

TECHNOLOGY • PRODUCTS • SERVICE...

KNOTT-AVONRIDE 
LIMITED

...THE COMPLETE PACKAGE!

**TRAILER SERVICE,
MAINTENANCE
& REPAIR**

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PRECAUTIONS

The correct assembly and adjustment of all equipment is critical to the safe operation of the trailer. Therefore the procedures must only be carried out by competent persons. If you have any doubts about your ability to complete the procedure, we recommend this task is performed by your local service centre. You are advised to wear suitable protective equipment such as safety glasses, gloves and face mask. In addition be aware of the hazards associated with handling workshop materials such as chemicals, oils and greases which may be flammable and can prove to be irritants.

It is recommended that the opportunity is taken to inspect associated items for wear or damage and replace if necessary, they can be obtained through your local stockist.

All procedures should be carried out with the trailer on level ground with either the parking brake applied or wheel chocks front and rear. In addition the drawbar should be supported with the trailer horizontal. Where required consult your trailer handbook for the recommended jacking points and positions for stands.

The components are used in a wide variety of trailers and reference to the trailer manufacturer's manual must always be made for procedures and data relevant to the particular unit.

The instructions relate to:

1. ALL Knott-Avonride Ltd overrun couplings including KFG 13, 20, 27, 30, 35, KF 7.5, 13, 17, 20, 27, and KRV 7.5, 13, 17, 20, 30.
2. Spreadlever brakes 160 x 35, 200 x 50, 203.2 x 40, 250 x 40, 300 x 60
3. Prop stand brackets Ø35, Ø42 and Ø48.

We have used "Plain English" descriptions throughout this text. If you are unsure of the meaning, if the procedure is unclear or you require any further information please use the following contact details:-

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T : +44 (0) 1283 531541

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CF34 0AQ
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sales@knottuk.com

If in doubt, ask.

Use only Knott original replacement parts.

The text includes guidance to assist in the safe execution of the procedures:

WARNING !	Risk of Injury.
CAUTION !	Risk of damage to equipment.
NOTE	Safety requirement.

SAFETY – WORKING PRACTICE

Always work in a clean area, tidying up as you go. Be especially diligent to clear spills and ensure that oils and greases do not contaminate linings and rubber bushes, suspension elements, or tyres. Remember some chemicals (brake fluid) can damage cosmetic finishes (car paint) and plastics.

Always work on a level, firm hard-standing, not muddy, slippery or soft ground.

Allow sufficient time to carry out the task, do not rush or take shortcuts which could endanger you during the work and put a potentially dangerous trailer on the road.

Do not allow animals, pets or children in, around or under the trailer whilst it is being worked on.

As a minimum have basic safety equipment available such as fire extinguishers and first aid kit and familiarise yourself with what to do in an emergency.

Be honest with yourself and do not embark on tasks outside your capability. If you get stuck enlist help.

Do not attempt to undo high torque fasteners with the trailer on a jack in case the force applied pulls the trailer over.

Ensure that spanners are the correct size, are in good condition and are suitable for the task. Never use ill fitting spanners.

Refer to recommended bolt torques and use a torque wrench.

Always replace brake shoes in axle sets and preferably all wheels on a tandem trailer at the same time.

Do not skimp on spare parts. If there is any doubt replace an item, most trailer parts are fairly low cost.

Use only original equipment parts approved by the trailer manufacturer.

Always use new self locking nuts (nylon insert type or deformed metal). Knott hub bearing centre nuts are suitable for use twice only so if the history of the trailer is unknown play safe by replacing with new. Refer to the trailer manufacturer's recommendations for their specific hub data.

Accident damaged components are potentially very dangerous. Wherever any doubt exists replace outright in preference to repairing.

Always ensure bolts are of sufficient length, the correct grade and use new locking nuts every time, ensure tapered washers or shaped washers are used on any surfaces not flat.

Always fit new split pins of the correct length and diameter.

Double check that all fasteners are tight as each item is fitted.

Never weld near rubber bushes or rubber suspension elements or tyres as the heat soak will damage the rubber. Protect adjacent areas from weld spatter.

Discard old brake shoes and dust in a sealed bag.

PERSONAL SAFETY

Do not rely on a jack when working underneath a trailer, always use a reliable secondary means of support such as axle stands. Always ensure that supports have wide bases so they cannot "topple" and that they are placed on firm and level ground.

Always use the correct jacking points as stated by the trailer manufacturer, in particular avoid jacking in the middle of an axle. Additional care is needed if the trailer is loaded, take due note of the weight and its distribution. Wherever possible unload prior to jacking up.

Always ensure that jacks and stands are of sufficient load capacity for the task.

Always ensure that wheels are chocked prior to carrying out any work, never rely on the handbrake alone.

Trailers and components can be heavy - do not try lifting heavy items, get help or use appropriate lifting aids.

Remove jewellery. Particularly metal banded wrist watches (these present a special hazard when working on electrics) and rings (easily snagged and are a major problem to remove if there is an injury to a finger).

Do not inhale brake lining dust, whilst all brakes have non asbestos linings it is recommended that a face mask is worn and dust is carefully brushed away, or use a proprietary brake cleaning fluid. Do not use an air line to blow out brakes or drums as the dispersed powder takes a long time to settle.

Wear eye protection when using power tools or working underneath a trailer.

Wear barrier creams or disposable gloves as a precaution and wash hands as soon as practical after completing the work.

Look out for trailing items which can be trapped in rotating machinery. Ties, loose wrist cuffs and long hair are always vulnerable.

Never work alone. Always ensure that someone is in the vicinity.

Do not eat, drink or smoke whilst working. Smoking can be especially dangerous as there may be chemicals in the air which become dangerous in the presence of heat. There is also the risk of fire or worse still explosion.

Beware of fumes from chemicals, cleaners, solvents, glues and paints, ensure the work area is ventilated and instructions on the can are followed.

Do not store fluids in unmarked containers.

GLOSSARY

GLOSSARY OF TERMS COMMONLY USED IN THE TRAILER INDUSTRY:

Unladen Weight (UW):	The weight of the trailer (or towing vehicle) less removable optional equipment and load
Gross Vehicle Weight (GVW):	The total weight of the trailer (or towing vehicle) and load
Maximum Gross Weight (MGW):	The maximum figure set by the manufacturer for the gross weight. This will normally be the technically permissible maximum based on the carrying capacity of the tyres, axles, coupling, suspension and chassis but may have been adjusted downwards for commercial reasons
Technically Permissible Maximum Weight:	The technically permissible maximum based on the capacity of the tyres, axles, coupling, suspension and chassis
Maximum Authorised Mass (MAM)	As maximum gross weight above. The latest EC term as used in the Driver Licensing Regulations
Gross Train Weight/ GTW:	The maximum allowable combined weight (combined MAM) of the towing vehicle and trailer as specified by the towing vehicle manufacturer
Payload:	The difference between the gross weight of the trailer and its unladen weight, i.e. the load carrying capacity
Kerb Weight	The weight of the towing vehicle (without payload), including all fluids required for operation / driver & nominal luggage
Nose Load:	The weight imposed on the towball or eye by the trailer coupling
Over-run Braking System:	A trailer braking system operated by the action of the trailer acting on the towing vehicle under deceleration
Power Operated Braking System:	A trailer braking system which is operated directly by the action of the foot brake on the towing vehicle
Wheel Track:	Horizontal distance between the centre lines of the wheels across the width of the vehicle or trailer
Wheel Base:	Horizontal distance between the centre lines of the wheels of multi-axle vehicles or trailers along the length of the vehicle

COUPLING/DE-COUPLING PROCEDURE

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

COUPLING TRAILER TO TOW VEHICLE

Braked / Unbraked

Wherever possible trailers should only be coupled and uncoupled on level ground.

Wherever possible couple with the trailer un-laden, particularly where livestock/horses are concerned.

Ensure that the trailer handbrake is firmly applied or chocks prevent movement of the trailer.

Check that the coupling head and towing vehicle ball are lubricated and free from grit and contamination. Where an eye and jaw is used check for wear.

Use the jockey wheel or propstand to raise the coupling head above the height of the towing vehicle ball.

Position the towing vehicle such that the ball is directly below the coupling head or the eye is within the towing vehicle jaw. Ensure that the tow vehicle is parked with engine off, in gear and handbrake applied.

Check the condition of the break-away cable (braked trailers). Ensure it passes through its guide at the front of the drawbar and secure to the tow vehicle in the approved manner. Where a secondary coupling (unbraked trailers) is used connect it.

Operate the coupling head mechanism and lift the handle to give clearance for the ball and lower the jockey wheel to engage. Release the handle and check to see that the coupling head is securely engaged on the ball and that any wear indicator shows that the engagement is correct. Where an eye is fitted ensure that the tow vehicle jaw is compatible with the trailer eye and that the pin and securing mechanism is correctly retained in accordance with the jaw manufacturer's recommendations.

Retract the jockey until it is fully wound up and release the clamp and lift the whole assembly to its highest position and re-clamp.

Make the electrical connections to the towing vehicle and confirm that lights function correctly.

Note: when loading ensure that the noseweight on the trailer is within the limits defined by the towing vehicle, towbar, and trailer manufacturers.

Ensure that the nominal heights of the ball on the towing vehicle and the coupling head (or eye and jaw) on the trailer are compatible. Where possible adjust the ball height to ensure that the trailer is towed level.

Release the trailer handbrake. Note: whenever possible have a driver in the towing vehicle applying the footbrake, this is particularly important when releasing a trailer handbrake on an incline.

PARKING AND UNCOUPLING

Wherever possible trailers should only be coupled and uncoupled on level ground.

Wherever possible uncouple with the trailer un-laden, particularly where livestock/horses are concerned.

When parking on a public road be aware of the highway regulations particularly regarding lighting, direction of travel and any local restrictions. Avoid leaving a parked trailer on public highways.

Always be alert to the possibility of individuals tampering with a parked trailer and the safety implications.

Avoid uncoupling a trailer on busy roads.

Note for added safety it is good practice when leaving the vehicle to take the ignition keys with you. Ensure that other people around you are aware of what you are doing and do not attempt to move the vehicle.

Always ensure that if some unexpected movement occurs that it will not cause personal injury.

COUPLING/DE-COUPLING PROCEDURE

Level ground

Apply the towing vehicle handbrake, turn the engine off and leave in gear.

Release the jockey wheel clamp and re-clamp lower down. Wind out the jockey until it just touches the ground. Where a prop stand is fitted clamp it in contact with the ground.

Apply the trailer handbrake (where fitted) taking note that over-centre handbrakes need to be "pulled" on to achieve optimum effectiveness.

Release the handle on the coupling head and continue to wind the jockey wheel lifting the head clear of the towing vehicle ball. Where a towing eye is fitted raise the eye to the middle of the jaw and remove the pin. If a propstand only is fitted lift the drawbar but be extra careful to ensure that there is not an excessive weight on the drawbar.

Disconnect the electrical connection and the break-away cable (braked trailers) or secondary coupling (unbraked trailers).

Move the towing vehicle clear and lower the jockey wheel until the trailer is horizontal. This avoids leaving extra load on the tyres and jockeys for extended periods. Lightweight unloaded trailers can usually be easily pushed clear depending upon the state of the ground.

As a safeguard the trailer wheels should be chocked. If the trailer is to remain in position for some time the recommendation is to use chocks and release the handbrake to minimise the risk of brakes sticking, cables stretching and someone inadvertently releasing the handbrake.

Facing uphill

Apply the towing vehicle handbrake, turn the engine off and leave in gear. If there is any doubt that the towing vehicle handbrake will hold because the trailer is heavily laden or the hill is very steep keep the engine running apply the handbrake and footbrake as an alternative (assistant required).

Braked trailers only: apply trailer handbrake, with everyone clear start the towing vehicle engine, hold the vehicle on the foot brake release the towing vehicle handbrake and gently release the footbrake allowing the trailer and tow vehicle to move back slowly as the trailer brakes move into auto-reverse, this can be observed as additional movement of the handbrake lever. Re-apply the tow vehicle handbrake, stop the engine and engage gear.

Place chocks behind one wheel on each side of the trailer.

Release the jockey wheel clamp and re-clamp lower down. Wind out the jockey until it just touches the ground. Where a prop stand is fitted clamp it in contact with the ground.

Release the handle on the coupling head and continue to wind the jockey wheel lifting the head clear of the tow vehicle ball coupling. Where a towing eye is fitted raise the eye to the middle of the jaw and remove the pin. If a propstand only is fitted lift the drawbar but be extra careful to ensure that there is not an excessive weight on the drawbar. Note: the front of the trailer may be light or there may be a negative noseweight due to the angle of the hill forcing the centre of gravity behind the axle, this is particularly noticeable with single axle trailers.

Disconnect the electrical connection and the break-away cable (braked trailers) or secondary coupling (unbraked trailers).

Move the towing vehicle clear and lower the jockey wheel until the trailer is parallel to the ground. This avoids leaving extra loads on the tyres and jockeys for extended periods.

We do not recommend leaving a trailer unattended on a steep hill.

COUPLING/DE-COUPLING PROCEDURE

Facing downhill

Apply the towing vehicle handbrake, turn the engine off and leave in gear. If there is any doubt that the tow vehicle handbrake will hold because the trailer is heavily laden or the hill is very steep keep the engine running apply the handbrake and footbrake as an alternative (assistant required).

Place chocks in front of one wheel on each side of the trailer.

Apply the trailer handbrake (where fitted) taking note that over-centre handbrakes need to be "pulled" on to achieve optimum effectiveness.

Release the jockey wheel clamp and re-clamp lower down. Wind out the jockey until it just touches the ground. Where a prop stand is fitted clamp it in contact with the ground.

Release the handle on the coupling head and continue to wind the jockey wheel lifting the head clear of the tow vehicle ball coupling. . Where a towing eye is fitted raise the eye to the middle of the jaw and remove the pin. If a propstand only is fitted lift the drawbar. Be extra careful to ensure that there is not an excessive weight on the front of the trailer, more so than on level ground as the hill will tend to increase the drawbar noseweight, this is particularly noticeable with single axle trailers.

Disconnect the electrical connection and the break-away cable (braked trailers) or secondary coupling (unbraked trailers).

Move the tow vehicle clear and lower the jockey wheel until the trailer is parallel to the ground. This avoids leaving extra loads on the tyres and jockeys for extended periods.

Towing Speeds

NB maximum towing speeds permitted on UK roads are as follows:-

On Motorways 60MPH (trailers are not permitted in the 3rd lane)

Dual Carriageway 60MPH, other roads 50MPH, provided no lower limit is in force

TOWING JAWS & HOOKS

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

British standards require that there should be sufficient room behind the pin of any towing jaw to allow a bar of 31.75mm (1.1/4") to be passed through. This ensures adequate articulation of the eyeshaft in both vertical and horizontal planes. It is also important that this gap is not too great, thus allowing the back of the eye to hit the front of the pin before the front of the eye contacts the throat of the jaw.

A jaw opening that does not comply with the standards and therefore restricts articulation upwards and downwards, is likely to bring about stress fractures on either the coupling or the trailer chassis drawbar. This may be particularly pronounced if the towing vehicle has a long overhang behind the rear wheels and, in such cases, the fitting of more robust, higher capacity equipment than the gross trailer weight might suggest, is often recommended.

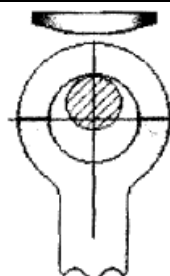
The above standards also apply to the jaw on a combination jaw and towball unit. This type of product provides the flexibility of being able to tow trailers fitted with either an eye or 50mm coupling head, without having to change the fittings on the tow vehicle. Where the ballpin is separate, it is also preferable to use a unit that is fitted with a primary locking device to stop the pin/ballpin working loose or rattling unduly. A secondary device such as an "R" clip or "D" lynch pin is also often used, but if this is the only means of securing the ballpin it is insufficient, due to the stresses imposed by the alternating lifting/dropping forces brought about by road conditions and/or poor load distribution.

CORRECT

Adequate Clearance

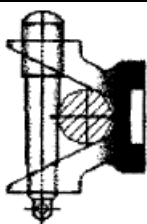


Adequate Clearance

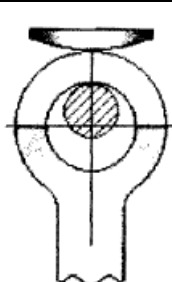


INCORRECT

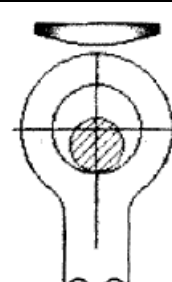
Insufficient Clearance



Insufficient Clearance



Excessive Clearance



A hook has no separate pin, but a safety catch should be fitted to prevent inadvertent detachment of the eye.

Where a hook has no "chin" or limiting pins on its outer face the towing eye may swing round and underneath the hook if the trailer has been reversed into a jack-knife position. In such a situation, as the towing vehicle moves forward, the eyeshaft and/or drawtube can be severely bent.

WHEELS & TYRES

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

WHEELS

Damage and Cracks : Check the wheels visually for damage or cracks. Cracks can be detected by rust showing through paint and by air loss if in the rim. Pay particular attention to the rim, around the wheel bolt and valve holes and at the ends of welds.



There must be no dents or gouges in the tyre seating area. The wheel shown below must be replaced. If any such defects are present, the wheel must be replaced.

A severe blowout can cause distortion to the inner rim which may be difficult to see when on the trailer. Damage less severe than that shown below can cause sealing problems between the damaged rim and the replacement tyre.

It is important to use wheels with the correct load rating and this is not usually marked on the wheel itself.



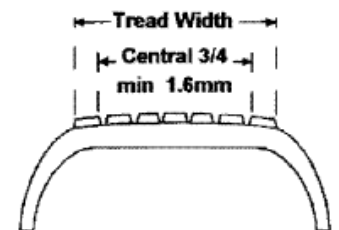
Runout : Rotate each wheel. There should be no visible runout on the vertical face of the bead seating well. If unsure, measure using a dial test indicator. Make sure that there is no load on the wheel and bearing float is not included in the measurement. Total runout should not exceed 2mm. As a guide, this should be visible to the naked eye.

Valve : Valve body rubber should show no cracks and a dust cap should be fitted.

TYRES

Size & Load/Speed Index : Check that the size and load/speed index are correct for the application. NB. Car and trailer tyres are often the same size but have a different index. Use of a car tyre with a lower load/speed index is dangerous and illegal.

Tread : Check the tread depth. The moulded 1.6mm tread depth indicator blocks must be below the level of the tread surface all the way around the tyre in the central % of the tread width. The tread pattern should be visible on the remaining portion. Tread depth of less than 3mm should be noted on the service record.



Ageing : In many trailer applications, tyres last a long time and may require replacement because of surface crazing or cracks between the tread blocks or in the sidewall rather than tread wear.

Cuts : Cuts should not be longer than 25mm or penetrate to the underlying reinforcement. Water ingress through the reinforcement can cause delamination.

There should be no lumps or bulges in tread or sidewall.

Check for foreign bodies embedded in the tyre.

Be aware that gradual pressure loss from a tubeless tyre could indicate the early stages of a cracked rim rather than a tyre problem. If allowed to go uncorrected, this will result in more rapid deflation with a tendency to run the tyre under inflated. In the final instance, the wheel will fail, causing a sudden and potentially dangerous deflation. Always check both the wheel and tyre when investigating a slow leak.

Check tyre pressures.

If in any doubt, refer to a tyre supplier.

The manufacturers recommend that tubes are not to be used with tubeless tyres.

JOCKEY WHEELS

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

SERVICING

- Service requirements for jockey wheels are limited to greasing the main threaded rod. To lubricate the thread, wind open the jockey wheel until the top and bottom sections disengage. Apply grease generously over as much of the threaded rod as can be reached. Grease the female thread in the bottom section. Grease will be carried throughout the length of the rod when the jockey wheel is next retracted.
- The jockey wheel clamp handle cannot be withdrawn directly. Remove the jockey and screw the handle in far enough to release the clamp pad. If the handle is bent, cut it off, leaving enough to cut a screwdriver slot.



THRUST WASHER/BEARING

- The thrust washer/bearing can be inspected if a problem is suspected.
- Remove the handle from the upper section of the jockey wheel by driving out the roll pin that secures it. The threaded rod and thrust washer/bearing can then be withdrawn and greased.
- This is not a recommended service procedure unless a problem has been identified in which case the unit is probably an economic write off.
- Note that the handle and threaded rod are drilled together and must be re-assembled in the same relative position.



WHEEL

The wheel unit itself needs no lubrication. If the plastic bush/bearing or tyre are damaged or worn, replace the wheel by removing the split pin which will release the axle. Note that heavy-duty wheels have steel needle rollers in a plastic bearing cage.

REPLACEMENT

There have been many changes in specification and compatibility between different upper and lower sections cannot be guaranteed. Jockey wheels are therefore sold only as complete assemblies.

PROBLEMS

- Bent Tube** : This is normally caused by forgetting to retract the jockey wheel before driving off, resulting in the wheel hitting the road and the lower tube (occasionally the upper) being bent. Look for obvious damage or signs of the inner section rubbing inside the upper.

The unit is beyond repair and must be replaced.

- Damage to the Thread** : The usual causes of failure are overloading and raising the jockey under load to the point where the threaded rod disengages from the lower section. In extreme cases, the jockey wheel may collapse so keep clear of the trailer when checking this issue.

Again, the unit is beyond repair and must be replaced.

PROPSTAND / JOCKEY BRACKET

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

REPLACING BRACKET

Support the trailer adjacent to the stand bracket leaving a clear working area around the bracket mounting.

1. Remove the jockey wheel or prop-stand from the bracket and inspect it for damage.
2. Remove the fasteners securing the bracket, noting the orientation of the clamping mechanism. See Figs. A & B.
3. Fit the new bracket with the correct bolts.
4. Trial fit the jockey wheel or prop-stand to ensure that it clamps securely. **WARNING!** Do not allow any weight to be placed on the support until adjustment is completed and you are confident that the parts clamp properly.

Fig. A



Fig. B



ADJUSTMENT

Split Clamp Only:-

Adjust the locking nut so that there is the same clearance at both sides of the clamp body when the clamp handle is tightened. **Warning!** If the two halves of the body touch the assembly will not support the weight when tightened.

SPREADLEVER BRAKES

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

REPLACING BRAKE ASSEMBLY COMPLETE

It is recommended that the brake assemblies are replaced in axle sets.

1. Follow the procedure for Replacing Brake Shoes items (1) to (7) inclusive taking due note of the introductory warnings.
2. The brake assemblies are handed, check the new assembly against the one fitted noting the position of the brake cable attachment. Remove the four bolts securing the backplate to the axle, remove the old assembly and fit the new one in accordance with the torque figures specified in the trailer manufacturer's handbook.
3. Continue with the procedure for Replacing Brake Shoes commencing at item (18).
4. Follow the Adjustment procedure below.

REPLACING BRAKE SHOES

Place the trailer on stands with all wheels free. **WARNING!** The handbrake should be released and the handbrake locking bolt fitted.

See Fig. A. Some couplings do not have provision for the locking bolt. In this case or if a bolt cannot be used the handbrake lever should be secured in the off position to prevent the handbrake lever operating. It is recommended that the brake shoes are replaced in axle sets.

1. Remove the wheels.
2. Remove the hub cap.
3. Slacken off the brake adjuster bolt until free. Some brake assemblies have a ratchet accessible through an aperture in the backplate instead of the bolt.
4. Remove the axle nut, this may be a castellated nut retained with a split pin or alternatively it may be a locknut.
5. Remove the brake drum (hub puller may be required) taking care not to displace the bearings. **WARNING!** Avoid inhaling brake dust. Don't use an airline to clean the drum. Carefully remove the dust using a small brush.
6. Check the condition of the brake drum, replace the drum if deep score-marks are visible.
7. Undo the locknut on the brake rod (front to rear) adjacent to the compensator. Slacken the second nut on the brake rod. Remove the half shell from the backplate and detach brake cable.
8. **NOTE.** Record the orientation of the brake shoes and springs on the backplate to ensure that the new shoes and springs are replaced in the same position as the old. See Fig. B (left hand) and C (right hand) for reference to Knott 200x50 brake (others similar).
9. With care and using a suitable lever, lift sliding shoe carrier away from expander. Extract expander and retain.
10. Remove brake shoe retaining spring taking care to retain the spring. Keep plate or pin at the rear of the backplate where fitted.
11. Lift off whole brake shoe assembly from backplate. Take care not to lose the two adjuster wedges.
12. Examine the components and springs, replace any damaged parts. Clean the mechanism and ensure that all parts are free to move. **NOTE.** Do not lubricate.
13. Re-fit springs to new shoes.

Fig. A

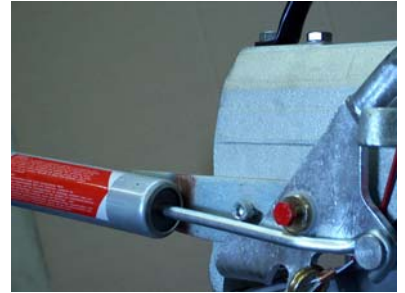


Fig. B



Fig. C



SPREADLEVER BRAKES

14. Locate shoes onto the backplate and position onto the adjuster wedges or cam block.
15. Re-fit retaining springs.
16. Locate expander into position on fixed shoe.
17. With care, and using a suitable lever, position the expander between the shoes and release the lever.
18. Attach brake cable and refit the half shell. **NOTE.** Always replace the brake cables if they show sign of wear, stiffness, damage or fraying.
19. Re-fit the drum and bearing. **CAUTION!** Refer to the axle manufacturer or trailer manufacturer's instruction. Replace the split pin or lock nut dependent on which type of nut is used. Generally speaking if a split pin and castellated nut is fitted the axle nut must be adjusted to allow the correct bearing clearance. When the locknut is used it is normally tightened to a pre-determined torque.
20. Refit the hub cap.
21. Repeat the procedure on the other drum(s).
22. Replace wheels securing wheel nuts, as specified in the trailer manufacturer's handbook.
23. Follow the adjustment procedure below.

ADJUSTMENT

NOTE. When adjusting the brake drum only turn the wheel in the direction of forward rotation.

Ensure that the coupling drawtube is fully extended and that there is no tension in the brake rod or cables.

1. Turn each wheel in the direction of forward rotation. Turn the brake adjuster bolt clockwise until some resistance is felt as the brake shoes begin to grip the drum, then slowly turn the brake adjuster bolt anticlockwise until the wheel begins to rotate freely again. Alternatively advance the adjuster using a screwdriver through the backplate hole until resistance is felt, then turn back by a few clicks until the wheel begins to rotate freely again.
2. Turn the nut on the brake rod until the nut is in contact with the compensator. **CAUTION!** Do not over-tighten as this will cause the brakes to drag and overheat.
3. **WARNING!** Double check that everything has been re-assembled with all fasteners secure. Remove the handbrake locking bolt and operate the handbrake several times to ensure that the compensators are seated. Check the travel of the individual brake cables. This should be 2-5mm. If not re-adjust the brake as appropriate.
4. With the handbrake engaged, turn each wheel in the reverse direction. They should turn a little and then lock as the auto-reverse mechanism operates. **NOTE.** As each wheel is turned there will be a rearward movement of the handbrake lever as the energy store operates. This action should occur once on the rearward turn of each wheel. If any wheel fails to lock there is too much slack in the system.
5. Check the compensators are at 90° to the brake rod with the brakes applied in forward and reverse. Misalignment can be corrected through adjustment of the cable locking nuts. This is particularly important if a new cable has been fitted.
6. Operate handbrake and leave on. Lower the trailer to the floor and recheck the torque of the wheel nuts.
7. Please note the brakes will not be 100% effective until the new linings have bedded in.

THE BRAKE ADJUSTMENT SHOULD BE RECHECKED AFTER A SHORT JOURNEY.

WARNING! THE DRUMS MAY BE HOT.

BRAKING – HINTS & TIPS

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

FORCE REQUIRED TO ENTER REVERSE MODE

There is a small "nib" at the front of the ramp on the brake shoe intended to prevent the shoe inadvertently entering reverse mode. There needs to be enough slack in the system to allow the shoe to ride over this before fully entering auto reverse mode. If the brakes are adjusted very tightly, this will not happen and the brakes will stay on when reversing.

Slippery surfaces such as mud or wet grass sometimes do not provide enough friction to turn the wheels into reverse mode. The trailer will slide backwards rather than roll.

RESIDUAL BRAKING

The system is kept in auto reverse mode by friction between the shoe and the brake drum therefore there is always a small amount of braking effect when reversing.

HANDBRAKE LEVER MOVEMENT

If the brakes enter reverse mode while the handbrake is on (e.g., when uncoupling while facing up a slope) the lever can move sharply and unexpectedly upwards under the force of the energy store spring. The trailer will also roll backwards a few inches as this happens. Allow room for this when parking.

BRAKES LOCK ON

Under certain circumstances e.g. on uneven ground, twin axle trailers can sometimes lock their brakes and refuse to reverse. This is caused by two wheels entering auto reverse mode while the other two are still in forward mode. The compensator transmits only half the normal amount of slack to the coupling which is then still able to apply all four brakes. There are two methods of dealing with this:

- a: If possible, begin the reversing manoeuvre on adjacent level ground so that all wheels enter reverse mode simultaneously.
- b: Manually turn the other two wheels backwards to engage auto-reverse mode

STICKING BRAKES

Cause not yet fully understood. Most prevalent on new trailers stored with the handbrake on, especially during the winter.

For an immediate fix, tap the brake drum (not the backplate) with a hammer. This works in most instances.

In the long term, instruct the user to chock the wheels and leave the handbrake off when leaving the trailer, particularly if it is new and the weather tends to heavy dew.

Trailers become far less prone to this complaint after the brakes are bedded in. Some trailer owners (horsebox users in particular) drive so gently that the brakes never bed in. A solution can be achieved by loading the trailer securely and deliberately bedding them by heavy use. Be careful not to endanger or inconvenience other road users with unexpected heavy braking.

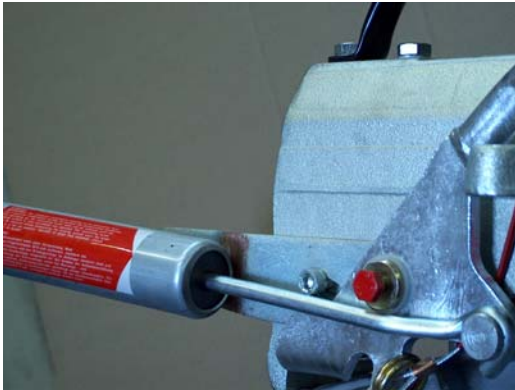
BOWDEN CABLE

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

REMOVAL & REPLACEMENT OF BOWDEN CABLE

Place the trailer on stands with all wheels free. **WARNING!** The handbrake should be released and the handbrake locking bolt fitted.

Fig. A



See Fig. A. Some couplings do not have provision for the locking bolt. In this case or if a bolt cannot be used the handbrake lever should be secured in the off position to prevent the handbrake lever operating.

1. Undo the locknut on the brake rod (front to rear) adjacent to the compensator. Slacken the second nut on the brake rod.
 2. Remove the nut from the cable inner and the nut retaining the outer to the bracket. Take note of any washers and orientation of domed nuts. Remove the half shell from the backplate and detach brake cable. Withdraw the cable assembly.
 3. Attach the new brake cable to the expander in the hub and refit the half shell.
 4. Thread the new cable into position, secure the outer with its nut and thread the nut on the inner to approximately the position noted on the old cable.
- NOTE.** This procedure covers just the Bowden cable replacement, we would always recommend that a full brake adjustment is carried out including hub adjustment.
5. Follow the adjustment procedure under SPREADLEVER BRAKES starting at item 2.

BREAKAWAY CABLE

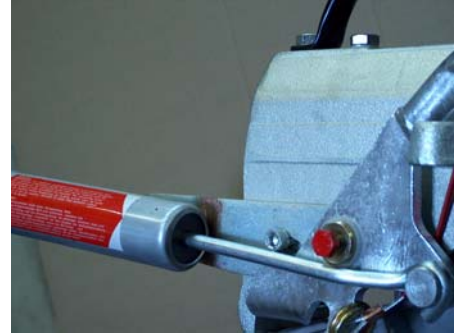
PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

REMOVAL

It is important to ensure that the handbrake lever is prevented from operating. **WARNING!** The handbrake should be released and the handbrake locking bolt fitted. See Fig. A. Some couplings do not have provision for the locking bolt. In this case or if a bolt cannot be used the handbrake lever should be secured in the off position to prevent the handbrake lever operating.

1. Remove the existing cable from any guides taking note of the route.
2. Where a coil fitting is used on the handbrake use pliers and screwdriver to prise the coils of the retention ring apart and remove the ring from the handbrake lever. See Fig.B.
3. Where a clevis and pin fitting is used on the handbrake remove the split pin and withdraw the clevis pin. See Fig.B.

Fig. A



REFITTING

WARNING! Always use the correct replacement from the manufacturer as an incompatible cable will fail to operate the handbrake mechanism correctly.

Note that the two different styles are interchangeable providing that the complete cable and fittings are changed.

1. For the coil fitting use pliers and screwdriver to prise the coils apart and fit the ring to the handbrake lever. Check that the cable is free to move on the ring.
2. For the clevis fitting insert the clevis pin and retain it with the split pin provided.
3. In all cases thread the cable through the guides.

Fig. B



OPERATION

1. Ensure that the cable passes through the guides provided. This is important to ensure that the cable operates under the widest range of circumstances.
2. Check that there is no damage or fraying prior to use.
3. Secure the cable to a suitable point on the tow vehicle, refer to the vehicle or tow bar manufacturers specifications for the location.
4. Ensure that the cable is not pulled tight during articulation of the trailer and remains clear of the ground.

COUPLING HEADS / TOWING EYES / BELLOWS

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

REPLACING COUPLING HEADS / TOWING EYES

Prior to proceeding it is essential to confirm the condition of the damper. Carry out a damper reaction test. Pull the handbrake lever on as far as possible. Push the ball coupling as far back into the overrunning hitch as it will go. This requires force to compress and should extend smoothly when released. If the draw tube is impossible to compress, compresses with just spring force and no damping resistance, or the extension is very rapid the damper must be replaced by carefully following the DAMPERS instructions. If completely satisfied that the damper is in good condition proceed as follows:

1. Follow the procedure for DAMPERS up to and including point (4).
2. If you have been able to remove the coupling head / eye as instructed in DAMPERS point (4) go straight to instruction (5) below, otherwise continue.
3. The damper will now be retained between the front coupling / eye bolt and the rear damper bracket. It is now necessary to remove the damper without destroying it. **WARNING!** Proceed with extreme caution. The most efficient method is to remove the rear damper mounting bracket but depending upon the coupling there may still be tension in the damper.
4. Place a lever against the rear damper in such a manner that once the mounting bracket bolts are removed the tension can be released slowly. Take the tension and remove the mounting bracket bolts, release the tension in the damper.
5. Inspect the shaft for damage, dress burrs and clean any dirt as the new coupling will be a close fit on the shaft.
6. If a new bellows is to be fitted cut the tie-wrap and discard the old one, fit the new and secure with a tie-wrap.
7. Trial fit the new coupling, it should slide into place without any undue force. DO NOT hammer the coupling into place, this can damage the coupling itself or the over-run mechanism. If it proves to be tight remove it, and thoroughly clean the shaft, inspecting for burrs.
8. Fit the bolts, washers and secure with NEW locking nuts. DO NOT re-use the old nuts as this is safety critical. Torque to the figure in the table below. Fit the plastic nut covers. Where the damper has been removed ensure that the coupling head rear bolt passes through the hole in the damper body. **NOTE.** If you have any doubts about the condition of the damper a new one must be fitted.
9. If the damper has been released the rear mounting bracket will need to be re-fitted. This means that the damper needs to be compressed such that the bolts can be located. **WARNING!** Proceed with extreme caution. Compress the damper with the lever and secure the mounting bracket bolts, as shown in Fig. A.
10. Re-fit the bellows with the coupling / eye horizontal taking care not to tear or damage the material.

Fig. A



Where the replacement coupling / eye is a different part to the original:

1. Always ensure that the corresponding length bolts are used.
2. Always ensure that the compatible bellows is used.
3. Always ensure that the hole sizes in the coupling and draw-bar tube match and that the correct sized bolts are employed.

ADJUSTMENT

It is not necessary to make any adjustments, simply rotate the coupling / eye to its limits to ensure that the natural position of the bellows is with the head horizontal.

TORQUE SETTINGS

M12 grade : 10.9 bolt / 100Nm

M14 grade : 10.9 bolt / 125Nm

M12 grade : 8.8 bolt / 70Nm

DAMPERS

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

SAFE REMOVAL AND DISPOSAL OF DAMPERS

The dampers assembled within overrun couplings are pressurised. During assembly the damper is preloaded and compressed in order that the coupling operates correctly. Care must therefore also be exercised when working on, handling and disposing of the coupling / damper. This is especially important if any damage or misuse of the coupling has occurred. This procedure will ensure that the damper is removed and disposed of safely. **WARNING!** Do not position anything or stand immediately to the front or rear of the coupling assembly in case a damper fails during the process.

REMOVAL

1. Pull back the bellows from the coupling / eye to expose the two securing bolts, see Fig. A.
2. Undo the self locking nut from the rear bolt of the coupling / eye, as shown in Fig. A.
3. Remove the rear bolt - force may be required as the damper may still be preloaded. Raise the coupling / eye operating handle in order to fully remove the bolt if needed.
4. When the rear bolt is removed the damper will move forward to rest upon the front bolt. **NOTE.** In some instances a retaining pin is fitted, (located between the bolt holes). This pin will hold the damper in its original position and will therefore need to be removed in the following manner: Undo the self locking nut from the front bolt, extract the bolt and remove the head. Replace both bolts in drawtube and finger- tighten the nuts. Knock out the retaining pin and remove the rear bolt, this will allow the damper to move forward and contact the front bolt. This position is shown in Fig. B. on the cut away photograph.
5. From underneath, through the bolt hole in the drawtube, drill a 3mm diameter hole into damper body to a depth of 8mm. **WARNING!** 1. Observe normal safety procedures for the use of hand tools. 2. Wear safety glasses. 3. Do not lie immediately underneath the bolt hole when drilling. 4. When the drill penetrates the damper body gas will be allowed to escape.
6. The pressure in the damper should now have been discharged. Remove the self locking nut on the front bolt of the coupling head. Remove the bolt and the coupling head. If the bolt is difficult to remove it indicates that there is still residual force in the damper and so section (5) above should be repeated.
7. Remove the rear damper bracket retaining bolts. Also remove the nuts and spring washer from the rear of the damper, as shown in Fig. C. on the cut away photograph.
8. The de-pressurised damper can now be removed by sliding the damper forward through the drawtube and be disposed of as per the DISPOSAL instructions below.

Fig. A



Fig. B



Fig. C



REPLACEMENT

1. Fit the rear damper mounting to the new damper, see Fig. C. and slide the damper loosely into position.
2. Follow the procedure for COUPLING HEADS / TOWING EYES / BELLOWS, section (5) onwards.

DISPOSAL

WARNING! This operation should only be carried out if the gas pressure has been discharged. Prior to disposing of the damper it is recommended that the oil remaining in the damper is drained away and disposed of in an appropriate manner. This can be achieved by drilling a 3mm hole in the damper body 60mm from the rod end of the damper.

DRAWTUBE

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

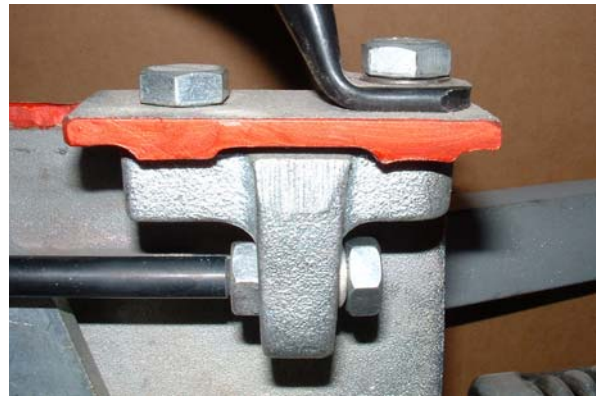
REMOVAL

1. Follow the instructions for DAMPERS (section 1 to 8) taking due note of the introductory notes.
2. Once the damper is removed the lever which transmits the force from the drawtube to the brake rod can be rotated to allow the drawtube to be removed rearwards.
3. If the drawtube has been bent it will prevent removal so the front portion must be sawn off and the remainder removed from the rear of the coupling housing. Once sawn all burrs must be removed and care exercised to prevent swarf being trapped such that it will jam the mechanism.
4. Clean the bearing surfaces inside the housing.

REPLACEMENT

1. Lubricate the drawtube and insert it into the housing ensuring that it is free to slide and that there is not excess clearance between the tube and bearing surfaces.
2. Fit the damper mounting to the new damper and slide it loosely into position.
3. Place bellows on to the drawtube, place coupling into position. Fit the bolts, washers and secure with new locking nuts. **DO NOT** re-use the old nuts as this is safety critical. Torque to the figures as shown below.
4. Compress the damper and fit the rear mounting bracket bolts. **WARNING!** Proceed with extreme caution. Compress the damper with a lever and secure the mounting bracket bolts as shown in Fig. A.

Fig. A



ADJUSTMENT

It is not necessary to make any adjustments, simply rotate the coupling/eye to its limits to ensure that the natural position of the bellows is with the head horizontal.

AVONRIDE HEAD LOCK

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

These instructions cover adding lock to a coupling head originally supplied without one, and also replacement of an existing lock.

Fig. A



1. Operate the latch and lift the handle to expose the latch pin. Block in position. See Fig. A.
2. Using a punch drift the pin out allowing the lock housing to lift off. See Fig. B.
3. If the housing is not currently fitted with a lock remove the spring for re-use. Remove the washers and the plastic blanking plug and discard.
4. If the housing has a lock fitted remove the spring, centre screw, washer and actuator lever for re-use. Followed by the lock barrel ring nut.
5. Fit the plastic cover to the new lock, insert lock into casting and secure with the ring nut.
6. Fit the actuator lever with washer and centre screw and locate the spring.

Fig. B



7. Place the assembly into position on the coupling body, line up the pivot hole gently drift in the pin.
8. Check all parts are secure, that the lock mechanism operates and that the catch moves freely securing the handle.

JOCKEY WHEEL CLAMP HANDLE & PAD

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

1. Screw clamp handle into jockey wheel clamp housing (located on the side of the coupling) until formed end protrudes through.
2. Locate keyway in clamp pad to formed end of clamp handle.
3. Unscrew clamp handle until pad is secure with the clamp housing.

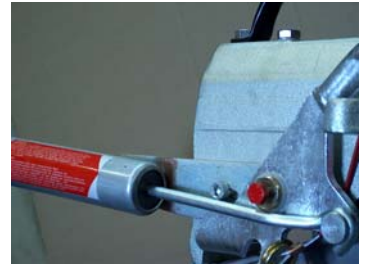
HUBS, SEALS & BEARINGS

PRIOR TO CARRYING OUT THESE TASKS PLEASE REFER TO PRECAUTIONS

These instructions refer to the Knott-Avonride bearing arrangements although others are similar. Always refer to the trailer manufacturer's handbook.

There are many varieties of hub bearing / seal arrangement, usually specific to each manufacturer. However these fall into two types; separate bearings (taper roller or angular contact ball races) which are assembled with some clearance and unitised bearings which are a single bearing and are assembled using a high torque locking nut. **WARNING!** Be aware that hub bearing failure in service results in a catastrophic failure with a high possibility of the wheel becoming detached from the stub with obvious potential consequences. Always err on the safe side and replace suspect components.

Fig. A



Place the trailer on stands with all wheels free. **WARNING!** The handbrake should be released and the handbrake locking bolt fitted. See Fig. A. Some couplings do not have provision for the locking bolt. In this case or if a bolt cannot be used the handbrake lever should be secured in the off position to prevent the handbrake lever operating.

HUB/DRUM REMOVAL

1. Assess the condition of the bearing by rocking the road wheel to see if there is play in the bearing, then spin the wheel rapidly and listen for a rumbling sound which indicates pitting of the races.
2. Remove the wheels and hub cap. Slacken off the brake adjuster if needed.
3. Remove the grease cap by carefully prying progressively around the flange of the cap.
4. For installations with a castellated nut and split pin, remove the pin, nut and, where fitted, washer.
5. For installations with a high torque nut unscrew the nut. **WARNING!** High forces are needed; ensure that the trailer is stable.
6. Remove the brake drum (hub puller may be required and adjustment may require slackening) taking care not to displace the bearings.
7. Once the linings are exposed take extreme care to avoid contaminating them and the friction face of the drum with grease as this will impair braking performance.

BEARING INSPECTION

Hubs with separate bearings

1. Wash grease and oil from the bearing with a suitable solvent; inspect each roller, inner and outer races. If any pitting, damage or corrosion is present then the bearing must be replaced. **NOTE.** If any one part shows damage or wear we always recommend replacing all bearings in the hub and fitting a new oil seal.
2. Using a brass drift carefully drive out the outer races working around the circumference. **WARNING!** Be sure to wear safety glasses when removing or installing force fitted parts. Failure to comply may result in eye injury.
3. Clean the hub and carefully tap in the new bearing outer races with a brass drift. Be sure they are seated against the shoulders.
4. Grease the bearings and fit with a new seal. Force grease into the bearing between each roller; apply a light coat of grease to the bearing races. Refer to the trailer manual for grease specification. **CAUTION!** Do not fill the cavity between the bearings, this is not necessary and can lead to grease leaking from the seals onto the brake linings.

Recommended grease is Shell Retinax EP2, Bearings should be lubricated every 12 months or 12,000 miles.

Hubs with unitised bearings

Unitised bearings used in Knott hubs are a single non-adjustable lubricated for life assembly with integral seals. If the check in (1) above indicated excess play in the bearing then the bearing should be pressed/drifted out having removed the circlip and replaced. The new bearing should be pressed/gently drifted into place ensuring that it remains square to the bore and seats against the shoulder, the circlip is then re-fitted.

HUBS, SEALS & BEARINGS

SEAL INSPECTION AND REPLACEMENT

Installations with separate bearings have a seal on the inside end to retain grease, whenever the hub is removed inspect the seal to ensure that it is not nicked or torn and is still capable of properly sealing the bearing cavity. If there is any question that it may be in poor condition, replace the seal.

To replace the seal: Pry the seal out of the hub with a screwdriver. Never drive the seal out with the inner bearing as you may damage the bearing. Tap the new seal into place using a clean wood block. Very lightly lubricate the seal face with grease. Unitised bearings have an integral seal which is less prone to damage and is not replaceable, if failure is suspected then the whole bearing must be replaced.

DRUM INSPECTION

Check the condition of the brake drum, replace the drum and bearing if deep score marks are visible. **WARNING!** Avoid inhaling brake dust. Do not use a compressed air line to clean the drum. Carefully remove the dust using a small brush or brake cleaner.

BEARING ADJUSTMENT & HUB REPLACEMENT

Refitting taper roller hubs with castellated nut and split pin.

If the hub has been removed or bearing adjustment is required, the following adjustment procedure must be followed.

1. After placing the hub, bearings, washers and spindle nut back on the axle spindle in reverse order as detailed in the previous section on hub removal, rotate the hub assembly slowly while tightening the axle nut to approximately 50lbs – ft. (69Nm).
2. Loosen the axle nut to remove the torque. Do not rotate the hub.
3. Finger tighten the axle nut until just snug.
4. Back the axle nut out slightly until the first castellation lines up with the split pin hole and insert the split pin.
NOTE. Always use new split pin.
5. Bend over the split pin legs to secure the nut.
6. Nut should be free to move with only restraint being the split pin.

Refitting unitised bearing hubs with high torque nut

1. Fit the drum to the axle shaft and tighten the nut to the correct torque (280 Nm as specified inside the dust cap for Knott-Avonride hubs) **WARNING!** Other manufacturers figures differ, refer to the trailer manufacturers handbook if there is any uncertainty. **NOTE.** The nut may only be used twice so if the history is not known it must be replaced.
2. Refit the hub cap and replace wheels securing wheel nuts as specified in the trailer manufacturer's handbook. Confirm that there is no excessive play at the wheel rim.

After the first 1000km wheel bearings should be checked for excessive end float.

WHEEL STUDS

1. Remove hub as detailed above.
2. Place hub on flat surface with studs showing up, and gently tap out studs.
3. Invert hub on raised surface, allowing room for new studs to be knocked through.
4. Align ribs on new wheel studs with grooves in stud holes.
5. Gently tap in studs using brass drift to protect studs.

WHEEL NUTS

Replace worn wheel nuts as necessary. **NOTE.** Tighten up to wheel manufacturers recommended torque (if in doubt consult supplier). We recommend that once the hubs have been refitted that the brakes are adjusted – please refer to the “adjustment” section of SPREADLEVER BRAKES.

TORQUE SETTINGS

M12 grade 10.9 bolt 100Nm M12 grade 8.8 bolt 70Nm M14 grade 10.9 bolt 125Nm

LIGHTING SYSTEMS

There is no servicing required on lighting systems. The service consists of a functional check - if this identifies a fault then an initial visual check followed by a methodical series of tests will be needed.

VISUAL INSPECTION

a. 7 Pin Plug & Trailer to Vehicle Cable

Check for damage or deterioration.

Plug electrodes are clean and not worn.

Plug body and seal is not damaged.

Cable is not abraded or cracked, especially near the plug or where secured to the trailer.

Open the plug and check the connections for corrosion or loose connections.

b. Junction Boxes

Check the junction box(es) for damage. Check that the lid is securely fitted. If the lid is in place, there should be no reason to disturb it.

c. Fixed Wiring

Check for damage, cuts and cracks especially where the cable runs over metal edges or is flexed.

FAULT FINDING STRATEGIES

These are simple systems and work logically. The difficulty sometimes lies in finding that answer quickly:-

1. check anything that has been disturbed recently.
2. check areas known to be susceptible to damage or deterioration.
3. check things that are easy and quick.

If this does not identify the fault then:-

4. follow systems in a logical and thorough manner.

Earth faults are common, particularly on older towing vehicles and can repay investigation.

If these do not yield a result, then follow the malfunctioning system through from one end to the other omitting nothing. Be aware that the circuit may pass from one colour wire to the other when passing through a junction made by an Aspock Double Click connector.

Do not assume that the trailer is always at fault. A great deal of time can often be saved by checking the wiring of the towing vehicle at an early stage.

EQUIPMENT

1. Lighting Board : A specialist fault finding device can be used to check the towing vehicle but a simple lighting board makes a readily available substitute. Make sure it is wired correctly and double check it is still working before using as a checking aid. Use this to check the towing vehicle and as an emergency field recovery replacement.
2. Multi Meter : The ranges required for trailer purposes are 12 (occasionally 24) volts DC (direct current) for detecting voltage and Resistance for checking continuity.
3. Test Lamp : A small 12 probe, one with a small crocodile clip. Attach the crocodile clip to earth (white lead) and use the probe to detect where a positive voltage is being supplied.
4. Extension Lead : A long lead with two crocodile clips to enable the multimeter or test lamp to be used between two remote points eg between the 7-pin plug and the junction box or a rear lamp.

LIGHTING SYSTEMS - FAULTS

LAMP DOESN'T WORK

FAULT: One lamp doesn't work at all and the others work correctly:

CHECK THE BULB

1. Make sure that it is the correct type, power and voltage of bulb.
2. Ensure that the contact on the base of the bulb is clean.
3. Frequently the filament can be seen to be damaged but not all bulb faults are visible. Either replace with a known good bulb or put the suspect bulb into another lamp of a similar type. If the new bulb works or the fault follows the suspect bulb, then it is faulty.

CHECK THE BULB HOLDER

1. Corrosion. Cleaning with abrasive paper and a smear of grease can get the lamp working but if there are any doubts replace the lamp unit.
2. Bulb mounting. Make sure that the bulb retaining tags are not bent or broken or loose and hold the bulb securely against the contacts.

CHECK FOR POWER

1. Check that a voltage appears between the contact and bulb holder when the lamp is switched on. If there is no power then go to the 7-pin plug at the front of the trailer and check for voltage between the live and the white earth cable. Follow the feed for that lamp back to the next connector or junction box and check for voltage again. Check leads coming into and out of each connector/junction box, all the way back to the lamp if necessary. Following a progression from the lamp to the power source will indicate in which connector or cable run the problem lies.

CHECK CABLES

1. If the problem lies in a cable run then identify if the problem is in the feed or ground wires. This can be done by continuity test or by substitution.
2. Check each crimp terminal. Check there is good contact between the crimp and the core and there is no insulation getting in the way. Cores sometimes break just inside the insulation.
3. If both terminals are good, then the fault lies in the wire. If there is no visual damage to indicate the location of the problem, the simplest solution is to replace the cable or add a supplementary cable.

WRONG LAMP COMES ON

FAULT: One lamp comes on instead of another:

1. This is almost certainly a wiring error. Follow the cables from the lamp to the 7-pin vehicle plug to find the mistake. Single cap built in twin filament sock can also do this.

FAULT: Correct lamp on, others come on very dimly:

1. An earth fault. The lamp being tested is trying to earth itself through the other lamps. Follow the earth from the lamp in question to find the fault.

FAULT: Fuses blow in the towing vehicle:

1. Longer trailers with side marker lamps can draw more current from right and left hand side lamp circuits than the towing vehicle is capable of supplying. NB. Each 5 watt bulb draws 0.4 amps over and above the requirements of the towing vehicle itself. Check the fuse capacity on the side lamp circuit. If this is inadequate install a by-pass relay. More modern lighting systems use LEDs for side marker lamps reducing the current consumption.

This problem can be caused by a live feed touching either the chassis or the white earth return wire.

Do not use a towing vehicle to test for this problem, use a multimeter to identify the fault.

Use the resistance function of a multimeter to determine which wire has the fault. At the 7-pin plug check each feed wire in turn against the white earth wire and then against the chassis. Low or zero resistance will indicate which feed wire is contacting which return. Follow the feed wire through the system to locate the fault.

MAINTENANCE – DAILY CHECKS PRIOR TO USE

Coupling head	Ensure positive locking onto ball and wear indicator acceptable
Lighting	Secure plug and check lights are operational
Tyres/Wheels	Check correctly inflated, sidewalls for damage, tread for wear, wheel nuts secure.
Noseweight	Ensure positive noseweight not exceeding maximum recommendations.
Towing height	Ensure trailer is “towing” horizontal to ground
Load	Ensure load is safe and secure and does not exceed maximum weight capacity
Tow vehicle	Ensure that trailer is within tow vehicle manufacturers weight range
Legal obligations	Ensure driver has licence category for the trailer. Tachograph regulations and duty hours to be observed if applicable

MAINTENANCE - GENERAL

Coupling head	<p>Oil moving parts and pivots</p> <p>Clean and lubricate coupling head</p> <p>Check coupling head for positive locking onto tow ball</p>
Coupling assembly	<p>Check bellows for damage and apply grease to the two grease nipples on the coupling body and check drawtube for play</p> <p>Carry out a damper reaction test. Pull the handbrake lever as far as possible. Push the ball coupling as far back into the overrunning hitch. This requires force to compress and should extend smoothly when released</p> <p>Check the handbrake lever including auto reverse.</p> <p>Braked: check break-away cable for damage, fraying and security of the fittings</p> <p>Unbraked: check secondary coupling (cable, chain) for damage and security of the fittings</p> <p>The use of a break-away cable or secondary coupling is a legal requirement. Always use a compatible cable from the original manufacturer</p>
Wheelbrake / brake rod mechanism	<p>After 500 miles and then every 3000 miles (or annually) adjust the wheel brakes at the backplate and re-check the mechanism. Note it is important that the brake wear is taken up by adjusting the brake hubs and not by adjusting the linkage to compensate for mis-adjusted hubs. Ensure that cables/rods are not pre-tensioned prior to adjusting the wheel brake</p>
Rubber torsion axle	<p>Check ride height</p> <p>Check wheel bearings</p>
Jockey Wheel	<p>Dismantle and lubricate</p>

MAINTENANCE – FAULT FINDING

Fault	Cause	Solution
Braking too weak	Too much play in the brake system Brake linings not run in Brake linings oiled or damaged Over-run hitch stiff in operation Brake rod bent Brake cables rusty, frayed, buckled or damaged	Re-adjust Drive with caution and re-check Replace shoes and clean drum and brake components Lubricate and check for free movement Inspect and replace Inspect and replace
Jerky braking	Too much play in the brake system Defective coupling damper Auto-reverse brake shoe binding in carrier	Re-adjust Replace damper Clean, check for wear and lubricate or replace
Trailer slews under braking	Wheel brakes working one side Brake linings oiled or damaged in one or more hubs	Check system, replace as necessary, adjust Replace shoes and clean drum and brake components
Trailer brakes when tow vehicle throttle released but brakes not applied	Defective coupling damper	Replace damper
Difficulty reversing (brakes lock)	Brake system too tightly adjusted Pre-tension in cables	Re-adjust hubs and cables do not overtighten Check hubs, cables and links for adjustment
Handbrake too weak	Too much play in the brake system Brake rod bent Brake cables rusty, frayed, buckled or damaged	Re-adjust Inspect and replace Inspect and replace
Wheel brakes get hot	Possible normal operation Brake system too tightly adjusted Pre-tension in cables Overloaded trailer	Request opinion of service centre Re-adjust system taking care not to overtighten Check hubs, cables and links for adjustment Ensure that heating is not simply due to high duty
Ball coupling does not locate	Inside of coupling head dirty Incorrect tow vehicle ball hitch	Clean and lubricate Ensure that hitch is ISO 50 mm (49.61/50.0 diameter)
Ball coupling does not locate	Wear in head or ball Faulty head	Inspect and replace Replace head

MAINTENANCE – “MOT” STYLE ANNUAL CHECK

Test	Method	Go/no-go
Check drawtube for play	Grasp and feel play vertically and horizontally	Max 1 - 2 mm play at the head
Check damper operation	Force inwards and allow to extend	Requires force to compress and extends smoothly
Check coupling head “fit onto” tow ball	Trial fit to tow ball	Head indicators should show acceptable
Check coupling head and coupling assembly for loose, worn or broken parts. Particularly the bellows for damage	Inspection and check moving parts	All parts move freely, no damage or wear
Check rubber suspension for soundness	Visual inspection and measurement	Ride height at the same height on both sides
Check coupling assembly and suspension mounting points (axle pads) for security	Use spanner to check critical fasteners (coupling or delta plate plus axle pad bolts)	All secure
Look at tyre treads for any clues to misalignment or possible suspension failure	Inspection	Tyres must be legal, have the correct load rating and any unusual treadwear investigated further
Check wheel bearings	Raise trailer, rock wheel	No/minimal play
Check the handbrake lever including brakes in auto-reverse.	Apply handbrake, push rearwards and observe lever	Brakes should re-lock as handbrake lever travels further overcentre
With trailer handbrake on check adjustment	Apply handbrake	Check that compensator remains parallel.
With trailer handbrake on check function of compensator	Raise trailer, turn each wheel backwards until it locks	Wheels should lock one at a time, compensator must articulate and return to a parallel position when all wheels are locked
Check that the trailer holds securely on the handbrake	Apply handbrake and attempt to tow forwards with vehicle	Braking effect should be felt plus likelihood of skidding wheels on poor terrain
Inspect linkage, cables and compensator for security and corrosion	Inspection	All secure and minimal corrosion

MAINTENANCE – BOLT TORQUES

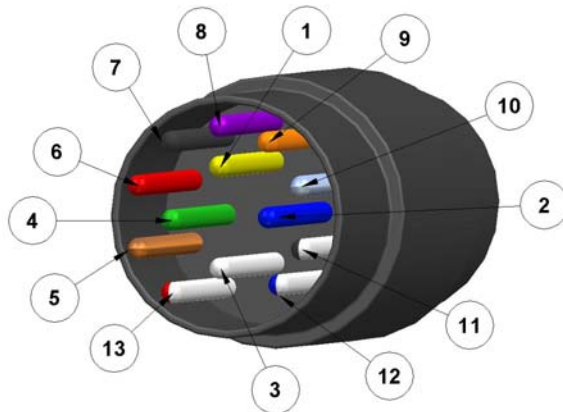
Fastener	Torque lb. ft.	Torque Nm
Wheel nut M12 Wheel nut M14	65 81	88 110
M10 grade 8.8 M10 grade 10.9	33 ---	45 ---
M12 grade 8.8 M12 grade 10.9 M12 grade 10.9 head/eye	59 74 ---	80 100 70
M14 grade 8.8 M14 grade 10.9 M14 grade 10.9 head/eye	--- 125 ---	--- 170 125
M16 grade 8.8 M16 grade 10.9	--- 207	--- 280

MAINTENANCE - LUBRICATION

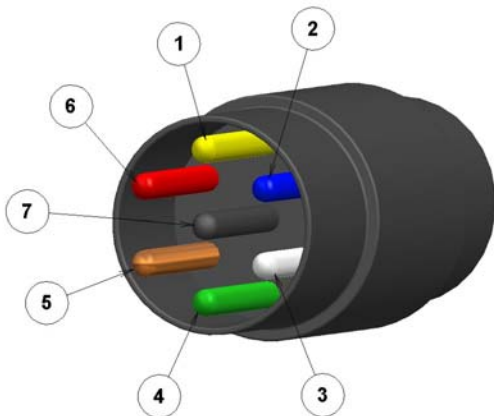
	Oil	Grease
Coupling head cup		Yes (Morris K2EP Longlife Grease)
Coupling pivots	Yes	
Coupling drawtube		Yes (Morris K2EP Longlife Grease)
Handbrake	Yes	
Jockey wheel thread		Yes (Morris K2EP Longlife Grease)
Exposed cables, rod ends, threads, pivots		Yes (Shell Albeida RL1)
Compensator	Yes	Yes (Shell Albeida RL1)

TECHNICAL – ELECTRICAL WIRING CONNECTIONS

13 PIN WIRING



No	Colour	Description
1	Yellow	LH Indicator
2	Blue	Rear Fog Lamp
3	White	Earth for Pins 1 to 8
4	Green	RH Indicator
5	Brown	RH Tail Lamp, End Outline, No Plate Lamp
6	Red	Stop Lamps
7	Black	LH Tail Lamp, End Outline, No Plate Lamp
8	Pink	Reversing Lamp
9	Orange	12V Power Feed
10	Grey	Fridge (IGN Switched Live)
11	White/Black	Earth for Pin 10
12	White/Blue	Spare (Signal)
13	White/Red	Earth Return for Pin 9

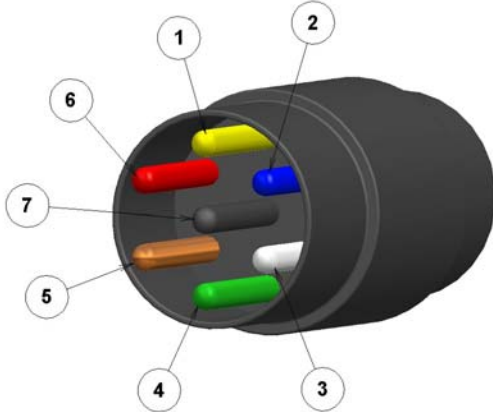


12 N 7 PIN 12 VOLT (Normal)

No	Colour	Description
1 (L)	Yellow	LH Indicator
2 (54G)	Blue	Rear Fog Lamp
3 (31)	White	Earth
4 (R)	Green	RH Indicator
5 (58R)	Brown	RH Tail, End Outline, No Plate Lamp
6 (54)	Red	Stop Lamps
7 (58L)	Black	LH Tail, End Outline, No Plate Lamp

12 S 7 PIN 12 VOLT (Supplementary)

No	Colour	Description
1 (L)	Yellow	Reversing Lamp
2 (54G)	Blue	Spare
3 (31)	White	Earth
4 (R)	Green	12V Power Feed
5 (58R)	Brown	Spare
6 (54)	Red	Fridge (IGN Switched Live)
7 (58L)	Black	Spare or Earth for Pin 6



Converters are available to enable attachment of 13 pin, 7 ??? and 75 connectors for both tow vehicle and trailer. Current understanding:-

A 13 pin equipped trailer with reversing lights will need an adaptor when coupled to a 7 pin equipped tow vehicle and reversing lamp will not be functional.

Type approved trailers will need to be equipped with reversing lights:-

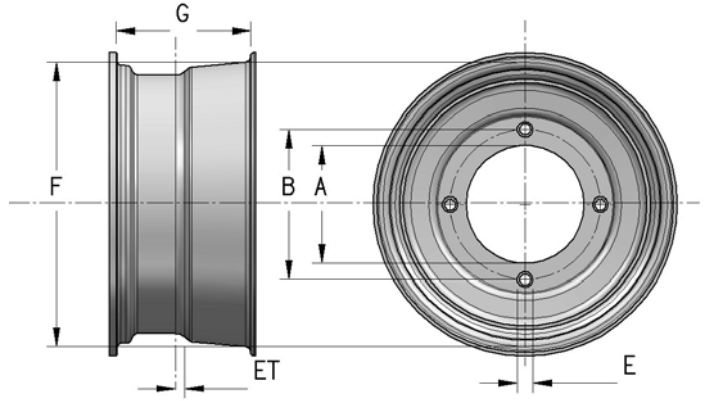
O1 optional **** O2 mandatory (one lamp up to 6m long, two lamps over 6m long)

KNOTT-AVONRIDE LIMITED **SUPPLIES LIGHTING EQUIPMENT**
CONTACT US FOR FURTHER DETAILS

TECHNICAL – HUB FITTINGS

CENTRE WHEEL STUDDING

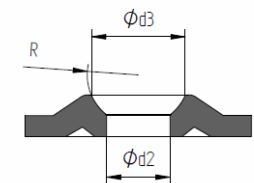
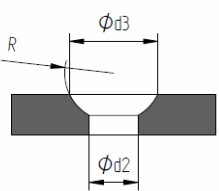
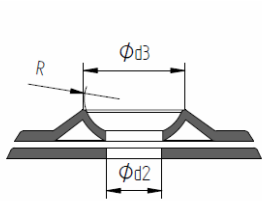
No of Bolts	Bore (A)	PCD (B)	Bolt
4	58	98	M12
4	57-60	100	M12
4	66.7	(4") 101.6	3/8"
5	63-67	112	M12/M14
5	80	(4½") 115	M12
4	95.25	(5½") 139.7	M12
5	94	140	M12/M16
5	115	(6½") 165.1	M12/M16
6	161	205	M14



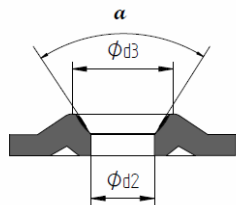
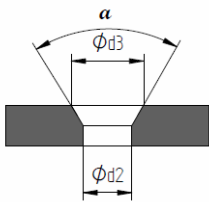
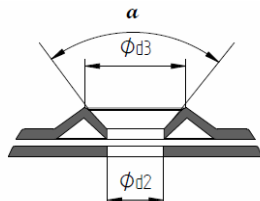
- A = Bore (mm)
- B = Pitch circle diameter (PCD) (mm)
- ET = Offset (mm)
- E = Bolt hole diameter (mm)
- F = Rim diameter (inches)
- G = Rim width (inches)

The correct nut or bolt must be used to suit the wheel seating i.e. Conical or spherical.

SPHERICAL COUNTERSINK



CONICAL COUNTERSINK



SPHERICAL COUNTERSINK SIZES

Internal Thread	R	ϕ_{d2}	ϕ_{d3}
M12 x M1,5	12	16	20
M14 x 1,5	14	16	23

CONICAL COUNTERSINK SIZES

Internal Thread	α	ϕ_{d2}	ϕ_{d3}
M10	60°	11	-
M10	90°	11	-
M12 x 1,5	60°	14	-
M12 x 1,5	90°	16	-
M14 x 1,5	60°	16.8	-

TECHNICAL – TYRE SPEED SYMBOLS & TYRE LOAD INDEX

TYRE SPEED SYMBOLS

Speed Symbol	Max. car speed for which tyre is suitable	
	Km/h	mph
J	100	60
K	110	69
L	120	75
M	130	81
N	140	87
P	150	93
Q	160	100
R	170	106
S	180	113
T	190	118
U	200	124
H	210	130
V	240	150



TYRE LOAD INDEX

LI	Kg	LI	Kg	LI	Kg	LI	Kg	LI	Kg	LI	Kg
60	250	71	345	82	475	93	650	104	900	115	1215
61	257	72	355	83	487	94	670	105	925	116	1250
62	265	73	365	84	500	95	690	106	950	117	1285
63	272	74	375	85	515	96	710	107	975	118	1320
64	280	75	387	86	530	97	730	108	1000	119	1360
65	290	76	400	87	545	98	750	109	1030	120	1400
66	300	77	412	88	560	99	775	110	1060	121	1450
67	307	78	425	89	580	100	800	111	1090	122	1500
68	315	79	437	90	600	101	825	112	1120	123	1550
69	325	80	450	91	615	102	850	113	1150	124	1600
70	335	81	462	92	630	103	875	114	1180	125	1650

LI = Load Index

Kg = Load (Kg)

The LOAD INDEX is a numerical code associated with the maximum load a tyre can carry at the speed indicated by its Speed Symbol under service conditions specified by E.T.R.T.O 1991, passenger car tyres section 13, reproduced above.

E.T.R.T.O. 1991, Section 13, Caravans and trailers. An increase of 10% over the load capacity quoted in the table is permitted when tyres are fitted to caravans and light trailers operated within the UK with a maximum operating speed up to 100km/h. The basic inflation should be increased by 0.2 bar / 3 psi.

Commercial/truck tyres can be increased by 5% whilst dedicated 'trailer' tyres do not attract a load bonus.

New legislation is in preparation defining additional side wall markings for rolling resistance, noise and manufacturing date. This will potentially lead to limits on the age of tyre allowed in service.

KNOTT-AVONRIDE  **LIMITED** **SUPPLIES WHEELS & TYRES**
CONTACT US FOR FURTHER DETAILS

TECHNICAL – TORQUE SETTINGS

HUB NUT

Manufacturer	One Piece Bearing	Taper Roller Bearing
Knott-Avonride Ltd	280 Nm	70 Nm (Rotate Hub) then back off. Retighten finger tight then fit split pin.
Ifor Williams Trailers	350 Nm	
Al-Ko	280 Nm	

NOTE: Manufacturers specific recommendations for Torque settings and for replacement of hub nut and split pin.

WHEEL BOLTS / NUTS

Thread Type	Torque Value
M10 x 1.25 Bolt	55 Nm
M12 x 1.5 Bolt	90 Nm
M14 x 1.75 Bolt	145 Nm
3/8" UNF Nut	60 Nm
7/16" UNF Nut	70 Nm
M12 x 1.5 Nut	100 Nm
1/2" UNF Nut	90 Nm
5/8" UNF Nut	110 Nm
M16 x 1.5 Nut	195 Nm

FASTENERS - GENERAL

Bolt	Torque Value
M10 Grade 8.8	45 Nm
M12 Grade 8.8	70 Nm
M12 Grade 10.9	125 Nm
M14 Grade 10.9	170 Nm
M16 Grade 8.8	195 Nm

<u>HEAD SECURING BOLTS</u>	
Bolt	Torque Value
M12 Grade 10.9	100 Nm
M14 Grade 10.9	125 Nm

TECHNICAL

BREAKAWAY CABLES & SECONDARY COUPLINGS - EXTRACT FROM DIRECTIVE 98/12/EC

- 2.2.2 Trailers of category O₁ need not be fitted with a service braking device; however, if trailers of this category are equipped with a service braking device this must comply with the same requirements as those of category O₂.
- 2.2.2.1 Every trailer of category O₂ must be fitted with a service braking device either of the continuous or semi-continuous type of the inertia (overrun) type. The latter type shall be authorised only for trailers other than semi-trailers.
- 2.2.2.9 The braking devices must be such that the trailer is stopped automatically if the coupling breaks while the trailer is in motion. However, this requirement shall not apply to single-axled trailers with a maximum weight not exceeding 1.5 metric tons provided that the trailers are fitted, in addition to the main coupling, with a secondary coupling (chain, cable, etc.) which in the event of breakage of the main coupling, can stop the drawbar from touching the ground and provide some residual steering action on the trailer.

These paragraphs are closely mirrored in UNECE Regulation 13, paragraphs 5.2.2.1 and 5.2.2.9.

Knott-Avonride Ltd unbraked couplings for use on trailers up to 750kg gross weight (O₁) must be fitted with a compliant secondary coupling.

Knott-Avonride Ltd braked couplings for use on trailers 750kg to 3500kg gross weight (O₂) are fitted with a breakaway cable.

USE ONLY  ORIGINAL REPLACEMENT PARTS

TRAILER WEIGHTS

Classification	Gross (kg)	Braking
O1	0 – 750	Unbraked with secondary coupling
O2	750 – 3500	Overrun couplings with breakaway cable (or secondary coupling to maximum mass of 1500kg)
O3	3500 – 10000	Power brakes, self adjusting hubs and ABS
O4	Over 10000	Power brakes, self adjusting hubs and ABS

NOTE: The maximum Mass considered for classifying a trailer corresponds to the static vertical load transmitted to the ground by the axle(s) (Annex II, paragraph 3, 2007/46/EC).

TRAILER DIMENSIONS

	Tow Vehicle	Length	Width	Height
The Road Vehicles (Construction & Use) Regulations 1986	< 3500 GVW	7.0m excl. drawbar	2.55m (was 2.3m)	4.2m
	> 3500 GVW	12.0m excl. drawbar	2.55m	4.2m
		(Min 4 wheels, max combination length 18m)		
EC Directive 2007/46/EEC Dimensions from 96/53/EC as amended by 2002/7/EC	M ₁ , M ₂ , M ₃ , N ₁ , N ₂ , N ₃	12.0m incl. drawbar	2.55m (2.60m refrigerated)	4.0m
		Max articulated vehicle length 16.5m Max roadtrain (wagon & drag) 18.75m		

The information here is intended as a guide. It is as accurate as we can make at the time of printing, however, Knott-Avonride Ltd do not accept any responsibility for any inaccuracies which may be in the text. Any person wishing to depend on the information contained here must check for themselves with the original documentation including any revision or additions to regulations, instruments or the law.

TECHNICAL - ECWVTA

TIMETABLE FOR THE ENFORCEMENT OF DIRECTIVE 2007/46/EC

O ₁ , O ₂ , O ₃ , O ₄	Enforcement Dates		
	New Types of Vehicles Optional	New Types of Vehicles Obligatory	Existing Types of Vehicles Obligatory
Incomplete and complete vehicles	Since 29 April 2009	29 October 2010	29 October 2012
Completed vehicles	Since 29 April 2009	29 October 2011	29 October 2013
Special-purpose vehicles	Since 29 April 2009	29 October 2012	29 October 2014

KNOTT-AVONRIDE LIMITED

European Community Whole of Vehicle Type Approval (ECWVTA) - 2007/46/EC

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GENERAL SAFETY REGULATION EC 661/2009

The General Safety Regulation (GSR) amends Directive 2007/46/EC by substituting the equivalent UNECE Regulations in place of the EC Directives. It makes compliance with the UNECE regulations for type approval submissions compulsory from 1 November 2012 and compulsory for vehicles entering into service from 1 November 2014.

All of the old EC Directives will be repealed and will be replaced by the UNECE regulations. UNECE Regulations are also recognised in a wider range of countries than the European Directives. Where equivalent UNECE Regulations are not available General Safety Implementing Measure documents are being published.

USEFUL CONTACTS

British Standards Institution	www.bsigroup.com
Business Link (select transport)	www.businesslink.gov.uk
Department for Transport.....	www.dft.gov.uk
Department of the Environment	www.doeni.gov.uk
Driver & Vehicle Agency.....	www.dvni.gov.uk
Driver & Vehicle Licensing Agency	www.dvla.gov.uk
European Tyre & Rim Technical Organisation	www.etrto.org
Freight Transport Association	www.fta.co.uk
Highways Agency	www.highways.gov.uk
Knott-Avonride Ltd, Burton Upon Trent, Staffordshire	www.knottuk.com
Knott-Avonride Ltd, Maesteg, South Wales	www.knottuk.com
Motor Industry Research Association	www.mira.co.uk
National Trailer & Towing Association	www.ntta.co.uk
Public Services (including transport).....	www.direct.gov.uk
Road Haulage Association	www.rha.uk.net
The European Union on-line	www.europa.eu
The Institute of Road Transport Engineers	www.soe.org.uk
The Society of Motor Manufacturers and Traders Ltd	www.smmt.co.uk
Transport Research Laboratory	www.trl.co.uk
United Nations Economic Commission for Europe	www.unece.org
Vehicle & Operator Services Agency.....	www.vosa.gov.uk
Vehicle Certification Agency	www.vca.gov.uk

PLEASE ALSO VISIT OUR WEBSITE FOR PUBLICATIONS & FURTHER INFORMATION

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