



Technical Information

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STABILISERS

This leaflet is prepared by The Caravan Club as part of its service to members. The contents are believed to be correct at the time of publication, but the position may be checked with The Club's Information Office. The Club does not endorse the listed products and you should satisfy yourself as to their suitability. As always check that the installation of an after-market accessory does not invalidate your Warranty.

October 2009

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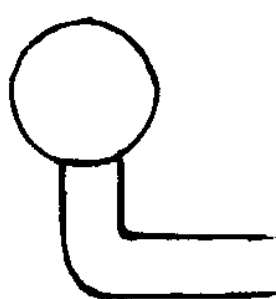
Any combination of towing vehicle and trailer, such as a car and caravan, must be flexibly connected to allow for turning corners and following surface deviation. This is usually provided for by a ball and socket joint with a ball of 50mm diameter. Under most road conditions a well-matched vehicle and trailer will encounter no stability problems, even though the trailer is free to swing on its connecting ball. This assumes that there is a good outfit weight ratio (so that the towing vehicle will hold its trailer, whatever momentum the trailer builds up); so that the trailer when attached and loaded rides level or slightly nose down but *never* nose up, that the car also rides level (see Information Leaflet entitled "*Rear Suspension Aids*"), and the tyres on both vehicle and trailer are in good condition and, most important, at the correct laden pressures. These guidelines are based on many years observations and on accident data analysis. Detailed research has also been conducted since 1994 by the University of Bath, sponsored by The Caravan Club, which has fully validated the Club's advice that a properly matched and maintained outfit will not normally encounter stability problems. Nevertheless, some caravan and car designs are inherently more stable than others and some form of extra assistance from an add-on stabiliser device may be found to give an easier or more comfortable tow, particularly when an overtaking vehicle's 'bow wave' upsets the outfit. When braking, no instability should occur if in addition the brake shoes and linkages are correctly and evenly adjusted (i.e. so that the brake on one side does not operate before the other and start the trailer slewing) and the hitch damper operates smoothly and effectively so that the caravan brakes are applied before all the travel on the overrun device is taken up.

There are two main categories of trailer stabiliser: first those which are designed only to reduce yawing, and secondly those which act both horizontally and vertically. This dual action type therefore reduces pitching as well as swinging, by introducing a link between vehicle and trailer which helps to reduce sinking at the hitch. This is referred to as a load equalising stabiliser. In the case of the Scott Stabiliser it is claimed for an average outfit that the effect is to take about 10 kg from the vehicle's rear axle, placing 6 kg of this on the front axle, and 4 kg on the caravan axle. This explains the otherwise puzzling claim that a stabiliser "*reduces noseweight*". Because of this effect care needs to be taken in using such a stabiliser.

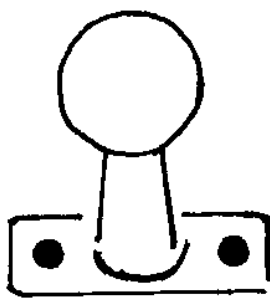
Research and experience show that for good dynamic stability a static noseweight of around 7% of a trailer caravan's Actual Laden Weight (ALW) is required, giving values typically in the range 50 to 80 kg. A load equalising stabiliser reduces this, and so they are particularly useful when a caravan has an inherently high noseweight. It is far safer to reduce noseweight to the correct value by fitting such a stabiliser than by placing heavy weights behind the caravan axle. Far better still is to choose a car and caravan combination with compatible noseweight figures in the first place, but establishing the actual noseweight characteristics of a caravan prior to purchase is often difficult.

As the effect of the car's rear end sinking is for the front to rise a proportionate amount, correct noseweight is important for steering and headlamp setting. It is also, for front wheel drive cars, particularly crucial for traction.

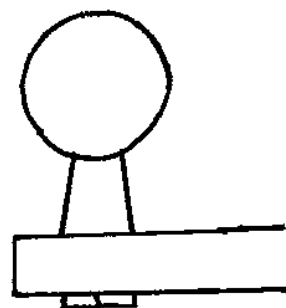
Another point to consider is the type of towball on your car. Most stabilisers need a mounting point on the car towing bracket and are generally designed with the standard two-bolt removable towball in mind. For swan-neck (continental) towballs and other varieties (e.g. removable) an adaptor bracket or special plate may be required. So remember to specify which plate or bracket you require when buying the stabiliser. See table at the end of this section.



Swan neck
(continental)



Standard



Single Bolt

It is also important to note that holes should not be drilled in the caravan chassis. In most cases L-brackets can be clamped to the drawbar to avoid drilling, and this is a condition of most chassis manufacturers' warranties.

Stabilisers with lateral action only

Under this category comes the Westfalia SSK3, Walter Winterhoff 500Q, and Al-Ko AKS *2700, *2004, 3004 and 1300 which are direct swaps for a standard Al-Ko or Albe coupling head and can be fitted in approximately twenty five minutes. The problem with most current stabilisers is their effect, usually slight, on the overrun brake because the extra linkage between car and caravan tends to hold the two vehicles apart through friction. This can slightly delay the overrun mechanism and, consequently, the start of braking. However, clamped to any standard 50 mm ball, lateral action only types do not affect the overrun mechanism.

* No longer manufactured.

Their major virtues are their simplicity in operation with instant hitching up and the use of dry towballs. Once the head has engaged on the ball there are just two actions of the clamping lever with the SSK3 and AKS 1300, and one with the AKS *2700, *2004 and 3004 and the Winterhoff 500Q. Because the clamps grip the side of the ball, damping is mainly on yaw and roll. There is also some damping in pitch, but without the spring assistance of a load equalising stabiliser. Normally towballs are lubricated to allow easy articulation and insignificant wear. The SSK3 has a special Teflon coating and so requires a dry towball; however, Westfalia claim that wear on the coating through friction is minimal. All AKS models require a dry towball, as does the Winterhoff 500Q, using a friction material similar to that used in brake linings. Replacement pads are available.

The AKS products are designed primarily for use on swan neck towbars. Where UK Standard towballs are fitted these must be replaced with the Al-Ko bolt on towball (which is included in all kits). The Al-Ko towball has a longer neck which allows these devices to pivot 25° either way from the vertical in order to comply with ISO standards. If any of the Al-Ko stabilisers are used on the standard (short neck) towball they could foul the ball shoulders and cause damage to the stabilisers and the overrun assembly. Note that the Al-Ko towball has been Type Approved and hence is compatible with Type Approved tow bars.

If you have a 4x4 with a spare wheel mounted on the rear there could be a problem raising the stabiliser handle to the vertical position. Al-Ko have now solved the problem with a short substitute handle that can be fitted for hitching and unhitching, suitable for AKS *2004/3004.

All Al-Ko stabilisers have a mechanical indicator built in to show when the hitch is safely engaged over the ball and the SSK3 is similarly fitted. With the Winterhoff 500Q, the ball coupling device and the lock will close automatically. Correctly set, the friction pads on all these stabilisers should have a long service life; in the case of the Al-Ko models, a lifespan of 50,000 km (31,069 miles) is claimed.

Before buying one it can be tried without fixing it to the caravan drawbar, but do not forget to thoroughly degrease the ball first and remove any paint from the towball using a fine emery cloth and either brake cleaning fluid or methylated spirits; also, if using the same towball cover, to degrease it too. A spacer is provided for use with standard two bolt fixing balls if clearance needs increasing, although the use of spacer plates to increase this distance is not strictly recommended as this alters the forces exerted on the towing bracket and would require longer hardened bolts (extended bolts, nuts and washers are included in all Al-Ko kits). The bracket testing programme obviously does not cover such variations.



WESTFALIA SSK3



WINTERHOFF 500Q



AL-KO AKS 1300



AL-KO AKS *2004/3004

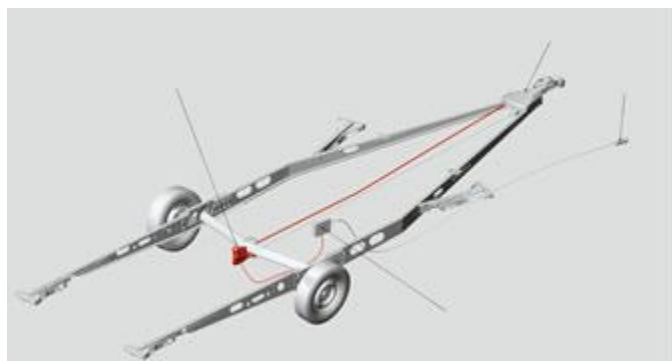
Active Trailer Control (ATC)

The ATC is an anti-snake system designed to ‘stretch’ the caravan outfit by lightly applying the caravan brakes whenever the trailer starts to sway (yaw) beyond certain limits.

Some caravan movement is natural, but if the car/caravan weight ratio is okay, the caravan loaded properly and the outfit is being driven properly, any yawing should soon damp itself out. ATC constantly monitors the caravan swing and, if it detects that sideways movements are increasing rather than decreasing, it pulls the trailer brakes on briefly bringing the caravan back into line. It will not react to sudden movements that self-correct or in normal cornering.

ATC has a black box that bolts onto the axle and connects to the brake actuation rod. The most complicated part of the installation is getting a 12V supply to the unit via the 12S seven-pin plug (or 13-pin plug if fitted). Every time you hitch up the system will carry out a ‘self-check’ to ensure there is a constant live connection, this is indicated via an LED readout on the caravan drawbar (changes from red to green).

Al-Ko advises that Bailey, Coachman, Fleetwood and Swift have started fitting the ATC as standard to some of their models; however the system can be retrofitted quite easily. Cost is expected to be around £300 plus VAT.

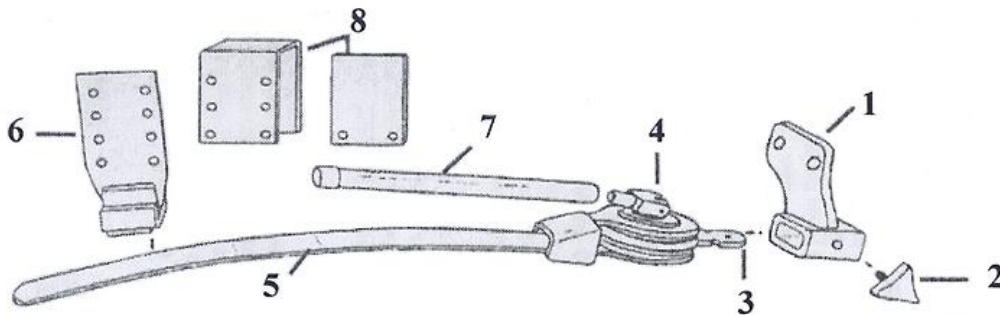


AL-KO ATC Trailer Control

Stabilisers with lateral and vertical action

Stabilisers which have *lateral and vertical action* have linkages connecting vehicle to trailer either on one side of the drawbar only or on both sides. It is likely that extra safety is offered by the double linkages against the very rare type of accident which results in the caravan being rolled by wind pressures from one side, ie downward pressure by a stabiliser on one side assists the roll over. However, Scott Halleys, the original manufacturer of the Scott stabiliser (now Northwest Towbar Centre), have carried out testing at MIRA's (Motor Industry Research Association) testing grounds and claimed the overturning effect of their stabiliser was negligible.

Many of the stabilisers in this group operate on the same principle of a single leaf spring mounted on a friction pad: an example is the Bulldog 200Q/300Q.

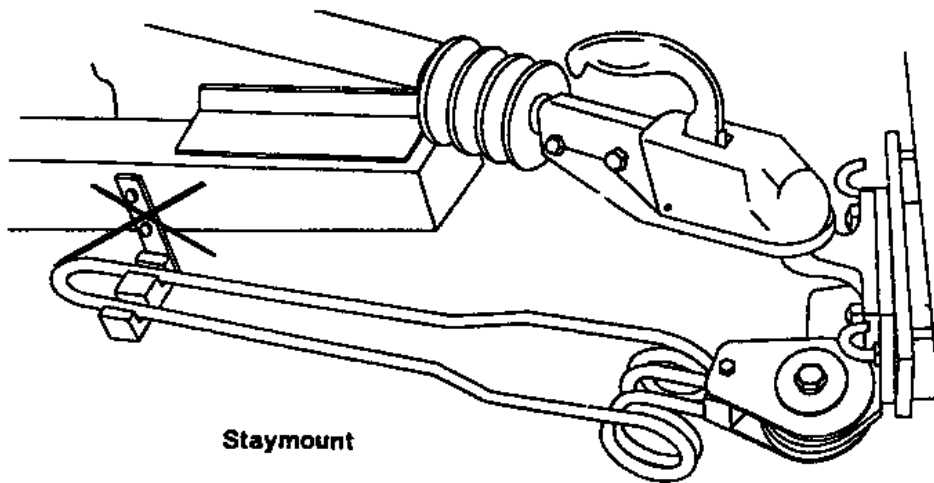


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|--------------------------------|--|
| 1. Reversible Car Plate | 2. Locking Stud and dust cap |
| 3. Damper pivot bracket | 4. Cam lever and 12mm safety type
adjusting bolt two lock |
| 5. Stabiliser spring arm | 6. Angle bracket & slipper assembly |
| 7. Tubular handle (detachable) | 8. Saddle clamp c/w packer plates (2mm
& 6mm thick) |

The Scott was available with one or two leaf springs for single or double linkages (one each side of drawbar), and offered an optional clamp to avoid chassis drilling.

Other popular makes are the Bulldog 400Q, Towsure's Snakemaster, and Breckland's Driver and Corgi. Many manufacturers also offer the option of a quick release mechanism, which makes engaging and releasing the connecting stabiliser bar or spring less of a struggle.

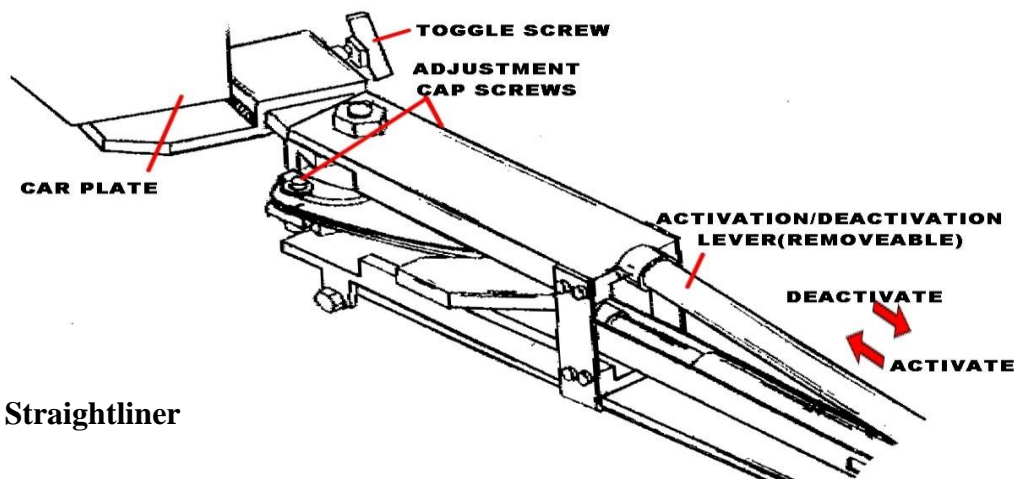
Other stabilisers in this group which incorporated a friction pad were the Staymount, Road Runner and Tando but, instead of the leaf spring, the Tando has a single steering rod with the spring element in the form of a rubber tension block below the towball mounting. The Road Runner uses two friction pads at right angles to damp yawing and pitching without spring assistance on the latter



Staymount

No drilling allowed on Al-Ko chassis. Use alternative clamp-on bracket.

The Straightliner uses a conventional leaf spring to reduce the loading on the towing vehicle's rear suspension and help control pitching of the caravan. To control side to side movement it relies on pressure from a gas-filled strut to hold a roller against a V-shaped section within which it can move. The 'Vee' is free to travel back and forth within a slot. In action, pressure from the strut holds the outfit in line, but any side force causing the caravan to yaw also causes the roller to run up the side of the 'Vee'. The roller then applies pressure to re-centralise it and restore stability.



Straightliner

Coming under the category of stabilisers, but not a friction damping stabiliser at all, is the Trapezium type of geometric towing system (Equaliser), which is no longer manufactured, although Shifta Products provides a spares and repairs service (Equaliser only). Whilst conventional stabilisers attempt to control instability by resisting, via friction, lateral movement between car and trailer, the Trapezium system allows the towball to move in a large radius arc from side to side, which moves the effective pivot point of the trailer forwards, nearer the rear axle of the car. This way the horizontal leverage on the rear of the car is reduced.

At the time of writing, it is unclear whether this system falls within the scope of the 94/20 EC Directive on Type Approval of towing devices. Check with the manufacturer to confirm that there is no legal difficulty with using this device on an 'S' plate or later car.

With all these stabilisers to choose from, it is difficult recommending the correct choice for a particular outfit. However, before selecting, use the following checklist.

1. Is a stabiliser really necessary? Might not a rear suspension aid or revised distribution of payload be adequate to restore the towing vehicle's attitude and therefore achieve outfit stability?
2. If the towing vehicle already copes with the trailer noseweight, a stabiliser controlling lateral movement could be all that is necessary. Cars with self levelling suspension, which keeps the rear end up whatever the load, come into this category.
3. A load equalising stabiliser *may* eliminate the need for rear suspension aids on the towing vehicle.
4. Load equalising stabilisers, by distributing vertical loads along the length of the outfit, require a particularly strong towing bracket on the vehicle to cope with these stresses. With modern lightweight construction of cars, this is becoming harder for bracket manufacturers to achieve. Fit only a bracket that has been *tested & passed* to AU 114 or equivalent ISO 3853, and has a plate stating this. ("*Conforms with*" or "*made to*" the Standard are worthless claims: only "*tested to*" means you can be sure of its strength.) Car manufacturer approved ones are also usually tested on a car body in addition to the test rig and have car makers' warranties, since the strength of the mounting points has been verified. Note that a vehicle first used after 1 August 1998 can only be fitted with a type approved towbar in accordance with the 94/20 EC Directive, which supersedes BS AU 114 for these vehicles and is an even more stringent test standard.
5. If fitment of a stabiliser requires drilling of the drawbar (remember many sold on the continent do not require drilling), check with the caravan/chassis manufacturer that drilling will not weaken the structure or invalidate the warranty.
6. As drawbar gas bottle fairings/lockers often enclose the drawbar, check how the stabiliser can be fitted: will cutting the fairing material weaken it? Will ground clearance be reduced?
7. Consider the effect of a stabiliser on the action of the overrun brakes. Any condition between the towing vehicle and the trailer must, to some degree, through friction (in either or both horizontal and vertical directions) affect the instantaneous action of the overrun brakes. A slight effect may not noticeably alter outfit braking, but too much interference could cause unevenness.
8. Replacement hitches, eg SSK and AKS, should not be used on towballs with single bolt fixing, as their gripping action could cause loosening of the fixing bolt.

9. If needed, remember to order the correct car plate or adaptor bracket for your type of car towball arrangement.

If you select and use a stabiliser, ensure that it is correctly fitted in line with the manufacturer's instructions. Occasional checking of the settings is also essential, as slackness of the friction pads (after wear through usage) will considerably reduce performance. Most conventional stabilisers are adjusted by tightening the centre bolt until it requires a force of around 60 lbs to move the leaf spring sideways (check the manufacturer's instructions). This can be checked by either pushing the bathroom scales against the stabiliser 'arm', or by using a spring balance.

Additional Points

Note that it may be necessary to remove a load equalising stabiliser if you are manoeuvring the caravan such that the angle between the car and the caravan is very large. This would not normally be the case on the road, but could occur on a congested storage site or a particularly tight pitch.

Be cautious of grounding any part of a stabiliser system which projects below the height of the tow bar or the caravan's drawbar. Take extra care over large sleeping policemen, or on car ferry access ramps.

Remember that all stabilisers need periodic adjustment to remain effective and to prevent wear. One service specialising in stabiliser adjustment is The Stabiliser Clinic. As well as attending most major rallies, they also operate a mail order service. For further information contact Jonathan Ward, Holme Grove, By Pass Road, Garstang, Preston PR3 1NA, telephone 01995 603745.

Finally, remember that the stabiliser is only an aid: do not expect it to overcome the impossible handicaps of a caravan too heavy for its towing vehicle, or badly balanced. A properly balanced and loaded caravan, with the right noseweight, correctly matched to the towing vehicle, will be stable. A stabiliser will then damp out small oscillations due to wind buffeting and overtaking large vehicles.

STABILISER PRODUCT INFORMATION 2008

Stabiliser	Type	Quick release	Suitable for Swan-neck towballs *	Approx Price inc. vat	Manufacturer
AKS 1300 (rated up to 1360kg)	Hitch	Yes	Yes	£254.20	Al-Ko Kober, South Warwickshire Business Park, Kineton Road Southam, Warks, CV47 0AL Tel 01926 818500 www.alko.co.uk
Retro-fit handle for AKS 2004/3004				£32.71	As above
AKS 3004 (rated up to 3000kg)	Hitch	Yes	Yes	£293.94	As above Not suitable for BPW chassis with gas strut handbrake contact AL-Ko for further advice
Active Trailer Control (ATC) Al-Ko	Anti-Snake System	N/A	N/A	£575.00 inc VAT (approx)	Al-Ko Kober (as above)
Breckland Corgi	Leaf Spring	Yes	Yes with adaptor	£72	As above
Westfalia SSK3	Hitch	Yes	Yes	£195	As above
Bulldog 200Q	Leaf Spring	Yes	Yes with adaptor LC8	£109.53	Bulldog Security Products Ltd, Unit 1-4 Stretton Road Much Wenlock, Shropshire, TF13 6DH Tel: 01952 728171/3 www.bulldogsecure.com
Bulldog 400Q	Leaf Spring	Yes	No	£227.47	As above
Walter Winterhoff/Bulldog 500Q Triple Pack	Hitch	No	Yes	£338.05	As above
Snakemaster Snakemaster Swan neck	Leaf Spring Leaf Spring	Yes Yes	Yes with adaptor	£49.95 £64.95	Towsure Products Ltd, 151-183 Holme Lane, Sheffield Tel 01142 503000 www.towsure.co.uk
Equaliser Not Trapezium/Rollsafe	Replaces Towball	Replaces Towball	No	Service only	Shifta Products. 103 Oakleys Road, Long Eaton, Nottingham NG10 1FH Tel 0115 973 1335 www.shifta.com
Westfalia SSK3	Hitch	Yes	Yes	£199.99	As above
Straightliner	Hydraulic	Yes	Yes with adaptor	£249.99	As above

* If you have an unusual towball arrangement, contact the stabiliser manufacturer for details; other adaptor plates/brackets may be available.

MEMBERS' COMMENTS ON SOME POPULAR MAKES OF STABILISER

STABILISER	LIKED BEST ABOUT IT	LIKED LEAST ABOUT IT	VARIOUS COMMENTS
Equaliser (Trapezium type)	Feeling of confidence. Its effectiveness. Makes reversing easier. Ability to do job.	Size of unit on car. Insecure cover. Price. Method of adjustment.	In 31 years of towing, I have never had a more stable outfit. It lived up to all the claims made for it.
Scott	Easy to use. Reliable & simple. Gives confidence. Good value. Low maintenance. Quality.	Effort of attaching. Dirty to fit. Manual effort needed. Less effective at speed. Groans at low speed. Car bracket fouls ground.	I would say that pitching is reduced by 75%. It is essential that the damping bolt is kept tight.
Al-Ko AKS 2500	Forms part of hitch. Hitch engaged indicator. Quick and easy to use. Performance. No need to drill A frame.	Price. Price of special hitchlock too.	Gives complete peace of mind. Only downside is cost, but on balance it has been money well spent.
Westfalia SSK Mk II	Easy to use. Effective. No lifting/effort required. Quality of components.	Price. Special hitchlock required. Grinding noise at low speed. Cost of replacing pads. Cleaning of towball after other trailer used.	Ideal for persons with back troubles. You know positively that you are hitched correctly.
Towsure Snakemaster	Value for money	Constant adjustment required. Poor instructions. Rate of wear of friction discs.	I do not use quick release otherwise hinge pin will bend, reducing tension on friction pads (Towsure supplied several replacement pins free of charge)
Bruna XL	Reasonable price Reduces pitching. Good build quality.	Stabiliser arm can jump out of caravan bracket. Groaning noises at low speed.	Stabiliser arm comes adrift with sudden large changes in gradient e.g. hump-backed bridges, level crossings etc. Reasonable price for adequate performance.
Bulldog	Value for money. Robust. Effective. Simple.	Car bracket rusts. Groans at low speed. Leaf has jumped out of caravan bracket. Storage of unit. Weight of unit.	Robust, easy to use and effective. To be effective, the action must be tight, which makes it harder to fit.