjust the Axial Play of a Wheel Hub Bearing (Figs. 40 and 41)

The corner steadies must not be used to jack up the caravan. They can be lowered to touch the ground only as a safety measure to stabilise the caravan.

(a) Apply the handbrake fully.

(b) Jack up the trailer with the jack under either the axle tube or the axle mounting plate.

Do not use the chassis as a jacking point.

(c) Support the weight of the trailer on axle stands or ramping boards. Lower the corner steadies.

(d) Release the handbrake and confirm that the wheels rotate on the stub axles freely, without catching.

To Adjust the Bearing Axial Play

(e) Remove the hub cap.

(f) Remove the split pin from the castellated nut.

(g) Slowly turn the wheel hub and simultaneously tighten the nut until resistance to turning is detectable.

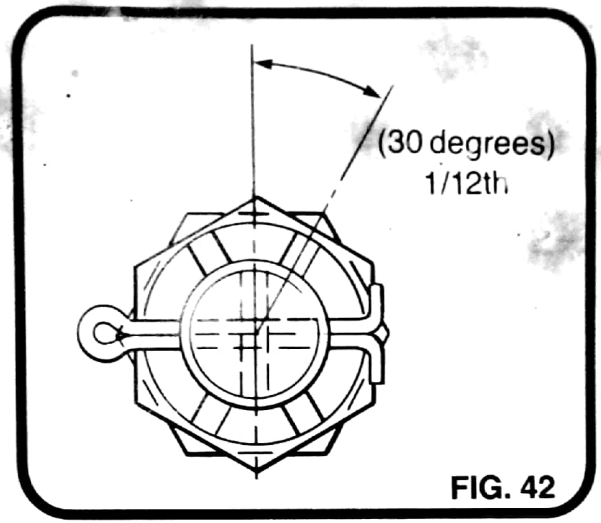


FIG. 42

Use a torque spanner set to 5kg/m (3.5lbf). Do not use an impact torque spanner.

(h) Turn back the castellated nut approximately 1/12th of a turn (30 degrees) to the next point at which the split pin can be inserted (Fig. 42).

(i) Insert the split pin and secure.

(j) Check the running of the wheel. It should oscillate slowly without detectable play at the rim.

OVERTIGHTENING THE CASTELLEATED NUT WILL LEAD TO BEARING DAMAGE.

(k) If required, regrease the wheel bearings using multipurpose grease (see Service Instruction 2.14).

2.16 Servicing After Use

Journeys During Winter

(a) To prevent white rust formation, wash down the chassis using clean fresh water after each journey on salty, wet roads during winter.

(b) Clean the dirt from the crank supports and regrease.

(c) Check all bolted joints for damage and tighteness.

Trailer Immersed in Water

(d) If the trailer has been driven into fresh or salt water, regrease the wheel hub bearings every three months.

2.17 Check the Brake Linings and Pull Off Springs for Wear or Fatigue.

The left and right hand shoes of wheel brakes type 1625 and 1627 have embossed marking arrows which must be taken note of when fitting.

The brakes will not work if the shoes are fitted to the wrong side.

For wheel brakes type 2051 and 2361, the left and right shoes are identical.

(a) Check the brake linings for wear at the wear check opening. Renew as required.

(b) Check the brake pull-off springs for fatigue. Renew as required.

(c) Adjust the brake unit by following the procedure detailed in instruction 2.4.

2.18 Visual Check

Inspect the axle for wear or damage. Renew with an AL-KO axle if required.

The springing system of this type of axle must NOT be greased, as this could degrade the designed safety function.

2.19 Grease a Torsion Bar Axle

Apply grease to the four nipples provided.

Do not overgrease.

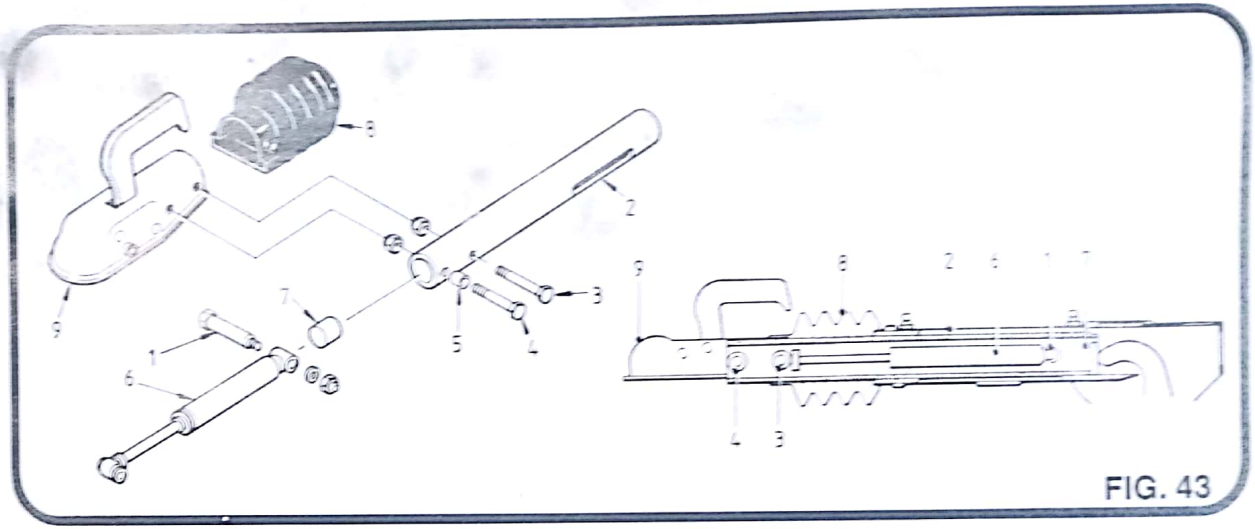


FIG. 43

SECTION 3 MAINTENANCE

3.1 Section Content

This section details procedures for tasks not considered part of normal servicing.

3.2 Renewing the Overrun Device Damper (Fig. 43)

Always fit an AL-KO gas strut damper of the correct type.

Removal

(a) Unscrew and remove the eye bolt (1).

(b) Remove the draw shaft tube (2) from the overrun device.

(c) Unscrew the hexagonal nuts, remove bolts (3 & 4) and bush (5).

(d) Remove the coupling head (9) and gaiter (8).

(e) Remove the faulty damper (6).

Refitting

(f) Insert the rubber buffer (7) into the draw shaft tube (2).

(g) Introduce the new damper (6) into the draw shaft tube (2), ensuring that the eye of the damper is positioned parallel to the bolt holes.

(h) Insert the draw shaft tube (2) into the overrun device.

(i) Refit the eye bolt (1) from right to left (looking in the direction of travel) and secure with its nut.

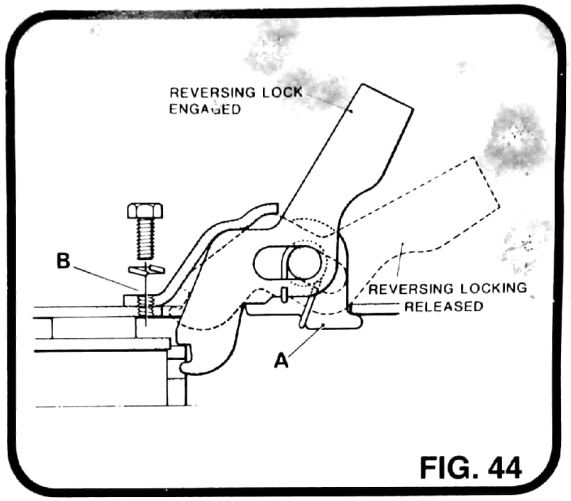


FIG. 44

(j) Refit the gaiter (8) into position.

(k) Refit the coupling head (9) and secure with bolt (4), bush (5) and hexagonal nut.

(l) Push the draw shaft tube fully home, compressing the damper at the same time.

(m) Withdraw the shaft tube again up to its stop, allowing the damper to slowly extend.

(n) Refit the bolt (3) through the coupling head, the draw shaft tube and the damper eye. Secure with the hexagonal nut.

3.3 Retrofit a Reversing Lock on 131R/161R/251R/161S and 251S Type Overrun Devices. (Fig. 44)

(a) Remove the cap on top of the body.

(b) Fit lugs (A) into the body of the overrun device.

(c) Secure the reversing lock with a hexagonal bolt and lock washer, retapping the bore of hole (B) if necessary.

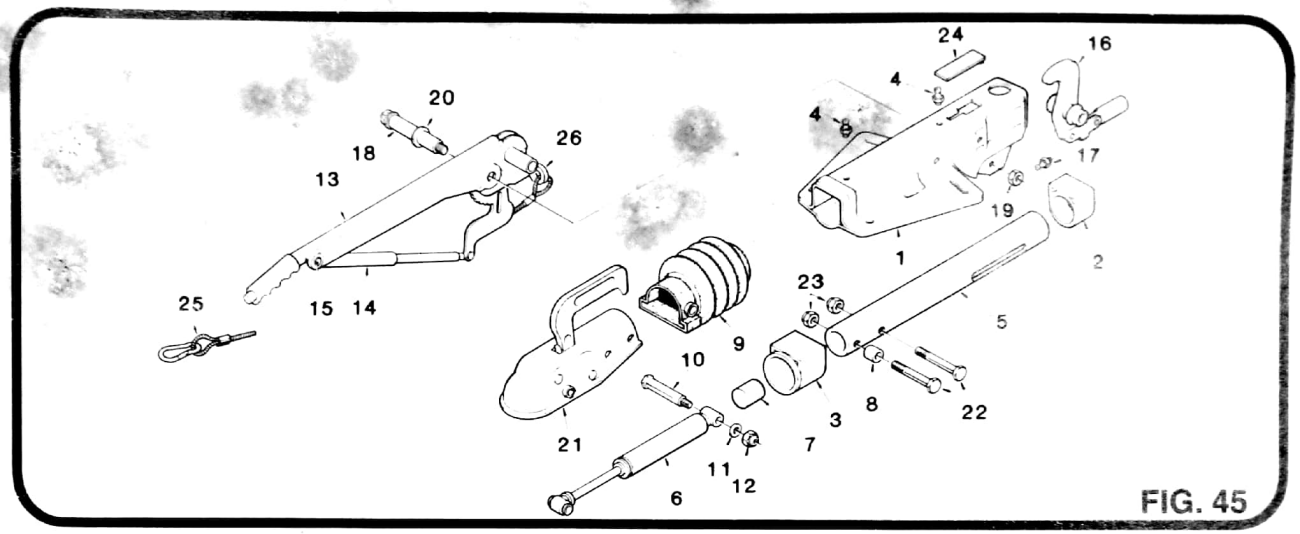


FIG. 45

3.4 Change a shock absorber on types 161S/251S/131R/161R/251R (Fig. 45)

Ensure that only an AL-KO gas filled shock absorber is fitted.

Removal

(a) Remove the nut (12), washer (11) and withdraw bolt (10).

(b) Withdraw the towing tube (5).

(c) Remove nuts (23) and withdraw bolts (22); retain the bush (8).

(d) Remove the ball coupling (21).

(e) Withdraw the redundant shock absorber (6) from the towing tube (2).

Assembly

(f) Insert the stop buffer (7) back into the towing tube (5).

(g) Slide the new shock absorber (6) into the towing tube.

The eye of the shock absorber must be parallel to the bolt holes in the towing tube.

(h) Introduce the retaining bolt (10) into the slot in the towing tube and push it through the eye at the rear of the shock absorber (6). Secure using washer (11) and nut (12), ensuring that the towing tube still moves freely.

(i) Refit the concertina shroud (9).

(j) Refit the ball coupling (21) and secure using the bushed bolt (22), bush (8) and nut (23). Confirm that the ball coupling still moves freely.

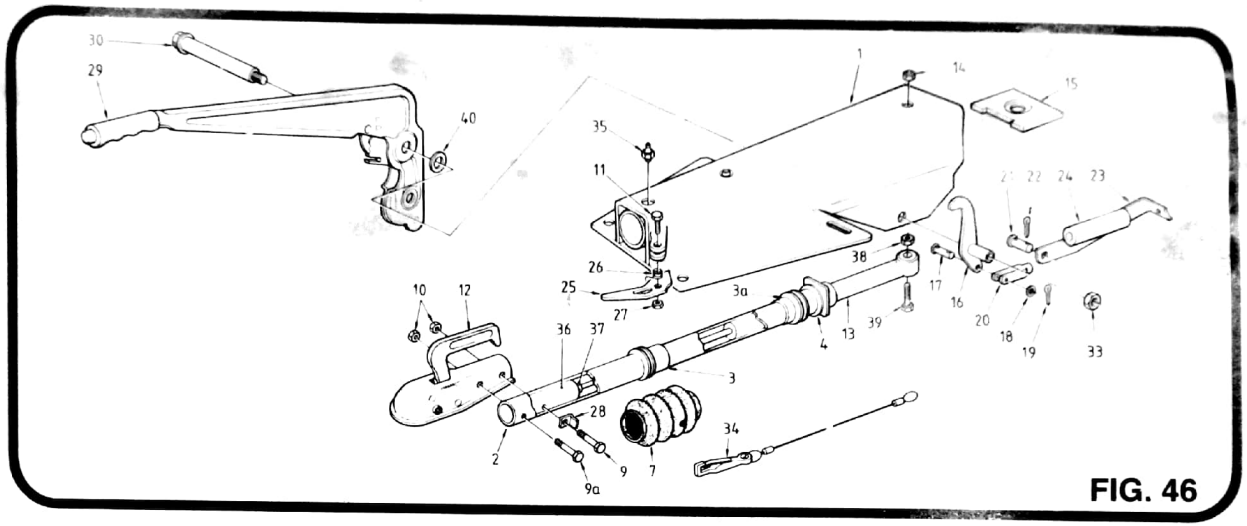


FIG. 46

(k) Push the towing tube into its housing to compress the shock absorber.

(l) Pull the towing tube out until it abuts against the stop.

(m) The shock absorber will slowly extend. As it does so, insert the remaining bolt (22) so that it passes through the ball coupling, towing tube and the outermost eye of the shock absorber. Secure using the remaining nut (23).

(n) Pull the concertina shroud over the exposed portion of the towing tube.

3.5 Change a shock absorber on types 30S/60S-2/90S-3 (Fig. 46)

Ensure that only an AL-KO gas filled shock absorber is fitted.

Removal

(a) Remove nuts (14 and 38) and withdraw bolt (39) from the eye at the innermost end of the shock absorber. Retain stop plate (15).

(b) Remove nuts (10) and withdraw bolts (9 and 9a); retain bracket (28).

(c) Remove the ball coupling (12).

(d) Withdraw the redundant shock absorber (13) from the towing tube (2).

Assembly

(e) Insert the new shock absorber (13) into the towing tube (2).

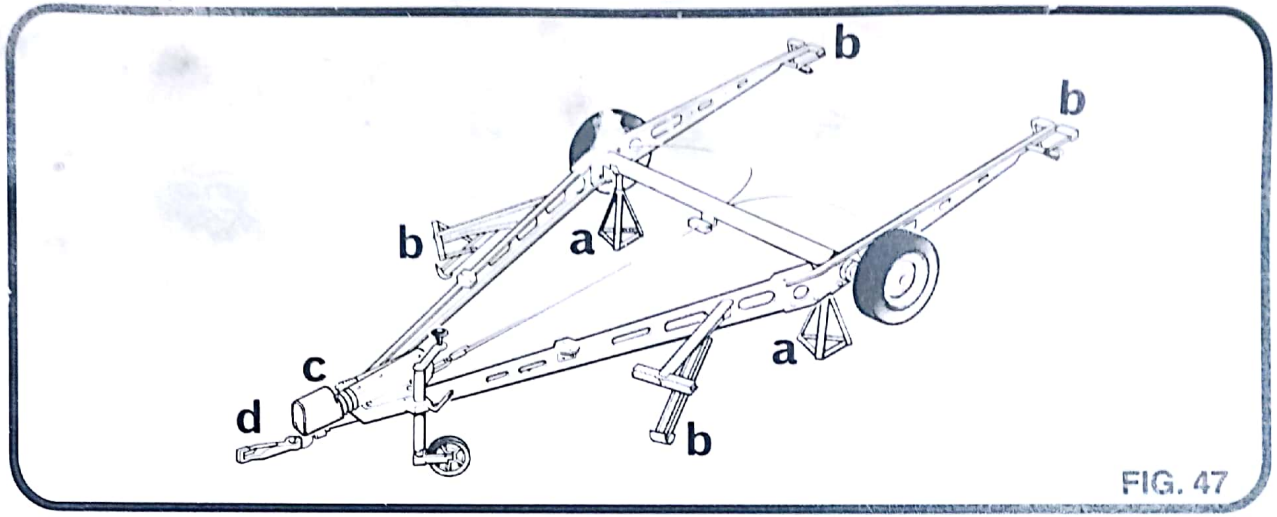


FIG. 47

The eye of the shock absorber must be parallel to the bolt holes in the towing tube.

(f) Locate the ball coupling (12) in place so that its holes are aligned with those of the towing tube (2).

(g) Align the holes in the shock absorber (13), ball coupling (12) and towing tube (2). Secure using bolts (9 and 9a), bracket (28) and nuts (10). Confirm that the coupling moves freely.

(h) Depress the shock absorber and align the stop plate (15) to the eye on the innermost end of the shock absorber. Secure using bolt (1) and nuts (14 and 38).

3.6 Storing Your Caravan (Fig. 47)

If your caravan is to be stored for any length of time, e.g. over winter, the following procedure is recommended:

(a) Jack up the caravan and support it on AL-KO axle stands or blocks so that the wheels are clear of the ground.

(b) Lower the corner steadies.

(c) Release the handbrake and rotate the wheels periodically to keep the bearings lubricated.

(d) Protect the coupling head from the elements by fitting the ALKO hitch cover.

SECTION 4 FAULT FINDING

FAULT	CAUSE	REMEDY
Uneven braking	Incorrectly adjusted wheel brake	Adjust as detailed (2.4)
	Brake cable seized	Free or renew cable (1.5)
	Brake lining contaminated with grease	Renew the brake shoe assemblies (2.17)
Trailer brakes when the towing unit slows down	Shock absorber in overrun device weak or ineffective	Inspect the shock absorber and renew if required (3.4 or 3.5)
	Brakes overadjusted	Adjust as detailed (2.4)
Trailer brakes snatch when the towing unit brakes	Brakes overadjusted	Adjust as detailed (2.4)
	Brake cable sticking	Inspect and free or renew cable (1.5)
	Brakes overadjusted	Carry out a complete check of the brake transmission system (2.7, 2.4)
	Shock absorber weak or ineffective	Renew the shock absorber (3.4 or 3.5)
	Drawshaft sticking	Examine the drawshaft over its full stroke; lubricate if necessary (2.7)
Brake judder	Linings contaminated with grease	Renew the brake shoe assemblies (2.17)
	Separation of lining from shoe	Renew a brake shoe assembly (2.17)
	Distorted or cracked brake drum	Renew the brake drum (1.5)
	Patches of rust on the braking face of the drum	Clean the face with sandpaper; wipe over with methylated spirit
Trailer brakes lock whilst reversing	Brakes overadjusted	Adjust as detailed (2.4)
	Reverse lever not functioning	Examine and rectify defect (2.7)

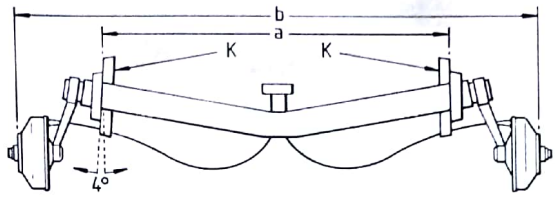
FAULT	CAUSE	REMEDY
Trailer brakes inoperative	Brakes underadjusted	Adjust as detailed (2.4)
	Lining contaminated	Renew the brake shoe assembly (2.17)
	Seized brake cables	Free or renew cables (1.5)
Hot brakes	Linings worn out	Renew the brake shoe assemblies (2.17)
	Brakes overadjusted	Adjust as detailed (2.4)
	Hub bearings too tight	Adjust as detailed (2.15)
	Pull-off spring broken	Renew the spring (2.17)
	Seized brake cables	Free or renew the cables (1.5)
	Bowden cable kinked or stretched	Renew the Bowden cable (1.5)
	Rusty brake drum	Clean using sandpaper then meths
	Handbrake lever not fully released	Release handbrake
	Transfer unit not fully released	Adjust as detailed (3.2)
Handbrake will not hold trailer on a slope	Spring cylinder incorrectly adjusted	Adjust as detailed (2.7, 3.2)
Handbrake effect too weak	Brake or linkage underadjusted	Adjust as detailed (2.4)
	Linings not run in	Clears after short running-in period
	Friction losses too high	Lubricate brake transmission and Bowden cable
	Faulty adjustment	Adjust as detailed (2.4)

FAULT	CAUSE	REMEDY
Erratic driving control and jerky braking effect	Shock absorber faulty	Renew the shock absorber (3.4 or 3.5)
Braking effect too weak	Too much play in the braking unit	Adjust as detailed (2.4)
	Towbar slides right in	Adjust as detailed (3.4 or 3.5)
	Linings not run in	Clears after short period of use
	Linings damaged	Renew the brake shoe assemblies (2.17)
	Friction losses too high	Examine and lubricate the transfer unit and brake cable
	Corrosion on the towbar	Adjust as detailed (2.4)
	Faulty adjustment	
Brakes overheating when the unit is travelling forward	Brake unit not completely released when the unit moves forward	Release the handbrake
		Inspect the transfer unit and the pivot lever of the overrun device for freedom of movement
	Dirty wheel brake	Clean the wheel brake unit
	Bowden cable kinked	Renew the Bowden cable (1.5)
	Pull-off springs weak or broken	Renew the pull-off springs (2.17)
	Rusty brake drum	Clean the brake drum
Coupling will not engage on the ball	Ball diameter greater than 50mm	Renew the coupling ball (2.12)
Trailer cannot be uncoupled	Coupling components dirty or jammed	Clean and grease coupling or renew
	Ball out of round	Position trailer and towing unit into straight line, then uncouple
Excessive play between coupling and ball leading to danger of unhooking	Coupling worn	Renew coupling
	Coupling ball worn	Renew the coupling ball (2.12)

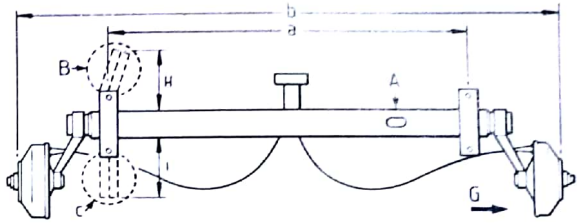
DATA PLATE on axle tube

ENTER all details

Delta semi-trailing arm suspension



Trailing arm suspension

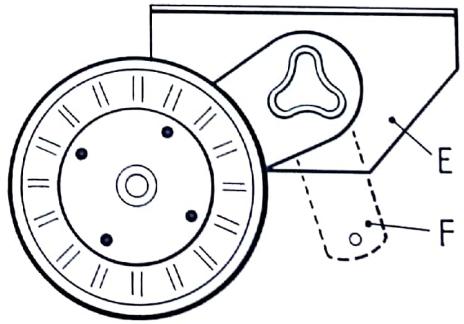


SECTION 5 ORDERING SPARES

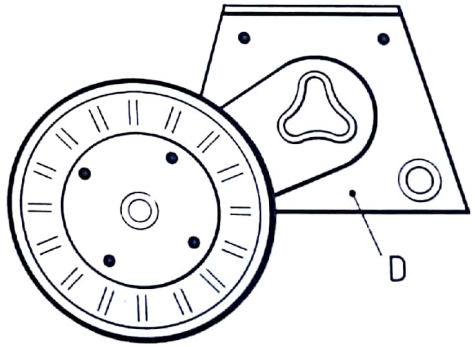
Dear trailer owner,
Please always quote the data shown when ordering spares, to ensure prompt attention to your orders: always keep this manual in your trailer (the relevant details may already have been entered by your dealer).

Remember: AL-KO has its own service network in Europe.
We wish you a safe journey.

Standard support bracket

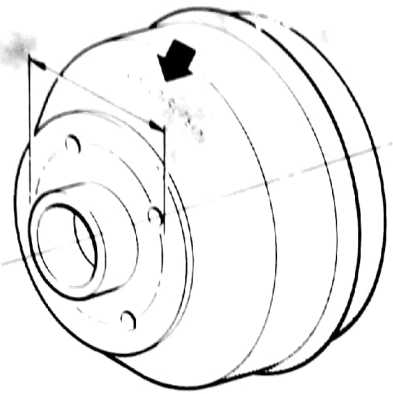


Integrated support bracket

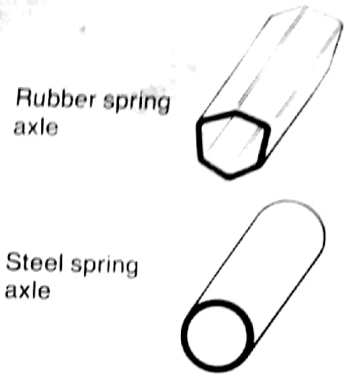


Data on the brake backplate

Data on the brake drum

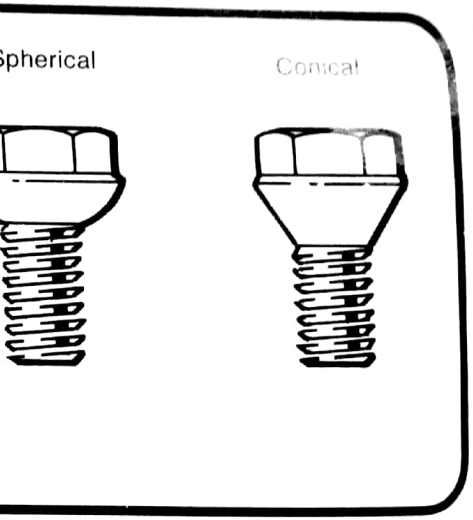


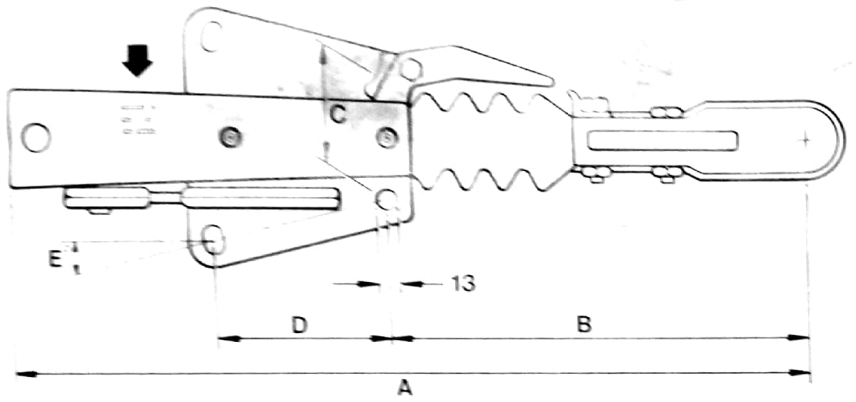
Section through the axle tube



For explanation of letters see next page

1. Trailer:
   Type: .....
   Built in: .....
2. Technical data on the brake backplate: .....
3. Wheel shock absorbers yes ☐ no ☐
4. Support brackets:
   Standard ☐ Integrated ☐
   Extended to the back ☐
   Extended to the front and bent ☐
   Dim H ..... mm Dim. I ..... mm
5. Axle type:
   Trailing arm (rubber) ☐
   Trailing arm (steel) ☐
   Semi-trailing arm (rubber) ☐
   Semi-trailing arm (steel) ☐
6. Dimensions:
   Dim. a ..... mm
   Dim. b ..... mm
7. Brake drum No. .....
   Wheel attachment ..... x ..... PCD
   Wheel bolts Spherical ☐ Conical ☐





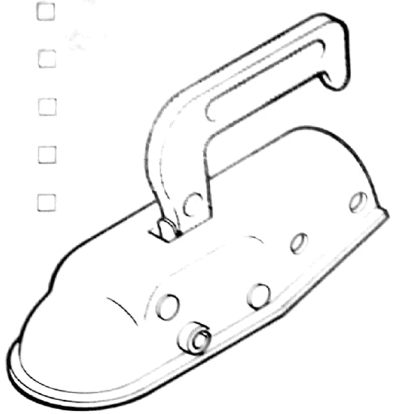
Overrun Device

60 S	☐
90 S/1/2	☐
120 SR	☐
160 SR	☐
161 S	☐
200 SR	☐
251 S	☐

The data appears on the top of the body.

***Ball Couplings**

AK-7	☐
AK-9	☐
AK-10/2	☐
AK-13/1	☐
AK-21	☐



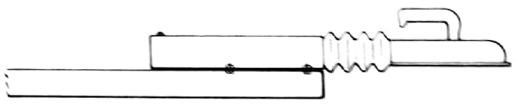
Explanations

A = Data plate
B = Support bracket extended to the front and bent
C = Support bracket extended to the back
D = Integrated support bracket
E = Standard support bracket
F = Shock absorber bracket (if fitted)
G = Technical data on the brake backplate

H = Dim. from the centre of the axle to the front face of the support bracket
I = Dim. from the centre of the axle to the rear face of the support bracket
K = Integrated support bracket, straight ..., staggered by 4 degree ...

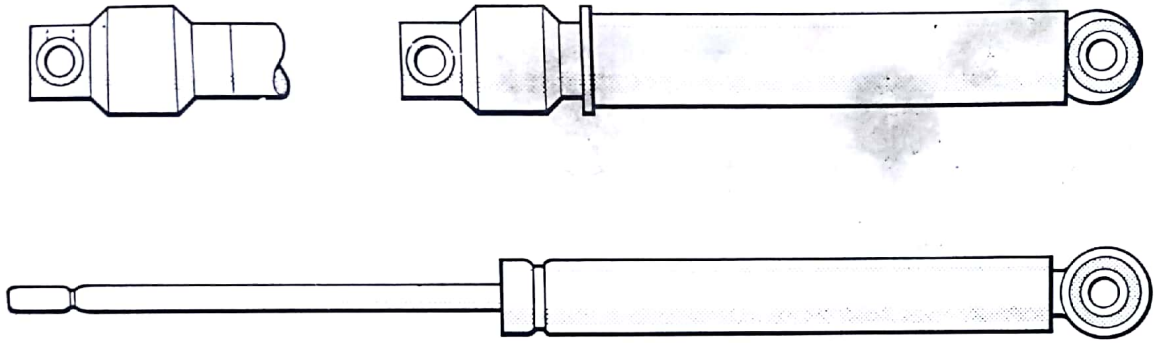
Overrun Device

Top Mounting



Bottom Mounting

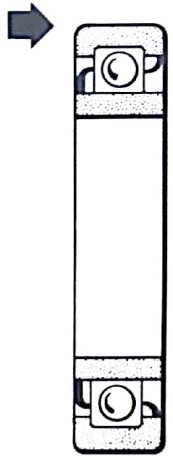
SHOCK ABSORBER



Shock absorber type (data stamped on body)

Type 354 029 ☐ Supercedes 207 672
359 987 ☐ Supercedes 207 745
207 755 ☐
207 773 ☐
207 864 ☐

A

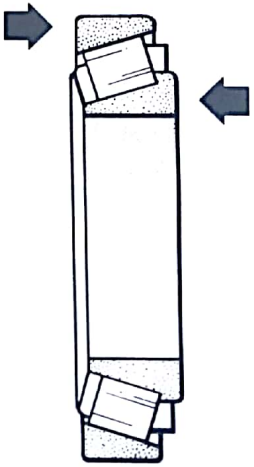


Bearing data appears on the Side

A.		B.			
6003	☐	Ring		K-LM 67010	☐
6005	☐	Cup		K-LM 67048	☐
6203-C3	☐	Ring		K-LM 11910	☐
6204-C3	☐	Cup		K-LM 11949	☐
6205-C3	☐				
6206-C3	☐				

* Security Locks with keys are available as an accessory
Part No. 203216 – For AK-7, AK-9 & AK-10/2
Part No. 203141 – For AK-13 & AK-21

B



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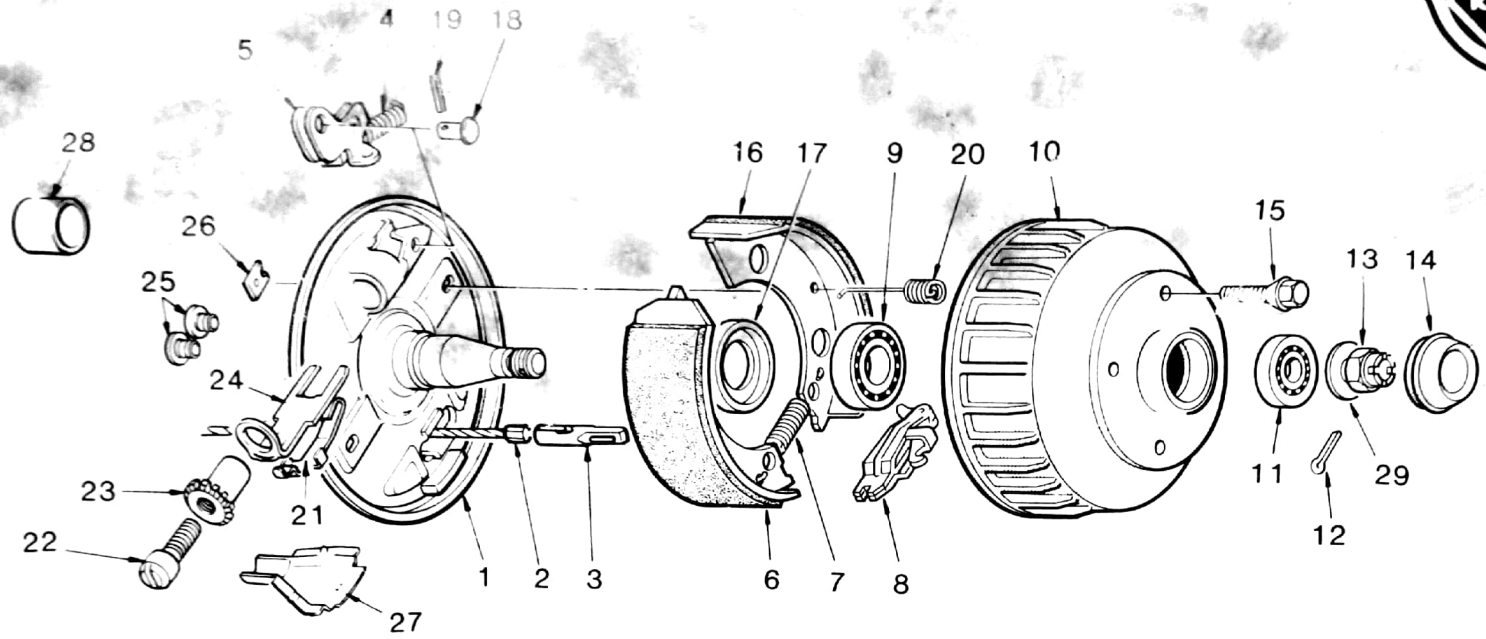
SECTION 6

ILLUSTRATED PARTS LIST

BRAKES 1637

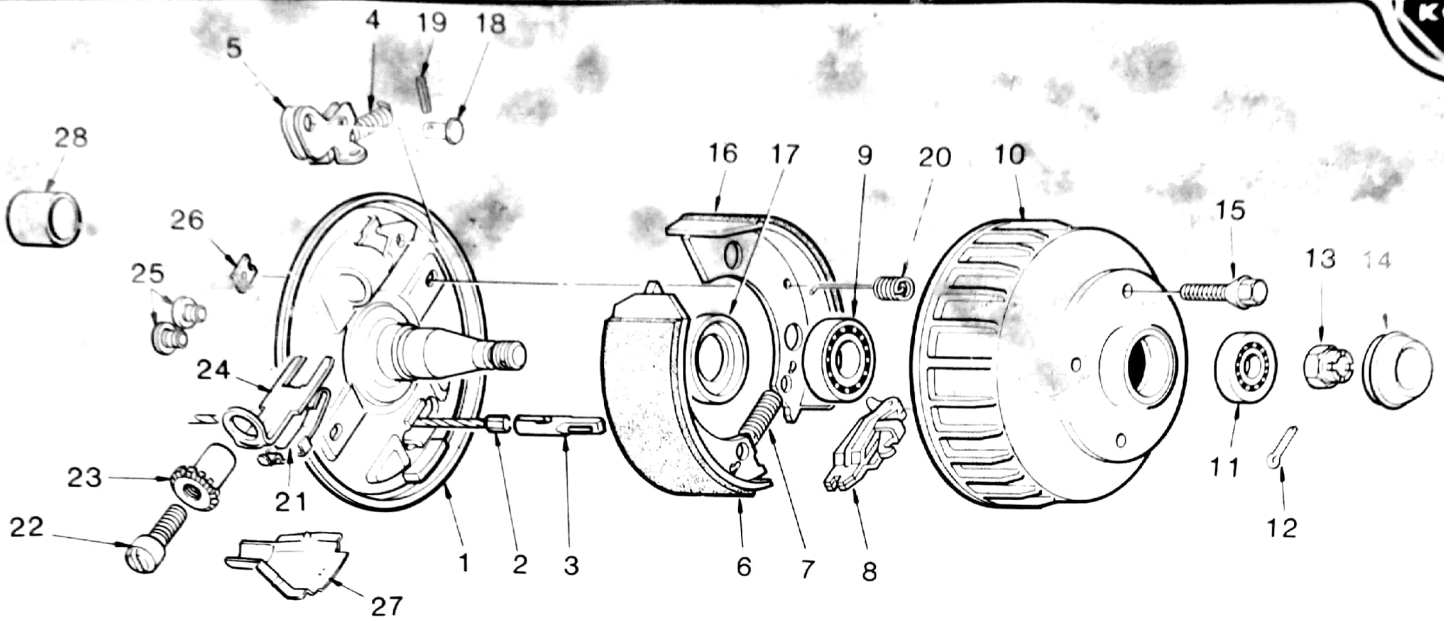


PART DESCRIPTION	PART No.
2 Bowden Cable	
350	299 707
530	299 708
770	299 709
890	299 710
1010	299 711
1130	299 712
1310	299 713
1430	299 714
1610	299 715
1790	299 716
3 Link	371 388
4 Tension Spring (Left)	218 887 00 01
Tension Spring (Right)	372 805
5 Transmission Lever (Left)	384 308
Transmission Lever (Right)	384 309

PART DESCRIPTION	PART No.
6 Brake Shoe	384 481
7 Tension Spring	218 215 00 03
8 Expanding Clutch	218 215 03
9 Bearing	701 513
10 Brake Drum	
98x4 / M 12x1,5	357 700
100x4 / M 12x1,5	357 701
11 Bearing LM1 1749 / LM 11710	701 512
12 Split Pin Ø 4x30 DIN 94	700 194
13 Castle Nut M 16x1,5 DIN 937	700 754
14 Grease Cap	208 399 00 02
15 Wheel Bolt	
M 10x1,25	208 892 00 10
M 12x1,5	208 167 00 18
M 12x1,5	208 167 00 02
M 14x1,5	208 167 00 02
M 18x1,5	218 568 00 06

PART DESCRIPTION	PART No.
16 Brake Shoe (Right)	384 296
17 Oil Seal B 40x52x7	701 511
18 Pivot Pin	368 651
19 Split Pin	700 192
20 Pressure Spring	208 880 00 03
21 Leaf Spring	368 405
22 Adjusting Screw	218 737 00 02
23 Adjusting Nut	218 737 08
24 Pressure Clip	368 395
25 Screw	373 245
26 Cover Plate	238 261 00 02
27 Cover	371 387
28 Lockwasher	218 215 00 05
29 Bush	371 389

BRAKES 2051

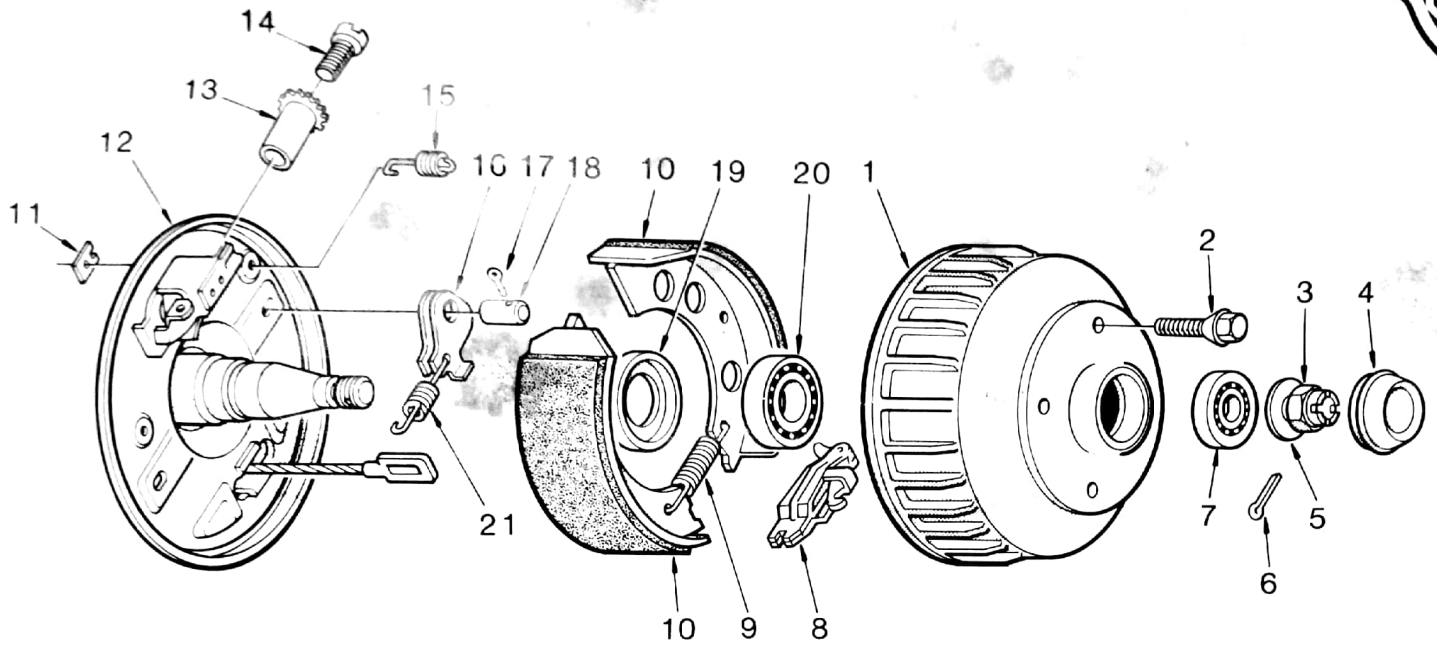


PART DESCRIPTION	PART No.
2 Bowden Cable	
Long 350	299 707
530	299 708
770	299 709
890	299 710
1010	299 711
1130	299 712
1310	299 713
1430	299 714
1610	299 715
1790	299 716
3 Link	371 388
4 Tension Spring	218 737 00 03
5 Transmission Lever (Left)	218 737 07
Transmission Lever (Right)	218 737 07

PART DESCRIPTION	PART No.
6 Brake Shoes	384 294
7 Tension Spring	208 200 00 07
8 Expanding Clutch	218 737 04
9 Bearing LM 67048 / LM 67010	700 771
10 Brake Drum	357 705
98 x 4 / M 12 x 1,5	357 706
100 x 4 / M 12 x 1,5	357 701
112 x 5 / M12 x 1,5	357 708
11 Bearing LM 11949 / LM 11910	700 764
12 Split Pin Ø 4 x 28 DIN 94	701 035
13 Castle Nut M 18 x 1,5 DIN 937	700 117
14 Grease Cap	208 399 00 02
15 WHEEL BOLT	
M 10x1,25	208 892 00 10
M 12x1,5	208 167 00 18

PART DESCRIPTION	PART No.
M 12x1,5	208 167 00 20
M 14x1,5	208 167 00 02
M 18x1,5	218 568 00 06
17 Oil Seal 42x62x7	700 272
18 Pivot Pin	368 651
19 Split Pin 4x20 DIN 94	700 192
20 Pressure Spring	208 880 00 03
21 Adjuster Assy	387 323
25 Screw	373 245
26 Cover Plate	238 261 00 02
27 Cover	371 387
29 Bush	371 389

BRAKES

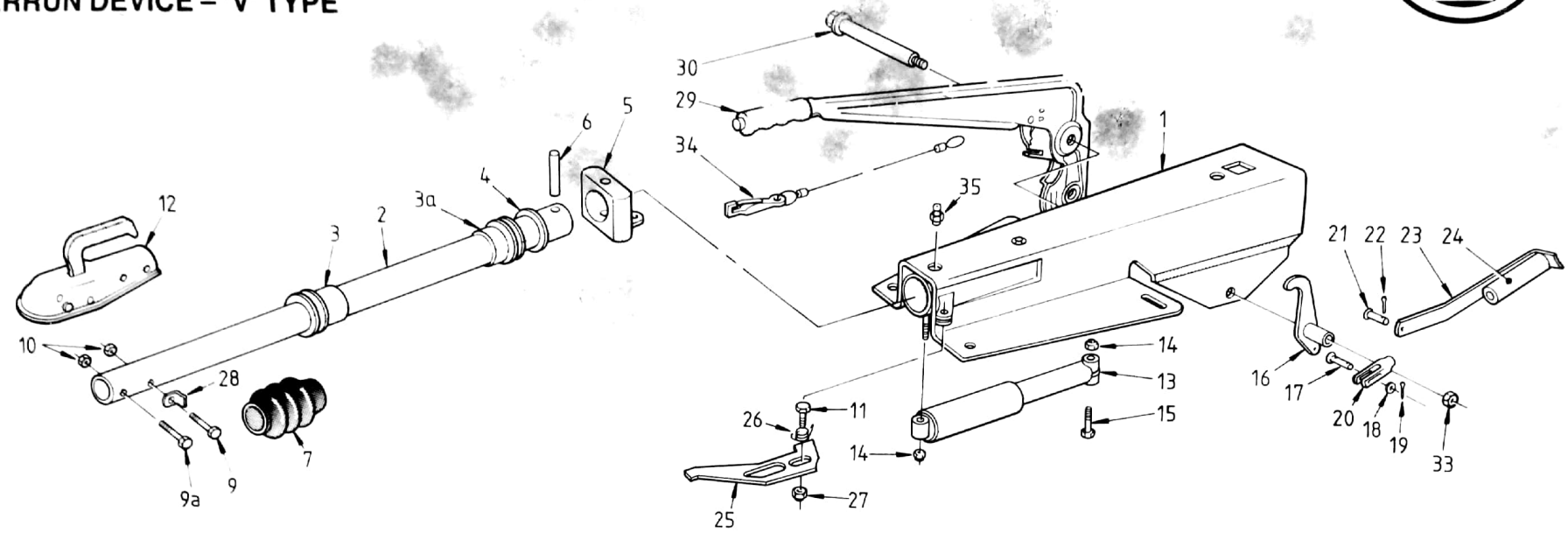


Illus.	Description	Gross weight 700kg Type 1635 218 887	850 kg 1636 278 991	890 kg 2035 238 261	1000kg 2035 238 356	1300kg 2050 238 266	1600kg 2350 218 907
1	Brake drum	218 215 00 04	278 991 00 02	238 270 (*)	238 266 00 04	238 266 00 01	238 352 00 02
2	Wheel bolt	700 754 M 18 x 1.5	700 754 M 18 x 1.5	700 117 M 18 x 1.5	700 117 M 18 x 1.5	700 117 M 18 x 1.5	700 118 M 22 x 1.5
3	Castle nut DIN 937	208 399 00 02	208 399 00 02	208 399 00 02 208 394 00 06	208 399 00 02	208 399 00 02	206 399 00 02
4	Grease cap	218 215 00 05	218 215 00 05	700 194 Ø 4 x 30	700 194 Ø 4 x 30	700 194 Ø 4 x 30	700 196 Ø 5 x 40
5	Lock washer	700 372 Ø 3 x 30 DIN 94	700 372 Ø 4 x 28				
6	Split pin DIN 94						
7	Ball bearing DIN 625	700 950 6203/C3		700 254 6204/C3			
7	Taper roller bearing (*alternative)	700 761 30203*	702 103 CONE LM 11749 702 104 CUP LM 11710	700 258 30204*	702 099 CONE KLM 11949 702 100 CUP KLM 11910	702 099 CONE KLM 11949 702 100 CUP KLM 11910	700 260 32005X

Illus.	Description	Gross weight 700kg Type 1635 218 887	850kg 1636 278 991	890kg 2035 238 261	1000kg 2035 238 356	1300kg 2050 238 266	1600kg 2350 218 907
8	Expanding clutch	218 215 03 00	218 215 03 00	208 880 03 00	208 880 03 00	218 737 04 00	218 737 04 00
9	Tension spring	218 215 00 03	218 215 00 03	208 200 00 07	208 200 00 07	208 200 00 07	208 200 00 07
10	Brake shoe	218 887 03 00	278 991 03 00	215 857 03 00	218 857 03 00	218 737 03 00	218 907 03 00
11	Cover plates		238 261 00 02	238 261 00 02	238 261 00 02	238 261 00 02	
12	Back plate – Right	218 887 01 00	278 991 01 00	238 251 01 00	238 356 01 00	238 266 01 00	218 907 01 00
	Back plate – Left	218 887 02 00	278 992 02 00	238 261 02 00	238 356 02 00	238 266 02 00	238 907 02 00
13	Adjusting nut	218 737 08 00	218 887 08 00	218 737 08 00	218 737 08 00	218 737 08 00	218 737 08 00
14	Adjusting screw	218 887 00 02	218 887 00 02	218 737 00 02	218 737 00 02	218 737 00 02	218 737 00 02
15	Pressure spring		208 880 00 03	208 880 00 03	208 880 00 03	208 880 00 03	208 880 00 03
16	Transmission lever-right	216 887 04 00	218 887 04 00	218 737 07 00	218 737 07 00	218 737 07 00	218 737 07 00
	Transmission lever-left	218 887 05 00	218 887 05 00				
17	Split pin DIN 94	700 194	700 194	700 194	700 194	700 194	700 194
18	Pivot pin	218 737 00 01	218 737 00 01	218 737 00 01	218 737 00 01	218 737 00 01	218 737 00 01
19	Oil seal	700 777 B30 x 52 x 7	701 511 B40 x 52 x 7	700 272 DF42 x 62 x 7S1	700 272 DF42 x 62 x 7S1	700 272 DF42 x 62 x 7S1	700 272 DF42 x 62 x 7S1
20	Taper bearing DIN 625	700 951 6205/C3		700 256 6206/C3			
20	Taper roller bearing (*alternative)	700 762 30205*	702 105 CONE LM 45449 702 106 CUP LM 45410	700 259 30206*	702 101 CONE KLM 67048 702 102 CUP KLM 67010	702 101 CONE KLM 67048 702 102 CUP KLM 67010	700 261 32007X
21	Tension spring	218 887 00 01	217 887 00 01	218 737 00 03	218 737 00 03	218 737 00 03	218 737 00 03
	Bowden Cable 920 long	208 880 04 00	208 880 04 00	208 880 04 00	208 880 04 00	208 880 04 00	208 880 04 00
	Bowden Cable 1160 long	208 880 04 01	208 880 04 01	208 880 04 01	208 880 04 01	208 880 04 01	208 880 04 02
	Bowden Cable 1310 long	208 880 04 02	208 880 04 02	208 880 04 02	208 880 04 02	208 880 04 02	208 880 04 02
	Bowden Cable 780 long	208 880 04 03	208 880 04 03	208 880 04 03	208 880 04 03	208 880 04 03	208 880 04 03
	Bowden Cable 580 long	208 880 04 04	208 880 04 04	208 880 04 04	208 880 04 04	208 880 04 04	208 880 04 04

When ordering brake drums, in addition to the part number, please state PCD and wheel bolt size and quantity. (*) 5½" PCD used up to 1982.

OVERRUN DEVICE – 'V' TYPE



PART DESCRIPTION		120 SR/1 PART No.	160 SR PART No.	200 SR/1 PART No.	250 S PART No.
1	Hitch body	217 534 01 00	217 361 01 00	217 539 01 00	207 792 01 00
2	Draw shaft	207 389 02 01	217 345 02 01	207 558 02 00	207 792 02 00
3	Bearing bush } set only	207 241 02 02	217 345 02 02	207 558 01 03	207 792 00 03
3a	Bearing bush } set only	207 241 02 06	217 345 02 07	207 703 02 01	207 792 00 03
4	Damping rubber	207 241 02 07	207 241 02 07	207 703 02 02	207 257 02 04
5	End block	207 489 02 03	207 241 02 03	207 559 02 01	207 558 02 01
6	Rollpin	700 174/700 226 Ø 12x50/Ø 7x50 DIN 1481	700 174/700 226 Ø 12x50/Ø 7x50 DIN 1481	700 176/700 329 Ø 12x60/Ø 7x60 DIN 1481	700 176/700 329 Ø 12x60/Ø 7x60 DIN 1481
7	Gaiter	207 389 02 10	207 389 02 10	207 389 02 10	207 389 02 10
9	Hexagon bolt	700 223 M 12 x 65 DIN 931	700 223 M 12 x 65 DIN 931	700 061 M 12 x 70 DIN 931	700 061 M 12 x 70 DIN 931

PART DESCRIPTION	120 SR/1 PART No.	160 SR PART No.	200 SR/1 PART No.	250 S PART No.
9a Hexagon bolt	700 222 M 12 x 60 DIN 931	700 222 M 12 x 60 DIN 931	700 223 M 12 x 65 DIN 931	700 223 M 12 x 65 DIN 931
10 Hexagon nut	700 645 M 12 DIN 980	700 283 M 12 DIN 934	700 645 M 12 DIN 980	700 283 M 12 DIN 934
11 Hexagon bolt	700 060 M 12 x 45 DIN 931	700 060 M 12 x 45 DIN 931	700 060 M 12 x 45 DIN 931	700 060 M 12 x 45 DIN 931
12 Coupling head	203 201 00 00	203 173 00 00	203 276 00 00	203 187 00 00
13 Shock absorber	207 755 04 00	207 773 04 00	207 773 04 00	207 773 04 00
14 Hexagon nut	700 122 M 10 DIN 980	700 317 M 10 DIN 934	700 122 M 10 DIN 980	700 317 M 10 DIN 934
15 Hexagon bolt	700 059 M 10 x 45 DIN 931	700 059 M 10 x 45 DIN 931	700 059 M 10 x 45 DIN 931	700 059 M 10 x 45 DIN 931
16 Overrun lever	207 489 05 00	207 489 05 00	207 489 05 00	207 489 05 00
17 Bolt	207 389 06 09	207 389 06 09	207 389 06 09	207 389 06 09
18 Washer	700 139 A 10.5 DIN 125	700 139 A 10.5 DIN 125	700 139 A 10.5 DIN 125	700 139 A 10.5 DIN 125
19 Split pin	700 191 Ø 3 x 20 DIN 94	700 191 Ø 3 x 20 DIN 94	700 191 Ø 3 x 20 DIN 94	700 191 Ø 3 x 20 DIN 94
20 Yoke end	207 389 06 06	207 389 06 06	207 389 06 06	207 389 06 06
21 Bolt	207 681 06 09	207 389 06 09	207 681 06 09	207 389 06 09
22 Split pin	700 192 Ø 4 x 20 DIN 94	700 192 Ø 4 x 20 DIN 94	700 192 O 4 x 20 DIN 94	700 192 Ø 4 x 20 DIN 94
23 Tension bar	207 683 06 08	207 683 06 08	207 683 06 08	207 683 06 08
24 Spring cylinder	207 502 06 01	207 489 06 01	207 705 06 01	207 705 06 01
25 Reverse lock	207 489 03 00	207 489 03 00	207 489 03 00	207 792 03 00
26 Torsion spring	207 240 03 03	207 240 03 03	207 240 03 03	207 240 03 03
27 Hexagon nut	700 645 M 12 DIN 980	700 645 M 12 DIN 980	700 645 M 12 DIN 980	700 645 M 12 DIN 980
28 Bracket	207 240 02 07	207 240 02 07	207 240 02 07	207 240 02 07
29 Hand brake lever	204 549 00 00	204 549 00 00	204 549 00 00	204 549 00 00
30 Pivot pin	207 771 05 03	207 771 05 03	207 771 05 03	207 771 05 03
33 Hexagon nut	700 645 M 12 DIN 980	700 283 M 12 DIN 934	700 645 M 12 DIN 980	700 283 M 12 DIN 934
34 Break away cable	209 157 00 00	209 157 00 00	209 157 00 00	209 157 00 00
35 Grease nipple	700 204 M 8 x 1 DIN 71412	700 204 M 8 x 1 DIN 71412	700 204 M 8 x 1 DIN 71412	700 204 M 8 x 1 DIN 71412

No.	Part No. 161S 290 874 00 00	Part No. 251S 290 875 00 00	Description
1	354 200	354 260	Body Assembly
2	353 942	353 942	Rear Bush
3	353 943	353 943	Front Bush
4	700 204	700 204	Grease Nipple AM8xl
5	354 207	354 225	Drawshaft Tube
	354 201	354 262	Drawshaft Assembly
6	353 936	355 338	Damper
7	353 952	355 140	Buffer
8	355 767	357 242	Spacing Bush
9	353 937	353 937	Gaiter
10	358 212	358 212	Damper Fixing Bolt
11	700 140	700 140	Washer Ø 13
12	700 645	700 645	Locknut M12
	219 010 00 00	219 010 00 00	Handbrake Assembly
13*	354 440	354 440	Handbrake Lever

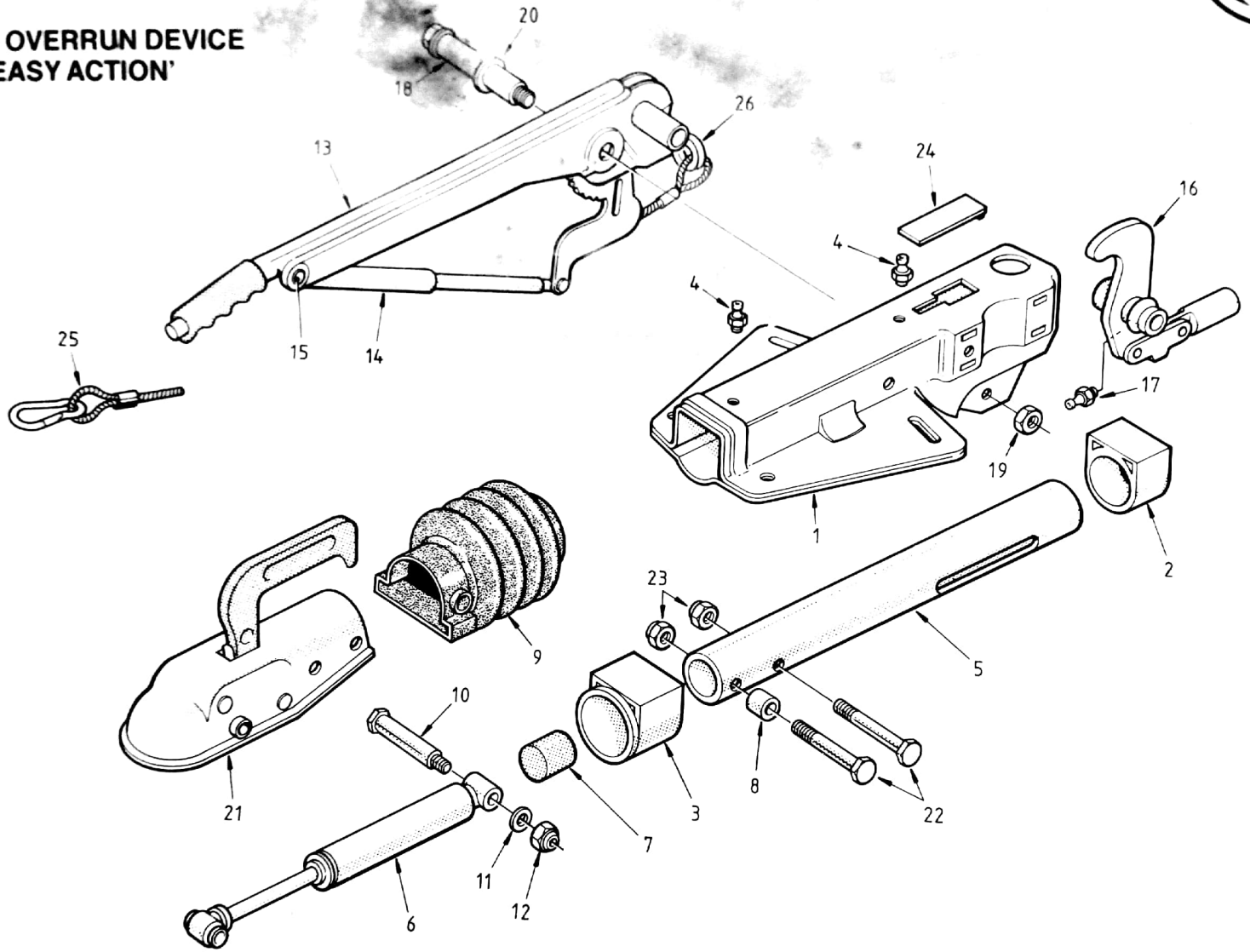
* For 161S (217 900 00 00) with standard handbrake, use the following part numbers:

13. 354 259 Handbrake lever.
207 683 06 08 Tension Bar
207 502 06 01 Spring Cylinder

} As per items 23 & 24 on Page 64

No.	Part No. 161S 290 874 00 00	Part No. 251S 290 875 00 00	Description
14	357 725	357 725	Gas Strut
15	357 633	357 633	Fixing bolt
16	354 405	354 405	Overrun Lever Assy.
17	700 203	700 203	Grease Nipple AM 6
	354 410	354 410	Lever & Pivot Assy.
18	217 771 05 03	217 771 05 03	Pivot Pin
19	700 645	700 645	Lock Nut M12
20	700 625	700 625	Washer Ø 17
21	203 318 00 00	203 322 00 00	Coupling Head
	354 204	354 204	Coupling Head Assy.
22	701 249	701 249	Hex. Bolt M12 x 75
23	700 123	700 123	Lock Nut NM 12
24	353 944	353 944	Cover Plate
25	209 157 00 00	209 157 00 00	Breakaway Cable
26	204 547 01 02	204 547 01 02	Burst Ring

161S AND 251S OVERRUN DEVICE *FITTED* WITH 'EASY ACTION' HAND BRAKE

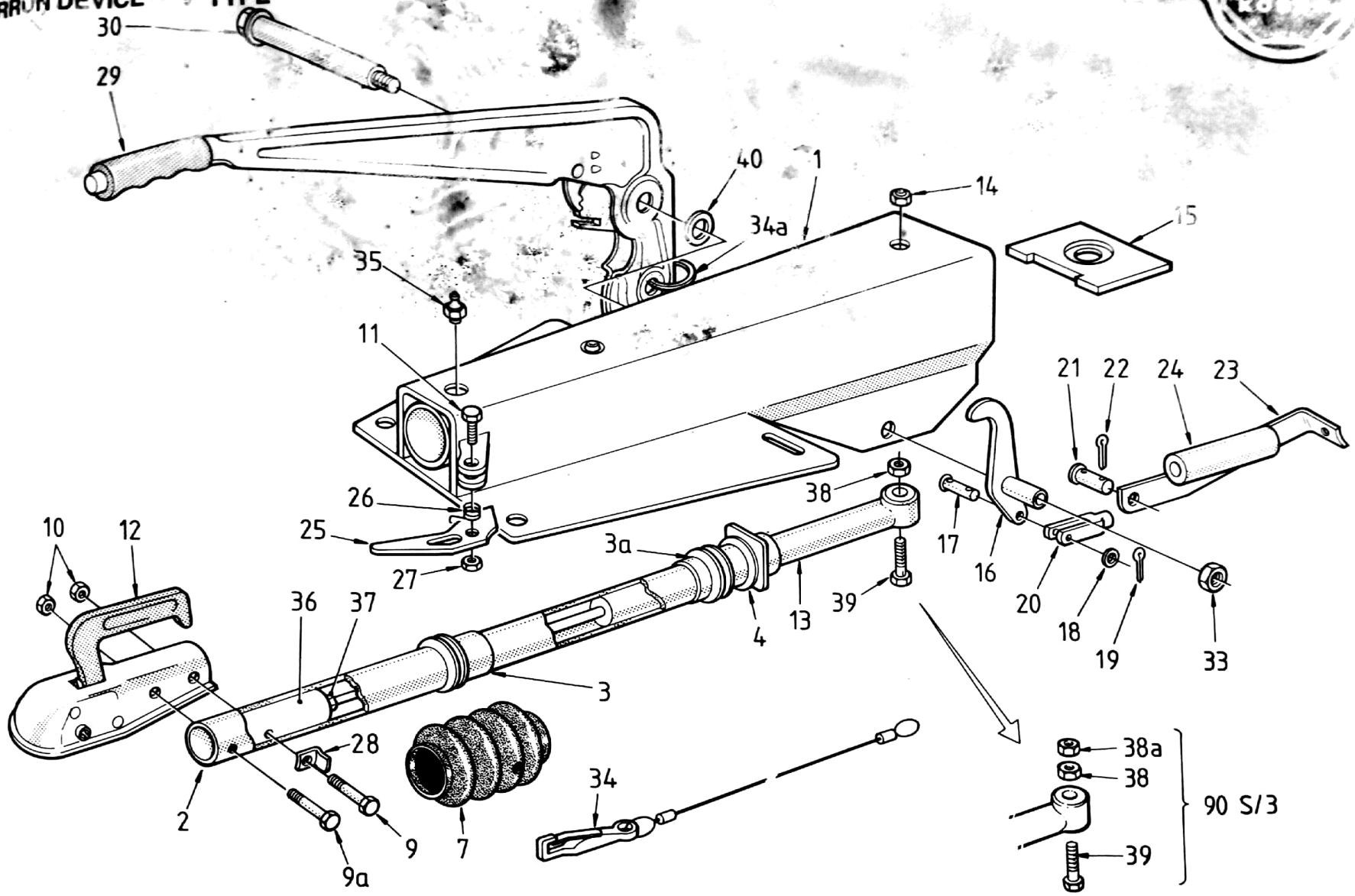


PART DESCRIPTION	60 S PART No.	90 S/2 PART No.	90 S/3 PART No.
1 Hitch body	2 07 738 01 00	2 17 535 01 00	354 000
2 Draw shaft	2 07 764 02 00	2 07 320 02 00	384 654
3 Bearing bush } set only	2 07 241 02 02	2 07 241 02 02	2 07 241 02 06
3a Bearing bush } set only	2 07 241 02 06	2 07 241 02 06	2 07 241 02 06
4 Damping rubber	2 07 241 02 07	2 07 241 02 07	2 07 241 02 07
7 Gaiter	2 07 389 02 10	2 07 389 02 10	207 389 02 10
9 Hexagon bolt	M 12 x 65 700 223 DIN 931	M 12 x 65 700 223 DIN 931	M 12 x 55 700 645 DIN 931
9a Hexagon bolt	M 12 x 55 700 281 DIN 931	M 12 x 55 700 281 DIN 931	M 12 x 55 700 645 DIN 931
10 Hexagon nut	M 12 700 645 DIN 980	M 12 700 645 DIN 980	M 12 700 645 DIN 6925-8
11 Hexagon bolt	M 12 x 45 700 060 DIN 931	M 12 x 45 700 060 DIN 931	
12 Coupling head	2 03 251 00 00	2 03 201 00 00	203 201
13* Shock absorber	3 54 029	3 59 987	3 59 987
14 Hexagon nut	M 10 700 122 DIN 980	M 10 700 122 DIN 980	
15 Plate	2 07 681 01 05	2 07 681 01 05	368 820
16 Overrun level	2 07 489 05 00	2 07 489 05 00	354 013
17 Bolt	2 07 389 06 09	2 07 389 06 09	702 121
18 Washer	A 10 700 139 DIN 125	A 10 700 139 DIN 125	700 139 DIN 125
19 Split pin	⌀3 x 20 700 191 DIN 94	⌀3 x 20 700 191 DIN 94	⌀3 x 20 700 191

PART DESCRIPTION	60 S PART No.	90 S/2 PART No.	90 S/3 PART No.
20 Yoke end	207 389 06 06	2 07 389 06 06	2 07 389 06 06
21 Bolt	2 07 681 06 09	2 07 681 06 09	2 07 681 06 09
22 Split pin	⌀4 x 20 700 192	⌀4 x 20 700 192	⌀4 x 20 700 192
23 Tension Bar	2 07 683 06 08	2 07 683 06 08	2 07 683 06 08
24 Spring cylinder	2 07 502 06 01	2 07 502 06 01	207 502 06 01
25 Reverse Lock	2 07 489 03 00	2 07 489 03 00	
26 Torsion spring	207 240 03 03	2 07 240 03 03	
27 Hexagon nut	M 12 700 645 DIN 980	M 12 700 645 DIN 980	
28 Bracket	2 07 240 02 07	2 07 240 02 07	
29 Hand brake lever	2 04 549 00 00	2 04 549 00 00	204 549 00 00
30 Pivot pin	2 07 771 05 03	2 07 771 05 03	2 07 771 05 03
33 Hexagon nut	M 12 700 645 DIN 980	M 12 700 645 DIN 980	M 12 700 645 DIN 6925-8
34 Break away cable	2 09 157 00 00	2 09 157 00 00	368 605
34a Burst Ring			
35 Grease nipple	M 8 x 1 700 204	M 8 x 1 700 204	M 8 x 217 171 00
36* Connecting bolt	2 07 320 02 03	2 07 320 02 03	
37* Hexagon nut	M 8 x 1 700 224 DIN 936	M 8 x 1 700 224 DIN 936	
38 Hexagon nut	M 10 700 122	M 10 700 122	M 10 700 109 M 10 700 644 DIN 934
38a Hexagon nut			
39 Hexagon bolt	DIN 980 M 10 x 55 700 275 DIN 931	DIN 980 M 10 x 55 700 275 DIN 931	M 10 700 275 DIN 931
40 Washer	⌀ 17 700 273 DIN 433	⌀ 17 700 273 DIN 433	⌀17 700 273 DIN 433

*Items 36 & 37 are not required with the latest Shock Absorbers which now have an eye fixing at the coupling head end.

OVERRUN DEVICE - "V" TYPE



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