

INTRODUCTION

DEAR OWNER,

THANK YOU FOR DECIDING TO BUY ONE OF OUR NEW CARAVANS. WE ARE SURE YOU WILL ENJOY MANY HAPPY HOURS IN IT AND WE HOPE THE INFORMATION AND HINTS IN THIS HANDBOOK WILL HEIGHTEN YOUR ENJOYMENT.

THE HANDBOOK HAS BEEN DESIGNED TO GIVE YOU A GENERAL GUIDE TO THE CARE, USE AND MAINTENANCE OF YOUR CARAVAN. WHETHER YOU ARE A NEW OR AN EXPERIENCED CARAVANNER THE HINTS WILL HELP TO PROTECT YOUR INVESTMENT.

THE INFORMATION CONTAINED WILL ANSWER MOST OF YOUR QUERIES, BUT IF THERE ARE ANY ASPECTS WHICH ARE NOT COVERED PLEASE CONSULT YOUR APPOINTED DEALER.

HAPPY CARAVANNING!

CONTENTS

The Towing Code



Safety and Security



Services



Electrical Equipment



Fitted Equipment



Maintenance



General Data





THE TOWING CODE

The Caravan Towing Code	2
Scope of the Code	2
Caravan Terms	2
Weights	2
Towing Vehicle Terms	3
Weights	3
Measurement of Noseweight	4
Type of Driving Licence Held	4
Glossary & Checklist	4
Preparing for the Road	7
Checklist	7
Loading & Distribution	7
Stability	8
Pre-tow Checklist	10
Moving Off	16
Reversing	17
Speed Limits	17
Caravan Handling	17
Motorway Driving	17
Changing a Wheel	18
Jacking Points	19
Stopping on a Hill	19
Arrival on Site	19



The Towing Code

THE CARAVAN TOWING CODE

This Code of Practice contains recommendations jointly reviewed and agreed by the following organisations:

The National Caravan Council
The Caravan Club
The Camping and Caravanning Club
The Caravan Writers Guild
The Department of Transport

Scope of the Code

The Code applies to all trailer caravans of maximum laden weight not exceeding 3500 kg (7,700 lbs), overall width not exceeding 2.3m (7ft 6in approximately) and overall length not exceeding 7m (23ft approximately), excluding the drawbar and coupling.

This is legally the maximum size of trailer that can be towed by a motor vehicle with a maximum gross weight of less than 3500 kg.

CARAVAN TERMS

Mass in Running Order:

The mass of the caravan as stated by the caravan manufacturer, as new with standard fixtures and fittings.

Note: Because of differences in the weight of materials supplied for the construction of caravans, a tolerance of +2% of the weight has been allowed in the Mass in Running Order weight.

Maximum User Payload:

The maximum allowable weight to be put into the caravan whilst it is being towed. This is made up of 3 sections:

Personal effects, optional equipment and essential habitation equipment.

The user payload is the difference between the Maximum Technically Permissible Laden Mass and the Mass in Running Order.

Essential Habitation Equipment:

Those items and fluids required for safe and proper functioning of the equipment for habitation as defined by manufacturer of the caravan.

Personal Effects:

Those items which a user can choose to carry in a caravan and which are not included as Essential Habitation Equipment or Optional equipment.

Optional Equipment:

Items made available by the manufacturer over and above the standard specification of the caravan.

Maximum Technically Permissible Laden Mass:

The maximum weight for which the caravan is designed for normal use when being towed on a road, laden. This mass takes into account specific operating conditions including factors such as the strength of materials, loading capacity of tyres etc.

WARNING: Under no circumstances should the maximum technically permissible laden mass of this caravan be exceeded.

Nose weight:

That part of the static mass of the caravan supported by the towing device on the rear of the towing vehicle.

Notes:

- (i) When measuring the noseweight it is important that the caravan is fully loaded. Do not place extra items indiscriminately into the caravan after this adjustment has been made.
- (ii) The caravan is intended to be towed slightly nose heavy. The nose weight can be adjusted by distribution of the load within the caravan. The nose weight should be approximately 7% of the actual laden weight (but not greater than the hitch capacity) and at the same time suit the towing vehicle. See section on Measurement of Nose Weight.
- (iii) It is not recommended that you tow with just a battery, spare wheel and gas bottles as this may exceed the permitted nose weight. Additional payload must be placed behind the axle to compensate for this.

TOWING VEHICLE TERMS

Kerb weight (Mass of Vehicle in Running Order):

The weight of the towing vehicle as defined by the vehicle manufacturer. This is normally with a full tank of fuel, with an adequate supply of liquids incidental to the vehicles propulsion, without driver or passengers, without any load except loose tools and equipment with which the vehicle is normally provided and without any towing bracket.

Caravan to Towing Vehicle Weight Ratio:

The towing vehicle to caravan weight ratio can be determined by calculation and is equal to:

$$\frac{\text{actual laden weight of caravan}}{\text{Kerb weight of towing vehicle}} \times 100\%$$

THE **LAW** REQUIRES THAT CARAVANS & THEIR TOWING VEHICLES & THE LOADS THEY CARRY MUST BE IN SUCH A CONDITION THAT NO DANGER OR NUISANCE IS CAUSED.

(Regulation 100 of the Road and Vehicles [Construction and Use] Regulations 1986).

Power to weight ratio:

No hard and fast rules can be stated but, here is a general guide.

- (a) Conventional petrol engines with a capacity up to approximately 1500 cc should be adequate for towing a

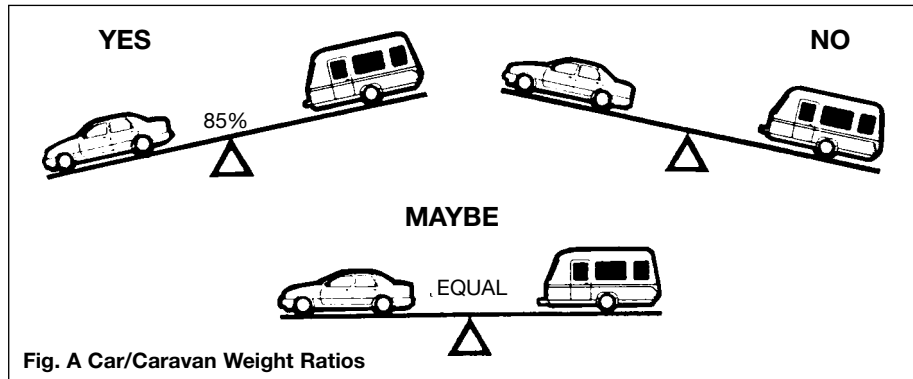


Fig. A Car/Caravan Weight Ratios

caravan weighing around 85% of the kerb weight of the towing vehicle.

- (b) Above 1500 cc such engines should manage a caravan weighing up to 100% of the kerb weight of the towing vehicle and still give adequate performance.

Note: The towing vehicle manufacturer's limit is, in some cases, less than the kerb weight.

Vehicles with automatic transmission may need an oil cooler fitting or the SAE rating of the gearbox oil increasing when towing. The advice of the vehicle manufacturer should be sought.

Mass in Running Order:

Caravanners can use a public weighbridge to establish the mass in running order.

Note: Weighbridges have varying weight tolerance levels.

Maximum Permissible Towing Mass:

The weight defined by the vehicle manufacturer as being the maximum that the vehicle is designed to tow.

Train Weight (Combination Weight):

The maximum combined weight of the towing vehicle and trailer combination as specified by the towing vehicle manufacturer.



The Towing Code

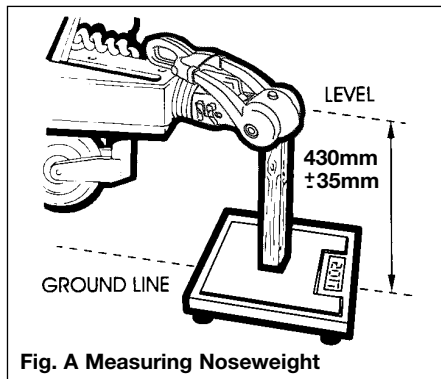


Fig. A Measuring Noseweight

MEASUREMENT OF NOSEWEIGHT

Noseweight may be measured using a proprietary brand of noseweight indicator.

Such equipment is obtainable at your Caravan Dealer.

Note: These indicators have a varying tolerance level.

Another simple method is to use bathroom scales under the coupling head with a piece of wood, fitted between the coupling head and the scales, of such length that the caravan floor is horizontal with the jockey wheel raised clear of the ground. (Fig. A)

Noseweight can be adjusted simply by distribution of weights in the caravan. Always

lower jockey wheel before entering the caravan and then raise before measuring again. (See **Loading**).

Note: The height of the towball on the towing vehicle, when laden, is also critical.

TYPE OF DRIVING LICENCE HELD

In order to be able to tow a caravan a driver must hold a Category B licence. Those car drivers who passed their tests prior to 1 January 1997 would have automatically obtained Category B+E. However, anyone who passed their test after 1 January 1997 will need to take a further test in order to obtain a Category B+E if they wish to tow a car and caravan combination whose train weight exceeds 3,500kg, or up to 4,250 if the caravan is less than 750kg or if the caravan's Maximum Technically Permissible Laden Mass exceeds the unladen weight of the car.

Note: The unladen weight of a car is normally less than the kerbside weight.

GLOSSARY & CHECKLIST

Awnings - Can consist of just a simple top sheet but may extend to a five sided frame tent attached to the side of the caravan.

Fire blanket - approved to BS 6575 is ideal for dealing with 'fat pan' fires.

Fire extinguisher - It is strongly recommended that a fire extinguisher is carried in the caravan. (For suitable types see **Safety and Security**).

Gas bottles - Bottled L.P. gas is the most convenient portable source of fuel. Two bottles are required for a constant supply. An initial deposit is payable on each cylinder. We recommend the use of 6kg Propane or 7kg Butane bottles. One position for use and one for storage only. (For detailed information see **Services - Gas**).

Jack - A suitable jack is essential (screw, scissor, side mounted or air jack type). Many car jacks are unsuitable.

Levellers - Levellers help level the caravan from side to side before unhitching. Proprietary products can be purchased from your caravan dealer and need to be positioned as indicated by a spirit level.

Spare Wheel - It is always advisable to carry a spare wheel with your caravan.

Spirit Level - A spirit level is extremely useful when siting the caravan.

Stabiliser - Stabilisers help to dampen the side to side movement of the caravan. One end fits to the car's towing bracket and the other end to the caravan. (See **Stability**)

Torque Wrench - A torque wrench is the only way that the exact recommended torque can be achieved for wheel nuts and bolts. (See **Preparing for the Road**).

Towing Bracket - Never use cheap alternatives, obtain one manufactured by a reputable company complying with the relevant standards.

Any light passenger vehicle registered in the UK on or after August 1st 1998 (S registered plate) will require a type approved towbar and towball (to 94/20/EC). Failure to fit a homologated towbar and towball could result in a prosecution and invalidation of your insurance cover. Always check with your car manufacturer or towbar manufacturer if in doubt.

Wooden Blocks - Wooden blocks typically 15cm. square and 2cm. thick are ideal for placing under corner steadies and jockey wheel when the ground is uneven or soft.

Water Containers - Two containers are required, one to carry fresh water to the caravan and one for waste water, which needs to be disposed of properly. Several types are available including jerry cans, folding cans and wheeled containers.

12N & 12S Sockets - Two sockets designated 12N and 12S are fitted to your car to accept corresponding plugs from the caravan. These are necessary to energise the road lights and caravan auxiliary circuits respectively.

12 Volt Battery - A deep cycling, heavy duty rechargeable leisure type battery should be purchased to provide back-up power for lights and other electrical appliances. (See **Battery**). The securing arrangements for the battery compartment require a leisure battery complying with EN 60095-2 in particular those with ledges for fastening to the lower edge of the long sides and having a maximum height of 190mm and width of 175mm.

WARNING: Your caravan dealer should be consulted if additional equipment is to be fitted as strong points may or may not be provided in the design.

Note: Fitting additional equipment will reduce the caravan allowable payload.



The Towing Code

Useful memory aid for other items.

Car	Gas regulator	Domestic	Floor cloth	Tea strainer
Distilled water	Jack	Adhesive tape	Fly spray	Tea towels
External mirrors	Levelling boards	Air freshener	Food	Table cloths
Fan belt	Mallet	Aluminium foil	Food mixer	Table mats
Fire extinguisher	Site/caravan mains lead	Ashtrays	Frying pan	Television
Jack	Spare bulbs	Bin liners	Glasses	Tin opener
Jump leads	(Mandatory in E.C.)	Binoculars	Grill pan	Tissues
Petrol can	Spare 12v fuses	Bottle opener	Jugs	Toilet paper
Socket set	Spare gas hose	Breadboard	Kettle	Torch
Spare bulbs	Spare wheel	Breadbin	Kitchen roll	Towels
Spare keys	Spirit level	Brush and dustpan	Kitchen tools	Toys & Games
Spare wheel	Toilet fluid	Butter dish	Litter bin	Vacuum cleaner
Tool kit	Waste water container	Camera and films	Matches	Washing up bowl
Towball cover	Wheel brace	Carving knife	Measuring jug	
Tow rope		Cassette recorder	Milk jug	Documents
Tyre pressure gauge	Personal	Chairs	Mixing bowl	Bail Bonds
Warning triangle	After sun cream	Clock	Needles and thread	(some Euro countries)
Tyre Pump	First Aid Kit	Clothes brush	Oven gloves	Bank and credit cards
	Flannels	Clothes line	Pegs	Caravan Certificate
Caravan	Hairbrush and comb	Coat hangers	Piezo Gas lighter	Cheque book
Awning pegs and poles	Make up. etc.	Coffee percolator	Potato peeler	CRIS document
Awning ground sheet	Raincoats	Coolbox	Pressure cooker	Driving licence
Battery 12 volt charger	Toothbrush	Colander	Radio	Green Card Insurance
Bucket	Toothpaste	Crockery	Rubbish bin	(some Euro countries)
Corner steady brace	Scissors	Cruet	Salad shaker	Maps and guides
Corner steady pads	Shampoo	Corkscrew	Saucepans	Money
Coupling lock	Shaving kit	Cutlery	Scissors	MOT Certificate
Door mat	Shoe cleaning kit	Dish cloth and brush	Sieve	Vehicle Registration
Fire blanket	Soap	Dusters and polish	Sugar bowl	Documents
Fire extinguisher	Sun tan oil	Disposable cloths	Shopping bags	
Fresh water container	Wellington boots	Egg cups	Sleeping bags	
Gas cylinder		Electrical extension lead	Tea pot	

The Towing Code

PREPARING FOR THE ROAD

PRE-LOAD CHECKLIST

Caution: Never enter the caravan without first lowering the four corner steadies with the brace provided.

BEFORE LOADING CHECK:

- loose articles are stowed securely. Do not stow tins, bottles or heavy items in overhead lockers prior to towing.
- all lockers and cupboard doors are closed and secured.
- all bunks are secure.
- all rooflights are closed and secured.
- main table is stored in its transit position.
- fridge is on 12v operation and door lock is set.
- all windows are fully closed and latched. Never tow with windows on night setting. Leave all curtains and blinds open to aid rear visibility.
- gas cylinders are correctly positioned, secured and turned off.
- battery is secure and mains connecting cable is disconnected and stowed.
- 12v distribution panel selector switch is set to the van position.

WARNING: The fridge will only operate in transit when the 12V distribution panel selector switch is in the 'VAN' position.

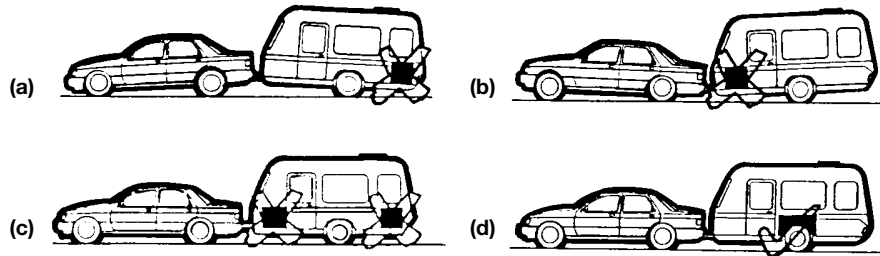


Fig. A Loading your caravan

WARNING: Turn off gas appliances except those heating appliances designed to function while the vehicle is in motion.

WARNING: Do not travel with televisions or microwaves in overhead lockers unless the appliance was supplied fitted to your caravan by the manufacturer.

LOADING AND DISTRIBUTION OF WEIGHT IN THE CARAVAN

Do not exceed recommended maximum loading for your caravan.

1. Load heavy items low down near the floor and mainly over or just in front of the axle(s) (Fig. A).
2. Load evenly right to left so that each

caravan wheel carries approximately the same weight.

3. Do not load items at the extreme front or rear since this can lead to instability due to the 'pendulum effect'.
4. Load remainder to give a suitable noseweight at the towing coupling.

Check noseweight.

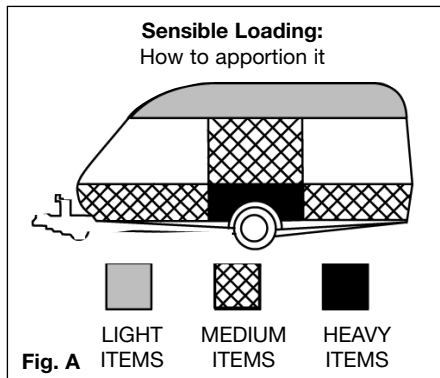
Note: Do not overload car boot.

Note: Please take care to ensure that you have allowed for the masses of all items you intend to carry in the caravan.

WARNING: All heavy and/or voluminous items (e.g. TV, radio etc) must be stored securely before travelling.



The Towing Code

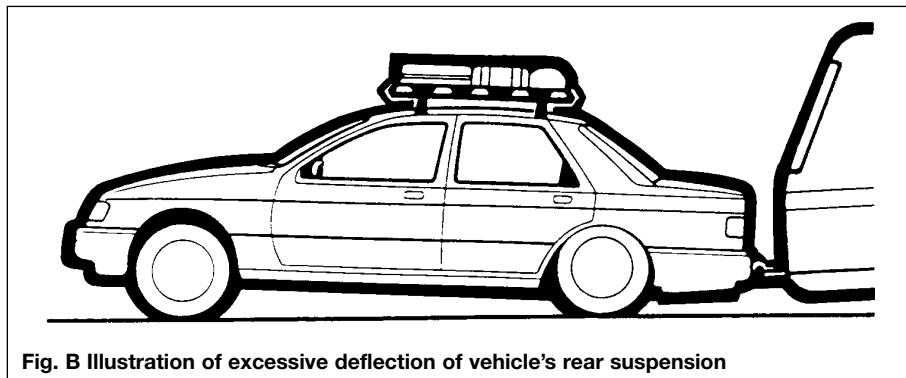


Towing vehicle's rear suspension

It is important that the towing vehicle's rear suspension is not deflected excessively by the noseweight on the tow ball. If it is excessive the steering and stability will be affected. (Fig. B)

The greater the towing vehicle's tail overhang (the distance between the rear axle and the tow ball), the greater the effect the noseweight will have on the towing vehicle's rear suspension.

After trying out the caravan it may be found that a stiffening of the rear suspension is necessary - but note that this may give the towing vehicle a firmer ride when not towing.



There are a number of suspension aids available and advice should be sought on which to use and how to fit. It is important to ensure that the caravan is towed either level or slightly nose down.

If you have any doubts about the suitability of your towbar for towing a caravan consult the towing bracket manufacturer.

DO NOT exceed the:

- Gross Vehicle Mass (G.V.M. on car plate).
- Maximum Technically Permissible Laden Mass (M.T.P.L.M.) on the caravan.
- Gross Vehicle Combination Mass (Train Weight) (G.V.C.M. on car plate).
- Maximum Permissible Towing Mass.

- Vertical Static Load on the caravan coupling.
- Maximum Vertical Load on the car towball as specified by towing vehicle manufacturer.

STABILITY

All our models are of a well balanced design and should be exceptionally good towers. Most models have an Al-Ko stabiliser fitted as standard. The common causes of poor stability include:

- (a) Worn springs or loose spring fixings on the towing vehicle.
- (b) Towing vehicle springs too soft.
- (c) Insufficient noseweight.
- (d) Nose of caravan is towing too high.

The Towing Code

Galvanised steel chassis

Drilling of the galvanised steel chassis will invalidate the warranty and must not be done.

Towball

The Al-Ko stabiliser is designed to be used with a swan neck, fixed or detachable towball. If you use a 'bolt on type' towball you may need to replace your towball with a special extended neck towball.

If you have a bolt on type towball you should ask your dealer to check clearance around the towball to allow for the stabiliser to articulate.

The Al-Ko extended neck towball (available from your dealer) is approved and marked with the approval number EC94/20. Failure to provide enough clearance around the towball may invalidate your stabiliser warranty.

Stabiliser Friction Pads

The Al-Ko stabiliser uses 'friction pads' inside the coupling head to clamp the towball. These pads must be kept free from grease and contamination from the towball. The friction pads should last approximately 50,000km (30,000 miles) under normal use, if correctly maintained.

Suitable towing vehicles

The caravan is manufactured for towing behind normal road cars and is not suitable for towing behind commercial vehicles. It is

strongly recommended that whenever a caravan is to be towed over rough terrain, e.g. a farmer's field or track, great care should be taken to ensure that no undue stress is placed upon the caravan via the hitch mounting, i.e. reduce speed. If in doubt, please consult the chassis manufacturer and the towing vehicle manufacturer who will advise. Touring caravans based on standard Al-Ko chassis can be towed by four wheel drive off road leisure vehicles providing the unit is used to tow in a like manner to a conventional road-going car and driven in the same considered manner.

Towbar manufacturers should be consulted before towing an uncompensated twin axle caravan.

Snaking

This is a term used to denote an unstable car and caravan combination where the caravan 'weaves' from side to side often causing a similar swaying movement in the car itself.

Causes:

- i) Unsuitable or unbalanced outfit.
- ii) Incorrect loading or weight distribution.
- iii) Excessive speed especially downhill.
- iv) Side winds.
- v) Overtaking.
- vi) Being overtaken by a large fast moving vehicle.
- vii) Erratic driving.

viii) Insufficient tyre pressures.

ix) Mixing radial and cross ply tyres.

Cures:

Cases of persistent snaking can be alleviated by the use of a stabiliser.

On the road

If you do find your outfit snaking, try to keep the steering wheel in a central position as far as possible, decelerate and avoid braking if possible.

OTHER IMPORTANT TOWING CONSIDERATIONS THAT COULD AFFECT STABILITY

Types of tyres fitted

The original tyres fitted by the manufacturer are suitable for towing at maximum speed of up to 81 mph (130 kph).

Maintenance checks should be carried out regularly for wear and tear.

Tyre pressures must be maintained, under inflation could lead to premature tyre failure.

Replacement tyres must be of the same size, load and speed index.

Periodically tyres should be rotated to equalise wear in the same manner as car tyres.

Do not mix four ply/six ply/eight ply tyres on the same axle.



The Towing Code

WARNING: If a wheel or tyre fitted to a wheel is changed any replacement must be of the same type of construction and size.

Tyre tread

The law requires that tyres and pressures must be suitable for the use to which they are being put. The minimum tread depth of both car and caravan tyres must be 1.6mm throughout a continuous band comprising the central three quarters of the breadth of tread and around the entire circumference of the tyre.

Tyre pressures

Towing vehicle's tyres must be at the pressures recommended for towing or heavy loading as stated in handbook not on tyre wall. Towing stability may otherwise be affected. Tyre pressures can be found on the manufacturers plate situated adjacent to the main exterior door and on the specification page in your service handbook.

Note: Although the caravan may be fitted with the same type of tyre as the towing vehicle, the pressures specified are different. All charts show values for cars and are therefore not applicable for caravans. Pressures displayed on tyre walls apply ONLY in North America and Canada.

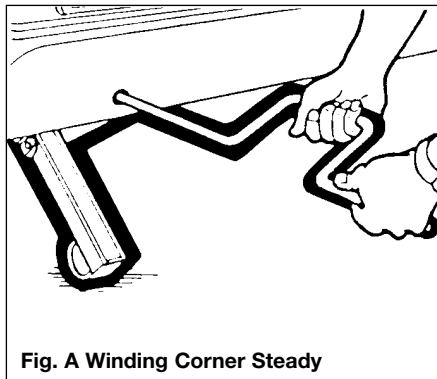


Fig. A Winding Corner Steady

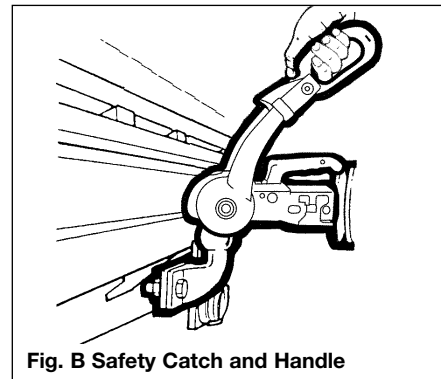


Fig. B Safety Catch and Handle

Wheels

Caravan wheel bolts should be tightened to a torque of 88Nm (65lb/ft) on steel wheels or 115Nm (85lb/ft) on alloy wheels and should be checked with the use of a torque wrench regularly. Only use a spare wheel and tyre of the type and size provided with you caravan.

Wheel Rims

Both steel and Alloy wheel rims are the 5.5J size incorporating a double safety hump which conforms to European safety standards.

If in any doubt, have your wheels checked by a competent tyre supplier.

Hitch head load capacity

The maximum vertical static load which can be put upon the hitch head when connected

is 100kg. Please refer to the technical data in your handbook.

(But see also vehicle manufacturer's weight limits on towball loading.)

PRE-TOW CHECKLIST AND HITCH-UP FOR AK 3004 STABILISER

Check Gas Locker, Battery Locker and Cassette Toilet doors are secure.

Check wheelnuts, tyre pressures and tyre conditions.

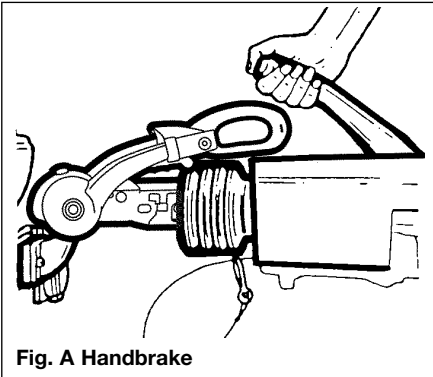
Fully raise all four corner steadies. (Fig. A).

Pick up any levelling pads or levelling boards.

Check rooflights/vents are securely closed.

Switch off gas supply and change over to electricity if required.

The Towing Code



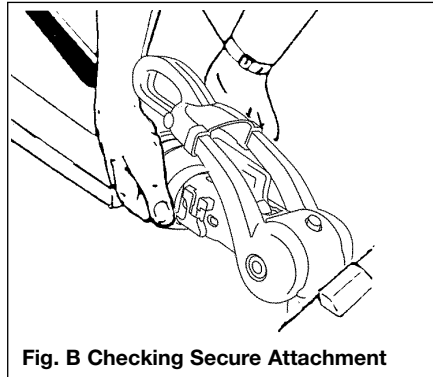
Lock the caravan exterior door.

An assistant can help in the hitching operation by standing on the left hand side of the drawbar (facing rear of car) and extending an arm horizontally to indicate position of the coupling. When reversing aim the towball of the car directly at the caravan drawbar. Remove towball cover and keep in car.

Adjust the jockey wheel to ensure the cup is high enough to slide over the towball.

Release caravan handbrake.

Position cup over the ungreaased towball, release and lift forward the large red stabiliser handle (Fig. B, Page 10), lift forward the exposed smaller black handle (Fig. B, Page 10), until it clicks up. The hitch head is



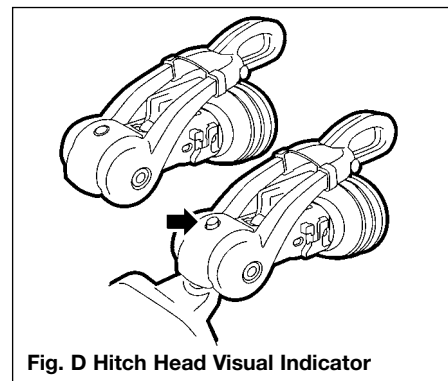
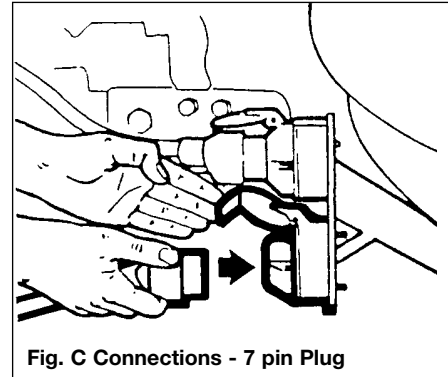
fitted with a visual indicator to show whether or not it is properly connected to the towball. A green band will show immediately below the red indicator button on the hitch head when a proper connection has been made. (See Fig. D)

WARNING: If the green band is showing when the hitch head is not connected to the towball there is a fault - contact your Dealer.

Adjust jockey wheel to lower cup on to the ball. A click indicates it is fully engaged. Ensure black handle has returned to its free position.

Secure caravan handbrake. (Fig. A)

Connect breakaway cable as described on page 13.



The Towing Code

Ensure that the jockey wheel is fully wound up and properly located in the slots, then release the clamp handle, lift the whole unit as high as possible and retighten the clamp handle.

Note: Ensure jockey wheel locates in recess provided.

Take hold of the caravan under the rubber gaiter behind the coupling and lift to ascertain whether the caravan is properly attached. (Figs. B & D.)

Lock hitch if possible (see Safety and Security, page 22).

Connect 7 pin plugs to car sockets ensuring there is enough loose cable for cornering, (Fig. C) ensuring they won't drag on the ground.

Check all car and caravan roadlights are working. Check round the caravan for anything left behind.

Release caravan handbrake, adjust all mirrors from driving seat and proceed.

PRE-TOW CHECKLIST AND HITCH-UP FOR AK 160 COUPLING HEAD

Check Gas Locker, Battery Locker (if fitted) and Cassette Toilet (if fitted) door/s are secure.

Check wheelnuts, tyre pressures and tyre conditions.

Fully raise all four corner steadies. (Fig. A, Page 10).

Pick up any levelling pads or levelling boards.

Check rooflights/vents are securely closed.

Switch off gas supply and change over to electricity if required.

Lock the caravan exterior door.

An assistant can help in the hitching operation by standing on the left hand side of the drawbar (facing rear of car) and extending an arm horizontally to indicate position of the coupling. When reversing aim the towball of the car directly at the caravan drawbar. Remove towball cover and keep in car.

Adjust the jockey wheel to ensure the cup is high enough to slide over the towball.

Release caravan handbrake.

Position cup over greased towball, release safety catch and lift handle (Fig. B). The hitch head is fitted with a visual indicator to show whether or not it is properly connected to the towball. A green band will show immediately below the red indicator button on the hitch head when a proper connection has been made. (See Fig. D, Page 13)

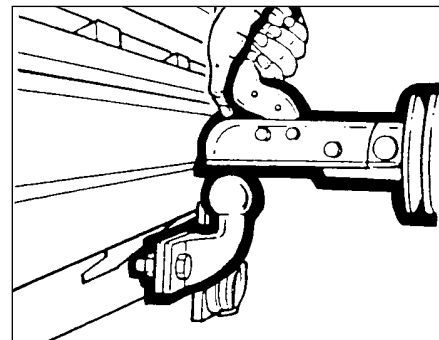
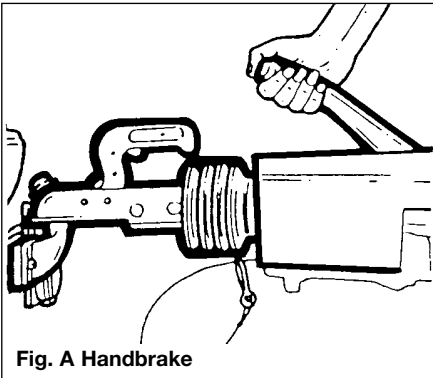


Fig. B Safety Catch and Handle

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

WARNING: If the green band is showing when the hitch head is not connected to the towball there is a fault - contact your Dealer.



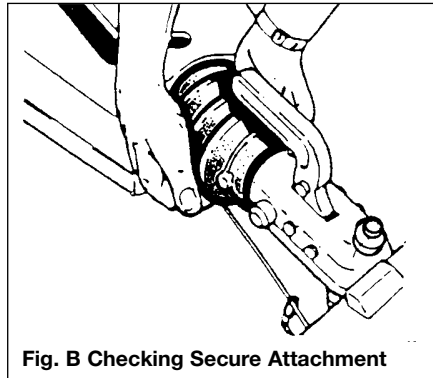
Adjust jockey wheel to lower cup on to the ball. A click indicates it is fully engaged. Ensure locking button has returned to its free position.

Secure caravan handbrake. (Fig. A, Page 13)

Connect breakaway cable (emergency braking device) in the form of a noose to suitable anchorage point on towbar. **DO NOT** attach to towball.

Ensure that the jockey wheel is fully wound up and properly located in the slots, then release the clamp handle, lift the whole unit as high as possible and retighten the clamp handle.

Note: Ensure jockey wheel locates in recess provided.



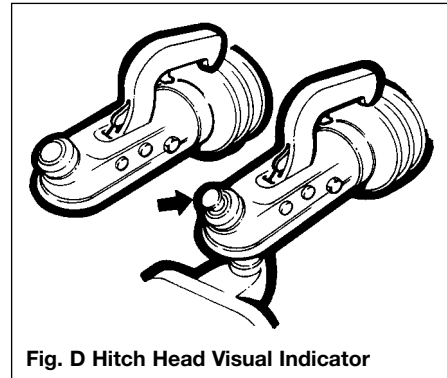
Take hold of the caravan under the rubber gaiter behind the coupling and lift to ascertain whether the caravan is properly attached. (Figs. B & D.)

Lock hitch if possible (see Safety and Security, page 24).

Connect 7 pin plugs to car sockets ensuring there is enough loose cable for cornering. (Fig. C, Page 11)

Check all car and caravan roadlights are working. Check round the caravan for anything left behind.

Release caravan handbrake, adjust all mirrors from driving seat and proceed.



The Towing Code

ROAD LIGHTING

For your information the wiring diagram of the 12N and 12S connectors is shown opposite. These should be checked regularly and if in any doubt a qualified electrician consulted.

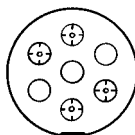
Some European cars may be equipped with Volta, Jeager, West or multi-con sockets, an adaptor or replacement sockets may be required. If so consult your dealer or qualified electrician.

The wiring allocations were changed in 1998 and it is important that you check the car to caravan connections are compatible prior to coupling up to the car.

WARNING: Always disconnect the electrical connector between the towing vehicle and the caravan before connecting a low voltage supply to the caravan (mains) and before charging the battery (EN 1648-1).

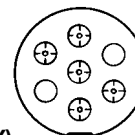
- All road lights must be in working order.
- Lenses and reflectors must be in good condition
- Bulbs must be of correct wattage for the application (see Service handbook).

12N AND 12S VIEWED FROM REAR OF PLUG



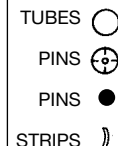
12N (BLACK)

TERMINAL	COLOUR	12N PLUG
1	YELLOW	L/H INDICATOR
2	BLUE	REAR FOG LAMP
3	WHITE	COMMON RETURN (1-7)
4	GREEN	R/H INDICATOR
5	BROWN	R/H SIDE TAIL & No PLATE LIGHT
6	RED	STOP LAMP
7	BLACK	L/H SIDE TAIL & No PLATE LIGHT

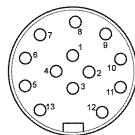


12S (GREY)

TERMINAL	COLOUR	12S PLUG
1	YELLOW	REVERSING LIGHT
2	BLUE	NO ALLOCATION
3	WHITE	NEGATIVE PIN 4
4	GREEN	CONTINUOUS POWER SUPPLY
5	BROWN	NO ALLOCATION
6	RED	FRIDGE
7	BLACK	RETURN FOR FRIDGE

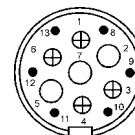


VOLTA/JEAGER & MULTICON FEDER 13 PIN PLUGS (viewed from rear)



VOLTA/JEAGER

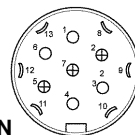
PIN NO	COLOUR	DESCRIPTION
1	YELLOW	LEFT FLASHER
2	BLUE	FOG HAZARD LIGHT
3	WHITE	EARTH FOR 1-8
4	GREEN	RIGHT FLASHER
5	BROWN	RIGHT TAIL LIGHT
6	RED	STOP LIGHTS
7	BLACK	LEFT TAIL LIGHT
8	ORANGE	REVERSE LIGHTS
9	BROWN/BLUE	CAR +
10	BROWN/RED	FRIDGE
11	WHITE/BLACK	EARTH FOR 10
12	NOT YET ALLOCATED	
13	WHITE/GREEN	EARTH FOR 9



WEST

PIN NO	COLOUR	DESCRIPTION
1	YELLOW	LEFT FLASHER
2	BLUE	FOG HAZARD LIGHT
3	WHITE	EARTH FOR 1-8
4	GREEN	RIGHT FLASHER
5	BROWN	RIGHT TAIL LIGHT
6	RED	STOP LIGHTS
7	BLACK	LEFT TAIL LIGHT
8	ORANGE	REVERSE LIGHTS
9	BROWN/BLUE	CAR +
10	BROWN/RED	FRIDGE
11	WHITE/BLACK	EARTH FOR 10
12	NOT YET ALLOCATED	
13	WHITE/GREEN	EARTH FOR 9

MULTICON FEDER 13K



The Towing Code

WARNING: Do not cause any road lighting to be obscured by the addition of any options or accessories to your caravan.

PASSENGERS

Passengers are forbidden to ride in a caravan.

BREAKAWAY CABLES

UK law requires that all caravans are fitted with a safety device to provide protection in the unlikely event of separation of the main coupling while in motion. A device referred to as a 'breakaway cable' fulfils this requirement and when fitted as on your caravan is mandatory.

Purpose

To apply the caravans brakes if it becomes separated from its towing vehicle. Having done this, the cable assembly is designed to part allowing the caravan to come to a halt away from the towing vehicle.

Identification

A thin steel cable with a red plastic coating fitted with a means of attachment for connection to the towing vehicle. Located directly beneath the coupling head.

Operation

In the event of the main coupling of the caravan separating from the towing vehicle, the cable should be able to pull tight,

without any hindrance, engaging the caravan brakes. **The breakaway cable should not become taut during normal use.**

Correct procedure for use

Regularly check the cable and clip for damage. If in doubt contact your Swift Group dealer.

Make sure the cable runs as straight as possible and goes through the cable guide fitted underneath the caravan coupling head.

Determine whether or not the towing vehicle towbar has a designated attachment point (i.e. a part specifically designated for a breakaway cable).

Where a point is designated on the towbar:

- Pass the cable through the attachment point and clip it back on itself (figure 1).
- Do not clip directly onto the designated point (figure 2) since the clip is not designed for use in this way.

Where there is no designated attachment point on the towbar:

- Fixed ball: Loop the cable around the neck of the towball in a single loop only. See figure 3A and 3B, Page 16.
- Detachable towball: You must seek guidance on procedure from the towing vehicle towbar manufacturer or supplier.

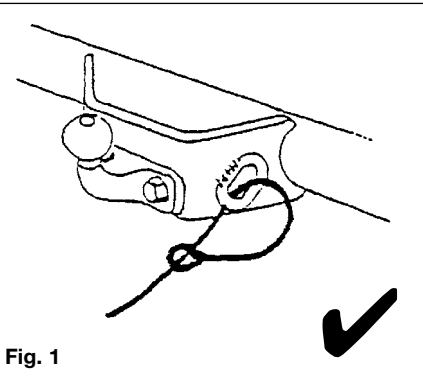


Fig. 1

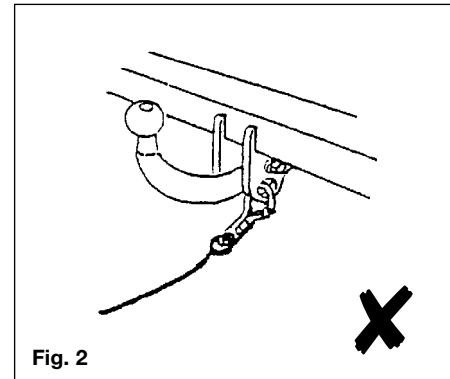


Fig. 2



The Towing Code

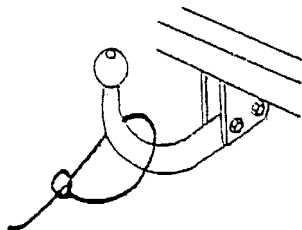


Fig. 3A

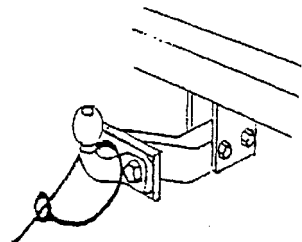


Fig. 3B

When the breakaway cable is attached, check to ensure:

- that the cable cannot snag in use on the caravan coupling head, jockey wheel, stabiliser or accessory e.g. bumper shield, cycle carrier etc.
- that there is sufficient slack in the cable to allow the towing vehicle and caravan to articulate fully without the cable ever becoming taut and applying the brakes.
- that it is not slack and can drag on the ground. If left loose, the cable may scrape along the ground and be weakened so that it subsequently fails to do its job. The cable may also be caught on an obstacle when in motion thus engaging the caravan brakes prematurely.

Having followed this advice, should you feel that a satisfactory coupling arrangement cannot be achieved, consult your Swift Group dealer or towbar supplier.

MIRRORS

The driver of the towing vehicle must have an adequate view of the rear.

If there is no rear view through the caravan it is essential that additional exterior towing mirrors are fitted. This is mandatory in some European countries and drivers can face instant fines if extension mirrors are not fitted.

Caution: Any rear view mirror must not project more than 200 mm outside:

- the width of the caravan when being towed.
- the width of the towing vehicle when driven solo.

Note: Any rear view mirror fitted shall be 'e' marked and cover the field of view as stipulated by type approval requirements (Regulation 33 of the Road Vehicles [Construction and Use] Regulation 1986).

MOVING OFF

Let the clutch in smoothly.

Allow more engine speed to produce the power to move the additional weight of the caravan.

Reduce wear and tear on clutch and transmission by taking extra care.

Change gears smoothly.

Try not to jerk the clutch.

REVERSING

When the towing vehicle is reversing, the overrun device shaft is pushing in, applying the brakes via the overrun lever, brake rod system, bowden cables and the expander mechanism.

The backwards rotation of the brake drum causes the secondary brake shoe to collapse cancelling out the braking effect, allowing the trailer to move backwards. At the same time the transmission lever swings back and compensates for the entire travel.

When reversing up a slope or on a loose surface the brakes may apply themselves, Correct maintenance and set up of the brakes will help prevent this. Incorrect adjustment of the wheel brakes or Linkages will result in making reversing difficult.

Proficiency at reversing can only be achieved with practice and should be first attempted in a large open area (Fig. A).

SPEED LIMITS

Normal road towing: 50mph

Motorways (including dual carriageways): 60mph

CARAVAN HANDLING

Allow for caravan being wider than car.

Do not bump kerb with caravan wheels.

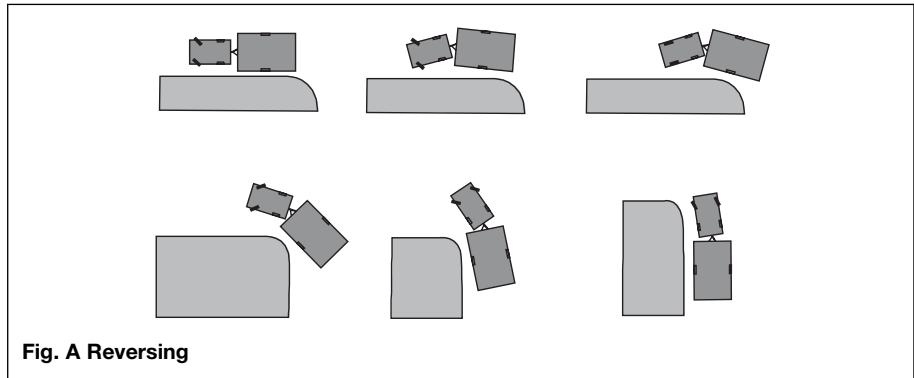


Fig. A Reversing

When passing other vehicles allow more than the normal clearance for driving solo.

Allow longer to get up speed to pass.

Allow for the outfit being twice its normal length.

Do not suddenly swing out.

Carry out all manoeuvres as smoothly as possible.

Use nearside wing mirror to check caravan has cleared when overtaking.

WARNING: Take care not to foul or ground caravan chassis whilst traversing ramps or other obstacles.

IMPORTANT POINTS ESPECIALLY FOR MOTORWAY DRIVING

1. Caravans may not be towed in the outside lane of a three or four lane motorway. (Reg. 12(2) of the Motorway Traffic [England and Wales] Regulations 1982).
2. Reduce Speed:
 - i) In high or cross winds.
 - ii) Downhill.
 - iii) In poor visibility.
3. High sided vehicles cause air buffeting so extra care must be taken when passing or being passed. As much space as possible should be given.



The Towing Code

CHANGING A WHEEL

1. Leave caravan hitched to towing vehicle and ensure handbrake is applied.
2. Lower corner steadies (as safety measure) on the side that the wheel is being changed to stabilise the caravan.
3. Use wheel brace to slacken off wheel nuts on the wheel to be changed.
4. Position jack under the axle at the appropriate jacking point (see fig. B)
5. Jack up the caravan until the wheel for removal is just off the ground.
6. Remove the wheel nuts, wheel trims and remove the wheel.
7. Fit spare wheel and reverse the above procedure.
Ensure clean, dry mating surfaces and clean, dry bolt/nut sealing areas.
8. Tighten all four/five nuts, according to Fig. A, to 88Nm (65lb/ft) for steel wheels or 115Nm (85lb/ft) for alloy wheels using a torque wrench or have checked as soon as possible.
Ensure the correct wheel fixings are used, as supplied with your caravan

IMPORTANT

When a wheel has been removed and replaced the torque of the wheel nuts should be re-checked after approximately 15 miles of running. (See 8 above).

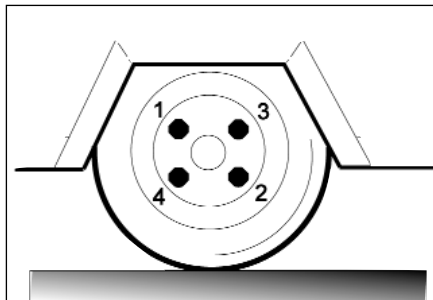
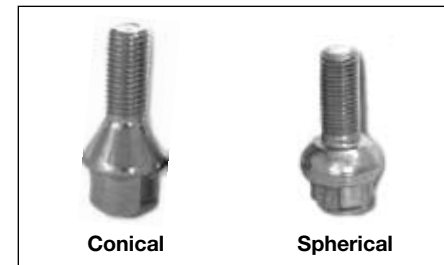


Fig. A Wheel Nut Tightening



Fig. B Scissor Jack

PLEASE NOTE DIFFERENT BOLT TYPES



Conical seated wheel bolts are suitable for 14" and 15" alloy and 14" steel spare wheel use only. However Spherical seated wheel bolts must be used on the 15" steel spare wheel (Challenger and Cameo single axle).

Spherical seated bolts must not be used on any 14" wheel or 15" alloy wheel this is due to the machined seating on the wheel rim.

MODELS AFFECTED: CAMEO SINGLE AXLES AND CHALLENGER RANGE.

SPHERICAL BOLTS ARE TIE WRAPPED TO THE SPARE WHEEL.

The Towing Code

JACKING POINTS

WARNING: Only jack up your caravan when it is coupled up to the car with its handbrake applied and in 1st gear (engine off).

Ensure that the jack is located in the correct position, i.e. on the jacking bracket on the chassis for the Al-Ko side mounted jack (Fig.B). Alternatively the reinforced axle mounting plate can be used as an alternative but the chassis member itself **MUST NEVER** be used as a jacking point.

All caravans are provided with the facility to fit Al-Ko side jacking points and although a scissor, trolley or bottle jack may be used, it is recommended that the side mounted Al-Ko Jacking System should be used.

STOPPING ON A HILL

Pulling off again can sometimes present a problem. The easy solution is

- (i) Carry a good sized wedge shaped piece of wood with a rope or light chain attached.
- (ii) Attach the other end of the rope to the nearside rear grab handle.
- (iii) Place the wood behind the nearside caravan wheel.
- (iv) Carefully reverse the car slightly back down the hill, the caravan will stop against the wedge and turn.

- (v) Drive forward since this attempt to move up the hill will now not involve pulling the full weight of the caravan until the car has gained some traction.

ARRIVAL ON SITE

Note: Check and observe site regulations.

1. Selecting a pitch

Do not pitch in such a position that your outfit will obstruct others coming in.

Try to choose an area which is dry, reasonably level and preferably with a hard base.

If you have no alternative but to pitch on a slope ensure that, for when you leave, you are facing down the slope.

It is good practice to chock the wheels of the caravan when parked on a slope even though the caravan brakes are applied.

2. Levelling the caravan

Levelling must be carried out in both directions in order for the refrigerator and other equipment to function correctly. This should be done before unhitching the caravan. Levelling boards (Fig. C) can be used to raise one side of the caravan by driving or reversing the caravan onto the boards. Apply the handbrake and chock the wheels.

The positioning of the jockey wheel can be used to help level the caravan.

Lower the corner steadies until they are in firm contact with the ground.

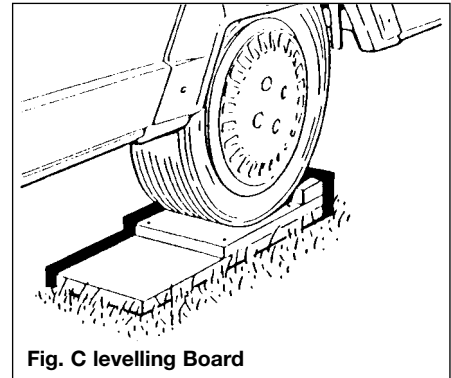


Fig. C levelling Board

DO NOT use the steadies as a jack they are only a means of stabilising the caravan.

Levelling pads or boards should be used under the steadies where the ground is soft or uneven.

In extreme cases where it is necessary to raise a wheel off the ground for levelling purposes, further adequate support should be applied so that the steadies do not take any undue strain.

Exterior Door

To prevent distortion of the body, the caravan must be always correctly sited and levelled. Failure to site the caravan correctly may prevent the exterior door from closing properly.



The Towing Code

3. Unhitching

Apply the caravan handbrake.

Lower the jockey wheel to the ground.

Disconnect the breakaway cable and road lighting plugs.

AKS3004

Release the stabiliser by lifting the red handle. Then lift the exposed black handle forward until it clicks up, at the same time winding down the jockey wheel, to lift the caravan clear of the towing vehicle.

AK160

Operate the handle by depressing the locking button on the lever mechanism and lift the handle upwards and forwards, at the same time winding down the jockey wheel, to assist in lifting the caravan clear of the towing vehicle.

When this operation is complete, replace towball cover and secure the 12N+12S cables in their storage cups.

Park your vehicle alongside the caravan on the offside.



SAFETY AND SECURITY

Fire	22
Notice	22
In Case of Fire	22
Smoke Alarm.....	22
Fire Extinguishers.....	23
Children	23
Ventilation	23
Security	24
Caravan Theft	24
Chassis Number.....	24
Additional Security	24
Security Chips.....	24
Caravan Insurance	24
AL-KO secure immobiliser	24



Safety & Security

FIRE

Important: Your attention is drawn to the notice affixed inside the caravan advising on fire precaution, ventilation and what to do in case of fire.

IN CASE OF FIRE

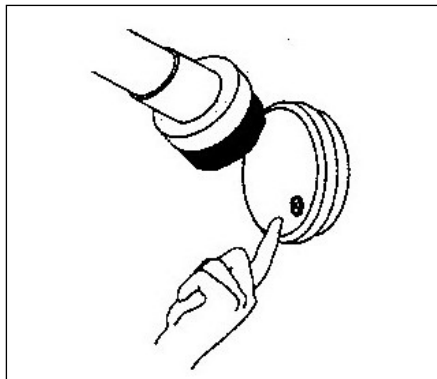
1. Get everyone out of the caravan as quickly as possible using whichever exit is the quickest, including windows. Do not stop to collect any personal items.
2. Raise the Alarm. Call the Fire Brigade.
3. Turn off the gas supply valve if it is safe to do so.
4. Turn off the electricity supply at supply point.

SMOKE ALARM

This is approved by The National Caravan Council. The NCC requires that all new or used holiday homes sold by its members are fitted with a smoke alarm featuring an alarm silence facility.

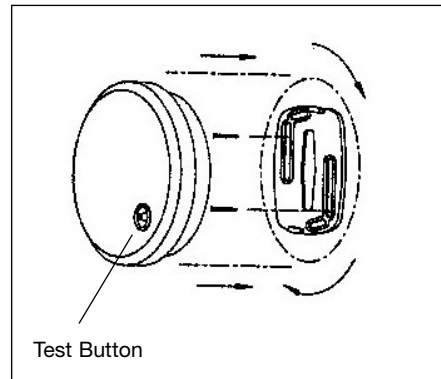
Maintenance

Test the smoke alarm every week, e.g. when doing the vacuuming, by pressing the test button for at least 10 seconds. The alarm signal is a penetrating, rapidly pulsating signal. The alarm sounds as long as the test button is pressed or there is smoke in the



detector. When the alarm goes off, always check carefully to see that there is no fire and never remove the battery from the alarm except when changing it!

Always test the alarm immediately after a long period of absence. Under the test button, there is a red control lamp which twinkles once a minute. This shows that the battery is correctly connected. If the alarm does not sound when testing, the battery must be replaced. The alarm should be dusted and cleaned regularly with a slightly damp cloth. In connection with annual battery change or when required, e.g. false alarm, clean and vacuum the alarm carefully using a soft brush.



Removing and Replacing the Alarm

Carefully twist the alarm anti-clockwise.

Replace as diagram above.

Battery Replacement

The battery lasts approximately one year. About a month before the battery is completely flat, the alarm emits a short signal once a minute, this is the signal that the battery needs changing. The alarm works as normal during this time.

The battery should be 9 Volt batteries GP 1604,S,A, Eveready 522,216, Duracell MN1604. Always test the alarm after changing the battery.

Safety & Security

WARNING: Ensure that batteries are correctly installed. Positive terminal to positive contact (marked +), negative terminal to negative contact. Reversing a battery in its compartment will immediately drain the battery and could damage the smoke alarm.

WARNING: The electronic test button provides a full test of the unit's functionality. **DO NOT** try to test the alarm with a naked flame, as this may present a potential fire hazard.

WARNING: Never use portable cooking or heating equipment other than electric heaters that are not of the direct radiant type, as it is a fire and asphyxiation hazard.

WARNING: Appliances such as cookers must not be used for heating.

FIRE EXTINGUISHER

It is recommended that a 1kg (2lb) minimum capacity dry powder fire extinguisher be carried inside your caravan at all times.

When using a dry powder extinguisher it is suggested that the caravan be evacuated until the powder has settled, to avoid inhalation.

A fat pan fire should not have a fire extinguisher aimed at it. It should be smothered with a fire blanket.

WARNING: Provide one dry powder fire extinguisher of an approved type or complying with ISO 7165, of at least 1kg capacity, by the main exterior door and a fire blanket next to the cooker. Familiarise yourself with the instructions on your fire extinguisher and the local fire precaution arrangements.

ESCAPE PATHS

It is important that you do not block escape paths to emergency exits with obstructions or hazards.

CHILDREN

Do not leave children alone in the caravan in any event. Keep potentially dangerous items out of reach, as at home e.g. matches, drugs etc.

VENTILATION

All caravans comply with BS EN 721. The ventilation points on your caravan are fixed points of ventilation which are required by the European Standards.

All caravans have ventilation at high level and low level which have been calculated to suit the individual needs of your caravan.

High level ventilation is achieved by means of the roof lights and washroom roof ventilators. The low level ventilators are positioned underneath the oven housing. Some models with sliding doors have two vents located underneath the sliding doors.

Under no circumstances must these vents be blocked or obstructed.

It is advised that fixed ventilation points are checked and cleaned (if necessary) on a regular basis using a small brush and a domestic vacuum cleaner.

Additional night time ventilation is obtained by releasing the window catches and placing them in the second groove. Note the windows are not sealed from rain in this position.

As the ventilation levels are calculated to suit each models requirements there should be no modifications made which may result in reduced ventilation levels.

WARNING: Do not obstruct ventilation.



Safety & Security

Petrol/Diesel Fumes

The fitting of a tail pipe to your car exhaust will reduce the possibility of fumes entering your caravan through the ventilation points.

Note: Never allow modification of electrical or LPG systems and appliances except by qualified persons at an authorised Swift Group dealership.

SECURITY

Caravan theft

The theft of a caravan can occur in the most unlikely circumstances; from a motorway service area, even from an owner's driveway.

Secure all windows and doors when your caravan is unoccupied even if only for a short length of time.

Chassis number

Record your caravan chassis number which can be found on the **front offside section of the drawbar (Fig. A) or any of the eye level windows.**

Make a note of this number in the space provided at the front of this handbook and make a separate note of the number to keep safe at home.

Additional security

Consider fitting any device which might deter or prevent intrusion by thieves.

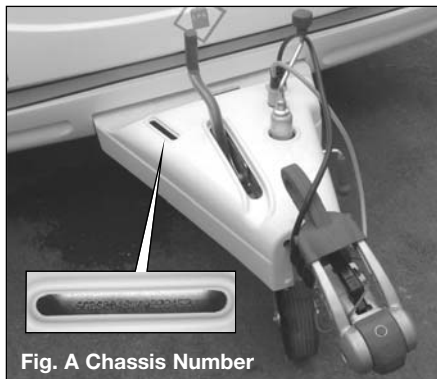


Fig. A Chassis Number

A hitch lock cover prevents towing of the caravan.

A wheel lock prevents towing of the caravan and removal of the wheel.

Customers are advised to identify their caravan with a method for subsequent identification if other forms of identification have been altered or removed.

Free crime prevention advice about securing your caravan, protecting your valuables, property marking, either at home or whilst on site, can be obtained from the Crime Prevention Officer through your local Police Station.

SECURITY CHIPS

A special security chip is concealed within the body of every caravan. This chip contains the individual identity of your caravan and can only be read by using a special decoder. Your local police can obtain the use of a decoder by contacting C.R.I.S. on telephone no: 01722 411430

CARAVAN INSURANCE

It is recommended that the caravan and its contents should be insured against theft.

It is essential to check with your car insurance company to ensure you are covered when towing your caravan.

AL-KO SECURE IMMOBILISER

The Al-Ko immobiliser is fitted as standard on some models, optional on others. When fitted the 4 part kit specified below is supplied with your caravan. Your kit will contain : -

Part A

Box containing security components. consisting of:

- 1off High security locking bolt
- 1off High security locking bar socket key
- 1off Barrel lock
- 2off Barrel lock keys

- Instruction manuals in CD and paper format.
- Security registration card and reference number

Part B

Wheel specific insert assembly consisting of:

- Red coloured wheel insert lozenge assembled with the locking bar and circlip

Part C

- 1off Wheel spanner

Part D

- Kit bag.







SERVICES

Connection of Services	28
Water	28
Typical Water Schematic Drawing	28
Truma Compact Crystal 2	29
Posiflo Water Pump	29
Inboard Water Tanks and On-line Water Systems	30
Truma Waterline.....	31
Microswitch Taps	32
Comet Roma Single Lever Mixer Tap	33
Reich Kama Single Lever Mixer Tap	34
Guidance on Cleaning.....	35
Gas	36
Typical Gas Schematic Drawing	36
General Information.....	37
Types of Gas	37
Gas Safety Advice.....	38
Thermal Insulation Heating	39
Electricity	40
Instructions for Electricity Supply	40
Overseas Connection.....	41
Wiring of Connecting Cable and Caravan Mains Inlet.....	42
Typical Appliance Consumption Figures.....	43



Services

Connection of services is dealt with under the separate headings.

In all cases users should become familiar with the equipment manufacturers' instructions.

Advice and leaflets, if not supplied with the caravan, can be obtained from the suppliers of the equipment.

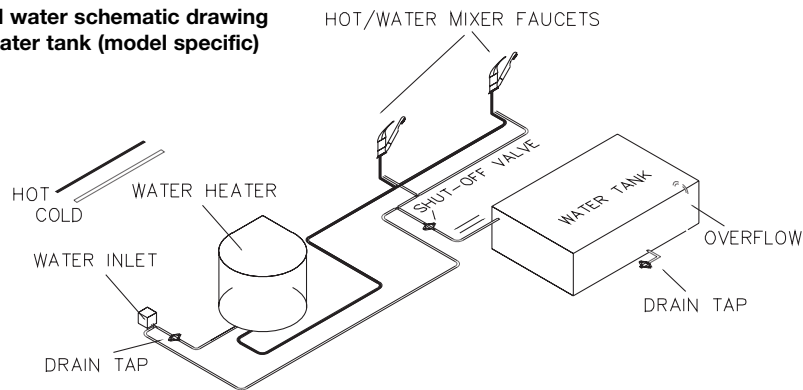
Before making connections of any description to the caravan or its equipment, ensure that ALL equipment is turned off.

WATER

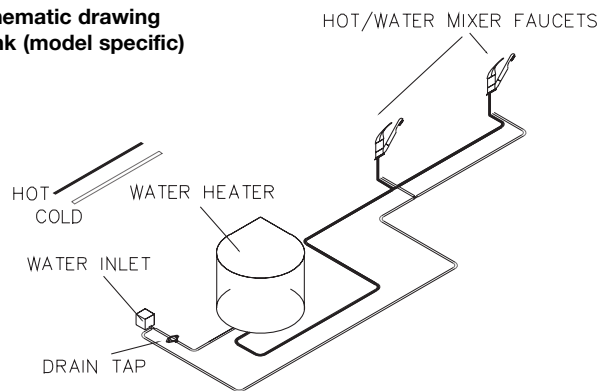
The caravan can use three separate systems for its water supply.

1. External water carrier.
2. Inboard water tank (for winter use essential).
3. Watermaster Aqua Source (mains water) or Truma Water Line.

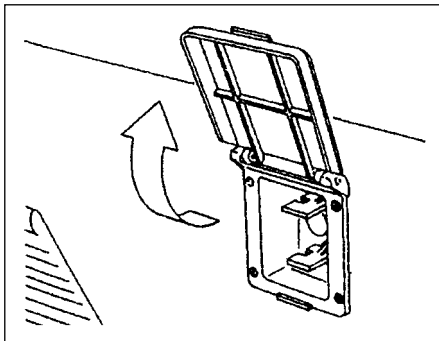
Typical water schematic drawing with water tank (model specific)



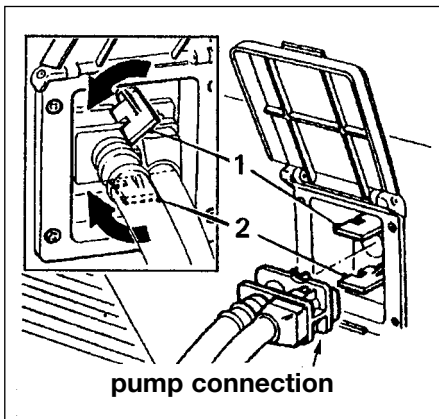
Typical water schematic drawing without water tank (model specific)



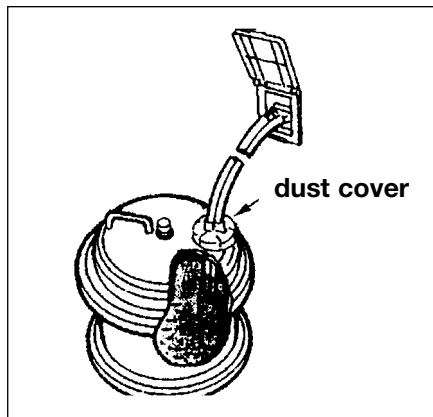
TRUMA COMPACT CRYSTAL 2



Raise the lid, clean both the water socket and the plug of the pump assembly.



Plug the pump connector into the socket. Turn the top security clip anti-clockwise and the bottom security clip clockwise to lock the plug into place.



Place the pump into the water container, ensuring that it is fully submerged before operating the system. A dust cover is available to stop contaminants falling into the water container.

To remove the pump assembly from the Crystal Compact Housing, release the security clips and pull the hose adaptor by using the finger grips provided.

Do not remove by pulling the hose or electric cable.

When using the Winter Kit the blanking plug provided will be fitted to the housing not being used.

Clean the water system at the start and end of the season with sterilising fluid (see notes under sterilising).

If the pump fails to deliver water the most likely cause will be air in the system. Switch off the pump and shake the pump assembly in the water. Then switch on again.

STERILISING

1. When cleaning the water system at the start or the end of the season it is advisable to use a sterilising fluid e.g. Chempo SDP or similar.
2. Flush the system thoroughly to remove the effective fluid traces.
3. After sterilising the system at the start of the season it is recommended that a new filter cartridge (if fitted) should be fitted. (Not standard).

POSIFLO FRESH WATER PUMP (MODEL SPECIFIC)

Fresh water is supplied to the caravan on some models by the Posiflo pump.

The pump is designed for continuous use and is self priming.



INBOARD WATER TANKS AND ON-LINE WATER SYSTEMS

TANK ISOLATION AND TANK FILLING OPERATIONS

When an internal water tank is fitted options exist to supply water to the taps and shower from either the internal tank or the external supply:

1. The external pump can be used to supply the taps. Select external pump on the control panel, and close the isolation valve close to the internal water tank (see picture page 31). Ensure that the external pump is connected and suspended in the external water container with water present.
The external pump will run when the taps are opened. Leaving the isolation valve open will route water from the external pump to both the taps and the internal tank. (The internal tank would overflow via fitted overflow pipe when full)
2. If the internal tank contains water the internal pump can be used to supply the taps. Check the water level gauge to confirm the water level. Select internal pump on the control panel, and ensure that the tank isolation valve is open. The internal pump will run when a tap is opened.

To fill the internal tank:

Ensure the taps are closed and the tank isolation valve is open, and that the external pump is connected and suspended in the external water container with water present. Check the tank drain valve is in the closed position (see diagram page 31), and that the Ultrastore drain valve is in the closed position (see fig 1 page 64).

With the pump selector switch in either position, switch the tank fill switch to 'ON', and water will flow into the tank until either the external container is empty, or the internal tank overflows. Progress can be monitored using the water level gauge on the control panel.

The tank fill switch is usually mounted in the furniture above the charger / distribution unit.

SOLENOID VALVE OPERATION (BESSACARR MODELS ONLY)

A normally closed solenoid valve is mounted with the 'Posiflo' internal pump on these models, and is controlled by a switch with neon indicator close to the entrance door of the caravan, which also operates the tank fill function. The operation of the solenoid valve replaces that of the manual tank isolation valve in the following way:

To supply water to the taps and shower:

1. Via the external pump. Ensure that the external pump is connected and suspended in the water container and that the drain valve located close to the Ultrastore or Alde water heater (see fig 1 page 64) is in the closed position. Ensure the solenoid is closed by moving the solenoid/tank fill switch to the 'OFF' position. Select external pump on the control panel. The external pump will run when the taps are opened. If the solenoid/tank fill switch was placed in the 'ON' position, water will route water from the external pump to both the taps and the internal tank. (The internal tank would overflow via fitted overflow pipe when full).
2. Via the internal pump. Check the water level gauge to confirm water is present in the tank. Ensure that the drain valve located close to the Ultrastore or Alde water heater is in the closed position (see fig 1 page 56) and move the solenoid/tank fill switch to the 'OFF' position. With the tank selector switch set to internal pump, the internal pump will run when the taps are opened. If the solenoid valve were in the 'ON' (open) position whilst the internal pump was running, pressure at the taps and shower would be reduced.

To fill the internal tank with solenoid valve fitted

Ensure the taps are closed and that the external pump is connected and suspended in the water container with water present. Also check that the tank drain valve is in the closed position, and that the Ultrastore or Alde drain valve is in the closed position as detailed above.

With the pump selector switch in either position, switch the solenoid / tank fill switch to 'ON', and water will flow into the tank until either the external water container is empty, or the internal tank overflows. Progress can be monitored using the water level gauge on the control panel.

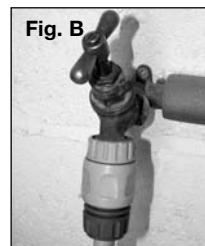
TRUMA WATERLINE

The Waterline allows mains water to be connected to the caravan to supply water to the taps and shower or internal tank.

WARNING: It is not recommended to tow with water in the onboard water tank as this could affect stability.

WARNING: Do not under any circumstances connect your caravan to the mains water supply without the pressure reducer fitted. Damage will occur to the caravan's water system.

1. Fig. A: Connect the fitted Crystal 2 plug into the water inlet socket.
2. Uncoil the hose and screw cap adaptor to the drinking water stand pipe. Plug in the hose adaptor.
3. Turn on the mains water supply and check for leaks.



Tank isolation and tank filling operations with Waterline

The manual tank isolation valve, (see pictures below).



Valve open – With all taps closed, and drain valve at tank and Ultrastore closed as detailed earlier in text, water at reduced pressure from the waterline will flow into the internal tank. This will continue until the tank

overflows via the fitted overflow pipe. Progress can be monitored on the water level gauge on the control panel. The pump selector switch on the control panel can be in either position. Valve closed – Check that the drain valve at the Ultrastore is closed. Select the central off position of the pump selector switch on the control panel. Water from the Waterline will only flow when the taps are opened, and will not flow into the internal tank.

Tank isolation and tank filling operations with Waterline, with Solenoid valve fitted.

Tank fill / solenoid switch in 'ON' position - With all taps closed, and drain valve at tank and Ultrastore or Alde boiler closed as detailed earlier, water at reduced pressure from the waterline will flow into the internal tank. This will continue until the tank overflows via the fitted overflow pipe. Progress can be monitored with the water level gauge on the control panel. The position of the pump selector switch on the control panel is not important during this operation.

Tank fill / solenoid switch in 'OFF' position - check that the drain valve at the Ultrastore or Alde boiler is closed as detailed earlier. Select internal pump with the pump selector switch on the control panel. Water from the Waterline will only flow when the taps are opened, and will not flow into the internal tank.



Services

INTERNAL WATER TANK

(EXPORT MODELS ONLY - Sprite Europa, Swift Charisma)

The internal water tank is configured differently from the internal tanks found in UK market caravans. Please observe the following for correct operation.

Tank filling

Ensure the taps are closed, and that the tank drain bung is in position. Also ensure that the drain valve adjacent to the water heater (see page 64) is in the closed position. With the external pump submerged in water in a suitable container, connect the external pump to the connection point on the outside of the caravan. The external pump will run when the power is turned on at the control panel, and water will flow into the internal tank until either the tank overflows or the external container is empty.

Drawing water from the tank

The micro switched taps (sink, vanity, and shower mixer as appropriate) operate a pump suspended in the internal water tank. With the pump switch in the on position, and the drain valve next to the water heater is closed, opening the taps will energise the pump in the tank and water will flow from the opened tap.

Tank drain

At a point on the side of the tank close to the floor, pipework from the tank passes below floor level. A red stopper can be seen if this pipework is located from below the van. When the red stopper is removed from the pipe, the tank will drain.

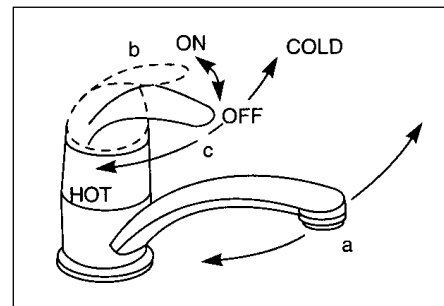
MICROSWITCH TAPS

The micro switch taps are used when the water supply is not pressurised.

When the tap is turned on, the micro switch (which is fitted inside the tap) activates the pump to supply water.

Operation

Swivel the tap spout (a) to the desired position over the sink, lift the control lever (b) to activate the pump and allow water to flow simultaneously. To adjust the temperature swivel the lever (c) to the left or right as shown below.



Note: Before commencing microswitch replacement ensure instructions are read through thoroughly. The entire process can be completed without the need to remove the tap from the worktop.

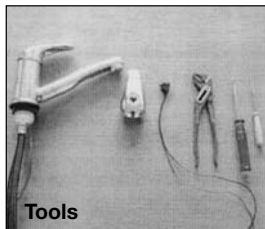
Before you Start

1. Ensure pump is isolated.
2. Position lever in central, i.e. mixer, off location.

COMET ROMA SINGLE LEVER MIXER TAP

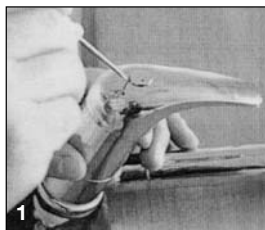
Required tools

- Pipe wrench
- Cross-point screw-driver
- Flat-bladed screw driver inside the handle.



Step 1

- Remove the marker cap



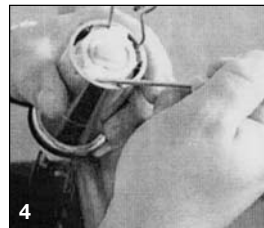
Step 2

- Remove the screw from the control knob
- Pull the microswitch out of the control knob



Step 3

- Remove the dome
- Remove the small screw between cartridge and closure



Step 4

- Remove the snap ring (small plastic piece)



Step 5

- Remove the snap ring with the Pipe wrench (Turn left or right)



Step 6

- Pull the cartridge out of the housing
- Remove the old microswitch

Step 7

- Put in the cable from the new microswitch.

You need 50 mm cable length over the top of the housing.



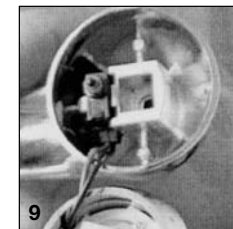
Step 8

- Insert the cartridge.

Step 9

- Refit the component parts in reverse sequence.

Steps 5 to 1

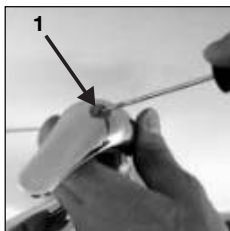


Services

REICH KAMA SINGLE LEVER MIXER TAP

Exchange of the ceramic cartridge/ micro switch

1. Detach cover (1) carefully. If the cover is damaged use spare part no.: 240-059512 (red cover) and 240-059513 (blue cover).



2. Loosen screw inside the handle.
3. Detach the handle (2).
4. Turn out the rosette.

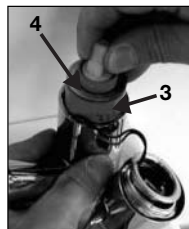
5. Turn out the brass nut with spanner.



6. Pull out the ceramic cartridge (3).

7. If the cartridge is defect:

- Remove the brass ring (4) from the top of the cartridge
- Install a new ceramic cartridge, part no.: 240-0528M
- Make sure that the cartridge is in the right position.



8. If the microswitch is defect:

- Pull the wire out of the mixer
- Install a new microswitch, part no.: 240-06220M.



9. Install ceramic cartridge, brass ring, brass nut, rosette and handle in the opposite way.



Maintenance

To prevent your single mixer tap KAMA from being impacted by frost, always drain the tap in the middle position of the handle.

The middle position of the handle is marked by an arrow!

GUIDANCE ON CLEANING PORTABLE WATER TANKS AND THE WATER SYSTEM IN TOURING AND MOTOR CARAVANS

The water systems, and in particular storage tanks, in caravans are susceptible to contamination by bacteria if care is not taken with their use and cleaning. The symptoms caused by bacterial contamination are not purely limited to gastro-intestinal diseases, but may also manifest themselves as ear, nose, throat, eye or skin infections. It is therefore important that you carry out the following procedure prior to using the caravan each time, even if you boil or filter all water you use for drinking.

Separate Water Containers

1. All water remaining in the container should be disposed of so that the container is empty.
2. The outside of the container should be thoroughly cleansed and washed down to remove any dirt, dust or other contaminant. Water at a suitably hot temperature containing an appropriate detergent is recommended for this purpose.
3. Water should be put in the container, swirled around, then emptied out.
4. The container should then be totally filled with water containing an appropriate sterilant solution and allowed to stand for the recommended contact time (e.g. Milton for 15 minutes).

5. The solution should be emptied from the container.
6. The opening of the container should be cleaned thoroughly with an appropriate prepared wipe impregnated with a sterilant.
7. The container should be inverted whilst stored overnight (if possible).
8. The container must be filled with mains water only and mains water only should be used for the above cleaning procedure.
9. On no account should garden hoses be used to fill water tanks.

For Systems:

1. Drain down the system (open all taps to allow air in, enabling the system to drain quickly). (See Maintenance Systems).
2. Remove any water filters fitted, and replace with a short length of hose or empty filter cartridge (this will ensure the filter is not affected by the disinfectant/sterilant solution).
3. Fill the system by using the pump with a disinfectant/sterilant solution (check that the solution at full strength appears at all taps/showers). Allow to stand for the recommended period of time.
4. Drain the system completely.
5. Thoroughly clean the outside of all taps/connectors with a cloth soaked in

the disinfectant/sterilant.

6. Flush the system through with clean drinking water until no traces of disinfectant/sterilant can be detected at any tap.

7. Replace the filter.

Suitable sterilising chemicals are available from your caravan dealer, accessory shop, chemist or home-brew shops. It is not, however, recommended to use bleach or sodium metabisulphite.

This guidance has been prepared with the kind co-operation and assistance of The Environmental Health Department of The Borough Council of King's Lynn and West Norfolk.

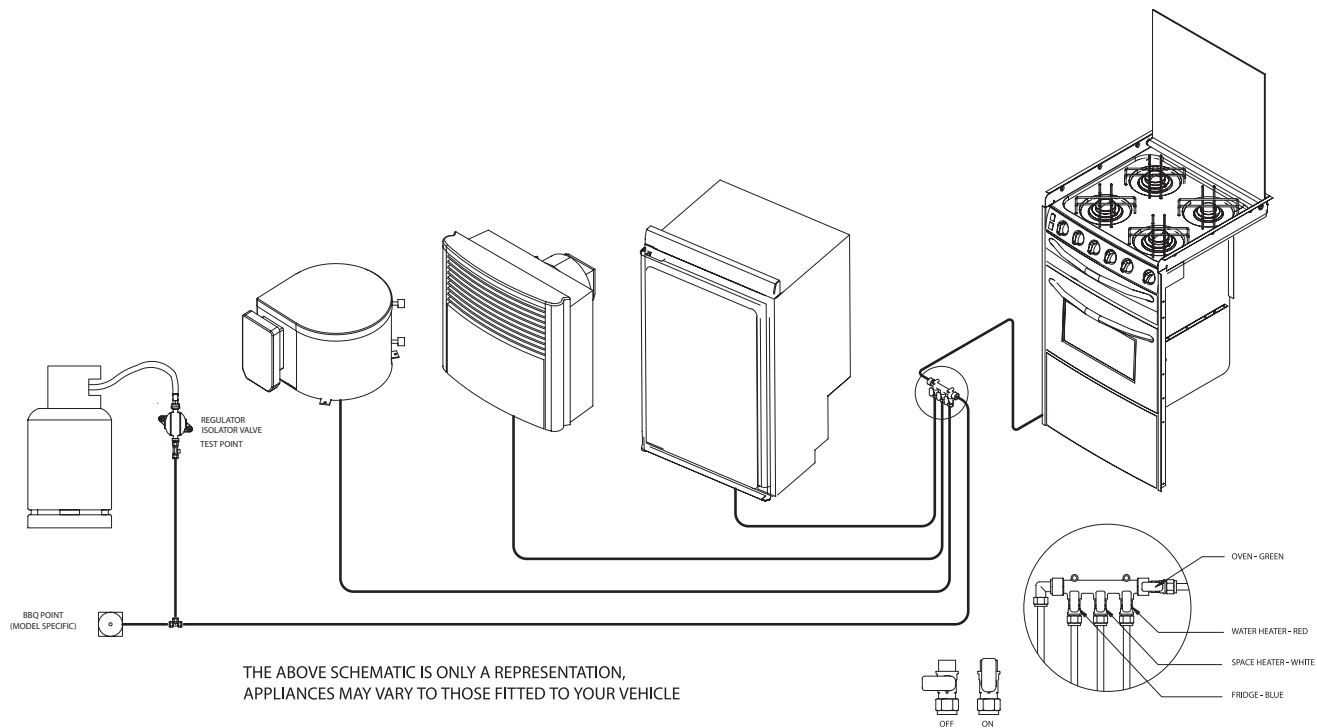
WARRANTY

Products are guaranteed from the date of purchase against defects in materials and workmanship. If the unit proves faulty, return it to your supplier with proof of purchase and purchase date. Please note that frost damage is not a valid warranty claim.

The manufacturer retains the right to repair or replace the unit. The manufacturer cannot be held responsible for claims arising from incorrect installation, unauthorised modification or misuse of the product. The above does not affect your statutory rights.



Services



**Typical gas
schematic drawing**

GAS

GENERAL INFORMATION

Gas Bottles

Bottled Liquified Petroleum Gas (LPG) is the most convenient portable source of fuel for your caravan.

Make sure that heating and cooking appliances and the gas cylinders are switched off before you move the caravan.

Regularly check flexible gas hose, joints and connections for tightness. Finally make sure that each gas appliance is working efficiently to the recommendations of the appliance manufacturers.

Only use gas bottle cylinders that are located within their dedicated position within the front gas bottle housing, never extend hose - hose lengths must not exceed 400mm

Regulator

Your caravan is supplied with a wall mounted gas regulator plumbed inside the gas bottle compartment. The regulator and all appliances work at a harmonised 30mb pressure, which work with Butane and Propane gas.

Pressure regulation system in this vehicle has a fixed working pressure of 30 mbar with a flow rate of 1.5 kg/h and complies with the requirements of EN 12864 annex D.

Note: Regulator valves should always be in the 'OFF' position when towing.

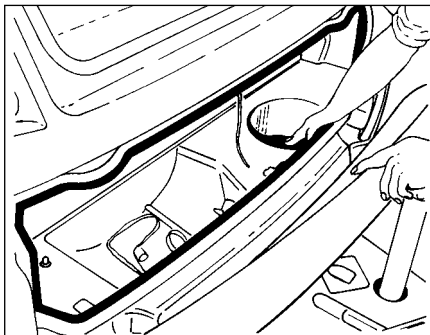


Fig. A Gas Bottle Compartment

Gas Hoses

Two new hoses, or pigtails as they are being called, are available - one for Propane and one for Butane with adaptors for Butane 'clip-on' and Camping Gaz cylinders. It is important to check you have the correct hose and adaptor to suit your gas bottles. Push on hoses are no longer permitted under the new regulations, the new hose have threaded connections and must be securely attached to the regulator and to the gas bottle.

WARNING: Inspect flexible gas hose(s) regularly for deterioration and renew, as necessary, with the approved type, in any case no later than the expiration date marked on the hose(s).



Fig. B Gas Regulator

WARNING: Ensure hoses do not become entangled in door mechanism.

TYPES OF GAS

Butane

Butane is supplied in the U.K. in green, blue or aluminium bottles.

All these have a male left hand thread EXCEPT for Camping Gaz which has a special female right hand thread and Calor 7kg and 15kg and aluminium bottles which have a special clip-on connection.

A 7kg bottle is recommended for butane gas use.



Services

Continental bottles usually have a male left hand thread similar to but not identical with U.K. butane.

Butane is suitable for use at temperatures down to 2°C but will not work below that.

Propane

Propane is supplied in Red, or partly red bottles which have a female left hand threaded connector.

Scandinavian countries use the same connector.

Germany and Austria supply propane with a male connection.

Propane will work at temperatures as low as -40°C and is therefore suitable for all winter caravanning.

A 6kg bottle is recommended for propane gas use.

GAS SAFETY ADVICE

WARNING: If you smell gas or suspect a leak and if it is safe to do so, isolate the gas appliances and turn off the gas bottles at the regulator. Evacuate the caravan and ventilate. Seek professional advice as to the cause of the leak.

WARNING: Inside outlet sockets shall only be used with dedicated appliances i.e. equipment supplied with the Touring Caravan. No gas appliance shall be used outside when connected to an inside socket.

Facts about LPG

LPG is not poisonous.

Bi-products are harmless.

There is danger if all air and oxygen were excluded.

(Ventilation holes must be kept clear at all times).

LPG has been given a smell by the manufacturers in order to identify leaks.

Awning Spaces LPG Appliance Exhaust

There is no danger of pollution of an enclosed awning space by the LPG exhaust from a refrigerator venting into it, as awning spaces are generally well ventilated.

Space heaters may produce sufficient exhaust to pollute the awning space, if it is totally enclosed, from a general comfort, smell and hygiene point of view. In the extreme case there could be a build up of carbon dioxide to a dangerous level.

Caravan owners are advised to allow some fresh air circulation in the awning space when such appliances are in use.

PRECAUTIONS

- a) Never look for a leak with a match. Always use a soap solution or its equivalent when testing connections. Do not operate any electrical apparatus whatsoever, especially light switches. If the leak is not obvious, the caravan should be evacuated and qualified personnel consulted.
- b) Avoid naked lights when connecting or changing a cylinder.
- c) Check the flexible hose frequently.
- d) The gas is heavier than air and therefore sinks to the lowest point.
- e) Keep bottle gas containers outside (and protected against frost). If they must be kept inside make sure they are well away from heat.

WARNING: Do not use appliances with a different working pressure to 30mbar.

WARNING: Maintain adequate spacing of combustible materials from sources of heat.

WARNING: Do not use independent portable gas appliances inside the vehicle.

WARNING: A BBQ point inlet valve, if fitted, must only be used for the connection of portable LPG appliances.

Always read individual appliance instructions

VENTILATION

All ventilation complies with BSEN 721 and vents should not be obstructed in any manner as this could lead to insufficient fresh air. In this case the confined atmosphere becomes depleted of oxygen which leads to the formation of the highly poisonous gas 'carbon monoxide'. Carbon Monoxide is odourless, colourless and tasteless and will rapidly cause unconsciousness and death with little or no warning prior to collapse. **THERE IS NO DANGER WHEN ADEQUATE VENTILATION IS PROVIDED.**

Roof-mounted Flue installations

All flue installations should be inspected once a year throughout their length for corrosion. Flues should be replaced if any sign of perforation is found. Ensure that the replacement is of an approved type.

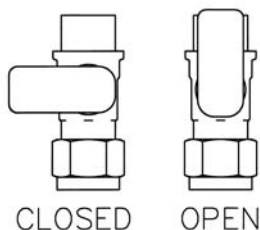


Fig. A

CONNECTION

Ensure that the gas regulator hose is correctly connected to the gas cylinder in gas bottle compartment and that the hose connection is tight.

Gas bottles must be fully located, seated at the base of the bottles and restrained by the strap provided in the dedicated compartment position.

Straps are positioned to suit 6kg and 7 kg bottles.

WARNING: If using cylinders other than those recommended, the user must ensure these are adequately supported, ventilation openings must not be obstructed and the cylinders must not cause damage to other fixtures and fittings located in the compartment.

Open ended gas hoses must always be protected from dirt and insects

Before turning on the gas supply at the regulator, ensure that all gas operated equipment in the caravan is turned off.

All gas equipment (except barbecue) is supplied through a central Gas Manifold System which has individual isolation taps for each appliance (Fig A), as follows:

- RED - Water Heater
- WHITE - Space Heater

- BLUE - Fridge
- GREEN - Oven
- YELLOW - Barbecue (if fitted)

Note: the external barbecue point is fed from the main feed through a built in integrated isolation valve. See schematic layout for details.

THERMAL INSULATION HEATING

Your caravan has been designed to achieve a thermal insulation and heating level for specific climatic conditions when tested according to the procedure in EN1645-1. The classifications are as follows:

GRADE 1

A caravan with an average thermal transmittance (u) that does not exceed $1.7w/(m^2k)$.

GRADE 2

A caravan with an average thermal transmittance (u) that does not exceed $1.7w/(m^2k)$ and which can achieve an average temperature difference of at least 20k between inside and outside temperatures when the outside temperature is $0^{\circ}C$.

GRADE 3

A caravan with an average thermal transmittance (u) that does not exceed $1.2w/(m^2k)$ and which can achieve an average temperature difference of at least 35k between inside and outside temperatures when the outside temperature is $-15^{\circ}C$.



Services

ELECTRICITY

As with electricity in the home, care must be exercised when handling mains electricity.

Your attention is drawn to the following notice as laid down by the Institute of Electrical Engineers.

INSTRUCTIONS FOR ELECTRICITY SUPPLY

On arrival at caravan site

1. Before connecting the caravan installation to the mains supply, check that
 - (a) both 12N & 12S plugs and hitch have been disconnected from the towing vehicle, once disconnected the 12N & 12S plugs should be placed in the holders provided to ensure protection against mechanical damage and the elements,



- (b) the mains supply is suitable for your installation and appliances, i.e. whether it is AC or DC and whether it is at the correct voltage and frequency,
- (c) your installation will be properly earthed. Never accept a supply from a socket outlet or plug having only two pins, or from a lighting outlet, and
- (d) any residual current device (earth leakage circuit breaker) in the mains supply to the caravan has been tested within the last month.

In case of doubt, consult the site owner or his agent.

2. **MAKE SURE THAT THE SWITCH AT THE SITE SUPPLY POINT IS OFF.**
3. Lift the cover of the electricity inlet provided on the caravan, and insert the connector of the supply flexible cable.
4. Remove any cover from the socket outlet provided at the site supply point, and connect the plug at the other end of the supply flexible cable to this. Switch on the main switch at the site supply point.

Note: Use mains cable fully uncoiled and protect from traffic.

IT IS IMPORTANT THAT THE MAIN SWITCH AT THE SITE SUPPLY POINT SHOULD BE SWITCHED OFF, THE SUPPLY FLEXIBLE CABLE DISCONNECTED, AND ANY COVER REPLACED ON THE SOCKET OUTLET AT THE SITE SUPPLY POINT BEFORE DISCONNECTING THE FLEXIBLE CABLE FROM THE CARAVAN. IT IS DANGEROUS TO LEAVE THE SUPPLY SOCKET OR SUPPLY FLEXIBLE CABLE LIVE.

Because touring caravans are generally left unused for long periods in the open, it is strongly advised that the mains installation is inspected periodically to ensure that it is safe to use. The IEE Wiring Regulations recommend that mains installations in touring caravans are re-inspected every 3 years by a qualified person (see list) who should sign and issue a periodic inspection report. (The manufacturer recommends annual inspections).

Suitably qualified persons acceptable to the NCC to sign and issue inspection and completion certificates are:

- an approved contractor of the National Inspection Council for Electrical Installation Contracting* or
- a member of the Electrical Contractors' Association
- a member of the Electrical Contractors' Association of Scotland

- a qualified person acting on behalf of the above (in which event it should be stated for whom he is acting).

**The names and addresses of Approved Contractors in any locality (there are over 10,500 in the UK) can be obtained from Electricity Shops, or direct from:*

NICEIC, Vintage House,
37 Albert Embankment, London SE1 7UJ

Telephone: 0171 582 7746

The names and addresses of members of the Electrical Contractors' Associations can be obtained direct from:

ECA, Esca House,
Palace Court, London W2 4HY

Telephone: 0171 229 1266

ECA of Scotland, 23 Heriot Row
Edinburgh EH3 6EW

Telephone: 0131 225 7221

WARNING: CURRENT CONSUMPTION IN THE CARAVAN MUST NOT EXCEED 16 AMPS OR THE PITCH PERMITTED MAXIMUM IF THIS IS LESS THAN 16 AMPS.

IT IS DANGEROUS TO ATTEMPT MODIFICATIONS AND ADDITIONS YOURSELF. LAMPHOLDER—PLUGS (BAYONET-CAP ADAPTORS) SHOULD NOT IN ANY CIRCUMSTANCES BE USED.

OVERSEAS CONNECTION

Note: Connection to a mains voltage supply OVERSEAS requires particular attention.

Care must be taken when connecting supplies abroad since the supplies can be of REVERSE POLARITY.

The significance of REVERSE POLARITY is that when equipment is switched off it may not be electrically isolated.

The only certain way of making equipment safe is to unplug it.

It is useful to have a means of checking polarity of the mains supply, especially when touring overseas. There are available several

proprietary makes of equipment for testing polarity.

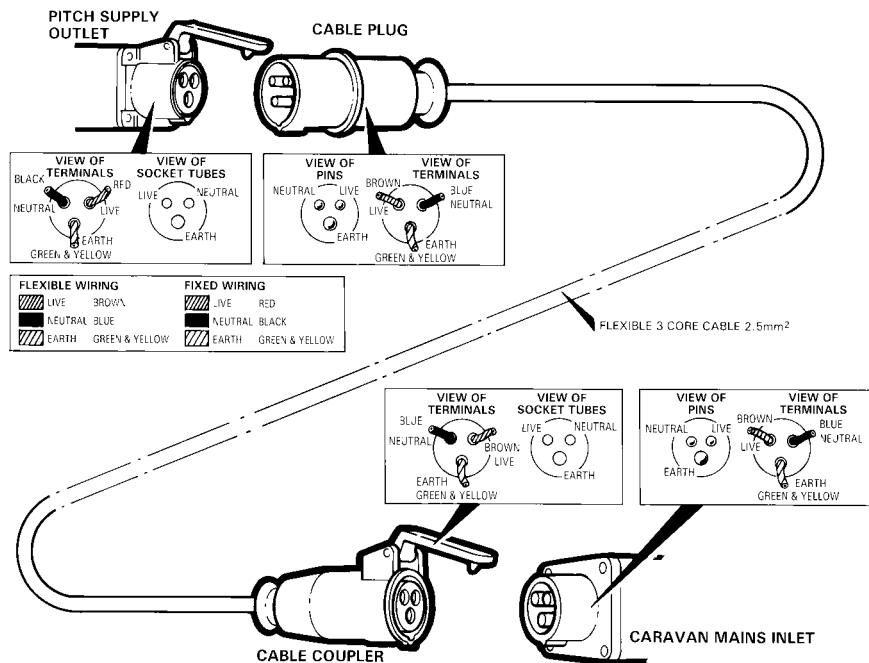
If it can be achieved, it is preferable to connect live to live, and neutral to neutral to maintain full electrical protection.

WARNING: Never allow modifications of electrical or LPG systems and appliances except by qualified persons.

WARNING: Always check the 230V supply rating on site before switching on two loads as this may cause an overload and a circuit breaker to trip.



WIRING OF CONNECTING CABLE AND CARAVAN MAINS INLET



WARNING: IT IS ESSENTIAL THAT CONNECTIONS ARE MADE EXACTLY AS SHOWN. IF TERMINAL MARKINGS ARE NOT IN ACCORDANCE WITH THE DIAGRAM THEY MUST BE IGNORED. IF IN DOUBT CONSULT A QUALIFIED ELECTRICIAN.
THE LEGAL LENGTH OF THE MAINS INLET CABLE IS 25 ± 2 METRES. WHEN IN USE IT MUST BE FULLY UNCOILED AND PROTECTED FROM TRAFFIC.

TYPICAL APPLIANCE CONSUMPTION FIGURES

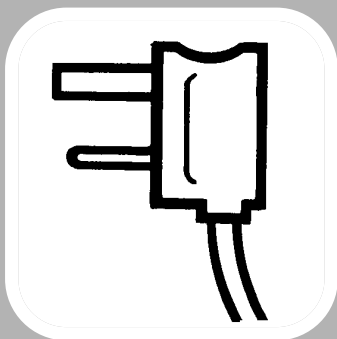
Appliance/ Item	230 Volt		12 Volt		LP Gas
	Watts	Amperes	Watts	Amperes	grams/hour
Refrigerator	115 W	0.5 amp	Only when towing		12 g/h
Ultraheat Space Heater	500 W	2.2 amp	12 W	1.0 amp	30 to 280 g/h
	1000 W	4.5 amp	12 W		
	2000 W	8.5 amp	12 W		
Ultrastore Water heater	850 W	3.7 amp	Not applicable		120 g/h
Cooker Hotplate 1	Not applicable		Not applicable		161 g/h
Hotplate 2	Not applicable		Not applicable		110 g/h
Hotplate 3	Not applicable		Not applicable		73 g/h
Hotplate 4	800 W	3.5 amp	Not applicable		Not applicable
Grill	Not applicable		Not applicable		117 g/h
Oven	Not applicable		Not applicable		125 g/h
Battery Charger	192 W	0.8 amp	Not applicable		Not applicable
Lighting 230V (based on 2x 40 W bulbs)	80 W	0.3 amp	Not applicable		Not applicable
Lighting 12V (based on 10 W bulb)	Not applicable		10 W	0.8 amp	Not applicable
Submersible water pump	Not applicable		28 W	2.3 amp	Not applicable
Radio/ CD player	Not applicable		12 W	1.0 amp	Not applicable
Omnivent position 1	Not applicable		15 W	1.2 amp	Not applicable
position 2	Not applicable		30 W	2.5 amp	Not applicable
position 3	Not applicable		50 W	4.0 amp	Not applicable
Air Conditioning unit	1200 W	5.25 amp	Not applicable		Not applicable
Microwave (factory fit)	1200 W	5.3 amp	Not applicable		Not applicable



Dometic 7-series fridges – A 60mA current draw is present (12v) on this range of fridges when operating, regardless of energy selection

Note: These are approximate figures for guidance only.





ELECTRICAL EQUIPMENT

AC50 and AC75 Control Panels	46
AC80 Control Panel	48
ESM 4 - Electrical Supply Module	50
ECM - Electrical Control Module	51
NE143 Power Supply Unit	52
Battery	54
Solar Panel Connection	57
Habitation Relay	58
Generator Guidelines	58
SAS 200 Mobile Alarm System	58
12 Volt Electrical Supply	60
Wiring of 12S Socket to Towing Vehicle	61



Electrics

AC50 Control Panel



AC75 Control Panel



AC50 AND AC75 CONTROL PANEL OPERATION

Symbol	Function	Description
	12V Power On/Off	This switch turns on (or off) the 12V power to all circuits. Note: as this switch works in conjunction with a relay (that uses around 40mA to operate), it should only be used for relatively short periods of time while using the caravan (i.e. when going out for the day). For long-term isolation of the 12V power, please place the Car / Van selector switch on the ESM2004 power supply unit in the centre (Off) position (i.e. during storage).
	Entry light	This switch operates the internal entry light (usually the first light within the caravan).
	Water Pump (AC50 only)	This switch turns on power to the water pump ready for use. It can be used to turn off the pump over night to avoid any noise from the pump (down on, up off). Note: A green indicator lamp will illuminate within the bottom left corner of the battery gauge when the pump motor is running.

Symbol	Function	Description
 	Dual Pumps (AC75 only)	In caravans with an onboard water tank, the pump switch will be a two-way switch with a centre off position. This allows the selection of either the internal pump (switch up - Tap symbol) or external pump (switch down - Water container symbol). Note: A green indicator lamp will illuminate within the bottom left corner of the battery gauge when the internal pump motor is running.
	Battery Level Test	This switch is used to display the battery voltage level. Press and hold the switch to display the battery level on the gauge. The green region indicates a battery with a good charge, the yellow region indicates a battery with an adequate charge, and the red region indicates a battery that requires charging.
	Water Level Test	This switch is used to display the fresh water level within the onboard water tank. Press and hold the switch to display the water level on the gauge. The gauge indicates the water level on an 'Empty - 1/4 - 1/2 - 3/4 - Full' scale, with empty being on the left.
	When using the optional remote control unit, please ensure the control panel '12V Power' switch is in the ON position and the 'Entry light' switch is in the OFF position for correct operation of the remote control (as the remote control operates in parallel with the control panel switches). The remote control button [I] controls the Entry Light and button [II] controls the 12V Power. If you do not wish to use the remote control, or the remote battery is flat / remote has been lost, you can of course return to manual operation by using the switches on the control panel. If the power has been turned off using the remote control and then the remote has been lost / battery become flat you will need to carry out the following to reset the caravan: Place the Car / Van selector switch on the ESM2004 power supply unit in the centre (OFF) position and turn the charger switch to the OFF position, wait 5 seconds and then turn the charger and Car / Van selector switch back on. The UH**** number on the back of the remote control is the remote code number. Please keep a record of this number in case you need to order a replacement or additional remote control.	



AC80 Control Panel



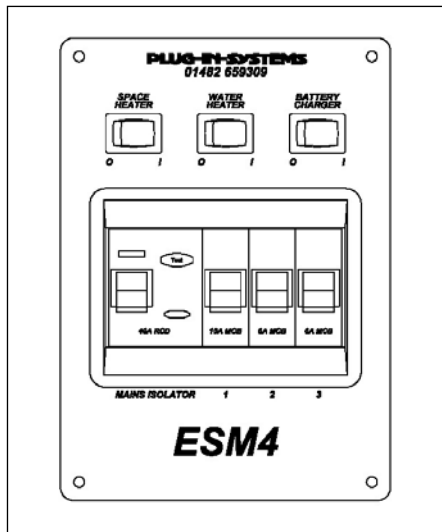
AC80 CONTROL PANEL OPERATION

Symbol	Function	Description
	12V Power On/Off	This switch turns on (or off) the 12V power to all circuits. Note: as this switch works in conjunction with a relay (that uses around 40mA to operate), it should only be used for relatively short periods of time while using the caravan (i.e. when going out for the day). For long-term isolation of the 12V power, please place the Car / Van selector switch on the ESM2004 power supply unit in the central (Off) position (i.e. during storage).
	Internal Pump	This switch turns on power to the internal water pump ready for use. It can be used to turn off the pump over night to avoid any noise from the pump. Note: A green indicator lamp will illuminate within the bottom left corner of the battery gauge when the pump motor is running.

Symbol	Function	Description
	External Pump	In caravans with an additional (external) pump, this switch will be a two-way switch with a central off position. This allows the selection of either the internal pump (switch up - Tap symbol) or external pump (switch down - Tank symbol). Note: A green indicator lamp will illuminate within the bottom left corner of the battery gauge when the internal pump motor is running.
	Battery Level Test	This switch is used to display the battery voltage level. Press and hold the switch to display the battery level on the gauge. The green region indicates a battery with a good charge, the yellow region indicates a battery with an adequate charge, and the red region indicates a battery that requires charging.
	Water Level Test	This switch is used to display the fresh water level within the onboard water tank. Press and hold the switch to display the water level on the gauge. The gauge indicates the water level on an 'Empty - 1/4 - 1/2 - 3/4 - Full' scale, with empty being on the left.
		When using the optional remote control unit, please ensure the control panel '12V Power' switch is in the ON position and the separately located 'Entry light' switch is in the OFF position for correct operation of the remote control (as the remote control operates in parallel with these switches). The remote control button [I] controls the Entry Light and button [II] controls the 12V Power. If you do not wish to use the remote control, or the remote battery is flat/remote has been lost, you can of course return to manual operation by using the manual switches. If the power has been turned off using the remote control and then the remote has been lost/battery become flat you will need to carry out the following to reset the caravan: Place the Car/Van selector switch on the ESM2004 power supply unit in the central (OFF) position and turn the charger switch to the OFF position, wait 5 seconds and then turn the charger and Car/Van selector switch back on. The UH**** number on the back of the remote control is the remote code number. Please keep a record of this number in case you need to order a replacement or additional remote control.



Electrics



ESM4 ELECTRICAL SUPPLY MODULE

The ESM4 Electrical Supply Module is a 230V AC and 12V DC power supply & control unit. It provides all the necessary features for control of the electrical circuits in a caravan or motorhome. The unit provides the following features:-

- MAINS MODULE with Earth leakage protection (RCD) Over-current protection (MCB's)
- CHARGER on/off switch
- SPACE HEATER on/off switch
- WATER HEATER on/off switch
- 18AMP TRANSFORMER / CHARGER with Over-current, Short-circuit, Reverse polarity & Thermal protection

MAINS MODULE

The ESM4 is designed to operate on a mains supply of 230V ~ AC +/-10% (making it ideal for use with low continental voltages). The 40 amp RCD (Residual Current Device) gives protection against earth faults and also acts as the main isolator switch. The mains module also has three MCB's (Miniature Circuit Breakers), which are basically re-settable mains fuses, to protect against over current. Allocation of the MCB's is as follows: -

- MCB1- SOCKETS / SPACE HEATER (if fitted)
- MCB2- WATER HEATER / LIGHTS (if fitted)
- MCB3- FRIDGE / CHARGER

USING A GENERATOR

When using a generator in conjunction with the ESM4 the following must be observed, failure to do so may result in damage to the unit:

1. Always start the generator with the mains isolator in the caravan turned off.
2. Allow the generator to warm up for a few minutes before energising power in the caravan, as the output voltage can be higher when cold.
3. Check the generator output voltage regularly to ensure it is within the specification of the ESM4 system i.e. 230V ~ AC $\pm 10\%$

ROADS LIGHTS FUSES

The fuses are located on the front bulkhead of the right hand front locker.

Fuse Ratings

1	LH ROAD	5A
2	RH ROAD	5A
3	LH INDICATOR	7.5A
4	RH INDICATOR	7.5A
5	FOG	7.5A
6	STOP	7.5A

ECM ELECTRICAL CONTROL MODULE

PUMP SWITCH AND INDICATOR

Included on this panel is a pump isolation switch and pump running indicator. The pump isolation switch is used to isolate power to the water pump in the event of a pump fault or merely as a safeguard against unwanted pump operation. The red pump running indicator will light up as a warning when the water pump has been activated.

AUX SWITCH

This switch may be used to power any auxiliary DC circuits the user may wish to have added to the system.

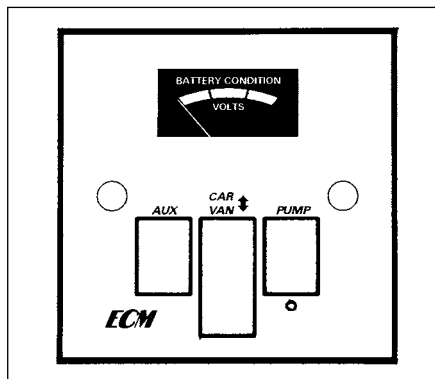
Battery Condition Meter

This meter indicates the power remaining in your caravan battery.

Readings should be taken as follows:

- Green region - Fully charged
(no charge necessary)
- Yellow region - Adequate charge
(re-charge if desired)
- Red region - Low charge
(turn on charger switch to re-charge)

A car/caravan changeover switch is provided in this module and should be used in the following way:



Caravan Position

When in this position DC power is available from the caravan battery to power all 12V circuits. If the charger is switched ON the caravan battery will be charged up via the charger/transformer unit.

Central Position

When in this position with the charger switch ON, power is provided to all 12V circuits via the charger/transformer only. With the charger OFF all DC circuits are isolated.

SUPPORT SERVICE

PLUG-IN SYSTEMS LIMITED PROVIDE AN ON-CALL SERVICE FOR WARRANTY OR NON-WARRANTY REPAIRS.

IF YOU WISH TO TAKE ADVANTAGE OF THIS SERVICE FOR PLUG-IN-SYSTEMS ONLY

Telephone (01482) 652523 and ask for PRODUCT SUPPORT SERVICE.



Electrics

POWER SUPPLY UNIT NE143-CWS, NE143-CF, NE143-CWSF

The NE143 family Unit is a 230V AC and 12V DC power controller. It provides all the necessary features for control and protection for all the electrical functions in a caravan. The unit provides the following features:

MAINS 230V AC

- Mains Module with Earth Leakage protection
- Over current protection (RCD)

12 VOLT DC

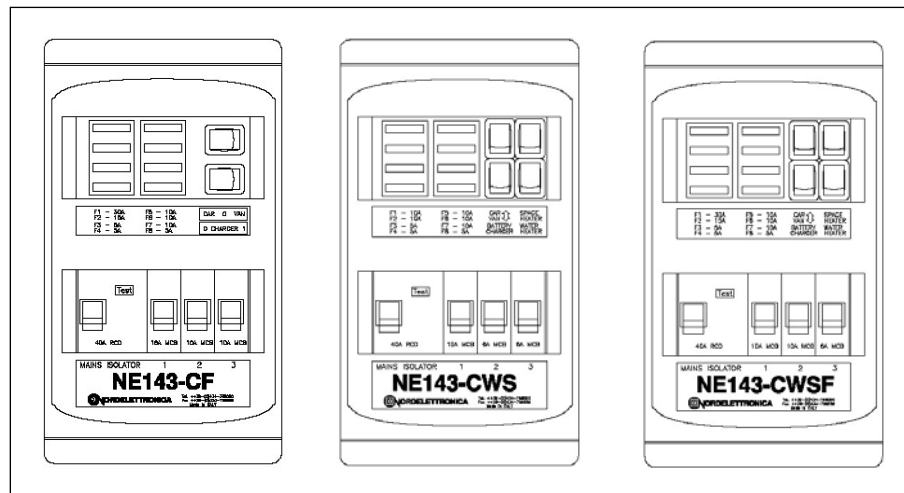
- Totally automatic charger
- Over current protection
- Short circuit protection
- Over temperature protection

SWITCHED FUSE MODULE

- With battery changeover switch
- Charger on/off switch
- 8 Fused DC output circuits

UNIT DESCRIPTION

The NE143 Unit is designed to operate on a mains supply of 207-253V AC (for use with low continental voltages).



The 40 Amp RCD gives protection against earth faults and also acts as the main switch. The mains module has three MCB's as follows.

For Abbey, Sterling, Swift and some Bessacarr models

MCB1 - SOCKETS/BLOWN-AIR HEATING (if fitted)

MCB2 - SPACE HEATER/ LIGHTS / AIR CONDITIONER (if fitted)

MCB3 - WATER HEATER/ FRIDGE/ CHARGER

Other Bessacarr models equipped with the NG143-CF

MCB1 - HEATING SYSTEM

MCB2 - SOCKETS/ OVEN/ MICROWAVE (if fitted)

MCB3 - LIGHTS/ FRIDGE/ CHARGER/ AIR CONDITIONER (if fitted)

CHARGER

The NE143 employs fully automatic 12V DC to operate with a wide range of mains input voltages and provides a stable output voltage even under load. The unit can provide up to 18 Amp maximum and 16 Amp continuously.

SWITCH AND FUSES MODULE

Car/Van Selector Switch

The car/caravan changeover switch provided in this module should be used in the following way:

Caravan position -

When in this position DC power is available from the caravan battery to power all 12V electric circuits. If the charger is switched on, the caravan battery will be charged via the charger/transformer unit. This position should be used when operating the fridge on 12V while towing.

Central position -

When in this position with the charger switch on, power is provided to all 12V circuits via the charger/transformer only. With the charger off all DC circuits are isolated.

Car position -

The switch can be placed in this position should the caravan battery become discharged and no mains power is available.

Note: First of all the towing vehicle should be electrically connected to the caravan via the 12S socket.

ELECTRICAL AND THERMAL PROTECTION

The battery charger is fitted with circuitry, which will protect it in the event of electrical or thermal overload. Should the current draw exceed the rated output of the unit, then it will begin to shut down. This will probably be noticed as a dimming of the 12V lighting. On removal of the excessive load the charger will automatically recover. To protect against overheating there is an electronic thermal protection circuit, which will operate should the temperature of the unit rise above a safe level. If this happens then the output will shut-off until the temperature has dropped back to a safe level.

CHARGER SWITCH

When the caravan battery requires charging, press this switch to the on position (it should then illuminate). Also ensure the Battery Selector Switch is in the Van position.

SPACE HEATER AND WATER HEATER SWITCHES

When you wish to use the space heater or water heater press the relevant switch to the on (downward position) It should then illuminate to show the heater is powered from the 230V supply.

Fuse 1 - Front roof lighting

Fuse 2 - Rear roof lighting

Fuse 3 - Blown-Air Heating

Fuse 4 - Radio

Fuse 5 - 12V sockets/Hitchlight/TV amp

Fuse 6 - Fan circuits

Fuse 7 - Water pumps/Water sensor/ Thetford toilet

Fuse 8 - Ignitions

For Bessacarr models an additional 12V fuse box is located in close proximity to the NC143 unit, with its own label appropriate to function



Electrics

THETFORD BATTERY BOX

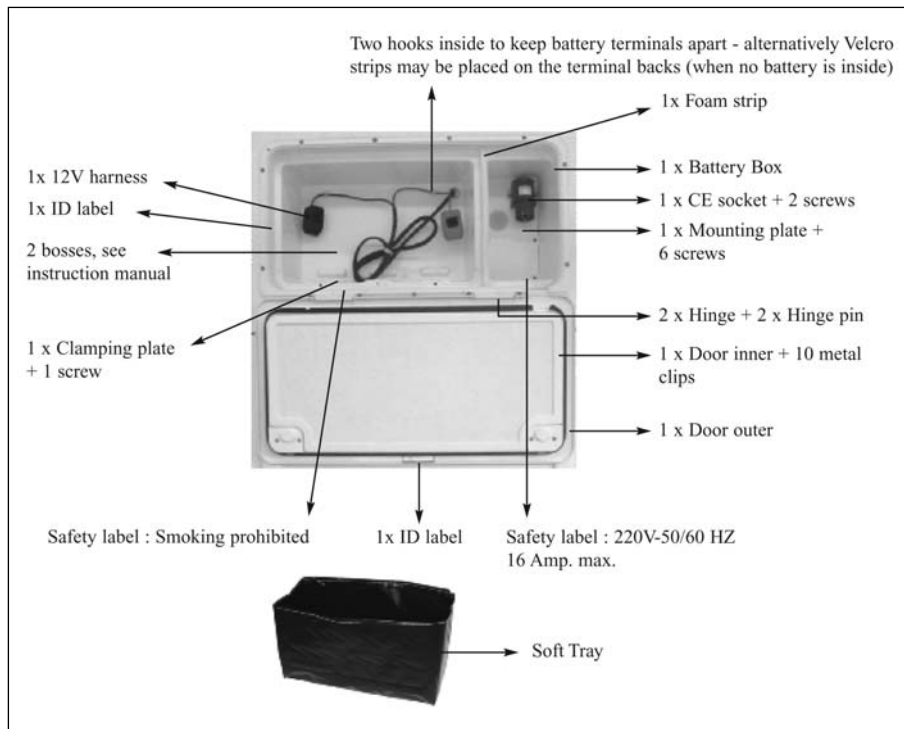
The Thetford Battery Box is intended to accommodate an auxiliary battery in your caravan. The Battery Box has a CE socket to connect to a 230 V power supply. Inside the Battery Box there is the option to fit several sockets and outlets.

PRECAUTIONS AND SAFETY INSTRUCTIONS

- Use caution when mounting the battery, as batteries contain acid liquids which can cause severe injuries and damage when handled incorrectly. Refer to the instructions on the battery.
- Use protective clothing and glasses when handling a leaking battery, and avoid direct contact to the skin, eyes and respiratory organ.

Should a battery leakage occur, please act according to the instructions supplied by the manufacturer of the battery. Act with caution as caustic substances are present in the battery.

- No smoking is allowed in the area of the Battery Box.
- Before removing a battery you should always check for spillages by touching the Soft Tray on the outside surface and sensing for any liquid spills. If you think that liquid has been spilt, you should



ensure that the Soft Tray and battery are lifted together so that spillages will not occur.

INSTRUCTION

WARNING!

- Use precaution when mounting the battery, as batteries contain acid liquids which can cause severe injuries and damage when handled incorrectly. Refer to the instructions on the battery.
- No smoking is allowed in the area of the Battery Box!
- Please note that the CE socket has a max of 16 amp.
- The Thetford Battery Box is designed for use with foot mounted batteries. These are recognizable by the rim around the bottom edge of the battery. This rim will locate against the back wall of the Battery Box and the angle metal bracket, which is screwed into place when the battery is fitted. The depth of the battery including rim should be between 173mm and 175mm.
- This product meets the latest version of the EN 1648 part 1 and 2 standard.

Before placing the battery inside the Battery Box, the adjacent battery should be placed into the Soft Tray and rested on the ground adjacent to the Battery Box. Carefully connect the electrical wires (the red cable attaches to the + pole and the black cable to the - pole of the battery).

Note! Incorrect connection of the cables will cause a short circuit with potential hazardous consequences. After mounting the terminals, lift the battery together with the Soft Tray into the middle of the Battery Box compartment. Push the Soft Tray with battery to the back of the Battery Box, into the safeguard bulge. If necessary shift the Soft Tray to the right or left until the battery is in place in the safety area (see photo 1).

The battery is located in the compartment by the manual clamping plate. This has to be screwed to the front of the box (screw is enclosed in package). Please ensure that the Soft Tray is pulled up tightly (to remove creases) before the plate is tightened. The rounded edge of the clamp prevents damage to the Soft Tray. Do not apply extreme force to the screw.

When disassembling, follow this procedure in reversed order. **Note!** Always check the Soft Tray for acid first! If found, take safety precautions (such as protecting clothing, body and especially the eyes). In case of contact with acid, immediately rinse with plenty of water. Follow regulations concerning these chemicals.

Tip! Generally, car workshop and gas station employees are familiar with this matter.

When attaching the 220/230 volts cable on the CE socket, the maximum recommended thickness of the cable is 10 mm. When

closing the door, the attached cable is to be fed through the slot at the bottom right of the door.

Photo 1

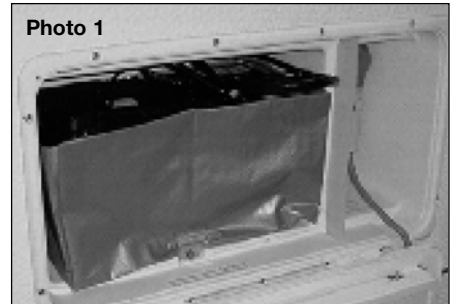
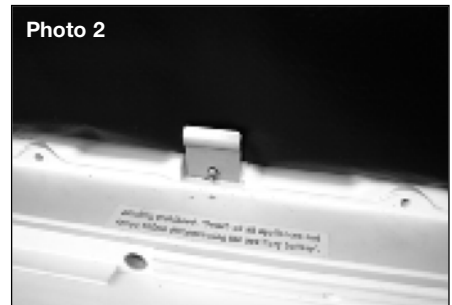


Photo 2



Electrics

CLEANING AND MAINTENANCE

- Use protective clothing and glasses when handling a leaking battery, and avoid direct contact to the skin, eyes and respiratory organ.
- Should a battery leakage occur, please act according to the instructions supplied by the manufacturer of the battery. Act with caution as caustic substances are present in the battery.
- Always remove the battery and the power cable before carrying out any maintenance of the product.
- Before removing the clamps switch off all appliances.
- No smoking is allowed in the area of the Battery Box.
- Use a soft cloth or sponge and a non-acid/abrasive detergent when cleaning the Battery Box and Soft Tray.
- To check if any acid is present in the Soft Tray, simply press it softly. A strong smell from the Soft Tray may also indicate spilled acid. The battery can be filled again with acid collected from the Soft Tray. Disposal through local drains is possible and legally permitted, on condition that the acid is mixed with water equaling 50 times the amount of acid. It is often possible to dispose of acid at gas stations.

- Before the camping season or extensive traveling, check the Soft Tray for faults and replace if necessary.
- The cleaning of the Battery Box and Soft Tray should only be done after all power sources have been switched off, in order to prevent a hazardous situations.

THETFORD WARRANTY

1. The Thetford Battery Box is warranted to the original purchaser for 3 years from the date of purchase.
2. The warranty covers replacement of parts arising from defects and workmanship and from the inability of the Battery Box to perform its intended function.
3. In case of a defect apply to original dealer or Thetford Service Center with proof of purchase.
4. Defects, which in our judgement occurred from misuse, negligence or accident, are not covered by the warranty. In addition, the warranty does not apply if the product is installed or handled improperly, if the product has been altered in any way, has been repaired by unqualified persons, or if the serial number and/or date has been altered or removed.
 - As the Battery Box is manufactured from polypropylene, it is resistant to temperatures up to 60 degrees Centigrade. Installing the battery box in

a position where it will be exposed to higher temperatures will invalidate the warranty and could lead to an adverse effect on the product.

5. Thetford products considered to be defective may be returned prepaid directly to Thetford. Any items received which are judged by Thetford to be covered under warranty will be dealt with accordingly. Defective products not considered to be covered by warranty will incur repair, handling and return carriage costs.
6. No other warranty is given and no personal representative is authorized to make any warranty or assume liability by words or action under any warranty other than that is contained herein.

BATTERY INSTALLATION

The battery should be positioned in the battery box provided. Connect the positive connector (+) to the positive terminal (+) and the negative (-) connector to the negative (-) terminal. Secure the battery using the front bar provided.

WARNING: When connecting the battery, ensure that the correct polarity is observed (black is negative and red is positive) and that the terminals are securely fastened.

Under normal circumstances it should not be necessary to remove the battery other than for routine inspection of terminals and “topping up”.

WARNING: Explosive gases may be present at the battery. Take care to prevent flames and sparks in the vicinity.

Your caravan has been fitted with an in-line fuse between the battery terminal and strip connector. It is recommended that the fuse rating fitted in this location does not exceed 20 amps.

WARNING: Switch off all appliances and lamps before disconnecting the battery.

Smoking is prohibited around the battery compartment.

To preserve the life of your leisure battery and charger please observe the following:

- i) Do not leave all 12V lights powered at the same time as this will drain your leisure battery more rapidly.
- ii) If all 12V lights must be powered together, ensure the battery is 'in-circuit' i.e. selector switch in the 'van' position and that the battery charger is turned on.
- iii) For optimum performance use the transformer/charger unit with a leisure battery attached.

BATTERY

It is recommended that a good quality rechargeable leisure battery is always in circuit when the system is in use.

A deep cycling heavy duty 12V battery should be purchased to provide power for lights and other electrical appliances. A proprietary brand leisure battery with a minimum of 85 Amp capacity is recommended.

Note: 85 Amp batteries and above should be checked dimensionally before purchasing, to ensure fitment within the battery compartment, as brands vary in size.

It should be remembered that batteries suitable for the electrical demands of a caravan differ in design from those for use with a car, and whilst the system may operate with a car battery it is strongly recommended that only a leisure type battery, maintained in good condition is used. The battery should be kept topped up at all times.

Note: Some models may have more than one 12V socket fitted, the 10 Amps required is available from the 12V socket provided no other 12V socket is used at the same time.

SOLAR PANEL CONNECTION POINT

A connection point has been included in the caravan electrical harness to take a 12V supply from an aftermarket solar panel (or similar device), to the caravan leisure battery.

The solar panel must provide a fused and regulated output in order to connect to this point. The connection point can be found inside the caravan adjacent to the battery box, in close proximity to the battery box fuse. Through the floor close to the battery box is a cable pass through, allowing a pair



Electrics

of wires from an externally located device to pass from exterior to interior to meet the connection point. This cable pass through will be capped both internally and externally with a cable entry gland.

A kit of parts is available from your caravan supplier which provides the mating half of the connection point. (The White rectangular connector found inside the caravan is a two way JST-LP type connector). For further assistance in identifying the connection, wire colours leading to the connector are detailed in the wiring schematic in your caravan service book.

HABITATION RELAY

To conform with European Safety Standards (EMC) all caravans have been equipped with a habitation relay.

This relay is actuated when the 12N/12S plugs are connected to the car's sockets and the car ignition is turned on.

The relay automatically isolates all 12V equipment within the caravan, excluding the fridge's 12V power supply, from the car.

GENERATOR GUIDELINES

- Lack of regular servicing can be the cause of most generator problems, gensets under 2kW are mainly dependent on engine speed for output frequency and voltage, poor or no servicing may

cause the engine speed governor to run the genset engine too fast. Therefore frequency and output voltage can rise above the specification of the machine data plate i.e. 230V at 50Hz, this may cause damage to electrical/electronic equipment (such as battery chargers).

- A generator should always be run for a few minutes prior to connection with the caravan or motorhome electrics, to allow it to warm up and the output to settle to a steady level.
- The AC output of generators is often derived from an AC alternator, rectified to DC then inverted back to AC. In essence this means the output sinewave may not be very smooth and may not run sophisticated electronics efficiently. Some of the new wave of gensets are more sophisticated in their production of a sinewave output and are more suited to run electronic equipment.
- If in doubt consult your genset dealer or manufacturer for advice.

SAS210 MOBILE ALARM SYSTEM

Using the latest microprocessor technology the SAS210 provides all year round protection for your caravan.

Please read all sections of these user instructions before attempting to operate the SAS210.

If you are unsure of any of the following points, please contact your local dealer or the manufacturer direct (see point 5), on page 60

1. Operation

Arm/Disarm

The SAS210 Alarm System is armed and disarmed by pressing the button on the key fob remote controller.

The alarm has four modes of operation:

- a) Disarmed
- b) Fully armed with internal movement sensor and tilt sensor active
- c) Partially set with only the tilt sensor active
- d) Partially set with only the movement sensor active.

The alarm indicates arm/disarm status by beeping. One beep = armed, two beeps in quick succession = disarmed.

To part set the alarm (modes c or d) hold down the arm button until the desired mode has been selected:

Hold down and release after 2 long beeps, mode (c) selected.

Hold down and release after 3 long beeps, mode (d) selected.

Note: if the arm button is continually held

down the system will disarm and then repeat the above sequence.

PIR Movement Sensor

The SAS210 Alarm System comes complete with a 120° x 360° Passive Infra Red movement sensor that detects body movement within the vehicle.

If you are leaving pets within the vehicle the system should be armed in mode (c) to prevent nuisance triggering.

Tilt Sensor

The SAS210 Alarm System has an inbuilt tilt sensor that detects tilting of the vehicle during the hitching process. If the tilt sensor is not set correctly, the alarm will not arm and will indicate a fault by beeping 4 times in rapid succession.

During normal (on the flat) operation there is no need to alter the tilt sensor.

If the vehicle is parked on a steep slope it may be necessary to adjust the tilt sensor. With the alarm disarmed, while viewing the movement sensor lens, move the tilt adjustment lever forward until the green light illuminates. Note the position of the lever.

Now move the lever backwards and again note the position of the lever when the green light illuminates.

Set the lever mid way between the two positions.

Remember to return the lever to the centre (locked) position when returning to 'on the flat' use.

Alarm Siren

When the alarm is triggered the siren will sound for 2 minutes. Following the 2 minute period the alarm will then deactivate for 15 seconds then rearm.

The alarm siren can be turned off at any point by pressing the key fob button. If the movement sensor caused the alarm trigger, the alarm will give a standard 'two beeps in quick succession' disarm indication. If the tilt sensor caused the alarm trigger, the alarm will give 'two beeps in quick succession' followed by a further 'two beeps in quick succession'.

Sleep mode

The SAS210 Alarm System incorporates a sleep mode that extends battery life over a long period of time.

If a charged leisure battery is fitted and is supplying 12V to the alarm system the alarm will operate in standard 'quick response' mode.

If the alarm is operating from the internal alarm battery only, the alarm will operate in 'slow response' battery saving sleep mode. In this mode you will need to press and hold the arm/disarm button for up to 3 seconds to arm or disarm the alarm.

2. Key Fobs

The SAS210 Alarm System comes complete with 2 key fob remote controllers. If an additional controller is required these can be ordered from your supplier.

Key Fob Battery Replacement

1. Remove the key fob from your key ring.
2. Prise the casing apart near the key ring fixing slot.
3. While holding the base part of the casing, prise out the old Lithium battery and replace with a new CR2032 battery. Ensure the [+] terminal is located towards the outer case.
4. Relocate the two casing halves and snap together.
5. Refit the key fob onto your key ring.
6. Remember to dispose of old batteries in accordance with local regulations.

3. Battery

The SAS210 Alarm System incorporates a 3.3Ah sealed lead acid battery that is charged from the vehicles 12V supply. This battery has been selected to run the alarm without any external supply voltage for up to 9 months depending on ambient temperature/initial charge.

The battery is fully charged when the alarm system is despatched, but may need further



Electrics

charging if the vehicle is stood for a number of months without a 12V supply to the alarm.

To charge the alarm battery either fit a fully charged leisure battery to the vehicle or connect the vehicle to the mains supply and switch on the 12V charger/power supply.

The internal battery should be replaced approximately every 3 years to ensure correct operation. Replacement batteries can be ordered from your supplier. Always dispose of old batteries in accordance with local regulations.

4. Specification

Control Box

Supply voltage:	10.5 to 15V DC
Supply current:	250mA max
Operating temperature:	-5 to +30°C
Battery capacity:	3.3Ah at 12V
Operating time (armed) with no supply:	9 months at 20°C
Siren output:	110 dB +/- 10%

Movement Sensor

Range:	120° x 360° x 8M
Current consumption:	<1mA typical

Key Fob

Range:	>10M typical
Battery:	CR2032 Lithium Cell
Typical battery life:	1 year

5. Spare Parts/Service

For spare parts, local supplier contact details or other service information please contact:

Sargent Electrical Services Ltd.
service desk on 01482 678981
during normal office hours.

12 VOLT ELECTRICAL SUPPLY

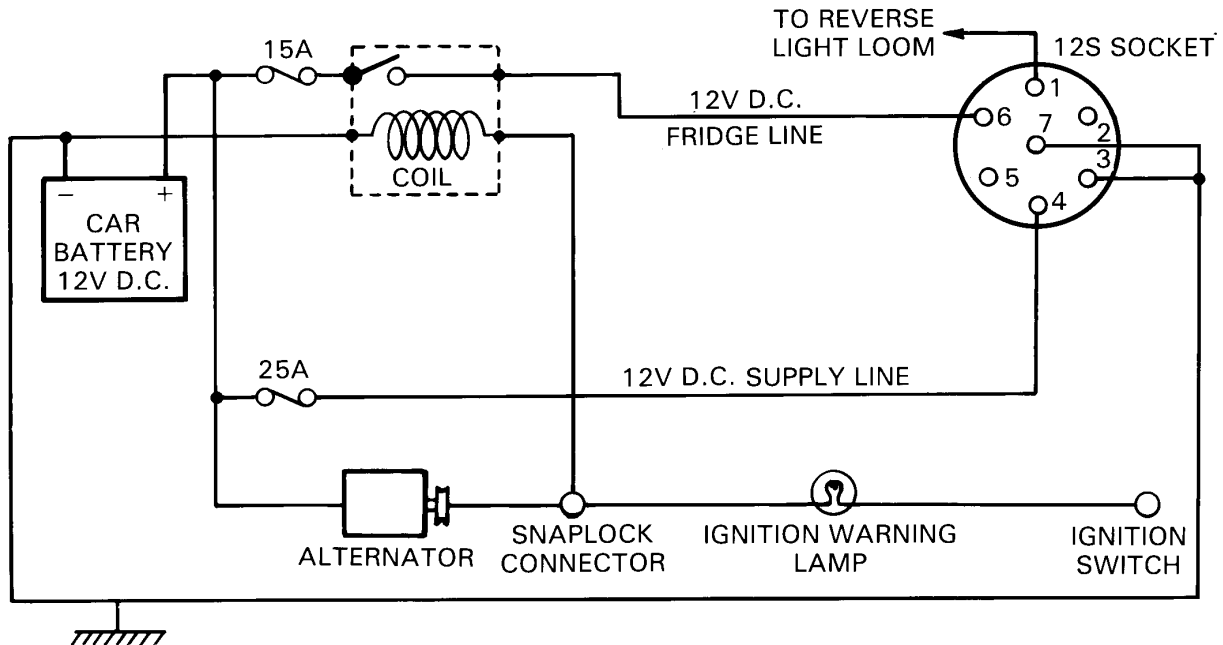
If your car is fitted with the appropriate relay, please note the following points:

1. The caravan battery will be charged by the car charging system independently of the distribution panel.
2. If the caravan battery level is “low”, power for the caravan 12V system can be obtained from the car battery, by connecting the 12S (grey) plug to the car, and setting the distribution panel selector switch to “car”. This will draw power from the car battery and care should be taken not to reduce the level of the car battery so low that the car engine cannot be started. (The battery level indicator in the caravan distribution panel will show the condition of the car battery in these circumstances).
3. When the car and caravan are connected through the 12N and 12S plugs and the engine is running, 12V power will be supplied to the fridge 12V cooling element, provided the fridge

fascia switch is set to 12V operation and the distribution panel battery selector switch is set to ‘van’.

4. If an extension lead from the 12S socket on a towing vehicle to the 7-core connecting cable is used while a caravan is parked on a caravan pitch, its length should be kept to a minimum and not exceed 5 metres. The minimum cross sectional area of the supply and return leads in the extension cable should be 2.5mm².

WIRING OF 12S SOCKET TO TOWING VEHICLE



Note:

If using a combination relay, ensure the supply fuse is the correct amperage. A lower rating will 'blow' causing the fridge, if switched on, to be connected directly to the caravan battery. While towing, the caravan battery will be discharged instead of being charged.







FITTED EQUIPMENT

Truma Ultrastore Water Heater	64
Truma S 3002 P and S 3002 Auto Space Heater	67
TEB Fan	70
Truma Ultraheat for S 3002 (P), S 5002 and S 55 T Heaters	70
ALDE Compact 3000 quick start guide	73
SC20 Control Panel	73
ALDE Heating System	76
TP5000 Electronic Programmable Room Thermostat	79
Refrigerator	83
Dometic RM7371 & RM7291L	84
Thetford Absorber Refrigerators	94
Stoves Hobs, Grills & Ovens	109
The Hob	109
Electric Hotplates	110
The Grill	110
The Oven	111
Cleaning	111
Microwave Oven	113
Thetford Cassette Porta Potti	117
Thetford Cassette C-200 CW & C-200 CWE	118
TV Inlet	121
External Barbeque Point	121
Status 315 omni-directional TV & FM radio antenna	122
Status 530 directional TV & FM radio antenna	122
WING omni-directional TV antenna	123
Bedding	124
Cassette Blinds and Flyscreens	126
Doorscreen	126
Seitz Entrance Door	127
Roof Lights and Windows	127
Air Conditioning	132
Ash Framed Doors	141
Shower	141
Tables	141
Fixing of Awnings	142



Fitted Equipment

The instructions covering fitted equipment to your caravan were correct at the time of going to print. Owners handbooks are updated annually and we take great care to try and ensure their accuracy.

However, the Swift Group Limited cannot accept responsibility for any changes that may be made in specification or operating instructions to the equipment described in this section after the time of going to press.

Every care is taken to ensure that the information provided in this handbook is correct and easy to understand.

Separate manufacturers' leaflets on many of the components are also included in the Owner's Pack provided with this caravan and we recommend that you compare the instructions in the handbook with the component manufacturers literature, to ensure the information provided is as accurate as possible.

If you are in any doubt as to how to operate the equipment in your caravan, please contact the component manufacturer's service department on the telephone number shown on their component leaflet. If you remain in any doubt, please contact the Swift Group Supercare customer care service department on 01482 875740.

Equipment Specification

For details on type of equipment fitted in your caravan, please refer to the Sales Brochure or Dealer.

IMPORTANT

To maximise the use and life of all fitted equipment in your caravan it is essential that any accompanying manufacturers' literature is read fully. All recommended maintenance and preparation procedures should be followed. The information provided in this handbook is only intended as a guide. If in any doubt consult your manufacturer appointed dealer, particularly before attempting to install EXTRA EQUIPMENT.

NOTICE: In the interest of safety, replacement parts for an appliance shall conform to the appliance manufacturer's specifications and should be fitted by them or their authorised agent.

THE TRUMA ULTRASTORE WATER HEATER

OPERATING INSTRUCTIONS

Attention: Before using for the first time, it is essential to flush the entire water supply through with clean warm water. Always mount the cowl cap when the water heater is not being operated! Drain the water heater if there is a risk of frost! **There shall be no claims under guarantee for damage caused by frost!**

When connecting to a central water supply (rural or city connection) or when using more powerful pumps, a pressure reducer must be used which prevents pressures of greater than 2.8 bar occurring in the Ultrastore.

Filling the Truma Ultrastore with water

e = Lever position "Closed"
f = Lever position "Drain"

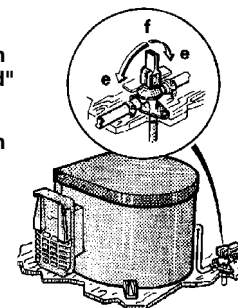


Fig. 1

Fitted Equipment

1. Check that the safety/drain valve in the cold-water intake is closed. Lever should be in the horizontal position, position (e).
2. Open the hot tap in the bathroom or kitchen with pre-selecting mixing taps or single lever fittings set to hot.

3. Switch on power for water pump (main switch or pump switch). Leave the tap open to let air escape while the water heater is filling. The heater is filled when water flows out of the tap.

Residues of frozen water can prevent filling if there is a frost. The water heater can be defrosted by switching on the heater for a short period (max 2 mins). Frozen pipes can be defrosted by heating the room.

Note: If just the cold water system is being used, without water heater, the heater tank is also filled up with water. In order to avoid damage through frost, the water contents must be drained by activating the safety/drain valve, also when the heater has not been used. As an alternative, two shut-off valves, resistant to hot water, can be fitted in front of the cold and hot water connection.

Draining the water heater

1. Disconnect power for water pump (main switch or pump switch).
2. Open hot water taps in bathroom and kitchen.

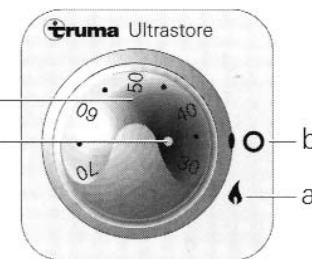
3. Open safety/drain valve: Lever in vertical position, position (f).
4. The water heater is now drained directly to the outside via the safety/drain valve. Check that the water contents have been completely drained (10 litres).

Gas operating instructions

Attention: Never operate the water heater without water in it!

If the wall cowl is positioned close to an opening window (or hatch) - in particular directly under it - it must remain closed when the water heater is in use (see warning plate).

1. Remove cowl cover.



a = Rotary switch "On" "Gas operation"

b = Rotary switch "Off"

c = Rotary knob for temperature selection (illuminated by green lamp "Operation")

d = Red indicator lamp "Failure"

2. Open gas cylinder and open quick-acting valve in the gas supply line.
3. Select required water temperature at rotary knob (c) infinitely variable from approx. 30° to 70°C.
4. Switch on water heater at the rotary switch (a) on the control panel, green indicator lamp "Operation" lights up.
5. If there is air in the gas supply line, it may take up to a minute before the gas is available for combustion. If the appliance switches to "Failure" during this period, switch off the appliance - wait 5 minutes - and switch on again!



Fitted Equipment

Switching off (gas operation)

Switch off the water heater at the rotary switch (b).

Drain the water heater if there is a risk of frost!

If the water heater is not to be used for a longer period, mount cowl cover (non-observance of this point can lead to the function of the appliance being impaired through water, dirt or insects), close quick-acting valve in the gas supply line and close the gas cylinder.

There shall be no claim under guarantee if this point is not observed.

Always remove the cowl cover prior to operating the water heater!

Red indicator lamp "Failure"

The red indicator lamp (d) lights up if there is a failure.

The reason for such an indication is, for example, no gas available or air in the gas supply system, triggering of the excess temperature monitor etc. To unlock, switch off the appliance, wait 5 minutes, and switch on again.

In event of faults, always contact the Truma Service on Tel: 01283 511092.

Electrical Operating Instructions

Switch the switch on the control panel to "On". This indicates the electrical water-heating element is operative.

When using the vehicle switches refer to operating instructions of the vehicle manufacturer or see switch labels.

Note: The water temperature cannot be selected, automatic temperature limitation at approx. 70°C. For a faster heating up period the appliance can be simultaneously operated with gas and electrical power.

Note: The water tank in the Truma-Ultrastore is made of high quality food-proof stainless steel VA.

Use wine vinegar for de-scaling the water supply. Allow the product to react and then thoroughly flush out the appliance with plenty of fresh water. To sterilise the water we recommend "Certisol- Argento". Other products, particularly those containing chlorine are unsuitable.

In order to avoid the proliferation of micro-organisms, heat the Ultrastore to 70° at regular intervals.

Do not use the water as drinking water!

Important Operating Notes

1. If the cowl is positioned close to an opening hatch (window), keep this closed during operation. See warning plate. Always mount the cowl cover if the heater

is not being used. Non-observation of this point can lead to the function of the appliance being impaired through water, dirt or insects.

2. The guarantee will be invalidated if this point is not observed. Always remove the cowl cover prior to operating the water heater!
3. If there is a defect in the electronics, return the control Printed Circuit Board well padded. If you fail to pack it correctly the guarantee will be invalidated. Only use original Truma Ultrastore control P.C.B's as spare parts.
4. If just the cold water system is being used, without water heating, the header tank becomes more vulnerable to frost damage. Accordingly the contents should be drained by operating the safety/drain valve. This also applies when the caravan is in storage.

General Safety Notes

In the event of leaks in the gas system or if there is a smell of gas:

- Extinguish all naked flames
- Do not smoke
- Switch off the appliance and gas cylinder
- Open the windows
- Do not operate any electrical switches
- Have the entire system checked by an expert



1. Repair jobs are only to be carried out by an expert.
2. The following would invalidate the guarantee:
 - a. Any alteration to the appliance (including cowl)
 - b. The use of non-Truma spare parts/accessories
 - c. Non observance of the operating instructions.
3. The operating pressure for the gas supply is 30mbar (or 28mbar butane/37mbar propane) and must correspond to the operating pressure of the appliance (see name plate).
4. Do not operate the water heater when refuelling the vehicle and when in the garage.
5. During the initial operation of a brand new appliance (or after it has not been used for some time), a certain amount of fumes, and a slight smell, may be noticed for a short time. Remedial action is to immediately run the heater at maximum output and to ensure adequate room ventilation.
6. If the burner makes an unusual noise or if the flame lifts off, it is likely that the regulator is faulty and it is essential to have it checked.

Technical Data

Water contents:	10 litres
Water pressure:	up to max. 2.8 bar
Type of gas:	Liquid Gas (propane or butane)
Operating Pressure:	30mbar (or 28mbar butane, 37mbar propane)
Rated thermal output:	1500W
Gas consumption:	120g/h
Heating time to approx. 70°C:	
Gas operation:	approx. 35 mins
Electrical operation:	approx. 70 mins
Gas and electrical operation:	approx. 20 mins
Power consumption 12V	
Ignition:	0.17A
Heating Up:	0.08A
Standby:	0.04A
Power consumption 230V	
Heating Up:	(3.7A) 850W
Weight (empty):	6.7Kg

Fitted Equipment

THE TRUMA S 3002 P & S 3002 AUTO SPACE HEATER

INSTRUCTIONS FOR HEATERS FITTED WITH AUTOMATIC IGNITOR OR PIEZO IGNITOR

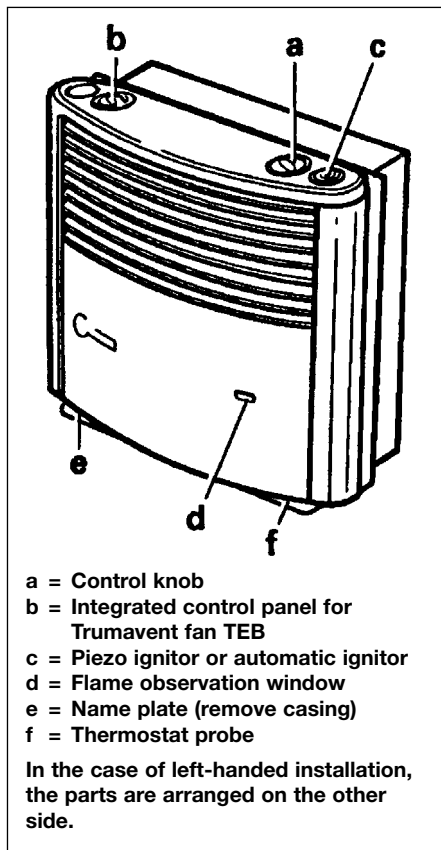
Switching On

1. Open the valve on the gas cylinder. Open quick-acting valve in gas supply line.
2. Turn control knob to thermostat setting 1-10 and press it down as far as the stop. At the same time keep operating the Piezo ignitor rapidly until the flame ignites.
3. Keep the control knob depressed for a further 10 seconds to allow the safety pilot to operate.
4. (Piezo only) Watch through the flame window for another 10 seconds to make sure that the flame does not go out through air in the supply pipe (caused by the valve being closed or changing the cylinder).

Attention: Always wait at least 2 minutes before attempting to re-ignite, otherwise there is a risk of blowbacks (misfiring). This also applies if a working heater goes out has to be re-lit.



Fitted Equipment



Automatic Ignitor

Prior to first ignition, make sure that the batteries have been inserted; observe correct fit battery cassette (see changing batteries, page 57).

Thermostat

Set the required room temperature at the control knob (numbers 1-10). For an average room temperature of approx. 22°C we recommend setting:

3-5 Without the Trumavent Fan
(switched on)

4-8 With the Trumavent Fan

Switching Off

Set control knob to "0". If turning off for a long period of time, close the quick-acting valve in the gas supply line. Close valve of gas cylinder.

Important Operating Notes

1. If the gas supply line is filled with air, it may take up to a minute before the gas becomes available for combustion. During this time depress the control knob and continuously operate the Piezo ignitor until the flame ignites.
2. You will have to find out the exact thermostat setting yourself, depending on how much heat you need.

3. Repairs are only to be carried out by a competent service engineer.

Attention: A new O-ring must always be installed after dismantling the exhaust duct.

4. Any alteration to the appliance (including exhaust duct and cowl) or the use of spare parts and accessories, which are important to the function of the heater and which are not original Truma parts, as well as the non-observance of the installation and operating instructions, will lead to the cancelling of the guarantee and exclusion of liability claim.
5. During the initial operation of a brand new appliance, a certain amount of fumes and a slight smell may be noticed for a short while. Remedial action is to immediately run the heater at maximum output and to ensure adequate room ventilation.
6. In winter, before switching on the heater, remove all snow from the cowl.
7. Inspect the exhaust duct and all connections at regular intervals and always whenever there is a blowback (misfire). It is essential that the exhaust duct is installed so that it slopes upwards over its whole length and is securely fixed with several clamps. Never place any object on the exhaust duct, since this

Fitted Equipment

could result in damage. The exhaust duct connection to both the heater and the cowl must be firm and well sealed.

Do not operate heaters with incorrectly fitted or damaged exhaust ducts.

8. Never allow the warm air outlet on the heater to be obstructed in any way. For instance never hang washing on or in front of the heater to dry. Misusing your heater in this way could cause serious damage from overheating. Do not place flammable objects near the heater. Please follow these guidelines in the interest of your own safety.
9. If the burner makes an unusual noise or if the flame lifts off while burning, it is likely that the regulator is faulty and it is essential to have it checked.
10. Cleaning (with switched off appliance): It is recommended that at least once a year, before the heating season starts, you remove any dust that has collected on the heat exchanger base plate.

Technical Data:

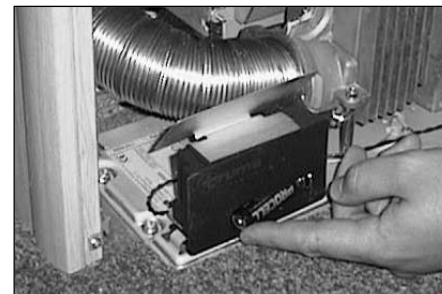
Type of gas:	Liquid gas (propane/butane)
Operating pressure:	30mbar (28mbar butane, 37mbar propane)
Rated thermal output:	3400W
Gas consumption:	30-280 g/h
Product Ident.	No: CE-0085AP0325
<i>Automatic Ignitor</i>	
Power consumption:	50 MA (ignition) 0.01 MA (monitoring)
Operating voltage:	3V

CHANGING OF BATTERIES

Changing the Batteries on the Automatic Ignitor

Only change the batteries with the heater switched off.

Always insert new batteries at the beginning of the heating season.



Remove front of heater retaining screw, located through centre of black grill. Unclip front of heater, slide up battery cover to reveal battery. Change the batteries. Observe plus/minus.

Only use temperature resistant (+70°C), leak-proof Mignon round cells (LR 6, AA, AM 3, Art. no. 30010-23600). Other batteries could lead to malfunctions!



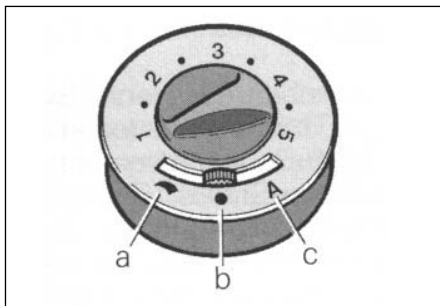
Fitted Equipment

TEB FAN

Always observe the operating instructions prior to starting!

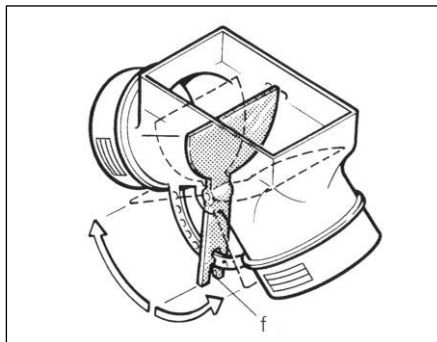
The vehicle owner is responsible for the correct operation of the appliance.

Repairs are only to be carried out by an expert!



- a = Manual control
(e.g. for ventilation) Adjust desired output at the control knob.
- b = Off
(or automatic operation/ heating with heaters Trumatic S 3002 K and S 5002 K)
- c = Automatic operation
(Heating) The output steadily adjusts to

the respective heat emission of the heater. The maximum output can be limited at the control knob, as required. The regulating between this value and slow running is carried out automatically.



The quantity of air can be individually adjusted at the air flap (f), for warm air distribution.

In centre position 50% of the warm air is distributed to each outlet.

Use the fan duct with 72 mm and if the fan ducts are of different lengths or on sides with a greater heat requirement. This means that the air output can be used to the full on this side. By adjusting the air flap (f) the quantity of air can be increased individually. This means that the air out-put on the other side is reduced.

If the air output drops or the operating noise increases, the fan impeller wheel may be severely soiled.

Cleaning

(with switched off appliance!) We recommend removing dust which has collected on the heat exchanger and base plate of the heater and on the impeller wheel of the Trumavent fan, once a year before the heating season starts. Clean the impeller wheel carefully using a brush or tooth brush.

TRUMA ULTRAHEAT ADDITIONAL ELECTRIC HEATING FOR TRUMATIC S 3002 (P), S 5002 AND S 55 T HEATERS

Function description

Truma-Ultraheat is an additional 230V electric heater for the LPG heater models Trumatic S 3002/S 5002.

Heater operation is basically possible with gas only, electricity only or simultaneously with electricity and gas.

When using simultaneously the electrical unit will switch itself off before overheating occurs as a result of the stronger gas burner.

When using electrical only we recommend to set the fan control on position 3 (manual or auto), remembering to set the output level to

Fitted Equipment

2000W (ensure that the fuse protection for the power supply of the camp site is sufficient).

If more than 2kw are required (heating up/cold temperatures) you must refer back using gas operations as the 230V electrical operation is a secondary heater only.

The electric heater can also be operated without the Trumavent fans.

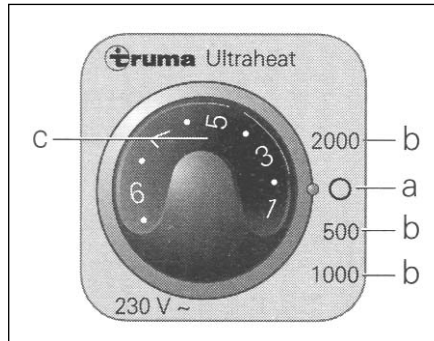
WARNING:-Surfaces become hot in use, guards provided do not give full protection to the young or elderly

OPERATING INSTRUCTIONS

Before operating the heater for the first time it is essential to observe the operating instructions, enclosed with the heater.

Control panel with thermostat

- a = Rotary switch "Off"
- b = Rotary switch "On"
power settings:
500 - 1000 - 2000 W
- c = Rotary control knob for room temperature (illuminated by green indicator lamp "operation")



Switching On

Attention: Before switching on, ensure that the fuse protection for the power supply of the campsite is sufficient for the selected power setting (b) (see Technical Data).

Important: The electric feed line for the caravan must be fully unwound from the cable drum.

1. To switch on, turn the rotary switch to the desired output level (b).
2. Set rotary control knob (c) to the desired room temperature.

The thermostat setting on the operating element (1-9) must be determined individually depending on the heating requirement and the type of vehicle. For an average room temperature of about 23°C, we recommend a thermostat setting of about 6 -8.

The electric heater can also be operated without the Trumavent fans.

If the heater is operated simultaneously with electricity and gas, the electrical unit will switch itself off before overheating occurs as a result of the stronger gas burner.

Switching off

Switch the heating system off at the rotary switch (a).

IMPORTANT OPERATING NOTES

1. Repairs may only be carried out by an expert.
2. The heater's hot air outlet should under no circumstances be blocked. Never hang clothes or similar in front of or on top of the heater to dry. This could cause serious damage to the heater as a result of overheating. Do not place inflammable materials near the heater! Please observe these instructions for your own safety.
3. The performance of the room thermostat will be affected if temporarily covered or obstructed
4. When operating a brand-new heater for the first time (or after it has been idle for a lengthy period) you may temporarily notice a slight smoke and smell. We advise running the heater at full power and thoroughly ventilating the room.



Fitted Equipment

5. Any modifications to the appliance or the use of spare parts and accessories important for operation which are not original Truma parts, of non-observance of the instructions for installation and use will result in the guarantee becoming invalid and no liability will be assumed.

Furthermore the approval for operating the appliance will become invalid and in some countries also the approval for operating the vehicle.

The mains element on the space heater is designed for supplementary heating. It is not recommended to run along side the gas for prolonged periods of time.

TECHNICAL DATA

Power supply: 230 V ~, 50 Hz

Power consumption at power setting:

500 W: 2.2 A

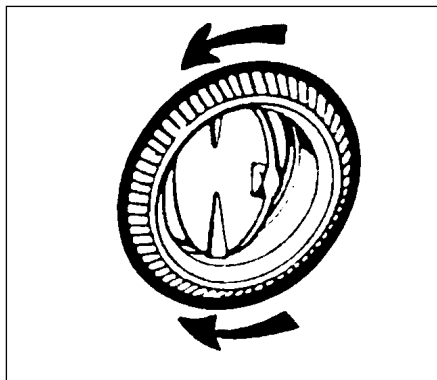
1000 W: 4.5 A

2000 W: 8.5 A

Weight: approx 2kg

BUTTERFLY OUTLETS

The butterfly plate may be opened or closed to control the quantity of air and may also be twisted around to control direction.



For uniform distribution, outlets nearest the heater should be closed more than those further away.

Blown air

The air ducting outlets are generally of the butterfly type and may be opened or closed by adjusting the butterfly valves. Twisting the disc in its housing directs the flow in the direction required.

One outlet on each leg of the air ducting layout must be kept open at all times.

Switching off

Push slide switch (a) to the "OFF" position.

IMPORTANT OPERATING NOTES

1. **Repairs may only be carried out by an expert.**

2. Under no circumstances should the hot air outlet be blocked. Never hang clothes or similar in front of or on top of the heater to dry. This could cause serious damage to the heater as a result of overheating. Do not place inflammable materials near the heater! Please observe these instructions for your own safety.
3. When operating a brand new heater for the first time (or after it has been idle for a lengthy period) you may temporarily notice a slight smoke and smell. We advise running the heater at full power and thoroughly ventilating the room
4. Any modifications to the appliance or the use of spare parts and accessories important for the operation, which are not original Truma parts, or non-observance of the instructions for installation and use will result in the guarantee becoming invalid and no liability will be assumed. Furthermore, the approval for operating the appliance will become invalid and in some countries also the approval for operating the vehicle.

TECHNICAL DATA

Power supply: 230 V ~, 50 Hz

Power consumption at power setting:

500 W: 2,2 A 1000W: 4,5 A 2000 W: 8,5 A

Weight: approx. 2 kg

ALDE COMPACT 3000 QUICK START GUIDE

Further information on can be found in the user handbook

SC20 OPERATION

SC20 Control Panel



Symbol	Function	Description
	1kW Heating Element On/Off	230V heating cartridge switched on/off.
	2kW Heating Element On/Off	230V heating cartridge switched on/off.
	6kW Gas Burner On/Off	LPG boiler switched on/off.



Fitted Equipment

Symbol	Function	Description
	Circulating Pump On/Off	With this switch in the OFF POSITION the boiler will heat DOMESTIC HOT WATER ONLY. With this switch in the ON POSITION the boiler will heat DOMESTIC HOT WATER AND HEATING. The circulation pump is then controlled by the Room Thermostat. The boiler then operates on Gas, electric or both to maintain water temperature.
	Gas Burner Flame Indication	This LED indicates that the LPG Burner is ignited
	Fault Warning	This LED indicates that the LPG Burner has not ignited. To Re-Set turn the Gas Burner Switch "Off", wait for 30 seconds then Turn the Gas Burner Switch "On"

The Compact 3000 Boiler is fitted with 2 x 230 volt x 1kW Heating Elements. Each element is controlled by a switch on the Control Panel so it is possible to operate on 1kW or 2kW.

Note: Gas and Electrical power can be used at the same time.

The TP5000 Programmable room thermostat "Programme Mode" is factory pre set with a programme which often suits most people.

Mon-Fri

Event	Time	Temp °C
1	08.00	20
2	08.30	15
3	11.30	20
4	13.30	15
5	16.30	21
6	22.30	15

Setting the Clock and Day

- Press PROG to begin programming
- Use + or - to adjust time
- Press PROG again
- Use + or - to adjust day
1=Monday 2 =Tuesday etc

At initial warm up use gas 6kW & electric 2kW combined for extra heat and hot water performance

Fitted Equipment

Details of how to input your own programmes

Operating Instructions.

MANUAL MODE

To override the programme settings (and run at a constant temperature setting of your choosing) press the UP and DOWN arrows simultaneously twice then use arrows to adjust the temperature.

To return to programme mode press the UP and DOWN arrows simultaneously once.

IMPORTANT INFORMATION AND USER CHECKS - PLEASE READ BEFORE OPERATING THE ALDE BOILER:

1. **Never operate the Alde boiler without ensuring the heating system has Antifreeze in it - Check the header tank.**
2. **Check the level of antifreeze in the Header Tank. When cold the fluid should be 10mm above the minimum mark.**

If you need to top up your system via the header tank use a 60/40 mix of water and ethylene glycol, this can be purchased at car accessory outlets nationwide.

3. **Ensure glycol mixture is at recommended strength. It not only prevents freezing but also stops corrosion and bacteria within the system.**

Blue antifreeze has a two year life.

4. **Propane Gas is recommended as it works at lower ambient temperatures. Butane loses functionality below 10 degrees centigrade.**
Total failure occurs at -2 degrees centigrade when using Butane, this applies to all LPG appliances.
5. **The heating system can be operated with the domestic water drained down.**
6. **If the vehicle is not in use and there is a risk of freezing the domestic water should be drained down.**
7. **Frost damage is not covered under the Alde Warranty.**
8. **If leaving the caravan for long periods of time without a 240v supply connected then the 12v supply should be disconnected.**

The boiler draws a small 0.01amp in standby mode. The circulation pump draws 0.18amp when operating.

FAULT FINDING

- **Check LPG - Sufficient supply?**
Is the main tap fully open?

If the boiler has not been used for a long period or Gas supply has been changed it may take more than one attempt to start.

- **Check that the boiler has 12v supply or if using electric elements that you have 230v supply**

The boiler is sensitive to current and needs a full 12v supply check battery level

- **Check that the 2 amp fuse on the back of the boiler is intact**
- **Check that the overheating protection has not activated by unscrewing the black cap on the back of the boiler and pushing fully in.**

Will not reset until the boiler has cooled by 20 degrees centigrade - Ensure system is bled of air before restarting. (To bleed see operating instructions).

- **Check that the Red LED on the Alde control panel has gone out**

If not switch off the boiler for 30 seconds and try again

- **Check all electrical connections are pushed firmly home and wires attached**

For further details please refer to the operating instructions.



Fitted Equipment

ALDE COMPACT 3000 OPERATING INSTRUCTIONS

To be read in conjunction with the Alde Manual

SC20 OPERATION

SC20 Control Panel



Symbol	Function	Description
	1kW Heating Element On/Off	230V heating cartridge switched on/off.
	2kW Heating Element On/Off	230V heating cartridge switched on/off.
	6kW Gas Burner On/Off	LPG boiler switched on/off.

Symbol	Function	Description
	Circulating Pump On/Off	With this switch in the OFF POSITION the boiler will heat DOMESTIC HOT WATER ONLY. With this switch in the ON POSITION the boiler will heat DOMESTIC HOT WATER AND HEATING. The circulation pump is then controlled by the Room Thermostat. The boiler then operates on Gas, electric or both to maintain water temperature.
	Gas Burner Flame Indication	This LED indicates that the LPG Burner is ignited
	Fault Warning	This LED indicates that the LPG Burner has not ignited. To Re-Set turn the Gas Burner Switch "Off", wait for 30 seconds then Turn the Gas Burner Switch "On"

The Compact 3000 Boiler is fitted with 2 x 230 volt x 1kW Heating Elements. Each element is controlled by a switch on the Control Panel so it is possible to operate on 1kW or 2kW.

Note: Gas and Electrical power can be used at the same time.

IMPORTANT CHECKS BEFORE OPERATION:

- Check the level of fluid in the Header Tank.
- Boiler must not be operated if fluid is near Minimum Level! Level should always be above minimum!

- The correct glycol mixture must be used at all times of year! It not only prevents freezing but also reduces corrosion within the system.
- Check that the Butane/Propane gas supply is correctly fitted via the proper Gas Regulator.
- Propane Gas is recommended as it works at lower ambient temperatures. Butane ceases to operate at minus 2°C
- The Heating System can be used when the Water Heater is empty.
- When using the system on Electrical Power the vehicle should be on Mains

Hook Up to provide 12v power and charge the battery.

- Operating without Hook Up may result in a flat battery. Minimum requirement: 10v

If domestic hot water is not being used, and there is a risk of frost, it should be drained.



Fitted Equipment

OPERATION

The boiler must always be switched off when refuelling the vehicle

1. Choose the power supply via the three switches on the SC20 Control Panel. Switch controls a 1kW element and can be used with or without Gas.
2. Choose "Water Only" or "Heating & Water" via the Circulation Pump Switch.
Up for Domestic Hot Water Only,
Down for Domestic Hot Water and Heating.
3. If Heating is required check the Temperature setting of the thermostat.

Heating performance re air circulation

In order to achieve the best possible performance from the heating system it is important to allow air to circulate freely under bunks and behind backrests etc. It is important that cushions, blankets, sleeping bags and carpets etc are not allowed to block air intakes etc.

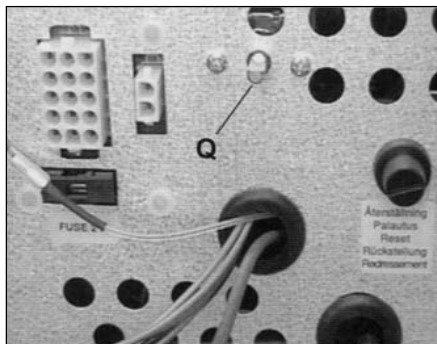
System temperature

The boiler is set to a system temperature of 80°C, i.e. the temperature of the glycol fluid as it circulates in the heating system. The system temperature may be reduced when

required, i.e. if the warm water becomes too hot.

Lowering the system temperature

Turn the spindle (Q) anti-clockwise. A quarter turn represents a temperature reduction of 10°C. To increase the system temperature, turn the axle clockwise until it reaches its maximum position and cannot be turned any further. The system temperature is then reset to 80°C.



Switching off the LPG boiler, heating element and circulation pump

1. Set the SC20 'Circulating pump', 'Gas burner', '1kW heating element' and 2kW heating element' switches to off.

2. Switch off the 230V fused isolator located close to the boiler if the vehicle is not to be used. If this switch is not set to off, the boiler will remain in the standby position and use a small amount of electricity.
3. For LPG isolation set the manifold or gas bottle valves to off.

If the red light comes on

The boiler is fitted with an ionised flame sensor. This means that if the flame goes out for some reason, the electronics will attempt to re-light it. If the flame is not re-lit within ten seconds, a solenoid valve within the boiler switches off the gas supply, the electronics are 'blocked', and the fault warning LED on the SC20 panel will illuminate. The electronics must be re-set before the boiler can be started.

Resetting from the blocked position

Switch the SC20 'gas burner' switch to off. The fault warning light will go out. Wait for approx. 30 seconds while the electronics re-set the block. Set the SC 'gas burner on/off' switch back to on - The electronics will once again attempt to re-start the boiler.

Fitted Equipment

TP5000 ELECTRONIC PROGRAMMABLE ROOM THERMOSTAT

Before programming the thermostat press the + & - AND $\wedge$ and $\vee$ buttons simultaneously to reset the unit (Fig.1)

Setting the Clock and Day

- Press PROG (Fig.2) to begin programming
- Use + or - buttons (Fig.3) to adjust the TIME (Fig.4)
- Press PROG again (Fig.2)
- Use + or - buttons (Fig.3) until correct DAY is shown (Fig.5) (1 = Monday, 2 = Tuesday, etc)

Accepting the Factory Pre-settings

The TP5000 has pre-set times already programmed in, which often suit most people (see Table).

To accept these settings close the front cover and after 2 minutes the pre-settings will automatically be accepted.

To adjust the factory pre-settings and set your own time and temperature programmes

For Days 1-5 (weekdays)

- a) Press PROG (Fig.2) 3 times to show the 1st pre-set time and temperature (Event 1 Days 1,2,3,4,5) (Fig.6)
- b) Use + or - buttons (Fig.3) to adjust the TIME (press and hold to change in 10 min increments)

Mon-Fri

Event	Time	Temp °C
1	08.00	20
2	08.30	15
3	11.30	20
4	13.30	15
5	16.30	21
6	22.30	15

- c) Use $\wedge$ or $\vee$ buttons (Fig.7) to adjust the TEMPERATURE
- d) Press PROG (Fig.2) to move to next preset time & temp (Event 2) (Fig.8)
- e) Repeat steps b, c & d for programming Events 3,4,5 & 6

For Days 6-7 (weekends)

- a) Press PROG (Fig.2) to show 1st pre-set time and temperature (Event 1 Days 6-7) (Fig.9)
- b) Repeat steps b, c and d above to programme time and temperature events for the weekend.

Returning to RUN mode

Press PROG (Fig.2) - the colon in the LCD display will start to flash (Fig.10)

Fig 1.



Fig 2.



Fig 3.

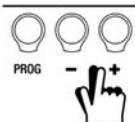


Fig 4.



Fig 5.

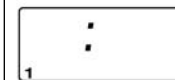


Fig 6.



Fig 7.

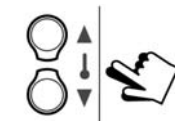


Fig 8.



Fig 9.

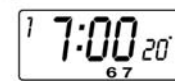


Fig 10.



Fitted Equipment

Fig 11.



Fig 14.



Fig 12.



Fig 15.

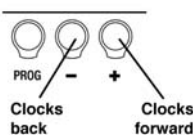


Fig 13.

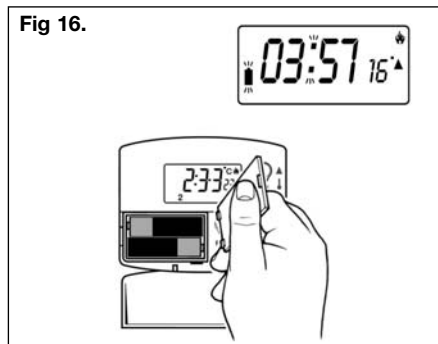


Battery Replacement

- A low battery symbol will flash in the LCD display (Fig.16)
- You have 15 days to replace the battery before the unit will switch off.
- When changing batteries, remove old batteries and insert new ones within ONE MINUTE and programming will not be lost.

NB. If the display ever goes blank during normal operation, the batteries will need to be renewed, the unit reset and the time and programmes reset.

Fig 16.



CARE AND MAINTENANCE

THE ALDE WARRANTY DOES NOT COVER DAMAGE CAUSED BY FREEZING/FROST DAMAGE

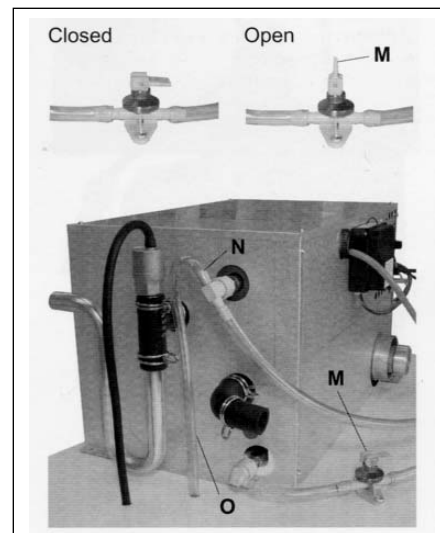
Always rinse out the heater before it is used, particularly if it has not been in operation for some time.

NB! The hot water is not intended for drinking or cooking. When the heater is in continuous use, it should be emptied approx. once a month, to ensure that a new air cushion is formed in the heater. The air cushion is essential for absorbing pressure surges in the heater.

NB! The warm water heater should always be drained of fresh water when there is a risk of frost and when the caravan is not in use.

Draining the heater using the combined safety/drain valve

1. Switch off the freshwater pump.
2. Open all water taps.
3. Then open the safety/drain valve by raising the yellow lever (M) to a vertical position.



Fitted Equipment

- The heater will now drain directly below the vehicle through the safety/drain valve hose. Check that all the water is emptied out (about 7-10 litre). Leave the valve in the open position until the next time the heater is used.

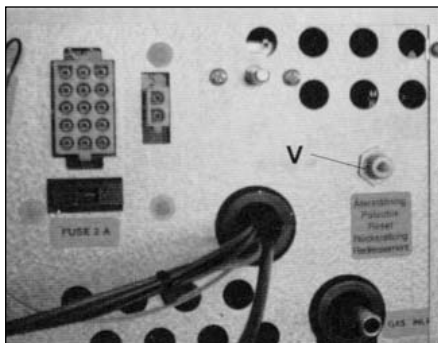
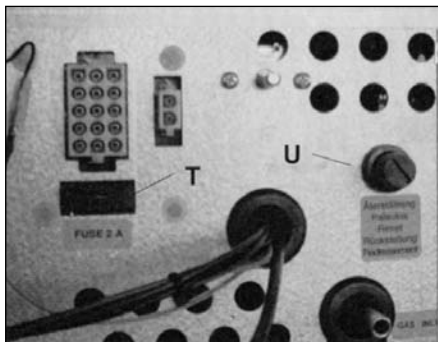
NB! Check that the automatic check valve (N) is open and is allowing air to enter the heater when it is being drained, and that the hose (O) is not blocked

FAULT FINDING

Should only be actioned by a Competent Person/Service Engineer.

The boiler does not start

- No LPG?
- Is the main tap fully open?
- If the boiler has not been operated for some time, or if the gas cylinder has been changed, it may take longer than normal to light the boiler.
- Check that the boiler is connected to the electricity supply ($> 11\text{ V}$).
- Check that the fuse (T) for the boiler is intact.
- Check whether the overheating protection has been tripped by unscrewing the black plastic cap (U) and pressing the reset button (V).



NB: If the overheating protection has been tripped it cannot be reset until the boiler has cooled down by $10\text{-}20^{\circ}\text{C}$. Before restarting the boiler, check that it has been properly bled.

- Check whether the red LED on the control panel has gone out. If not, switch off the boiler. Wait 30 seconds and then try restarting it.
- Check that the boiler's electrical connections are properly attached.
- If none of these help, please contact a service company.

The Heating Element is not working:

- Check that there is an electricity supply (230 volt) to the Heating Element.
- Check that the relays fitted to the boiler operate a slight click can be heard from the relays when the Heating Element is switched on at the Control Panel.
- Check whether the overheating protection has been tripped by unscrewing the black plastic cap (U) and pressing the reset button (V).
- Other causes - Service Engineer to investigate.

GUARANTEE

Alde's guarantee is valid for one year from the date of delivery and only covers materials or manufacturing faults, provided that the directions for installation and use have been followed. The guarantee does not cover frost damage.



Fitted Equipment

NB! Only Alde original parts should be used as replacement parts.

The boiler is fitted with a built-in warm water heater with a volume of approx. 8.5 litres fresh water. The warm water heater can produce around 12 litres of 40°C water per half-hour (at a cold water temperature of 10°C). If the heating cartridge is used instead of gas for heating the boiler, the capacity is slightly reduced.

MAINTAINING THE HEATING SYSTEM

Winter camping

While camping during the winter, ensure that the flue is kept clear of snow and ice since the inlet air to the LPG boiler enters through the flue. Do not start the LPG boiler until the flue is completely free of snow. A flue extension (part no. 300 320) for fitting on the roof is recommended for winter camping.

The LPG system

A professional, who will ensure that there are no leaks from connections or hoses, should check the LPG system regularly. LPG hoses should be changed every second year, since their propensity to dry out and crack will eventually result in leaks. To increase safety, we recommend fitting an Alde leak gauge, type 4071, as close as possible to the pressure reduction valve.

The heating system

Regularly check the heating system's fluid level in the expansion tank. The level should be about 1cm above the minimum indicator in a cold tank. The heating system should be filled with a mixture of water and glycol. For preference, use high quality ready-mixed glycol (with inhibitor) intended for use in aluminium heating systems. If using concentrated glycol, the mixture should consist of 60% water and 40% glycol. If the heating system will be exposed to temperatures below -25°C, the glycol content must be increased, but not to more than 50%. Any vessels used for the liquid must be spotlessly clean, and the pipes in the heating system must be free of contamination. This will prevent the growth of bacterial in the system. The glycol mixture should be checked before topping up with new liquid. This will ensure that the concentration of glycol in the mixture is not too high. If the fluid level in the expansion tank falls for reasons other than evaporation, please check all joints, drain cocks and bleeder screws to ensure that they are not leaking. If the glycol-water mixture leaks out, rinse with water and wipe up. Never allow the heating system to stand empty of glycol.

FILLING THE SYSTEM WITH GLYCOL FLUID

NB! Any vessels used for the liquid must be spotlessly clean, and the pipes in the heating system must be free of contamination. This will prevent the growth of bacteria in the system.

The system is filled through the expansion tank, either manually or using the Alde filling pump which both tops up and bleeds the system. For manual filling, unfasten the circulation pump nut (R) and lift the pump (S) out of the tank. Slowly pour the glycol mixture into the tank. Bleed the system. Top up with more liquid if the level has fallen after bleeding. Bleed a newly filled system regularly during the first days the heating system is in operation.

BLEEDING THE SYSTEM

Depending on how the pipes have been fitted, air pockets may form when the system is filled with glycol fluid. A sign that there is air trapped in the system is that the heat released into the pipes only extends a metre or so from the boiler even though the circulation pump is operating. In newly filled systems, small air bubbles can form in the expansion tank, creating a murmuring sound. If the circulation pump is stopped for a few seconds, the bubbles will disappear.

Fitted Equipment

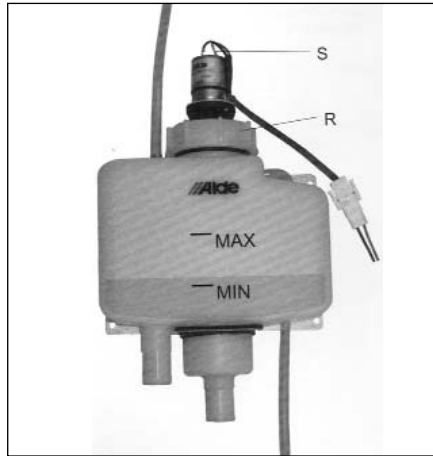
Bleeding

If a bleeder screw is fitted to the outgoing pipe on the rear of the boiler, open this bleeder screw and leave it open until it starts to discharge water. If the boiler is fitted with an automatic bleeder, there is no need to bleed it manually.

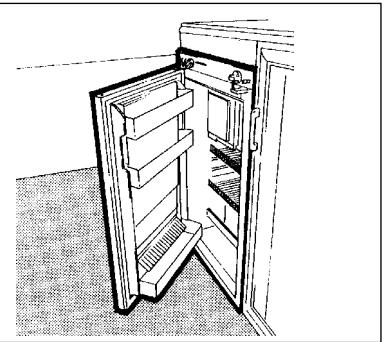
Start the LPG boiler. The circulation pump should be switched off. Open the remaining bleeder screws in the system (please refer to the instruction manual of the vehicle for their locations). Leave the bleeder screws open until they start discharging fluid. Start the circulation pump and let it run for a while. Check that the pipes and radiators around the vehicle are heating up. If they still fail to heat up, try the following

Single-axe caravans: Stop the circulation pump. Using the jockey wheel, lower the front of the caravan as far as possible so that the rear is tilted upwards. Leave it in this position for a few minutes to allow the air to travel upwards in the system. Open the bleeder screw at the highest point. Leave it open until it discharges glycol fluid.

Using the jockey wheel, raise the front of the caravan as far as possible and repeat the procedure in this position. Then position the caravan horizontally and start the circulation pump. Check that the pipes and radiators around the vehicle are heating up.



Twin-axe caravan: The easiest way to bleed the heating system is to place the vehicle on a sloping surface or to raise one end of the vehicle using a jack. Bleed the system as described above.



REFRIGERATOR

When using your refrigerator for the first time, it is advisable to wash the interior and its accessories.

When the caravan is on tow, the refrigerator should be operated electrically, i.e. from the 12V battery in the towing vehicle, and not by means of bottled gas.

CONTROLS

The refrigerator can be run on either 230V, 12V or LP gas. Changing between these modes of operation is carried out by means of the controls shown on the relevant control panel.

Caution!

Only use one source of energy at a time.



Fitted Equipment

DOMETIC RM7371 AND RM7291L

You have made an excellent choice in selecting the Dometic Absorption Refrigerator. We are sure that you will be fully satisfied with your new appliance in all respects.

The appliance, which works silently, meets high quality standards and guarantees the efficient utilisation of resources and energy throughout its entire life cycle, during manufacture, in use and when being disposed of.

Before you start to use the appliance, please read the installation and operating instructions carefully.

The refrigerator is designed for installation in leisure vehicles such as caravans or motorcaravans. The appliance has been certified for this application in accordance with EU Gas Directive 90/396/EEC.

WARNING AND SAFETY NOTICES

Warning: Never use a naked flame to check the appliance for leaks.

- Protect children!
- When disposing of the refrigerator, remove all refrigerator doors and leave the storage rack in the refrigerator. This will prevent accidental locking in or suffocation.

- If you smell gas:
 - close the locking tap of the gas supply and the valve on the cylinder.
 - open the windows and leave the room.
 - do not switch on anything electrical.
 - extinguish naked flames.
- Never open the cooling unit; it is under high pressure.
- Work on the gas, flue system and electrical components must only be carried out by qualified service personnel.
- It is imperative that the operating pressure should correspond to the data given on the model plate of the appliance.
- Compare the operating pressure data given on the model plate with the data on the pressure monitor of the liquid gas cylinder.
- Gas operation of the appliance is not permitted while travelling on ferries.
- Covers ensure electrical safety and must only be removed using a tool.
- The appliance must not be exposed to rain.
- The refrigerator is not suitable for the proper storage of medications.

COOLANT

Ammonia is used as a coolant.

This is a natural compound also used in household cleaning agents (1 litre of Salmiak cleaner contains up to 200g of ammonia - about twice as much as is used in the refrigerator). Sodium chromate is used for corrosion protection (1.8% of the solvent).

In the event of leakage (easily identifiable from the unpleasant odour):

- switch off the appliance.
- air the room thoroughly.
- inform the authorised Customer Service department.

WARRANTY AND CUSTOMER SERVICE

Warranty arrangements are in accordance with EC Directive 44/1999/CE and the normal conditions applicable for the country concerned. For warranty or other servicing, please contact our Dometic Service department. Any damage due to improper use is not covered by the warranty. The warranty does not cover any modifications to the appliance or the use of non-original Dometic parts;

the warranty does not apply if the installation and operating instructions are not adhered to and no liability shall be entertained. Parts can be ordered throughout Europe from our

Dometic Service department. Your Service Centre contact numbers are found in the "European Service Network" booklet

When contacting Dometic Service, please state the model, product number and serial number together with the MLC Code, if applicable. You will find this information on the data plate inside the refrigerator.

DESCRIPTION OF MODEL

Refrigerator Mobile /
Mobile Absorption Refrigerator

"L" with interior light

RM 7291 L

Last digit 1 = manual energy selection

Last digit 5 = automatic and manual energy selection

CLEANING

Before using the refrigerator, it is advisable to clean the appliance both inside and out.

- Use a soft cloth and lukewarm water with a mild detergent.
- Then rinse the appliance with clean water and dry thoroughly.
- Remove dust from the refrigerator unit at yearly intervals using a brush or soft cloth.

Warning: To avoid deterioration of materials:

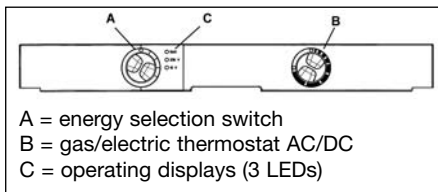
- **Do not use soap or hard, abrasive or soda-based cleaning agents.**
- **Do not allow the door seal to come into contact with oil or grease.**

Using the refrigerator

- The cooling unit is silent in operation.
- When the appliance is first put into operation, there may be a mild odour which will disappear after a few hours.
- Ensure the living area is well ventilated.
- The refrigerator will take several hours to reach its operating temperature in the cooling compartment
- The freezer compartment should be cold about one hour after switching on the refrigerator.

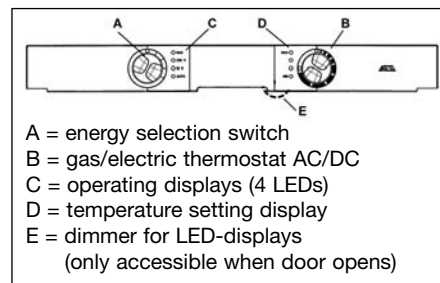
Controls

A. Manual energy selection MES (e.g. RM 7XX1 L)



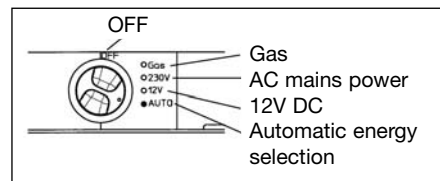
Fitted Equipment

B. Automatic and manual energy selection AES (e.g. RM 7XX5 L)



Note: The refrigerator is equipped to operate on mains power, DC or liquid gas (propane/butane). The desired power option is selected by means of energy selector switch (A). Energy selector switch (A) has four settings: AC mains power, DC (12V), Gas (liquid gas), OFF.

Appliances with automatic energy selection have the additional setting "AUTO".



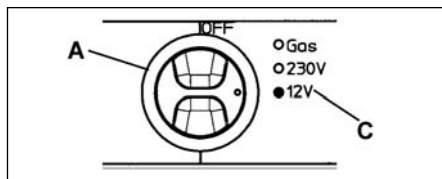
Fitted Equipment

MANUAL ENERGY SELECTION

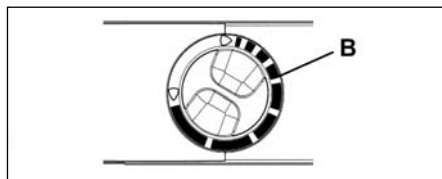
ELECTRICAL OPERATION

12V - operation (DC)

Warning: The refrigerator should only be used while the motor is running, otherwise the on-board-battery would be discharged within a few hours!



1. Set energy selector switch (A) to 12V .
2. Operating display "C", 12V lights "green".
Appliance is in function.

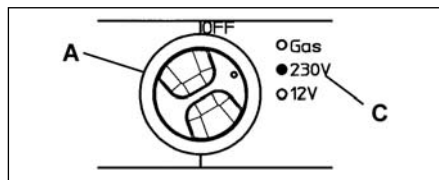


3. Use rotary switch (B) to regulate the temperature in the main refrigerator compartment.

Note: If the operating display fails to light up (it lights up "red" at AES models) the device is not in operation. (For troubleshooting see page 82).

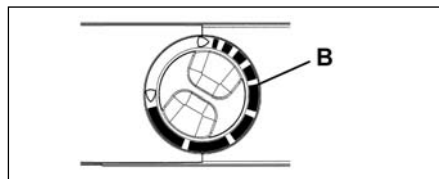
Mains power

This option should only be selected where the supply voltage of the connection for power supply corresponds to the value specified on the data plate. Any difference in values may result in damage the appliance.



1. Set energy selector switch (A) to 230V .
2. Operating display "C", 230V lights "green".

Appliance is in function.



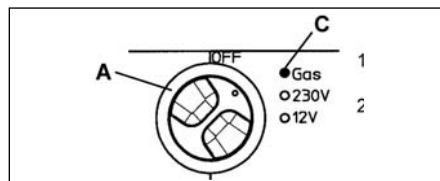
3. Use rotary switch (B) to regulate the temperature in the main refrigerator compartment.

Note: If the operating display fails to light up (it lights up "red" at AES models) the device is not in operation. (For troubleshooting see page 82)

GAS OPERATION

- The refrigerator should only be operated using liquid gas (propane, butane). Do not use town gas or natural gas.
- If the refrigerator is operated during travel using gas, the precautions stipulated by the legislation in the respective country must be taken (in conformity with the European standard EN 732).
- Operating the refrigerator with gas is not permitted during travel in France and Australia.
- As a basic rule, operation using gas is prohibited in petrol stations.

1. Open the valve of the gas cylinder
2. Open the shut-off valve to the gas supply.



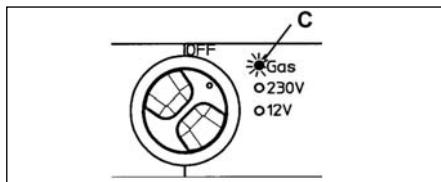
Fitted Equipment

1. Set energy selector switch (A) to gas
2. Set rotary switch (B) to "MAX" position.

The ignition process is activated automatically, accompanied by a ticking sound approx. 30 sec. Upon successful ignition, the display LED (C) "Gas" lights yellow. The refrigerator is in function. Use rotary switch (B) to regulate the temperature in the main refrigerator compartment.

GAS FAULTS

In the event of a gas fault (e.g. gas cylinder empty), the operating display (C) flashes yellow.



Remedies:

Set the energy selector switch (A) to position "OFF".

1. Is there any gas in the gas bottle?
2. Is the gas bottle valve open?
3. Is the on-board shut-off valve open?
4. Set the main switch (A) to "on"

The reignition starts again.

If after about 30 seconds the operating display (C) starts flashing red again, the gas fault has not been cleared (e.g. air in the gas pipe).

5. Briefly switch the refrigerator off and then on again using main switch (A).

To remove air from the gas pipes, repeat this procedure 3-4 times.

If these actions do not help, please call an authorised Dometic Service Centre.

Additional functions (RM 7XX5 L - models only)

- Temperature setting display (D) with 4 LED to indicate the selected temperature (MIN - MAX)
- LED - dimmer (E) for adjusting the brightness of the display-LED (only accessible when door opens)

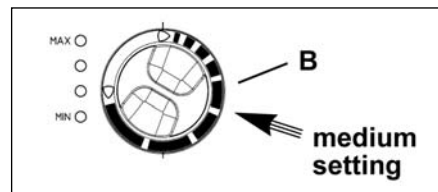
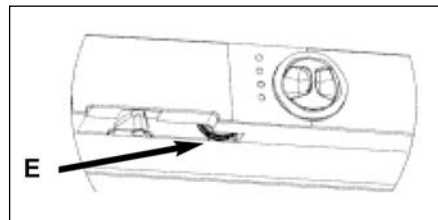
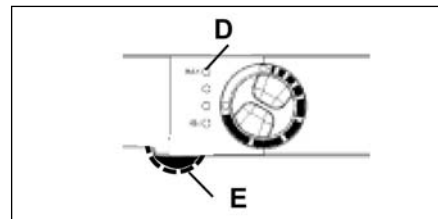
Underneath the fascia is a knurled knob for adjusting the brightness (see item E above)

Temperature setting cooling compartment

As shown, you are able to regulate the temperature of the cooling compartment, if necessary, by turning rotary knob (B).

The cooling unit's performance is influenced by ambient temperatures.

Tip: Please select the medium setting for ambient temperatures between +15°C and +25°C. The unit operates within its optimum performance range.



STORING FOOD

- Always store food in sealed containers, aluminium foil or similar.
- Never put hot food into the refrigerator, always let it cool down first.



Fitted Equipment

- Products that could emit volatile, flammable gases must not be stored in the refrigerator.
- Store quickly perishable foods directly next to the cooling fins.

The freezer compartment is suitable for making ice cubes and for short-term storage of frozen food. It is not suitable as a means of freezing foods.

MAKING ICE CUBES

Ice cubes are best frozen overnight. At night, the refrigerator has less work to do and the unit has more reserves.

1. Fill the ice cube tray with drinking water.
Only use drinking water!
2. Place the ice cube tray in the freezer compartment.



DEFROSTING

As time goes by, frost builds up on the fins.

When the layer of frost is about 3mm thick, the refrigerator should be defrosted.

1. Switch off the refrigerator, as described on page 89 - "Switching off".
2. Remove the ice cube tray and food.
3. Leave the refrigerator door open.
4. After defrosting (freezer compartment and fins free of frost), wipe the cabinet dry with a cloth.
5. Use a cloth to mop up the water from the freezer compartment.
6. Switch the refrigerator back on again.

Warning: The layer of ice must never be removed forcibly, nor may defrosting be accelerated using a heat source.

Note: Water thawing in the main compartment of the refrigerator runs into an appropriate container at the back of the refrigerator. From there, the water evaporates.

POSITIONING THE STORAGE RACK

Dismantling:

1. Loosen the front and back securing brackets.
2. Move the storage rack to the left and remove it.

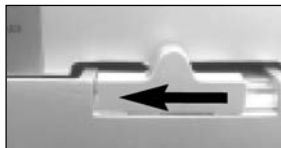


To fit the storage rack, the reverse order applies.

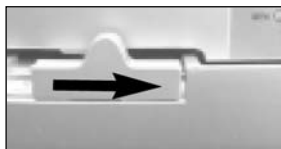
Fitted Equipment

DOOR LOCKING

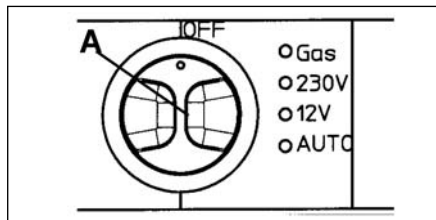
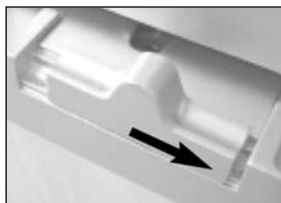
Open



Close



Park-position/
vent-position

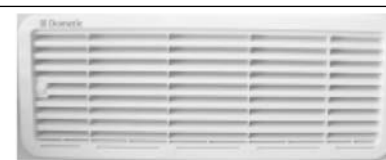


Switching off gas operation

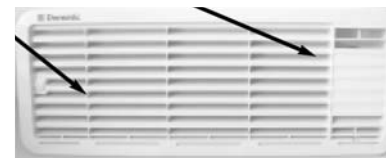
If the refrigerator is to be taken out of service for an extended period of time, the on-board shut-off valve and the cylinder valve must be closed.

WINTER OPERATION

1. Check that the ventilation grilles and the extractor have not been blocked by snow, leaves or similar.
2. When the ambient temperature falls below $+8^{\circ}\text{C}$, the optional winter covers should be fitted. This protects the unit from excessively cold air.

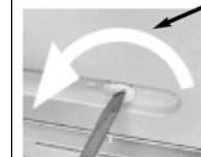


Lower ventilation grille (L200)



Upper ventilation grille with flue vent (L100)

3. Affix the cover and fasten it.



Fitted Equipment

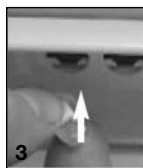
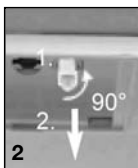
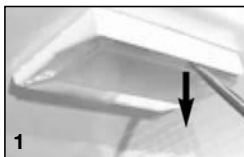


Tip: It is also recommended that the winter covers should be used when the vehicle is taken out of service for an extended period of time.

INTERIOR LIGHT

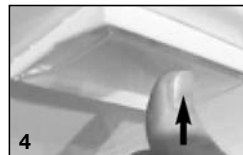
Changing the light bulbs

1. Remove cover.
2. Detach defective light bulb.
3. Fit new light bulb



4. Clip the cover back in place.

Note: For 12V DC : 1 light bulb
12V, 2W



Please contact Dometic Service Centres for replacement light bulbs.

Changing the doorhang

TROUBLESHOOTING

Before calling the authorised Service Department, please check whether:

1. The instructions in the section "Using the refrigerator" have been followed.
2. The refrigerator is not tilted excessively.
3. It is possible to operate the refrigerator with an available power source.

Failure : The refrigerator does not work in gas operation mode

Possible cause	Action you can take
Gas bottle empty	Change gas bottle
Is the supply cut-out device open?	Open the cut-out device
Air in the gas pipe?	Switch device off and on again 3-4 times to remove air from the gas pipe

Note: The Seven Series refrigerator requires a constant 12 volt supply for the fridge to operate on gas. Disconnecting the leisure battery will switch off the gas operation of the fridge.

Failure : The refrigerator does not work on 12V

Possible cause	Action you can take
On-board fuse defective	Fit new fuse
On-board battery discharged	Check battery, charge it
Engine not running	Start engine

Failure : The refrigerator does not work on 230V

Possible cause	Action you can take
On-board fuse defective.	Fit new fuse.
No connection to supply voltage.	Establish power connection.
AES: gas operation despite connection to the supply voltage?	Appliance switches to gas operation due to insufficient supply voltage (automatically switches back to 230 V operation)



Fitted Equipment

Failure : The refrigerator does not cool sufficiently

Possible cause	Action you can take
Inadequate ventilation to the unit.	Check that the ventilation grilles are not covered.
The thermostat setting is too low.	Turn the thermostat to a higher setting.
There is too much ice on the condenser.	Check that the refrigerator door seals when shut.
Too much warm food put inside.	Let food cool down first.
Appliance running for a short time.	Wait several hours, check again.

MAINTENANCE

- Works on gas components and electrical installation may only be carried out by authorised personnel. We recommend you contact your Dometic Service Centre.
- EN 1949 stipulates that the appliance's gas equipment and its associated fume system must be inspected after installation and a certificate issued.
Afterwards a qualified technician must inspect according to EN 1949 every two years and a certificate issued.

It is the user's responsibly to arrange for inspections after purchase.

- It is recommended that the gas burner be inspected and cleaned as necessary at least once a year.

- We recommend maintenance following an extended shutdown of the vehicle.

PRODUCT LIABILITY

Product liability of Dometic GmbH does not include damages which may arise from faulty operation, improper alterations or intervention in the equipment, adverse effects from the environment such as changes in temperature and air humidity, which may impact the equipment itself or the direct vicinity of the equipment or persons in the area.

ENVIRONMENTAL HINTS

Refrigerators manufactured by Dometic GmbH are CFC-free.

Ammonia (a natural compound of hydrogen and nitrogen) is used in the cooling unit as a coolant. The non-ozone-hazardous cyclopentan is used as a propellant in the manufacture of the PU foam insulation.

DISPOSAL

In order to ensure that the recyclable packaging materials are re-used, these should be sent to the usual local collection system.

The appliance should be transferred to a suitable waste disposal company that will ensure re-use of the recyclable components and proper disposal of the rest.

For eco-friendly draining of the coolant from all absorber refrigeration units, a suitable disposal plant should be used.

ENERGY-SAVING TIPS

- At an average ambient temperature of approx. 25°C, it is sufficient to operate the refrigerator at the middle thermostat setting (for both gas and mains voltage).
- Where possible, always store goods that have previously been cooled.
- Do not position the refrigerator in direct sunlight.

Fitted Equipment

- Constant circulation of air must be supplied to the refrigerator unit.
- Defrost regularly.
- Open the door only for a short time when removing goods from the refrigerator.
- Run the refrigerator for about 12 hours before filling it.

TECHNICAL DATA								
Model	Dimensions H x W x D (mm) depth incl. door	Gross capacity incl. freezer compartment	Usable capacity of freezer compartment	Connection Mains / Battery	*Consumption electricity / gas in 24 hrs	Netweight	Ignition Burn Control Device / Ignition unit	Stepped cabinet
RM7371L	821x486x606	89 litre	11.0 litre	125 W / 130 W	ca.2.5 kWh / 270g	27kg	✓	✓
RM7291L	821x525x541	86 litre	10.5 litre	125 W / 120 W	ca.2.6 kWh / 260g	27kg	✓	✓
We reserve the right to make technical changes. *Average consumption measured at an average ambient temperature of 25°C in pursuance of ISO Standard.								



Fitted Equipment

THETFORD ABSORBER REFRIGERATORS

This user's information is for N112, N145 models of Thetford absorption refrigerators. It explains how to use your refrigerator correctly and safely. Read the manual carefully before using the refrigerator for the first time to obtain a quick overview of how to operate and use the refrigerator.

Thetford absorption refrigerators are specially designed to store fresh and frozen food and make ice cubes in caravans and campers. The control panel allows you to select the preferred energy source and cooling level. Different energy sources allow you to use your refrigerator under different conditions.

Thetford absorption refrigerators belong to category C11: gas appliances that must be installed so that the combustion area is isolated from the living space.

To find out more about how your absorption refrigerator works, visit the website at www.thetford-europe.com.

PRECAUTIONS AND SAFETY INSTRUCTIONS

Alerts

The following alerts are used in this user's manual:

Warning! "Warning" alerts the user to the danger of damage to the

product or to the user if the user fails to carry out the described procedures carefully.

Non-observance of the procedures may result in serious injury to the user or damage to the product.

Caution! "Caution" alerts the user to the possibility of damage to the product if the user fails to carry out the described procedures carefully.

Important! "Important" denotes supplementary information for the user and alerts the user to potential problems.

Warnings

- This refrigerator must be installed according to the manufacturer's instructions and in compliance with local and national regulations.
- Read this manual carefully before you start to use your refrigerator.
- Always consult the warnings before you perform any maintenance or gas checks.

Repairs/maintenance

- Never open or damage the cooling system. The cooling system is pressurized and contains substances harmful to health.

- Never attempt to repair gas, extractor or electrical parts yourself. They must be repaired by a qualified service engineer. Contact the Customer Service department of Thetford for a list of qualified parties.
- Always switch off the refrigerator before you perform any kind of maintenance or cleaning.

Use

- Never cover the ventilation grills in the walls of a caravan. Good ventilation is essential for the correct working of the absorber system.
- Water in the ventilation grating can result in damage to the refrigerator. Therefore, we advise that you put the winter cover over the ventilation gratings prior to washing your vehicle.
- Never expose the refrigerator to rain.
- Never operate the refrigerator by gas while driving. If a road accident results in fire, there is a risk of explosion.

What to do if...

- You smell gas:
 - close the valve of the gas bottle;
 - extinguish any naked flames;
 - do not switch on any electrical devices or lighting;

Fitted Equipment

- open the windows and leave the room;
- contact the Customer Service department of Thetford.
- You suspect a leak in the cooling system:
 - switch off the refrigerator;
 - extinguish any naked flames;
 - provide sufficient ventilation;
 - contact the Customer Service department of Thetford.

ABOUT YOUR REFRIGERATOR

Your refrigerator has a cold space and a freezer compartment. After starting up the refrigerator, allow it to cool for at least eight hours before placing any food in it.

Cold space

The cooling fins are located on the inside of your refrigerator. The absorption system uses the cooling fins to withdraw heat from the refrigerator. Therefore, never place plastic or paper over the cooling fins. Air must be able to circulate freely through the refrigerator so that heat can be extracted.

Important! Do not cover the cooling fins at the back of the refrigerator with plastic or paper. The refrigerator cools optimally when air is allowed to move freely through the refrigerator.

- To limit frosting on the cooling fins:
 - always cover liquid foods before placing them in the refrigerator;
 - always let hot food cool before placing it in the refrigerator;
 - never keep the refrigerator open longer than necessary.

Fitting racks

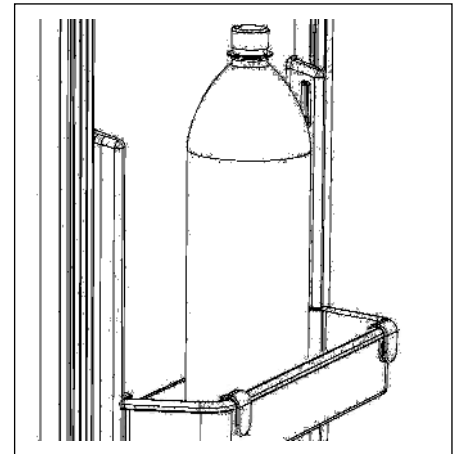
Inside your refrigerator there are two or three storage racks. You can adjust the racks to a convenient height by means of a simple click system:

- click the plastic bracket to the right short side of the rack;
- turn the bracket into the horizontal position and insert the rack tipped in a sloping position into the refrigerator;
- place the short side without bracket into one of the grooves on the left wall of the refrigerator;
- place the short side with bracket in the corresponding groove on the right wall of the refrigerator;
- turn the bracket downwards to fix it into the groove.

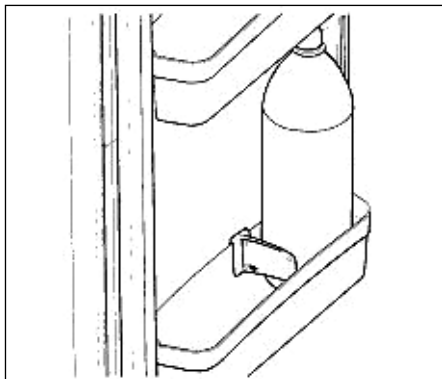
To move a rack, turn the bracket upwards and remove the rack. Place the rack at the required height in the way described above.

Securing products for driving

The fitting racks in your refrigerator have a system for you to secure products while driving. The system consists of a simple click-and-slide plastic strip. To secure products on the rack while driving, push the plastic strip as tightly as you can against the products on the rack. In the storage space on the inside of the refrigerator door, there are two unique Thetford bottle slides (see illustration) The slides prevent bottles from sliding around during driving. Push the slide against the products in the door or place the products between the bottle slide .



Fitted Equipment



Freezer compartment

Important!

- The freezer compartment is unsuitable as a means of freezing food, the freezer will maintain the temperature of already frozen food
- Use only drinking water to make ice cubes.
- Do not place any other products in the freezer compartment when you are making ice cubes.
- Water freezes fastest with the thermostat at the highest setting.

Tip!

- Make ice cubes at night when your refrigerator has more spare capacity.

Automatic defrosting cycle

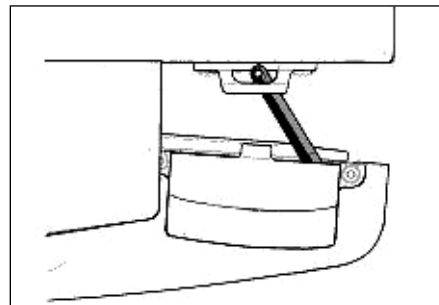
The Automatic (and LCD - Electric) refrigerators that work on the SES system (Smart Energy Selection) are equipped with an automatic defrosting cycle. At the end of each 49 hours of refrigerator operation, the system checks the temperature of the cooling fins at the rear of the refrigerator. If the temperature is too low, the system activates the defrosting cycle: the system switches off the refrigeration, until the rear cooling element has reached the correct temperature again. After this, the timer is set at 49 hours once again and the system resumes normal operation. Each time the refrigerator is switched on or off, the timer is automatically reset to 49 hours.

Note! Regular manual defrosting is not necessary with refrigerators that work on the SES system. The automatic defrosting cycle ensures that there is minimal ice build-up on the cooling element at the rear of the refrigerator.

Door locking mechanism

The refrigerator door has an automatic locking mechanism. The door locks automatically when you press it shut firmly. This automatic locking mechanism also keeps the refrigerator door shut during driving. For some models an additional security device is fitted below the refrigerator. By pushing the locking bar over the pin when the door is closed, you can be sure that the door does not open during your journey.

If you are not going to use the refrigerator for a prolonged period of time, you can use the special storage latch of the door locking mechanism (see illustration) to prevent odours. Rotate the hook through 90 degrees and lock it in place using the strike plate.

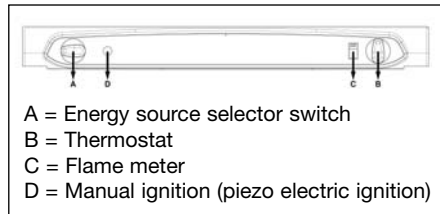


SWITCHING ON THE REFRIGERATOR (control panel)

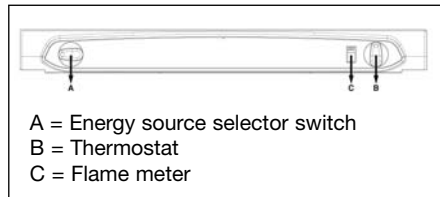
- It is recommended to clean the inside of the refrigerator before you switch it on.
- Let the refrigerator cool for at least eight hours before you place food in it for the first time.

Igniting and starting your refrigerator

Manual ignition:



Electric ignition:



- A. The refrigerator can be powered by the mains (230V), direct current (12V) or liquid gas. Select the energy source that you want by means of the energy source selector switch (A). The switch has four settings:

- direct current (DC) (12V)
- mains supply (230V)
- gas
- switched off

- B. The thermostat controls the refrigerator temperature when the refrigerator is powered from the mains (230 V) or gas. The refrigeration level is indicated by the dots (the bigger the dot, the colder the setting).
- C. The flame meter shows whether the flame is alight. The flame is alight when the red needle of the meter moves into the green area.
- D. Pressing the manual (piezoelectric) starter produces a spark that ignites the flame in the burner.

Electrical operation

The refrigerator can be powered by electricity in two ways:

- DC (12V): Set the energy source selector switch (A) to the refrigerator will now be powered by the battery of your car or camper.

Important! - Always use the gas connection or mains voltage to start up the refrigerator for the first time and to cool it. Powering from the battery of your vehicle is suitable only for maintaining the temperature of the refrigerator and its contents once it has been refrigerated.

- When powered by a vehicle battery (12 V) the refrigerator works without temperature control (i.e. constant operation).
- Mains voltage (230 V): set the power selector switch (A) to
- Set the temperature by means of the thermostat, rotary switch (B). (The bigger the dot, the colder the setting).

Powering with gas

Warning! - Flammable material must be kept away from the refrigerator.

- For selection of gas type, see the information plate inside your refrigerator.
- For the pressure regulator model, see the information plate inside your refrigerator and the table at the end of this booklet.
- The type of gas container and its location must be in compliance with the most recent regulations. Ensure that the unit is installed in a location with good ventilation and make sure that the ventilation openings in the gas container storage location remain open.



Fitted Equipment

- The changing of the gas container must be done outside in the open air and out of reach of any possible sources of ignition.
 - You are strongly advised not to use gas to power the refrigerator while you are driving. If a road accident results in fire, there is a danger of explosion.
 - You are strongly advised not to use gas to power the refrigerator in the vicinity of petrol stations.
1. Open the valve of the gas bottle and the gas taps.
 2. Set the thermostat (B) to the highest level (the biggest dot)
 3. Set the energy source selector switch (A) to 
 4. Ignite the gas flame:

Manual ignition (N80P, N90P, N100P, N112P)

- Press the thermostat (B), and keep it depressed.
- Press the button for manual ignition several times at intervals of between 1 and 2 seconds.
- Release the thermostat when the indicator of the flame meter enters the green area. If it does not enter the green area, repeat the previous step.

Warning! Never keep the thermostat depressed for longer than 30 seconds. If a flame does not appear, wait at least five minutes before trying again. If you fail to observe this rule, there may be an accumulation of gas creating the risk of fire or explosion.

- Set the desired refrigeration level by means of the thermostat (B). (The bigger the dot, the colder the setting)

Electrical ignition (N80E, N90E, N100E, N109, N110E, N145E)

- Press the thermostat (B) and keep it depressed.
- Ignition takes place automatically. You will hear a ticking noise. If ignition was successful, the noise will stop and the flame meter will turn green. Release the thermostat.
- If the flame goes out, ignition will be repeated automatically.
- Set the desired refrigeration level by means of the thermostat (B). (The bigger the dot, the colder the setting)

Switching off the refrigerator

- Set the energy source selector switch (A) to 
- The refrigerator is now completely switched off.

- Use the special storage latch on the door locking mechanism to stop the door from closing. This prevents unpleasant odours and mould in the refrigerator.

Important! If you are not going to use the refrigerator for a prolonged period, close the valve of the gas bottle and the gas taps.

Electrical ignition (N145E).

- Press the thermostat (B) and keep it depressed.
- Ignition takes place automatically. You will hear a ticking noise. If ignition was successful, the noise will stop and the flame meter will turn green. Release the thermostat.
- If the flame goes out, ignition will be repeated automatically.
- Set the desired refrigeration level by means of the thermostat (B). (The bigger the dot, the colder the setting).

Switching off the refrigerator

- Set the energy source selector switch (A) to 
- Use the special storage latch on the door locking mechanism to stop the door from closing. This prevents unpleasant odours and mould in the refrigerator.

Important! If you are not going to use the refrigerator for a prolonged period, close the valve of the gas bottle and the gas taps.

SWITCHING ON THE REFRIGERATOR (control panel)

- It is recommendable to clean the inside of the refrigerator before you switch on the refrigerator.
- Let the refrigerator run for at least eight hours before you place food in it for the first time.

Smart Energy Selection (SES)

When you start up a refrigerator equipped with Smart Energy Selection (SES) you should usually select the AUTO mode. The SES system will then automatically select the best of the three available energy sources.

The system will apply the following priority:

- mains voltage (230V) 
- direct current (12V) 
- liquid gas 

If an energy source becomes available that has a higher priority than the source the refrigerator is currently using (e.g. if your vehicle engine is started), the system will stop using the current energy source and switch to the energy source with the higher priority.

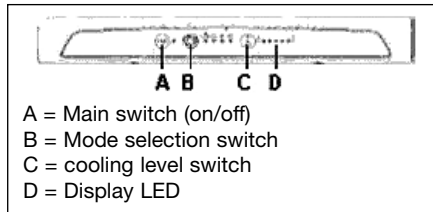
If a fault occurs in one or more of the possible energy sources, the system will not generate an error message while an alternative energy source is still available. The SES system switches over automatically.

If none of the energy sources is available, the LED of the main switch will turn from green to red and flash every second.

SES models additionally allow you to select the desired energy source manually.

Switching on the refrigerator

Important! The memory of the SES system saves every change made to the setting. Consequently, the SES system will start up on each subsequent occasion in the last-selected setting.



- Open the valve of the gas bottle.
- Open the taps of the gas supply.
- Press main switch (A). The LED alongside the main switch will turn green.
- Use the mode selection switch to select the "Auto" function or one of the power supplies that you want. The LEDs will show the option you have selected.
- Set the desired cooling level by means of the cooling level selection switch (C). The LEDs will show the cooling level setting

you have selected.

- Use the main switch to switch the refrigerator on and off. The LED alongside the main switch will turn green. The display LEDs show the most recent settings. After 10 seconds the display LEDs will go out. The LED of the main switch remains green.
- Press the mode selector switch and the display LEDs will show the setting for 10 seconds. Successively pressing the mode selector switch takes you through the menu in the following sequence: AUTO, manual DC (12V), manual gas, manual mains voltage (230V) and back to AUTO. Select either the AUTO option or one of the other power supplies that you want to use. The LEDs show the option you have selected. If you select the AUTO option, the system will choose the most suitable power supply and the AUTO LED and the LED of the power supply chosen by the system will both light up. Ten seconds after release of the mode selector switch, the system will switch off the LEDs. They will go out.
- Use the cooling level selector switch to control the temperature of the refrigerator. When you press the cooling level selector switch, the LED showing the currently set temperature will light up. Every time you press the cooling level selector switch you set the refrigerator one position cooler.



Fitted Equipment

On reaching the coldest temperature, the system will start again at the warmest temperature setting. Ten seconds after release of the cooling level selector switch, the system will switch off the LEDs. They will go out.

Powering with electricity

Powering with electricity can be selected both by the Auto mode and manually.

Auto mode

Mains voltage (230V):

This energy source will be selected if the mains voltage is greater than 200V. This power supply requires a continuous current of 12V to operate the electronic control system.

Direct current (12V) :

The SES system will select 12V powering only if a mains voltage (230V) is unavailable, the vehicle engine is running and a voltage higher than 11V is available.

If a fault occurs during electrical powering (230V or 12V), an error message will not be shown on the display as long as another energy source is available. The system will automatically switch to the available energy source that has the highest priority.

Selecting electrical power manually

Mains voltage (230V):

The LED on the main switch warns you whenever insufficient voltage is available or if a fault occurs. If this happens, the LED will change from green to red and flash once per second.

When sufficient current is available again, or the fault has been resolved, the main switch LED will emit a steady green light again.

Direct current (12V):

The main switch LED warns you whenever your vehicle's engine is not running, or if a fault occurs, or if insufficient voltage is available. If this happens, the LED will change from green to red and flash once per second.

Once the engine is running, or the fault has been resolved, or sufficient voltage is available again, the main switch LED will again emit a steady green light.

NB: If the refrigerator has been manually set to operate at 12V, it will not automatically switch to another energy source when your vehicle's engine is not running. In this case, the refrigerator will stop cooling.

Powering with gas

Powering with gas can be selected both by the Auto mode and manually.

Warning! - Flammable material must be kept away from the refrigerator.

- For selection of gas type, see the information plate inside your refrigerator.
- For the pressure regulator model, see the information plate inside your refrigerator and the table at the back of this booklet.
- The type of gas container and its location must be in compliance with the most recent regulations. Ensure that the unit is installed in a location with good ventilation and make sure that the ventilation openings in the gas container storage location remain open.
- The changing of the gas container must be done outside in the open air and out of reach of any possible sources of ignition.
- It is prohibited to use gas to power the refrigerator while you are driving. If a road accident results in fire, there is a danger of explosion.
- It is prohibited to use gas to power the refrigerator in the vicinity of petrol stations.

Auto mode

The system will select gas operation if:

- mains voltage (230V) is unavailable;
- the vehicle's engine is not running.

Once mains voltage (230V) is available again or the vehicle's engine is running, the system will switch to the available energy source that has the highest priority. If the refrigerator switches from 12V DC to gas operation when it is in auto mode, the system will wait for about 15 minutes before igniting the gas. During this time, however, the gas indicator lamp will come on. The delay is built in to avoid it switching to gas operation whenever you stop to refuel your vehicle. You can cancel the delay by immediately switching the refrigerator off and then on again. If the system selects gas operation, the ignition will be activated automatically. The gas will flow to the burner and be lit by the electric ignition. If the flame goes out, the gas will immediately be lit again.

Selecting gas operation manually

If the flame cannot be lit within 30 seconds, the gas supply will stop and gas mode will be switched off. The LED of the main switch will turn from green to red and flash every second.

The gas mode can be reset only if the refrigerator is switched off. If you switch the

refrigerator on again and the gas mode is still not working, the LED of the manual gas mode will flash to indicate that gas is unavailable.

Important! It is prohibited to use gas to power the refrigerator while you are driving. If a road accident results in a fire, there is a danger of explosion. It is prohibited to use gas to power the refrigerator in the vicinity of petrol stations. If it takes longer than 15 minutes to refuel your vehicle, you should switch the refrigerator off using the main switch (A).

Switching off the refrigerator

- Set the main switch (A) to 0 (off).
- The refrigerator is now completely switched off.
- Use the special storage latch on the door locking mechanism to stop the door from closing. This prevents unpleasant odours and mould in the refrigerator.

SWITCHING ON THE REFRIGERATOR (control panel)

- It is recommendable to clean the inside of refrigerator before you switch on the refrigerator
- Let the refrigerator run for at least eight hours before you place food in it for the first time.

Smart Energy Selection (SES)

When you start up the refrigerator (equipped with Smart Energy Selection (SES)) you should usually select the AUTO mode. The SES system will then automatically select the best of the three available energy sources.

The system will apply the following priority:

- mains voltage (230V) 
- direct current (12V) 
- liquid gas 

If an energy source becomes available that has a higher priority than the source the refrigerator is currently using (e.g. if your vehicle engine is started), the system will stop using the current energy source and switch to the energy source with the higher priority.

If a fault occurs in one or more of the possible energy sources, the system will not generate an error message while an alternative energy source is still available. The SES system switches over automatically.

If none of the energy sources are available, the blue LED flashes every second and an error code is shown in the display.

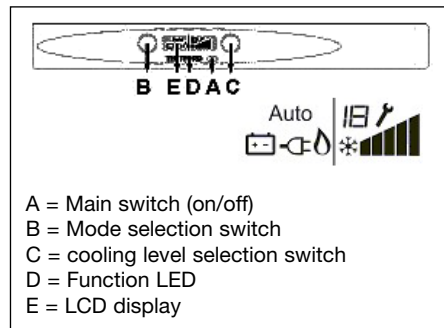
Automatic models additionally allow you to select the desired energy source manually.



Fitted Equipment

Switching on the refrigerator

Important! The memory of the SES system saves every change made to the setting. Consequently, the SES system will start up on each subsequent occasion in the last-selected setting.



1. Open the valve of the gas bottle.
2. Open the taps of the gas supply.
3. Press main switch (A). The function LED will turn blue and all symbols on the LCD display will light up.
4. Use the mode selection switch to select the "Auto" function or one of the power supplies that you want. The LCD display will show the option you have selected.
5. Set the desired refrigerating cooling level by means of the cooling level selection

switch (C). The LCD display will show the cooling level setting you have selected.

- A. Use the main switch to switch the refrigerator on and off. The function LED will turn blue. The display LCD shows the most recent settings. After 10 seconds the LCD display's backlight will go out. The function LED remains blue.
- B. Press the mode selector switch and the LCD display backlight will show the setting for 10 seconds. Pressing the mode selector switch successive times takes you through the menu in the following sequence: AUTO, manual DC (12V), manual gas, manual mains voltage (230V) and back to AUTO. Select either the AUTO option or one of the other power supplies that you want to use. The LCD display shows the option you have selected. If you select the AUTO option, the system will choose the most suitable power supply and the AUTO symbol and the symbol of the power supply chosen by the system will both be shown on the LCD display. Ten seconds after release of the mode selector switch, the system will switch off the LCD backlight.
- C. Use the cooling level selector switch to control the temperature of the refrigerator. When you press the cooling level selector switch, the LCD backlight will light up and show the currently set temperature. Every time you press the cooling level

selector switch again, you set the refrigerator one position cooler. On reaching the coldest temperature, the system will start again at the warmest temperature setting. Ten seconds after release of the cooling level selector switch, the system will switch off the LCD backlight.

Powering with electricity

Powering with electricity can be selected both by the Auto mode (only Automatic fridges) and manually.

Auto mode

Mains voltage (230V):

This energy source will be selected if the mains voltage is greater than 200V. This power supply requires a continuous current of 12V to operate the electronic control system.

Direct current (12V) :

The SES system will select 12 V powering only if a mains voltage (230V) is unavailable, the vehicle engine is running and a voltage higher than 11V is available.

If a fault occurs during electrical powering (230V or 12V), an error message will not be shown on the display as long as another energy source is available. The system will automatically switch to the available energy source that has the highest priority.

Selecting electrical power manually

Mains voltage (230V):

The LED warns you whenever insufficient voltage is available or if a fault occurs. If this happens, the LED will start flashing once per second and an error code is shown in the LCD display

When sufficient current is available again, or the fault has been resolved, the LED will emit a steady blue light again.

Direct current (12V):

The LED warns you whenever your vehicle's engine is not running, or if a fault occurs, or if insufficient voltage is available. If this happens, the LED will start flashing once per second and an error code is shown in the LCD display.

Once the engine is running, or the fault has been resolved, or sufficient voltage is available again, the LED will again emit a steady blue light.

NB: If the refrigerator has been manually set to operate at 12V, it will not automatically switch to another energy source when your vehicle's engine is not running. In this case, the refrigerator will stop cooling.

Powering with gas

Powering with gas can be selected both by the Auto mode (only Automatic fridges) and manually.

Warning! - Flammable material must be kept away from the rear of the refrigerator.

- For selection of gas type, see the information plate inside your refrigerator.
- For the pressure regulator model, see the information plate inside your refrigerator and the table at the back of this booklet.
- The type of gas container and its location must be in compliance with the most recent regulations. Ensure that the unit is installed in a location with good ventilation and make sure that the ventilation openings in the gas container storage location remain open.
- The changing of the gas container must be done outside in the open air and out of reach of any possible sources of ignition.
- It is prohibited to use gas to power the refrigerator while you are driving.
- It is prohibited to use gas to power the refrigerator in the vicinity of petrol stations.

Auto mode

The system will select gas operation if:

- mains voltage (230V) is unavailable;
- the vehicle's engine is not running.

Once mains voltage (230V) is available again or the vehicle's engine is running, the system will switch to the available energy source that has the highest priority if the fridge is in Auto mode.

If the refrigerator switches from 12V DC to gas operation when it is in auto mode, the system will wait for about 15 minutes before igniting the gas. During this time, however, the gas indicator lamp will come on. The delay is built in to avoid it switching to gas operation whenever you stop to refuel your vehicle. You can cancel the delay by immediately switching the refrigerator off and then on again.

If the system selects gas operation, the ignition will be activated automatically. The gas will flow to the burner and be lit by the electric ignition. If the flame goes out, the gas will immediately be lit again.

Selecting gas operation manually

If the flame cannot be lit within 30 seconds, the gas supply will stop and gas mode will be switched off. The LED start flashing every second and an error code is shown in the LCD display.

The gas mode can be reset only if the refrigerator is switched off. If you switch the refrigerator on again and the gas mode is still not working, the LED of the manual gas mode will flash to indicate that gas is



Fitted Equipment

unavailable and an error code is shown in the LCD display.

Important! It is prohibited to use gas to power the refrigerator while you are driving. If a road accident results in a fire, there is a danger of explosion. It is prohibited to use gas to power the refrigerator in the vicinity of petrol stations. If it takes longer than 15 minutes to refuel your vehicle, you should switch the refrigerator off using the main switch (A).

Switching off the refrigerator

- Push the main switch (A).
- The blue LED will go out.
- The refrigerator is now completely switched off.
- Use the special storage latch on the door locking mechanism to fixate the open door. This prevents unpleasant odours and mould in the refrigerator.

MAINTENANCE

Regular maintenance is necessary to ensure the correct functioning of your refrigerator.

Cleaning

Tip! A good time to clean your refrigerator is straight after you have defrosted it.

- Clean the refrigerator with a soft cloth and mild detergent.

- Dust the refrigerator with a soft, moistened cloth.
- Use a brush or soft cloth to remove once a year any dust from the condenser at the inside of the refrigerator.

Important! - Do not use soap or aggressive detergents that are abrasive or soda-based.

- The removable interior components of the refrigerator are not dishwasher proof.

Defrosting

Frost will gradually build up on the condenser of the refrigerator. You should defrost the refrigerator as soon as the frost layer is about 3 mm thick. Frost reduces the refrigerating capacity and life of your refrigerator.

- Remove the ice cube tray and all food.
- Switch off the refrigerator.
- Leave the refrigerator door open.
- Place dry towels in the refrigerator to absorb the water.
- Place trays containing hot water in the freezer compartment.
- After defrosting (when the freezer compartment and condenser are frost-free), remove the towels and the water trays and use a cloth to dry off the refrigerator.

- Switch the refrigerator on again in the way described in section 4.1 ("Igniting and starting your refrigerator").

Important! - Do not use force or sharp objects to remove frost.

- Do not try to accelerate defrosting by using (for example) a hairdryer.

Door locking mechanism

Frost will form in the refrigerator if the door is not closed properly. To determine whether the door closes properly, close the door with a piece of paper between the door and the refrigerator. Pull at the piece of paper. If you feel resistance, the refrigerator door closes properly. If you feel no resistance, the door does not close properly. Perform this test regularly on all four sides of the refrigerator door.

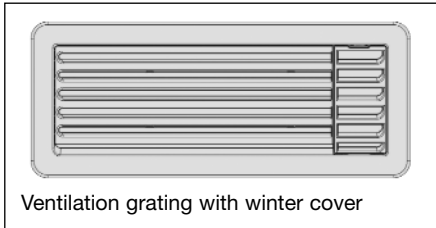
If you find that the door does not close properly, check whether the door locking mechanism keeps the door properly shut.

Winter operation

If you use the refrigerator when the outdoor temperature is below 8°C, install the Thetford vent winter/storage cover on the ventilation grills. The cover protects your refrigerator from excessively cold air. The winter cover is a refrigerator accessory obtainable from your caravan dealer.

Fitted Equipment

Tip! It is advisable to use the winter/storage cover if you are not going to use the vehicle for a long period of time.



IMPORTANT; DO NOT USE THE WINTER/STORAGE COVER IN TEMPERATURES GREATER THAN 8°C AS THIS CAN DAMAGE THE COOLING UNIT AT THE REAR OF THE FRIDGE. Remove the covers and re-fit when placing the vehicle back into storage.

Maintenance of gas equipment

A **qualified service engineer** must maintain and inspect gas and electrical equipment. It is advisable to have this maintenance work performed by a customer service centre. Contact the Customer Service department of Thetford for a list of qualified parties.

Important! European laws covering gas appliances and extractors prescribe observance of the following rules (which are the user's responsibility):

- appliances that run on liquid gas must be inspected before being used for the first time and every year thereafter.
- the gas burner must be cleaned at least once a year or more frequently if necessary.
- If a gas hose is used, it must be checked annually. This hose has a limited life and, thus, must be regularly replaced. Check the hose regularly for cracks, splits and ageing. If in doubt, replace the hose. Pay attention to the maximum life of the hose and replace it in time, as advised by the manufacturer or in conformance with local regulations.
- For replacement, a gas hose approved in accordance with the local regulations must be used. Position the hose so that it can rotate, is not kinked, and will allow
- Due to the limited life of the gas hose, it must be installed so that replacement is possible.

Maintenance checklist

This refrigerator will give you many years of trouble-free use if you simply run through the following checklist regularly:

- keep the refrigerator clean (see section 7.1, "Cleaning");
- defrost the refrigerator as often as is necessary (see section 7.2, "Defrosting");

- check the door closing mechanism regularly (see section 7.3, "Door locking mechanism");
- make sure that the ventilation grills are not blocked;
- Regularly clean the ventilation grills.

Vent screen

The vent has a vent screen to prevent bugs from entering the combustion area of the refrigerators. These vents need to be cleaned regularly to insure a good airflow. When the refrigerator performs poor because of external circumstances such as extreme ambient temperatures, the vents can be removed to improve the airflow and improve the cooling performance of the refrigerators.

STORAGE

If you do not expect to use your refrigerator for a lengthy period, carry out the following actions:

- Remove all food
- Switch off the refrigerator
- Clean the refrigerator as described in Section 7.1 'Cleaning'
- Shut off the gas tap to the refrigerator
- Leave the door of the refrigerator ajar using the special door closure hook (storage position)
- Place the winter protection on the ventilation grill.



Fitted Equipment

TROUBLESHOOTING

If your refrigerator does not refrigerate properly or will not start, run through the following checklist. If this fails to solve the problem, please contact the Customer Service Department in your country (see the addresses at the back of this manual).

- Check whether you have followed the instructions in chapters 4, 5 or 6 ("Switching on the refrigerator").
- Check whether the refrigerator is on a level surface.
- Check whether the refrigerator can be used with an available energy source.

Problem: refrigerator will not work on gas	
Possible cause	Action you can take
a) Gas bottle is empty.	a) Replace the gas bottle.
b) Valve of the gas bottle or one of the shut-off valves is closed.	b) Open the valve of the gas bottle or shut-off valve(s).
Problem: refrigerator will not work on 12V DC	
Possible cause	Action you can take
a) 12V fuse is defective.	a) Fit a new fuse (Camper —> fuse box of camper. Car —> fuse box of car)
b) Battery is empty.	b) Test the battery and charge it.
Problem: refrigerator will not refrigerate sufficiently	
Possible cause	Action you can take
a) Insufficient ventilation for the refrigerator.	a) Check whether the ventilation gratings are covered.
b) Thermostat set too low.	b) Increase the setting of the thermostat
c) Too much ice on the condenser.	c) Check whether the refrigerator door shuts properly and defrost the refrigerator.
d) Too much hot food stored simultaneously.	d) Let the food cool off first.
e) Gas burner is dirty.	e) Have the gas burner cleaned.
f) Door does not shut properly.	f) Check the door closing mechanism.

Control Panel Diagnostics

Refrigerators with a LCD control panel have a special diagnostics area which displays an error code if there is a fault.

- **Fault 1:** AC heater current is measured to be 75% below nominal current.
Action: Contact your dealer or a Thetford Service Centre.
- **Fault 2:** DC heater current is measured to be 75% below nominal current.
Action: Contact your dealer or a Thetford Service Centre.
- **Fault 3:** AC heater is ON when it should be OFF.
Action: Contact your dealer or a Thetford Service Centre.
- **Fault 4:** DC heater is ON when it should be OFF.
Action: Contact your dealer or a Thetford Service Centre.
- **Fault 5:** Senses flame when gas should be OFF.
Action: Contact your dealer or a Thetford Service Centre.
- **Fault 6:** Senses gas output terminal ON when should be OFF.
Action: Contact your dealer or a Thetford Service Centre.

- **Fault 7:** Senses gas output terminal OFF when should be ON.
Action: Contact your dealer or a Thetford Service Centre.
- **Fault 8:** AC mains supply is 20% below nominal.
Action: Your controls are in manual AC mode, but there is no power available. Check if you plugged in the 230V connection, if so the voltage supply on the 230V connection is too low, contact the power supplier.
- **Fault 9:** Gas lockout because flame fails to ignite after 30 seconds.
Action: Your controls are in manual gas mode, but the flame fails to ignite. Check if your gas cylinder is empty or if one of the shut-off valves is closed. Select another energy source. Reset the fridge 3 or 4 times in gas-mode until flame ignites. Contact your dealer or a Thetford Service Centre if problem isn't resolved.
- **Fault 10:** No "engine running" signal is present and control is in Manual DC mode.
Action: Your controls are in manual DC mode and the engine of your vehicle is not running. The refrigerator can only cool on 12V when the engine of your vehicle is running. Start the engine or select a different energy mode.

- **Fault 11:** No energy source is available and control is in AUTO mode.
Action: Your controls are in AUTO mode, but no energy source is available. Start the engine, connect the 230V supply or open the gas supply and reset the refrigerator by turning it off and on again.
- **Fault 12:** Contact your dealer or a Thetford Service Centre.
- **Fault 13:** Thermistor fails; control automatically switches to Backup mode (BOS).
Action: Check if the connector above the fin on the inside of the cabinet is correctly plugged in. If so contact your dealer or a Thetford Service Centre.
- **Fault 14:** Display Board and Power board lost communication with each other.
Action: Contact your dealer or a Thetford Service Centre.



Fitted Equipment

GUARANTEE, CUSTOMER SERVICE AND LIABILITY

Guarantee

Thetford B.V offers the end users of Thetford refrigerators a three-year guarantee.

In the case of defects within the guarantee period, Thetford will repair or replace the product. In this instance, the costs of replacement, labour costs for the replacement of defective components and/or the costs of the parts themselves will be paid by Thetford.

1. To make a claim under this guarantee, the user must take the product to a Service Centre recognised by Thetford. The claim will be assessed here.
2. If components are replaced during repair under guarantee, these become the property of Thetford.
3. This guarantee does not prejudice current consumer protection law.
4. This guarantee is not valid in the case of products that are for, or are used for, commercial purposes.
5. No claim under the guarantee will be accepted in the following circumstances:
 - the product has been improperly used or the instructions in the manual have not been followed

- the product has not been installed in accordance with the instructions
- alterations have been made to the product
- the product has been repaired by a Service Centre not recognised by Thetford
- the serial number or product code have been changed
- the product has been damaged by circumstances outside the normal use of the product

Liability

Thetford is not liable for loss and/or damage caused directly or indirectly by use of the refrigerator.

ENVIRONMENT

Refrigerators manufactured by Thetford B.V. are PCB-free. Most of the refrigerator is recyclable.

If the refrigerator has reached the end of its service life, contact your local waste processing company to dispose of the refrigerator in an environment-friendly way.

Energy-saving tips

- Install the refrigerator and switch it on about 12 hours before you put anything in it.
- Do not expose the refrigerator to direct sunlight.
- At an ambient temperature of approximately 25°C you can let the refrigerator operate at the middle position of the thermostat (both with gas operation and mains voltage).
- Store foods that have been pre-cooled.
- Open the door only briefly when you take things out of the refrigerator.
- Defrost the refrigerator regularly.

STOVES HOBS, GRILLS AND OVENS

PLEASE READ THE MANUFACTURERS INSTRUCTIONS BEFORE OPERATING THE APPLIANCE

WARNING: When you are cooking it is essential to provide additional ventilation such as opening windows near the grill, cooker and oven.

WARNING: When using cooking or heating appliances, surfaces and handles may become hot. Care should be taken and if necessary hand protection used.

WARNING: Extra care should be taken when accessing the locker above the hob especially whilst the hob is in use. Always be aware when opening the locker door objects could fall out onto cooking pans causing injury.

BURNER IGNITION

The hotplate lid must be open for the hotplate, grill or oven burners to ignite.

The ignition should not be operated for more than 15 seconds. If, after 15 seconds the burner has not lit, stop operating the ignition, open the compartment door and wait at least 1 minute before attempting to ignite the burner.

In the event of the burner flames being accidentally extinguished, turn off the burner control and do not attempt to re-light the burner for at least 1 minute.

SPARE PARTS

When ordering spare parts, please give the following information so the appliance can be correctly identified:

1. The name of the appliance from the fascia, and its colour.
2. The model number and the serial number of the appliance (from the data badge).

BE SAFE - NOT SORRY

Warning: Good ventilation is essential to the continuing safe operation of all gas appliances. Do not allow any ventilation openings to become accidentally or deliberately blocked.

Keep all flammable materials (such as curtains, furnishings, towels and clothing) away from the appliance.

Parts of the appliance may be hot during or immediately after use. Allow sufficient time for the appliance to cool after switching off.

When opening the appliance door, take care to avoid skin contact with any steam which may escape from the cooking.

Do not use aluminium foil to cover the grill pan, or put items wrapped in foil under the grill as this can create a fire hazard.

Fitted Equipment

Do not use the oven with the door inner glass panel removed (glass oven doors only).

If the cooker has a storage compartment below the oven, this should only be used to store oven furniture. Do not store any flammable materials in this compartment.

When cooking with fat or oil, never leave unattended.

Turn pan handles inwards so they are out of reach of children and cannot be caught accidentally.

Glass lids may shatter when heated, turn off all burners before shutting the lid.

Models without ignition button: For safety reasons, we recommend the use of a hand held spark ignitor or gas lighter to ignite the burner, rather than a match or taper, which could allow burning debris to fall behind the appliance.

When you have finished cooking, check that all controls are in the off position.

THE HOB

Caution:

- Do not use foil on the hob, as it creates a fire hazard
- Glass lids may shatter when heated, turn off all burners before shutting the lid
- Note: When positioning the pan support, ensure that the fingers are central to the burners (Fig 1).



Fitted Equipment



Always use the most appropriate size of burner for the pan you wish to use. Use pans with a flat base of minimum 100mm/4 ins diameter, and maximum 200mm/8 ins diameter, which are stable in use. Avoid old or misshapen pans as these may cause instability.

Important: Any spillage of liquid should be cleaned away immediately to reduce the risk of fluid entering the appliance.

Ignition - Push in the control knob and turn anticlockwise to the large flame symbol. Keep the knob depressed, and press the ignition button (if fitted), or use a hand held spark ignitor or gas lighter. The knob must be held in for 15-20 seconds before releasing.

ELECTRIC HOTPLATES

Before using for the first time, prime the hotplate - switch it on without a pan to harden and burn off the coating. Use a medium-high setting for 3 - 5 minutes. A non-toxic smoke may occur.

To switch on, turn the hotplate control knob to the required setting.

The high speed hotplate ring (if fitted) is identified by its central red spot - this ring has a faster response time.

THE GRILL

- Note: The door must be open when the grill is used.
- Caution: When the grill is being used, accessible parts may be hot; young children should be kept away.
- Never cover the grill pan or grid with cooking foil, or allow fat to build up in the grill pan as this creates a fire hazard.
- Keep all flammable material away from the appliance.

To light the grill

Push in the control knob and turn anticlockwise to the large flame symbol. Keep the knob depressed, and press the ignition button (if fitted), or use a hand held spark ignitor or gas lighter. The knob must be held in for 15-20 seconds before releasing.

Detachable grill handle (if supplied)

Place the handle (shield uppermost) over the edge of the grill pan at the recess and slide along to position centrally between the two locator bumps. To remove the handle, place the grill pan down, and lift the handle slightly as you slide it along the recess.

Using the grill

Push in the grill pan until it locates centrally under the grill burner

There are three different grilling positions as the trivet can be inverted to give a high or low position or it may be removed.

1. The high trivet position is suitable for toasting bread.
2. The low trivet position is suitable for grilling all types of meat.
3. With the trivet removed the food is placed directly on the base of the grill pan, eg; when cooking dishes such as whole fish.

Always preheat the grill for 3 minutes for best results.

When you have finished grilling, check the control knob is in the off position.

THE OVEN

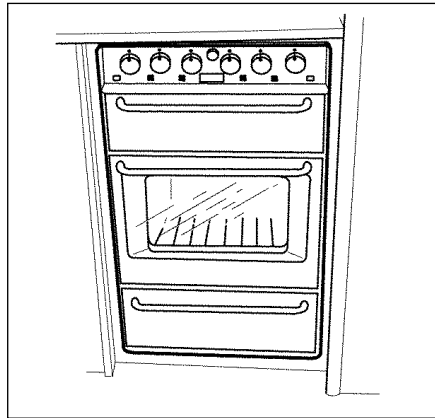
Caution: When you are cooking, keep children away from the vicinity of the oven.

- **Important:** A safety device stops the ignition being used when the oven door is closed.
- Do not use foil on the oven shelves as this creates a fire hazard, and can hinder circulation of heat.
- Keep all flammable material away from the appliance.

To light the oven

1. Open the oven door and turn the control knob anticlockwise to the required gas mark. Push in and hold in the control knob, and either press the ignition button (if fitted) or use a hand held spark ignitor or gas lighter.
2. Once the burner has lit, close the oven door and hold the knob in for 15-20 seconds.
3. If the flame goes out, the flame sensing device cuts off the gas supply to the burner. To light the oven again, wait for 3 minutes then repeat the above procedure.

To turn off - Push in the control knob and turn clockwise.



Preheating

The oven must be preheated for 10 minutes when reheating frozen or chilled food, and we recommend preheating for all yeast mixtures, batters, soufflés and whisked sponges.

Using the oven

The shelf positions in the oven can be altered. If you prefer darker cooked results, cook on a higher shelf. For paler results use a lower shelf.

The cake tray and roasting tin that are supplied with this appliance are the largest which can be used for good results and even baking. Extra shelves, tins or trays can be ordered from your supplier.

Place food items on the tray and position the tray on the centre of the shelf, leaving one clear shelf position between shelves to allow for circulation of air.

CLEANING

Caution: Any cleaning agent used incorrectly may damage the appliance.

Always let the appliance cool before cleaning.

Some cooking operations generate a considerable amount of grease. This combined with spillage can become a hazard if allowed to accumulate on the appliance through lack of cleaning. In extreme cases this may amount to misuse of the appliance and could invalidate your guarantee.

Do not use caustic pastes, abrasive cleaning powders, coarse wire wool or any hard implements as they will damage the surfaces.

All parts of the appliance can be safely cleaned with a cloth wrung out in hot soapy water.

Burner caps and heads

Important: Allow burners to cool before cleaning.

Caution: Hotplate burners can be damaged by soaking, automatic dishwashers (or dishwasher powders/liquids), caustic pastes, hard implements, coarse wire wool and abrasive cleaning pastes.



Fitted Equipment

For the burners to work safely, the slots in the burner head, where the flames burn, need to be kept clear of deposit. Clean with a nylon brush, rinse and dry thoroughly.

Clean with a mild cream cleaner eg; Cif, or use a moist soapy Brillo pad.

Note: Fixed burners (if fitted): Some versions incorporate fixed burners. These burners are secured to the hob with 2 screws. Fixed burners must be cleaned whilst in position. Make sure that the gap between the burner and the hotplate does not become blocked with grease.

Glass parts (if fitted)

DOOR PANELS, FACIA PANEL,
HOTPLATE LID

Do not use abrasive cleaners or polishes. Use a mild cream cleaner, eg; Cif. Rinse thoroughly and dry with a soft cloth.

The inner door glass panel can be removed for cleaning; open the door wide, hold the bottom and top edges and slide out. When replacing the glass panel, hold it level and straight with the grooves in the door trims before sliding back in.

Painted, plastic and gold coloured parts

DOOR FRAME & HANDLES, CONTROL
KNOBS

Only use a clean cloth wrung out in hot soapy water.

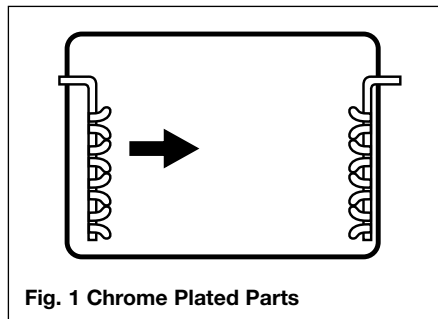


Fig. 1 Chrome Plated Parts

Vitreous enamel parts

GRILL PAN, HEATGUARD, OVEN/GRILL
COMPARTMENT(S), HOB SPILLAGE WELL,
PAN SUPPORTS

Use a mild cream cleaner. Look for one that has the Vitreous Enamel Council's recommendation seal, eg; Cif.

Chrome plated parts (Fig 1)

GRILL GRID, SHELVES, SHELF RUNNERS

Do not use abrasives or polishes. Use a moist soap pad, eg; Brillo. Shelf runners can be removed for cleaning. Grasp the runners and slide out of the hanging holes as shown in fig 1.

Stainless steel surfaces (stainless steel models only)

Only use a clean cloth wrung out in hot soapy water, and dry with a soft cloth. Do not use undiluted bleach or any products containing chlorides as they can permanently damage the steel.

Some foods are corrosive, eg; vinegar, fruit juices and salt, and they can mark or damage stainless steel if they are left on the surface for any length of time. Wipe any spillage immediately.

Sharp objects can mark the surface of stainless steel but will become less noticeable with time.

Electric hotplates

**Important: Ensure that elements are
switched off and cool before cleaning**

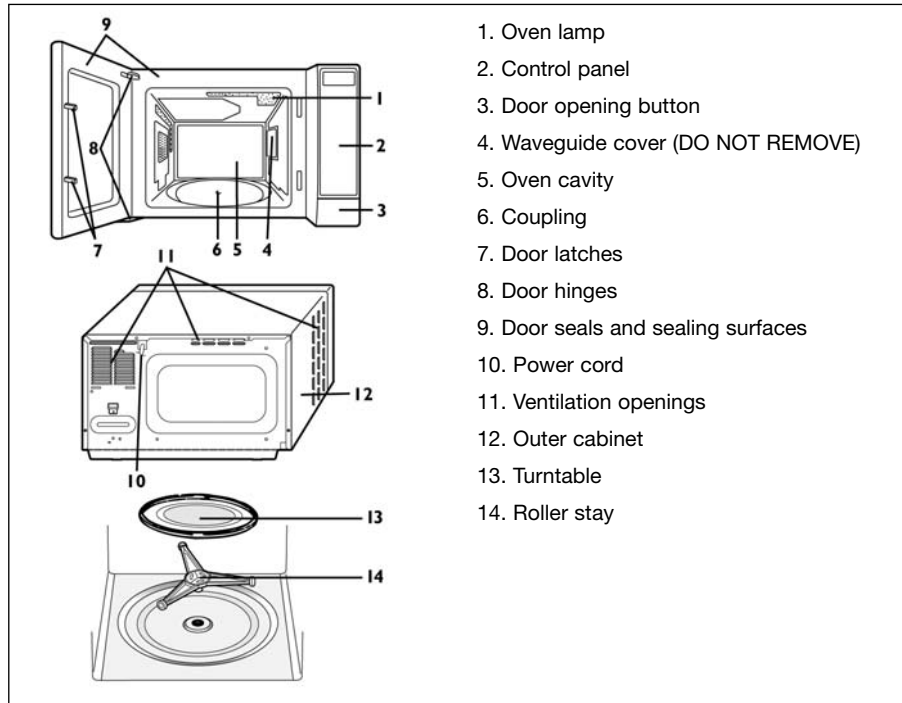
For normal cleaning use a clean damp cloth. For heavy cleaning, use a clean damp cloth or scouring pad with a cream cleaner.

Follow the circular grooved pattern on the hotplate. Rinse off any cleansing agent thoroughly, then switch on to a low-medium setting for few minutes to dry. When cleaning take care to avoid the red dot on the high speed hotplate (if fitted).

SHARP R247 MICROWAVE OVEN

Please refer to the appliance manufacturers handbook regarding: - OPERATION, COOKING ADVICE, AFTERCARE and GUARANTEE

WARNING: THE DOOR, OUTER CABINET, OVEN CAVITY, TURNTABLE AND DISHES WILL BECOME VERY HOT DURING OPERATION. TO PREVENT BURNS, ALWAYS USE THICK OVEN GLOVES.



ELECTRICAL CONNECTION

- Do not allow water to come into contact with the power supply cord or plug.
- Insert the plug properly into the socket.
- Do not connect other appliances to the same socket using an adaptor plug.
- If the power supply cord is damaged, it must be replaced by a Sharp approved service facility or a similarly qualified person to avoid a hazard.
- When removing the plug from the socket always grip the plug, never the cord as this may damage the power supply cord and the connections inside the plug.
- If the plug fitted to your oven is a rewirable type and in the event of the socket outlet in your home not being compatible with the plug supplied, remove the plug properly (do not cut off).
- If the plug fitted to your oven is a non-rewirable type and in the event of the socket outlet in your home not being compatible with the plug supplied, cut-off the mains plug.
- Refit with a suitable type, observing the wiring code given in 'To replace the mains plug' on page 34 of the SHARP user instructions.



Fitted Equipment

IMPORTANT SAFETY INSTRUCTIONS PLEASE READ CAREFULLY AND KEEP FOR FUTURE REFERENCE

OVEN USE:

- THE OVEN IS FOR DOMESTIC FOOD USE ONLY.
- NEVER OPERATE THE OVEN WHEN EMPTY.
- DO NOT LEAVE OR STORE ANYTHING INSIDE THE OVEN WHEN NOT IN USE.
- NEVER ATTEMPT TO USE THE OVEN WITH THE DOOR OPEN. IT IS IMPORTANT NOT TO FORCE OR TAMPER WITH THE DOOR SAFETY LATCHES.
- NEVER OPERATE THE OVEN WITH ANY OBJECT CAUGHT IN THE DOOR.
- DO NOT INSERT FINGERS OR OBJECTS IN THE HOLES OF THE DOOR LATCHES OR AIR-VENT OPENINGS AS THIS MAY DAMAGE THE OVEN AND CAUSE AN ELECTRIC SHOCK.
- IF WATER OR FOOD DROPS INSIDE THE AIR VENT OPENINGS SWITCH OFF THE OVEN IMMEDIATELY, UNPLUG IT AND CALL A SHARP APPROVED SERVICE FACILITY. (SEE PAGE 34 OF THE USER INSTRUCTIONS).

- NEVER MOVE THE OVEN WHILE IT IS OPERATING.
- NEVER PLACE ANY OBJECT SUCH AS A TEA TOWEL, ORNAMENT, RECIPE BOOK ETC IN ANY OF THE AIR GAPS BETWEEN THE MICROWAVE AND THE INSIDE FACE OF THE MICROWAVE

CABINET. CLEAR AIR GAPS AT THE TOP, BOTTOM AND BOTH ENDS ARE ESSENTIAL TO THE EFFICIENT OPERATION OF THE MICROWAVE.

PACEMAKER: IF YOU HAVE A HEART PACEMAKER, CONSULT YOUR DOCTOR OR THE PACEMAKER MANUFACTURER PRIOR TO OVEN USE.

MICROWAVE OVEN If factory fitted the specification is:		
Make		SHARP
Model		R247
Power supply		SINGLE PHASE 230-240V, 50Hz,
Microwave	Power Consumption	1.21kW
	Input power	5.2A
	Output Power	800W (IEC 60705)
	Frequency	2450 MHz
Outside dimensions		460(W) x 275(H) x 360(D)mm
Cavity dimensions		322 (W) x 187(H) x 336 (D)mm*
Oven capacity		20 litre*
Cooking uniformity		Turntable diameter 272mm
Weight		Approx 12kg
* Internal capacity is calculated by measuring maximum width, depth and height. Actual capacity for holding food is less. If fitting a Microwave DIY we recommend you purchase the above specification.		

Fitted Equipment

SOME MODELS MAY BE FITTED WITH A DAEWOO MICROWAVE OVEN

If factory fitted the specification is:

Make		DAEWOO
Model		KOR-63F7/63F7GR/63F7MY/63F7/SL
Power supply		230V-50Hz, SINGLE PHASE WITH EARTHING
MICROWAVE	POWER CONSUMPTION	1000 W
	OUTPUT POWER	700 W (IEC705)
	FREQUENCY	2450 MHz
OUTSIDE DIMENSIONS		465 x 279 x 364mm
CAVITY DIMENSIONS		290 x 220 x 306mm
NET WEIGHT		APPROX 12.5 Kg
TIMER		35 MIN. DUEL SPEED
POWER SELECTIONS		7 STAGES
If fitting a Microwave DIY we recommend you purchase the above specification.		

ADVISORY NOTE FOR USERS OF A MICROWAVE OVEN

Microwave Ovens were originally introduced to re-heat pre-cooked pies etc. Over the years people started using them for re-heating ready made meals and now for they are used for cooking small amounts of food.

Most small microwaves, and some large microwaves, cease to cook the food when the microwave starts to overheat. This often occurs when batches of food are cooked consecutively.

Overheating is caused by a number of factors: -

- The heat generated within the Microwave.
- The Heat generated by an adjacent Oven, Hob or Fridge/Freezer, Radiator etc.
- The Heat generated in the environment due to the heating system and/or lack of ventilation etc.
- The mounting of the microwave in a housing.

It has been proven in independent tests that even when placed on a worktop in an open household kitchen environment a microwave will switch off, or the Magnetron will reduce its output, when the microwave starts to overheat.

This fact is exacerbated in a Caravan or Motorhome as space is at a premium. The microwave has to be placed in a cabinet to



Fitted Equipment

maximize the space available for all the family activities that take place in the modern Caravan and Motorhome. The housing also secures the microwave whilst travelling.

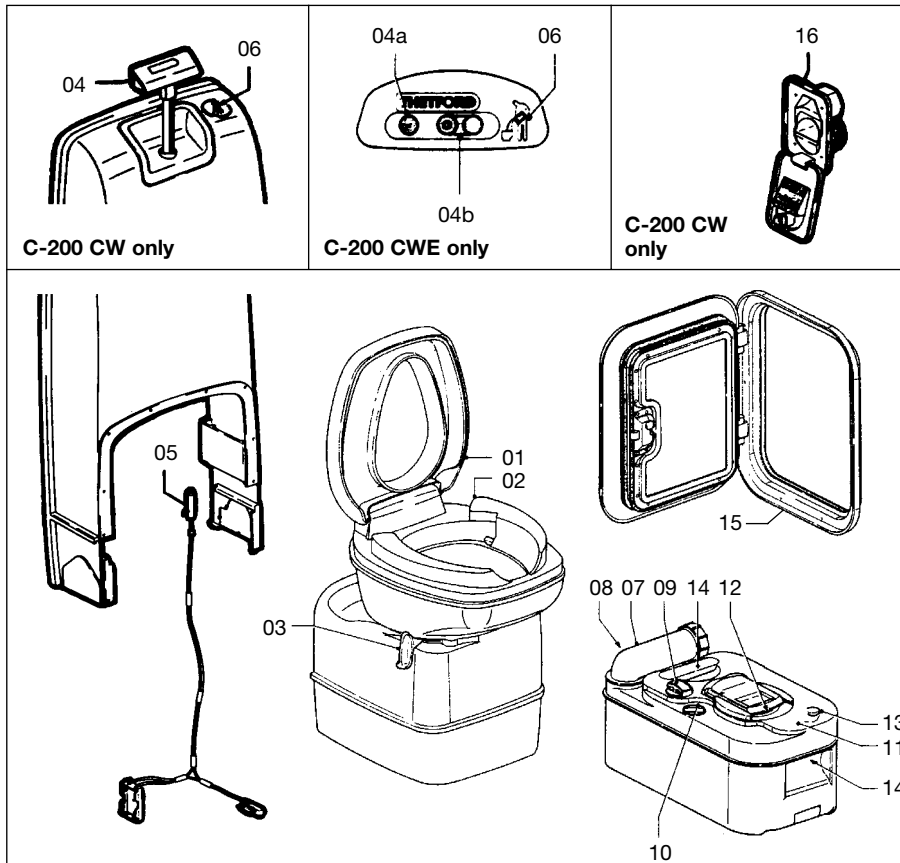
Frequently the above results in the Microwave being mounted above an Oven/Hob or a Fridge/Freezer.

When the Sharp Microwave starts to overheat, the magnetron automatically reduces its output but the Microwave still looks the same. The Light will stay on, the turntable will continue to rotate, the cooling fan will still operate and the timer will continue.

The above means that times quoted in recipes should be used for guidance only.

It is essential, when cooking with any microwave, that the food is examined to ensure that it is fully cooked before eating.

Fitted Equipment



THETFORD CASSETTE C-200 CW (Manual) and C-200 CWE (Electric)

FEATURES

1. Removable seat and cover.
2. Rotatable bowl.
3. Valve blade handle: opens and closes valve blade.
4. Flush-handle activates the flush by lifting and pushing down the handle.
- 4a **C-200 CWE.** Flush button: activates flush.
- 4b **C-200 CWE.** Valve blade buttons: open and close valve blade electronically.
5. Power-supply for the waste-level indicator: two batteries, type: Penlite 1,5V AA alkaline.
6. Waste-level indicator: indicates when holding tank requires emptying.
7. Rotating pour-out spout: makes emptying holding tank easy and convenient.
8. Upper carrying handle
9. Automatic holding tank vent: vents the holding tank when the tank is inserted in the toilet. This prevents under- or overpressure in the holding tank.
10. Valve blade opener.
11. Sliding cover: closes automatically when holding tank is taken out. Guarantees optimal hygiene.
12. Valve-blade
13. Vent button: vents the holding tank to avoid splashing while emptying.
14. Hand grip
15. Access door
16. Waterfill door



Fitted Equipment

CASSETTE C-200 CW AND C-200 CWE

The toilet section of the C-200 includes a rotatable bowl, removable seat and cover, a console with a flush handle/flush buttons, a built in flush-watertank and a waste level warning indicator. Underneath the bowl, the valve blade handle is located.

PREPARING FOR USE

1. Open access door pull retaining clip upwards (fig. 1).
2. Remove holding tank by pulling straight out. When holding tank hits the stop, tilt front end downwards slightly and remove (fig. 2).
3. Position tank vertically and swivel pour-out spout upwards (fig. 3).
4. Remove the cap of the pour-out spout. Add required quantity of toilet fluid through pour-out spout then add approx. 2 litres of water through the spout to cover holding tank bottom. Replace cap and return pour-out spout to its original stored position (fig. 4).

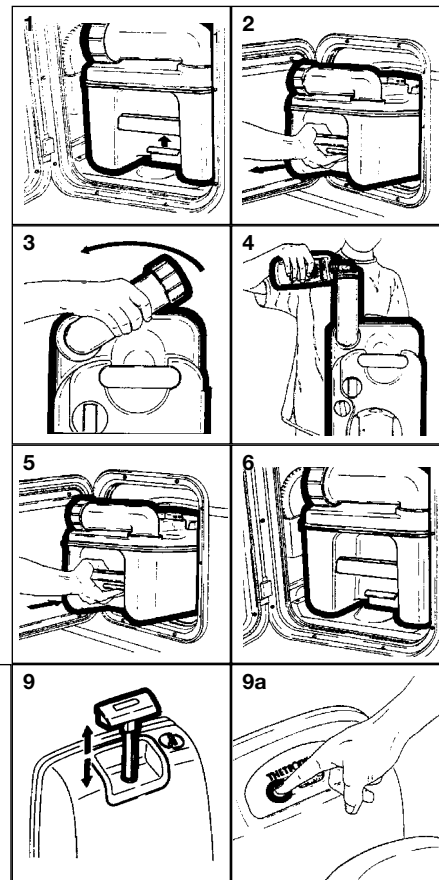
Note: Warmer weather or longer intervals between emptying the waste tank may require additional toilet fluid. Use only Thetford toilet fluid to achieve the best results.

Caution: Never add toilet fluid directly into toilet bowl.

5. Slide the holding tank into position through access door (fig. 5).
6. Make sure the holding tank is secured by the retaining clip. (fig. 6).
7. Open the waterfill door and add 50 ml of Aqua Rinse. Aqua Rinse results in a better flush and improves the hygiene of the toilet. Then fill the watertank with fresh water using a jerrycan or a hose. Tank capacity is 7 litres (fig. 7).

OPERATION

8. Turn the bowl in the most comfortable position (fig. 8).
9. **C-200 CW only:** Before using the toilet it is recommended to flush some water into the bowl by lifting and pressing down the flush handle (fig. 9).
- 9a. **C-200 CWE only:** Before using the toilet it is recommended to flush some water into the bowl by pressing and releasing the flush button (fig. 9a).



Fitted Equipment

10. After use open the blade by turning the blade-handle anti-clockwise (fig. 10).
- 10a. C-200 CWE only: After use open the blade by pressing the 'open' button (fig. 10a).
11. C-200 CW only: To flush, lift the flush handle and press it down (fig. 11). After flushing, close the blade by turning the blade handle clockwise.
- 11a. C-200 CWE only: To flush press the flush button (fig. 9a). After flushing, close the blade by pressing the close button on panel (fig. 11a).

The toilet may also be used with the valve blade open, which allows the waste to pass directly into the holding tank.

The waste holding tank is located underneath the toilet and is removed for emptying from the outside of the vehicle through an access door. A rotating pour-out spout, automatic holding tank vent, air release valve, valve blade, carrying handles and hand grip are incorporated in the waste holding tank. A sliding cover guarantees you optimal hygiene.

EMPTYING THE HOLDING TANK

The holding tank capacity is approx. 17 litres and the tank should be emptied when the waste-level indicator lights up. The waste-level indicator lights up when the holding tank contains more than 15 litres of waste.

CAUTION: Do not allow the holding tank to become overfilled. See trouble shooting section for emergency emptying procedure.

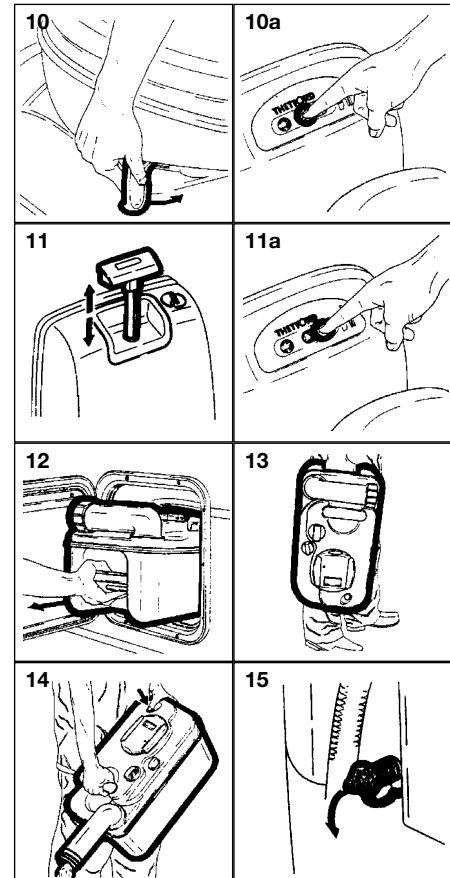
12. Open access door and remove the holding tank. The holding tank can only be removed when the valve blade is closed (fig. 12).
13. Carry the holding tank to a normal household type toilet or other authorised disposal point. Place the holding tank in vertical position and rotate pour-out spout upwards (fig. 13).
14. Remove the spout cap. Grasp unit by upper carrying handle nearest to pour-out spout. Place other hand on upper rear hand grip so that vent button can be depressed with the thumb while emptying. This ensures a smooth outflow of the tank contents. (fig. 14).

Note: Only depress the vent button when pour-out spout is pointed downwards.

Rinse the holding tank with clean water. For preparing for use again, see steps 1 to 7.

CLEANING AND MAINTENANCE

The lipseal and the seal of the automatic vent are made of rubber and therefore these parts need regular maintenance (depending on frequency of use, once or twice a month).



Fitted Equipment

Lipseal: Remove the sliding cover. Open the valve-blade by turning the blade-opener knob anti-clockwise. Clean the seal with water. Dry the seal and grease with silicone spray/oil or vegetable oil.

Seal of automatic vent: Turn the automatic vent 60° anti clockwise and remove gently. Clean the seal with water. Dry the seal and grease with silicone spray/oil or vegetable oil.

To clean the holding tank, empty the tank, and rinse with clean water. Use a mild soap to clean toilet bowl, seat and cover, as well as exterior of toilet unit and holding tank.

NOTE: Do not use strong household detergents or cleaners that contain chlorine, solvents or acid contents.

WINTERING/STORAGE

The Thetford Cassette C-200 CW/CWE is easily winterised for storage.

Empty remaining fresh water into the bowl by activating the flush handle up and down (C-200 CW) or by pressing the flush button (C-200 CWE).

Once pump has been cleared and water flow has stopped completely, release into waste tank. Remove waste tank and empty contents in normal way.

To evacuate any remaining water from the fresh water tank. place a container

underneath the drainplug and remove drainplug.

When procedure has been completed replace drainplug and waste holding tank (fig. 15). Clean the seals and grease them after drying (see cleaning and maintenance).

Leave the blade of the holding tank open. Do not replace cap on the pour out spout, to ventilate the holding tank. (Also grease the seal of the pour out spout cap.)

COLD WEATHER USE

The toilet can be used in cold weather conditions provided that the toilet is in heated surroundings. If this is not the case, you can use a nontoxic antifreeze (propylene glycol) or an antifreeze such as those used in car radiators. Add the antifreeze to the water in the tank. Add the quantity specified in the instructions, paying due regard to the safety instructions.

HIGH ALTITUDE AND WARM WEATHER USE

Pressure may build up in the holding tank if the tank is not inserted while driving at high altitudes or in warm weather conditions. The automatic holding tank vent will vent the tank when there is over- or under-pressure. High temperatures may require additional Thetford toilet fluid.

THETFORD WARRANTY

1. The Thetford Cassette is warranted for one year from the date of purchase, please fill in and return the warranty card.
2. The warranty covers replacement of defective or flawed parts and the inadequate performance of the toilet.
3. In case of a defect apply to an original dealer or Thetford Service Centre with proof of purchase.
4. Defects, which in our judgement occurred from misuse, negligence or accident, are not covered by the warranty. In addition, the warranty does not apply if the product is installed or handled improperly or if other than the prescribed toilet fluids have been used or if the product has been altered in any way or has been repaired by unqualified persons, or if the serial number and/or date has been altered or removed.
5. Should the original buyer wish to return to us parts believed to be defective, the parts should be sent prepaid. If we find the parts defective and covered by warranty, they will be repaired and returned. If warranty does not apply or has expired, a nominal charge will be made. Any transport costs are for the account of the owner.

- Before returning product or parts they should be properly cleaned, in order to carry out inspection and repair.
- No other warranty is given and no personal representative is authorised to make any warranty other than that is contained herein.

CARAVANS WITH TV INLET IN BATTERY BOX

Models equipped with TV points in the battery box can be attached to a pitch facility:

- Connect pitch output to input in battery box being careful not to trap aerial lead in battery box door.
- At aerial booster position disconnect roof aerial input lead and replace it with the loose end of the cable from the battery box. The internal TV point is now connected to the battery box input.

CARAVANS WITH EXTERNAL BARBEQUE POINT

Models equipped with an external barbeque point can be used to power any gas appliance suitable for the gas used in the caravan, at the working pressure shown on the label in the barbeque outlet box. Please note when using the outlet that the fitted regulator will allow a maximum of 1.5kg per hour of gas to be taken from the gas bottle.

Therefore the consumption of gas from both the appliances within the caravan and the appliance connected to the barbeque point cannot exceed a total of 1.5kg per hour at any one time. If you are in any doubt please consult your dealer for advice. To use point proceed as follows:

- Fit male nozzle from despatch kit to your barbeque or appliance ensuring a gas tight joint. The work should be carried out by a competent person; if in any doubt consult your dealer.
- Open box lid by pulling tab on bottom edge and lifting. Remove red cover cap.
- Insert male nozzle on appliance into female coupling, push firmly until click is felt.
- Open gas locker on caravan, ensure gas bottle tap is open and supply is connected to regulator. Turn isolation tap behind barbeque point to open (so that the tap handle is in line with the flow direction of the gas).
- Returning to barbeque point, turn red knob until it is in line with the flow direction of the gas.
- Light and operate appliance to its instructions.
- When operation of external gas appliance has finished, turn red knob in barbeque box so that it is at right angles to the flow of gas to isolate the appliance.

Fitted Equipment

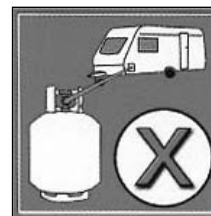
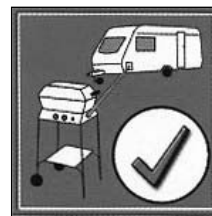
- Release the appliance hose and nozzle by pushing back the collar of the coupling.
- Replace red cover and close lid of barbeque point.

Please note that you cannot open the gas supply until the nozzle has been inserted.

In the interest of safety all external hose lengths should be kept to a minimum and attachments secured correctly.

WARNING: Care should be taken when using the external barbeque point. Never barbeque next to an awning or tent.

WARNING: The caravan barbeque point should only be used as an outlet point for gas, never connect a gas bottle direct to the outlet.



Fitted Equipment

STATUS 315 OMNI-DIRECTIONAL TV AND FM RADIO ANTENNA (model dependant)

OPERATING THE SYSTEM

- Switch on the Power Pack and the red LED will illuminate.
- Check the gain control switch is set to the normal 'NML' position (Switch Up).
- Turn on your television set and tune in. This may be necessary at all new locations.

REMOVING THE ANTENNA

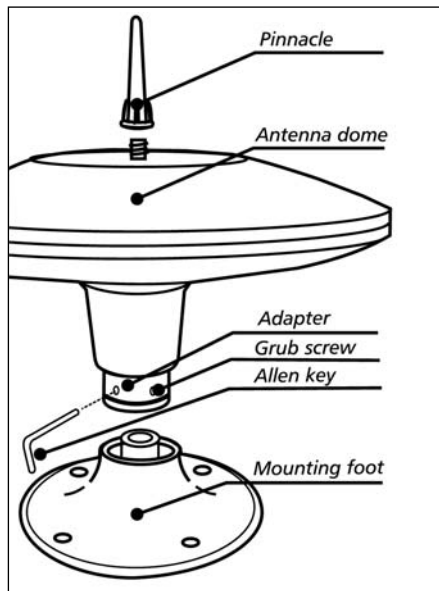
- A permanently fitted Status may be removed if there are severe height restrictions, leaving only the mounting foot in place.
- Unplug the antenna from the Power pack. On the adapter, loosen the two grub screws and lift off whilst carefully feeding out the coaxial cable with the plug attached.
- Push the blanking cap supplied into place to cover central hole

REMOVING THE PINNACLE

This may be necessary should you wish to reduce the overall height of the antenna by 90mm.

- Simply unscrew the Pinnacle and remove. The antenna is designed to remain watertight without the Pinnacle
- To replace, simply screw in and tighten BY HAND

IMPORTANT – The Pinnacle is an integral part of the antenna and critical to its performance. When in use always ensure the Pinnacle is fitted.



STATUS 530 DIRECTIONAL TV AND FM RADIO ANTENNA (model dependant)

Firstly determine the approximate location of the nearest transmitter and whether the signals are horizontally or vertically polarized. For assistance ask your site operator or check antennas in the vicinity

1. Loosen the Mast Locking Collar and Wall Bracket and raise the antenna. Turn the mast to direct the Antenna towards the TV transmitter.

The RED spot on the bottom of the mast indicates the front of the Antenna.

2. When receiving vertically polarized signals, rotate the winder anti-clockwise to cant the antenna through 90°. DO NOT over tighten or use undue force on the winder.

DO NOT cant for vertically polarized signals with the TELESCOPICS EXTENDED

3. Switch ON the Power Pack and the RED LED will illuminate.
4. Check the gain control switch is set to normal – NML.
5. Tune your television to the strongest signal. You may need to adjust the direction of the mast to achieve the best quality picture.

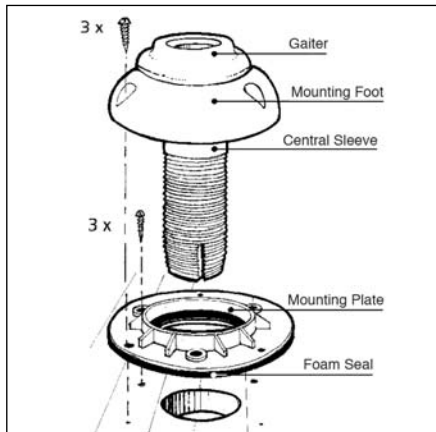
- Secure by tightening the Mast Locking Collar and Wall Bracket

REMOVING THE ANTENNA

A permanently fitted Status can be easily removed leaving only the Mounting Foot and rubber gaiter.

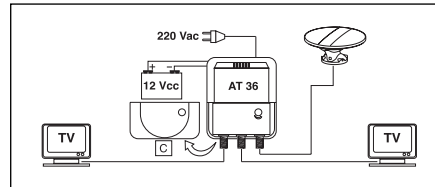
1. Unplug the antenna from the Power Pack.
2. Loosen the Mast Locking Collar and Wall Bracket and lift off whilst feeding out the cable.
3. Push the Blanking Cap supplied into place.

IMPORTANT – The Blanking Cap is a temporary seal and is not for long term use.



WING OMNI-DIRECTIONAL TV ANTENNA (model dependant)

This is a plug and play antenna, only suitable for use with televisions. The pinnacle on the roof cannot be removed.



Fitted Equipment

BEDDING

Sleeping bags and continental quilts can be compressed into small spaces and can be ready to use in minutes.

LOWER SINGLE BEDS ASSEMBLY

(Figs. A & B)

1. Unroll bed slat bundle and place between the recess in both seats.
2. Arrange seat cushions as appropriate.

DOUBLE BED ASSEMBLY

(Fig. C)

1. Grip front of slatted bed and walk backwards until bed is fully extended.
2. Arrange seat cushions as appropriate.

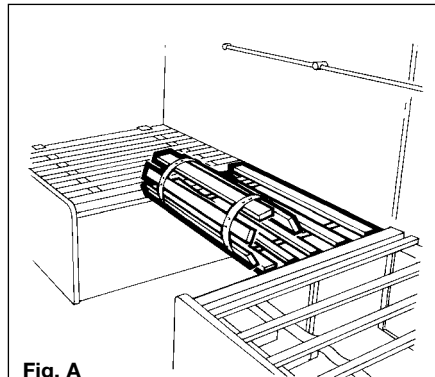


Fig. A

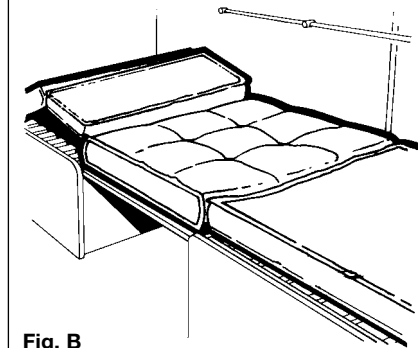


Fig. B

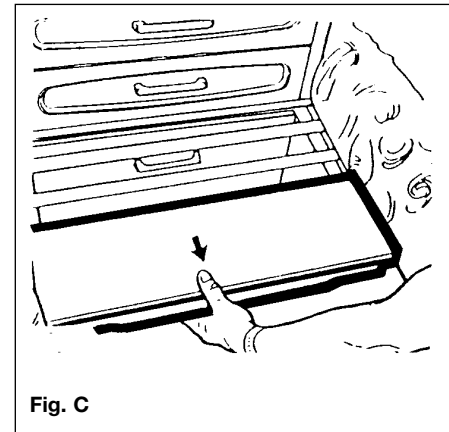
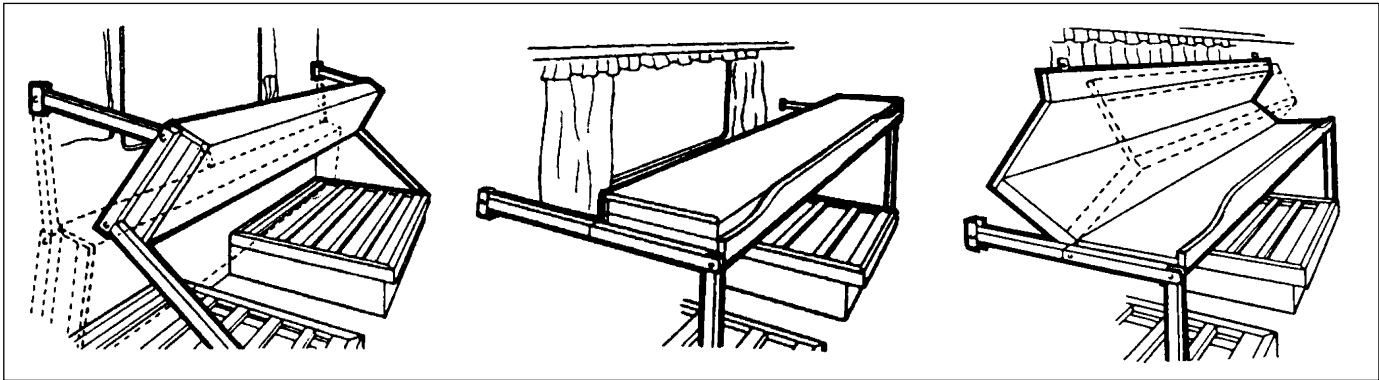


Fig. C



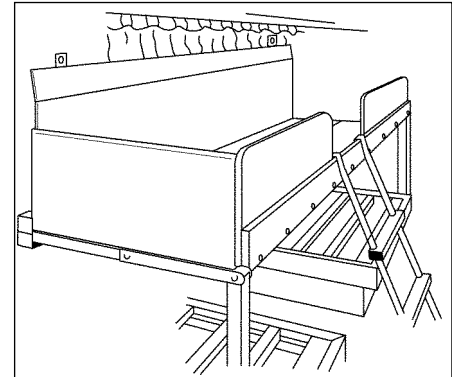
PULLMAN BUNKS

1. Release catches, one at a time.
2. Release press studs on the bed board.
3. Grasp the bunk as shown and pull carefully in direction of arrows.
4. The bunk is designed to automatically move into the correct position.
5. Where a bed board is fitted, unfold and make sure it is secured by press studs when lifted into position. (The bed board is required to protect both the occupant and the window from damage during use of the bunk.)
6. Locate safety boards.
7. Arrange seat cushions as appropriate.

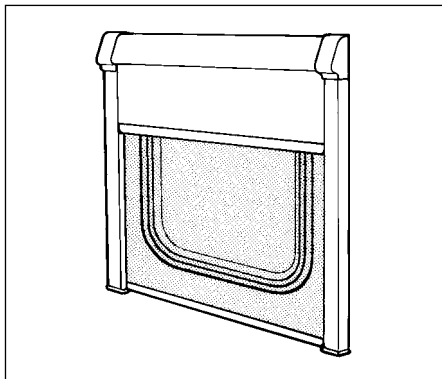
BUNKS ARE DESIGNED TO CARRY A CHILD TO A MAXIMUM OF 70KG (11 STONE)

WARNING: Use upper bunks for sleeping only, with the provided protection against fall out in position

WARNING: Care shall be taken against the risk of fall out when the upper bunks are in used by children especially under 6 years of age, these bunks are not suitable for use by infants without supervision.



Fitted Equipment



KOMFORTROLLO BLINDS (SEITZ)

Blinds and Flyscreens

Flyscreen and blinds operate in the same manner. The flyscreen can only be 'fully up' or 'fully' down, but the blind also has an intermediate position.

To operate, pull down by holding the fingergrip(s), gently ease towards the window to locate the catches. To retract, pull down easing away from the window to release the catches and guide to the required position.

- **ONLY OPERATE BY HOLDING THE FINGERGRIP(S)** - pulling on one side will cause uneven running and snagging.

- **DO NOT ALLOW THE BLIND OR FLYSCREEN TO RE-COIL WITHOUT CONTROL.**
- It is not recommended that blinds and/or flyscreens are left in the down position for long periods or when travelling, as this can result in fatigue of the spring.
- Clean the cassette, side track and fabrics with mild detergent and water.
- Lubrication of mechanism or spring is not required or recommended. However, if components should require cleaning, use only WD40 or similar with fluff-free cloth. Other lubricants may result in damage to fabrics and plastics.

Tension Adjustment

Remove plastic cover (if fitted) to locate tension lugs. The tension lugs have a slot and are located in the cassette on a 'bayonet' principle. Insert screwdriver into slot (ensure a good fit), turn lug clockwise to allow the spring tension to push the lugs just free of the cassette. Keep fingers away from screwdriver tip to avoid accidental injury. Spring can now have more or less tension applied as required.

If in doubt of tension to be applied, release all tension and re-start. In which case, with blind fully wound on the roller, apply 12 revolutions of lug (factory setting).

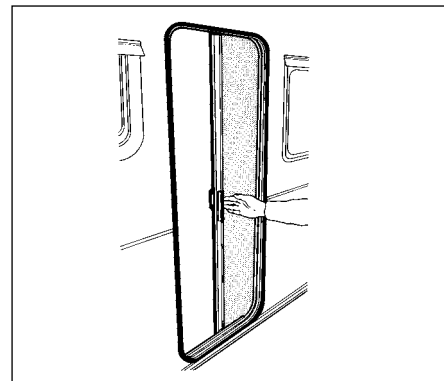
Refitting is a reversal of removal procedure.

For more detailed information, see manufacturer's instructions.

Cassette Blind and Flyscreen

Always hold the end rod in the middle. When closing blinds, slide the end rod of the flyscreen blind on to the end rod of the sun blind and engage. To open the blind push the end rods towards the darkening blind to the edge and disengage the end rods. Now move the end rod of the flyscreen back by hand - do not let it recoil.

DOORSCREEN



When drawing or releasing the doorscreen, care should be taken not to let it spring back freely, this may result in damage to the screen or its fittings.

Fitted Equipment

Always pull the doorscreen close to the centre. It is not advisable to pull close to the top or bottom as this will cause snagging and uneven running.

Caution

When opening or releasing the doorscreen, care must be taken to avoid trapping fingers.

Do not allow the doorscreen to slam open.

SEITZ ENTRANCE DOOR

To open from the outside, pull the opening lever in the door handle.

To open from the inside, pull the opening lever in the recessed handle.

To lock the door from the outside turn the key to the left, to unlock turn the key to the right.

To lock the door from the inside, depress the locking button. To unlock pull the handle.

The window is opened by depressing the button on the catches and turning through 90°, open the pane fully until it locates. To close pull the pane back and close the catches.

The door flynet and blind operate independently by sliding together and engaging.

ROOF LIGHTS

When opening the roof lights, care must be taken to release the locking mechanism as the unit is raised.

Roof lights must be fully closed when towing.

Roof lights provide 12,500mm² of fixed ventilation each.

WINDOWS

To open press the knobs in the middle of the catches and turn through 90°. Swivel the pane open as required.

To close the window, open the window as far as possible and slowly close again, turn the catches through 90° to close.

All opening windows have two catch positions. The first position is for ventilation the second seals the window from ventilation and rain.

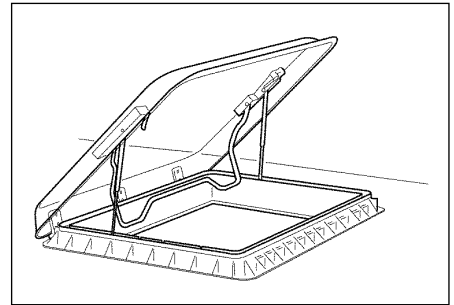
HEKI-2 ROOF LIGHT (SEITZ)

The lift/tilt roof light can be set in 3 positions by means of pneumatic springs.

Position 1 lifts the pane 12mm without allowing rain to enter the caravan.

Position 2 sets the pane to a 150mm opening and locks with a bar.

Position 3 opens the pane through 55°.



A fully adjustable flyscreen and black-out screen are built into the inner frame. The flyscreen can be drawn independently and the black-out screen is variable for partial or full black-out.

Forced ventilation functions via a brush lined duct instead of a ventilated pane.

A cover hood can be fitted for winter protection.

Heki-2 roof lights provide 13,200mm² of fixed ventilation

MINI HEKI ROOFLIGHT

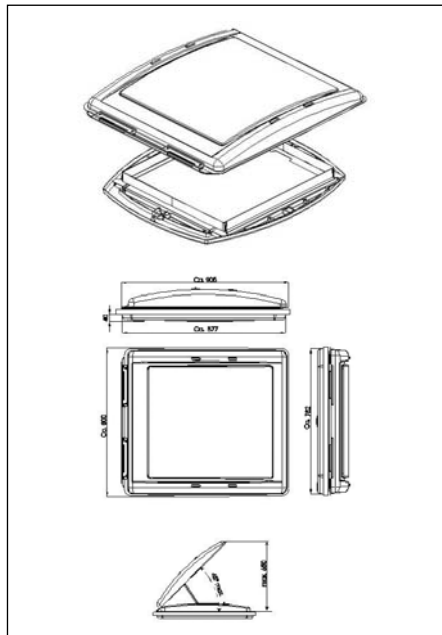
To open depress button and push bar upwards. The rooflight has two open ventilation positions and a fully open position.

The blind and flynet operate independently of each other and are engaged by connecting to each other and sliding.



Fitted Equipment

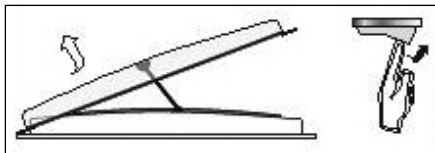
REMISTAR



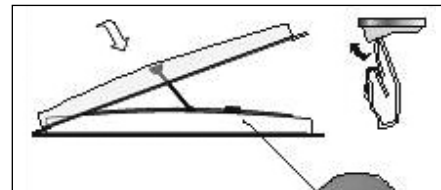
Important notes:

- **Keep the roof light closed and locked when driving**
- **Keep the blind systems open when driving**

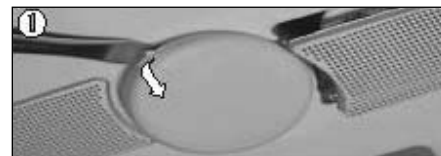
- Never step onto the roof light.
- Never open the roof light when it is heavily raining or hailing.
- Never open the roof light at temperatures below -20°C .
- Before opening, remove snow, ice or dirt.
- **Keep the blinds systems open while driving.**
- **Keep the roof light closed when driving.**
- Before opening, check for obstacles such as branches. While closing no objects or parts of the body mustn't reach the opening. Attention: risk of injury!
 - a) To open the rooflight: Press switch until requested position is reached
At the final position motor stops automatically



- b) For closing the rooflight: Press switch until requested position is reached
To secure completely press the switch until motor stops automatically



- Manual usage in case of electricity failure:
Make sure that no obstacles or parts of the body are in the roof light opening.
1. Detach round cap and remove ventilation grids

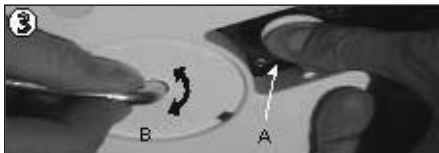


2. Insert crank handle completely and hold tight



Fitted Equipment

- Press button (3 A) for unlocking motor gear: Keep button pressed and turn the crank handle (3 B) for moving closing/opening the rooftop



Attention:

The roof light might close abruptly-

Therefore always hold the crank handle securely as long as the gear is unlocked.

For relocking the motor gear, pull the button (A) down and move the crank handle until gear is locked to the motor gain.

Lighting

Press the balance switch



Fly net functions

Push crossbar of fly net against crossbar of pleated material until it locks. To release blind, push both crossbars against each other and press gently. Guide the fly screen back to the open position.



Sun protection

Push crossbar of pleated material until requested position is reached



Attention: DO NOT allow the blind to spring back as this will cause damage.

MAINTENANCE

Care

Never use aggressive or corrosive cleaners

The acrylic cover and the frame is to be cleaned only with damp cloth and with mild cleaner that does not contain solvents or abrasives.

Take care that water does not get into the motor and into its electrical wiring. The ventilation grids of the inner frame can be removed for cleaning purposes.

All rubber seals should be dusted with talcum powder at least once per year.

The fly net and pleated sunscreen may be cleaned by using a soft brush or a damp cloth.

Retensioning

After demounting the inner frame, the spring of the fly net of blind system can be retensioned (put screwdriver into spring tension clip and turn clockwise -2 times)

The cords of the sun screen system can be retightened by unscrewing the clamps with an hexagon spanner. Retighten the cords by 3-5mm if necessary. You should do this on both cords equally in order to keep the crossbar parallel to the pleated material.

Documents

User Guide and crank should be stored within the vehicle.

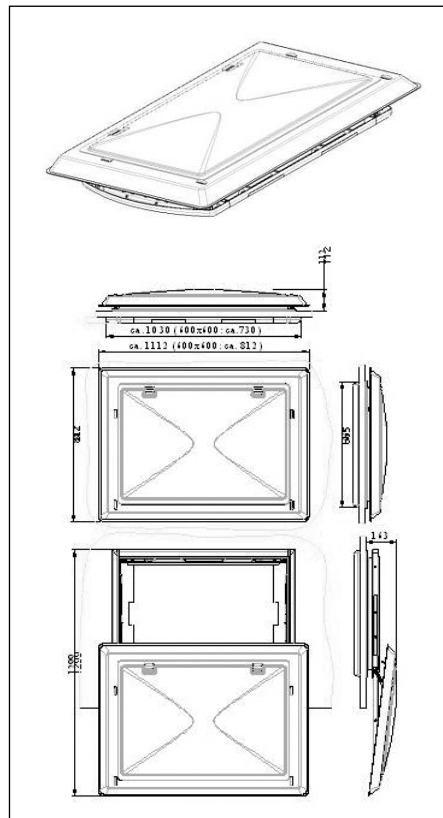
Spares

Spare parts can be bought from your dealer.



Fitted Equipment

REMITOP II



- **Keep the roof light closed and locked when driving**
- **Keep the blind systems open when driving**

OPERATING

- Keep the roof light closed and locked when driving and keep the blind systems open !
- Before opening the roof light, remove snow and dirt and check for obstacles.
- Never open the roof light at temperatures below -40°C.
- Do not open the roof light when it is raining heavily, hailing or snowing !

To open the roof light:

- Unlock the sash locks by pressing on the buttons and simultaneously turning them 90 degrees.
- Push the cover completely upwards with both hands on the sash locks.
- Open the cover until requested position is reached.

To close the roof light:

- Pull the cover with both hands on the sash locks. Then lock them by turning of 90 degrees.

- **Bad weather setting:** The sash lock can be bolted onto the centre recess of the holder screwed onto the frame. The cover is then open approx. 15mm, so that rain cannot enter nor can the wind open the cover.

- **Lighting:** Press the balance switch (not included in delivery) on/off for two lamps

Fly screen blind system:

- For closing push crossbar of fly net against the crossbar of the pleated material. For opening, push both crossbars against each other and press gently.

Attention: Do not allow the blind to spring back as this will cause damage.

Sun protection system:

- Push crossbar of pleated material until requested position is reached.

MAINTENANCE

Care: Never use aggressive or corrosive cleaners.

The acrylic cover and the frame is to be cleaned only with a damp cloth with mild cleaner that does not contain solvents or abrasives.

When cleaning the vehicle take care that water does not get into the vehicle. There is a continuous gap between the cover and the frame that provides fixed ventilation.

The 4 ventilation grids can be removed for cleaning purposes.

The fly net and pleated sun-screen may be cleaned by using a soft brush or a damp cloth.

If you demount the inner frame complete cleaning of the blind systems is possible.

To change the lamps, lift the lighting caps with the help of a screwdriver, the lamps (4x12V/5W) can be changed.

Insert the new lamps - avoid direct contact with the bulbs by using a woollen cloth

The gliding rails are stainless steel. They should be re-greased with silicone from time to time.

Do not leave the blinds in the closed position for prolonged periods of time.

Spare parts for REMItopII can be bought from your dealer.

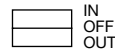
THE OMNIVENT (12V) ROOFLIGHT

The Omnivent is a double glazed rooflight constructed from a synthetic ultra-violet screened material. Its side operating mechanism allows a completely free central opening with built-in fixed ventilation when closed.

Red Switch = Mode of Operation

Induction (IN)

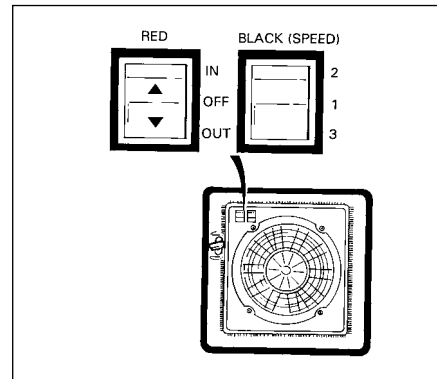
Expel (OUT)



Black Switch = Speed Control

1, 2 and 3

Omnivents give no fixed ventilation when set on induction.



Fitted Equipment

THE B1500S AIR CONDITIONER

HOW TO USE THE AIR CONDITIONER

The air conditioner performance can be improved by taking some simple measures:

- Improve the thermal insulation of the vehicle by closing any opening and by covering any glassed surfaces with reflecting curtains.
- Avoid opening doors and windows unnecessarily.
- Select the most suitable temperature and speed.
- Properly direct the air flaps.

To prevent troubles and minimise risks for people, take the following precautions:

- Always wait some minutes (at least 3) before attempting to turn the air conditioner on, after turning it off, to prevent damage to the compressor;
- Do not obstruct the air inlets and outlets with cloths, paper or other objects;
- Do not introduce your hands or other objects into the openings;
- Do not spray the air conditioner with water;
- Keep flammable substances away from the air conditioner

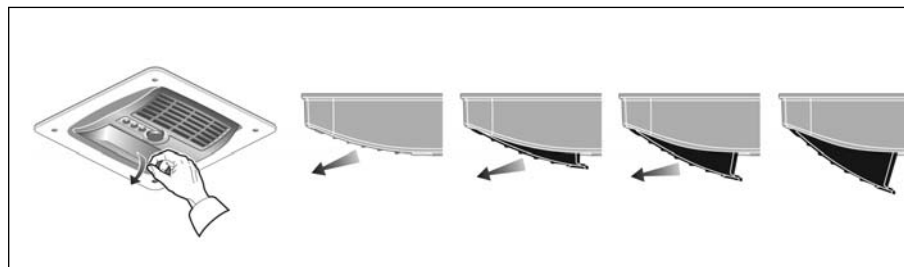
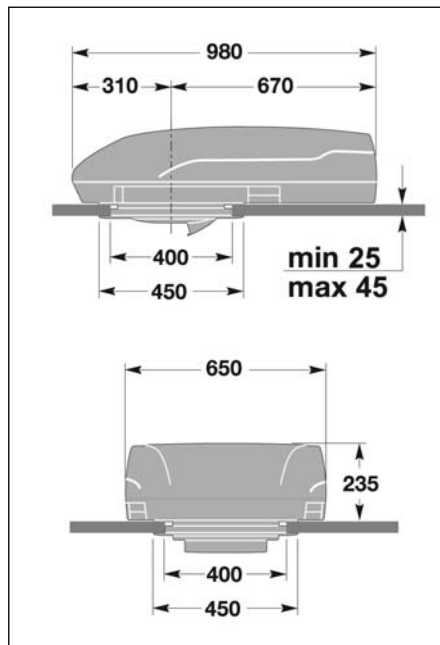
Starting and function selection

	Main Switch	ON-OFF	Position  air conditioner ON Position  air conditioner OFF
	Warm/Cold Dual Switch	Warm-Cold	Position  fresh air Position  warm air
	Thermostat	Air Temperature (18°C-40°C)	By rotating the knob clockwise, temperature increases (max 40°C) By rotating the knob anti-clockwise, temperature reduces (min 18°C)
	Fan Switch	Air Speed	Position  high speed Position  low speed

Adjusting the air direction

Position the air diffusing flaps to direct the air to the desired position.

Technical data



Description	Measurement unit	Model		
		B1100S	B1500S	B1900S
Refrigerant gas (type-quantity)		see data plate		
Refrigerating yield	Watt/h	1000	1500	2000
Cooling consumption	W	500	650	900
Heating capacity	W	800	800	1200
Electrical rating	V-Hz	230-50	230-50	230-50
Protection degree	IP	X4	X4	X4
Conditioned air volume	m ³ /h	310	310	380
Max internal volume of the vehicle (with insulated walls)	m ³	16	20	25
Weight	kg	29	30	33

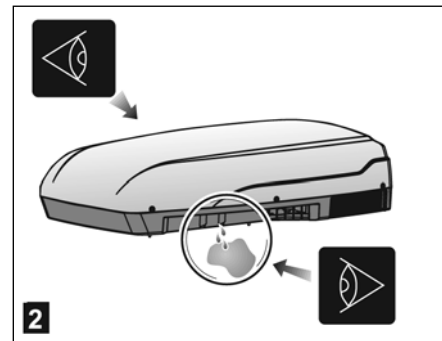


Fitted Equipment

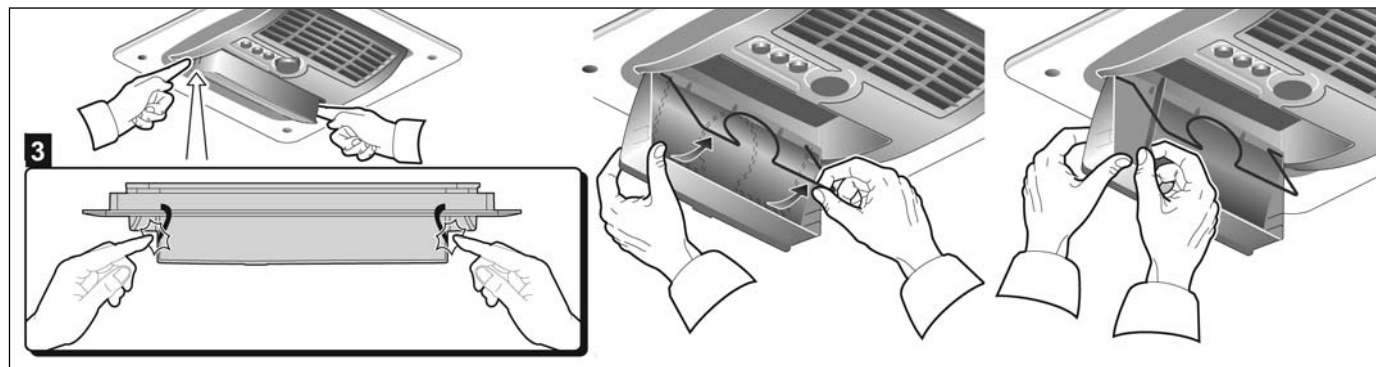
Ordinary maintenance



Cleaning: Periodically clean the air conditioner and remove dust with a damp cloth. When necessary, use a mild detergent. Do not use petrol or solvents.



Checks: Regularly check the air conditioner and make sure that the water outlet holes are not clogged.



Filter cleaning: Periodically carry out this operation; wash the filter with detergent solution and allow to dry before refitting.

Trouble shooting, Maintenance & Recycling



Operations to be carried out by the user



Operations to be carried out by authorised personnel

Problem	Solution														
	Temperature less than 18°C														
	Temperature over 40°C														
	Thermostat wrongly positioned														
	Defective thermostat														
	Switch wrongly positioned														
	Defective heating resistance														
	Refrigerant gas is not enough														
	Damaged compressor														
	Thermal exchange batteries are dirty														
	Defective internal fan														
	Air filter is clogged														
	Defective external fan														
	Water outlet holes are clogged														
	Damaged sealing gasket														
	No power supply														
	Low power supply (less than 200V)														
	Defective capacitor														
	Defective thermal protection														
The air conditioner does not cool sufficiently															
The air conditioner does not heat enough															
No air circulation into vehicle															
Water leaks into vehicle															
The air conditioner does not start															
The air conditioner stops running															



Fitted Equipment

Extraordinary maintenance

For the best performance of your air conditioner, have your dealer/workshop clean it thoroughly before use.

In particular, make sure that:

1. Thermal exchange batteries
2. Water outlet holes

are properly cleaned.

Recycling

Regarding disposal and recycling, follow the national or local regulations. To this end, address to the authorised environment bodies.

THE B2100 AIR CONDITIONER

HOW TO USE THE AIR CONDITIONER

The air conditioner performance can be improved by taking some simple measures:

- Improve the thermal insulation of the vehicle by closing any opening and by covering any glassed surfaces with reflecting curtains.
- Avoid opening doors and windows unnecessarily.
- Select the most suitable temperature and speed.
- Properly direct the air flaps.

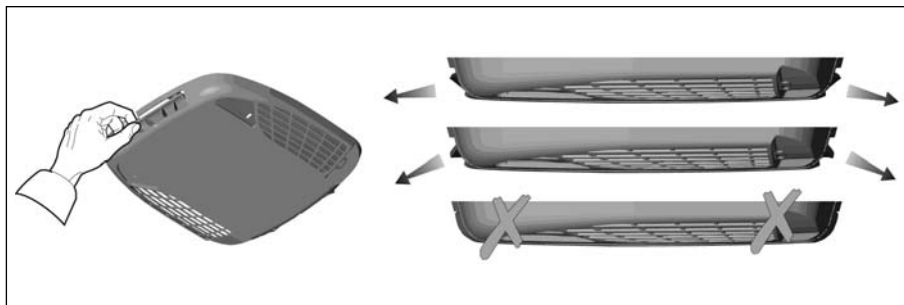
To prevent troubles and minimise risks for people, take the following precautions:

- Always wait some minutes (at least 3) before attempting to turn the air conditioner on, after turning it off, to prevent damage to the compressor;
- Do not obstruct the air inlets and outlets with cloths, paper or other objects;
- Do not introduce your hands or other objects into the openings;
- Do not spray the air conditioner with water;
- Keep flammable substances away from the air conditioner

Adjusting the air direction

Position the flaps to direct the air to the desired position.

WARNING: - Never shut both diffusing flaps while the unit is run.



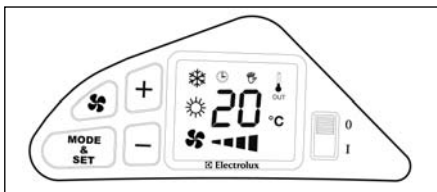
DESCRIPTION OF CONTROLS

Selection of the operating mode

When turned on, the system always waits 2 minutes before starting the compressor and sets to AUTOMATIC MODE.

To select one of the manual modes, proceed as follows:

- hand-set the ventilation speed by pressing the  key and the + and - keys;
- Press the “MODE & SET” key to scroll through the possible settings (manual fresh air, manual warm air, ventilation, automatic), select the required mode while holding the key pressed down for two seconds until the selected mode is confirmed by the system.



Alarm visualizations

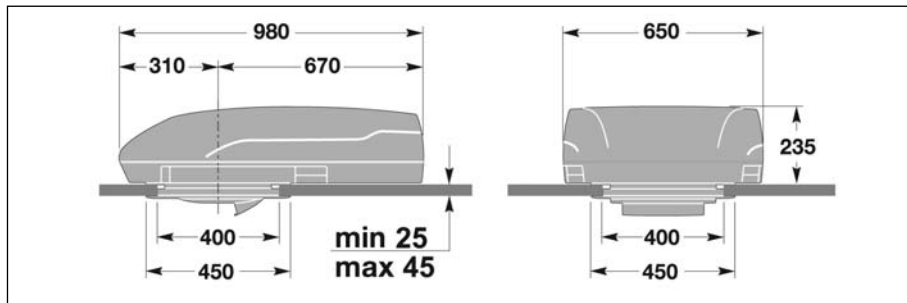
- When the display shows E1 and E2, the temperature probes are defective;
- When the display shows the ON symbol and the timer symbol flashes, the system is waiting that 2 minutes from the last compressor stop elapse.

Mode	Description	Display visualisation
AUTOMATIC   	The +/- keys enables the user to change the PRE-SET TEMPERATURE. In this mode, the machine automatically controls the compressor, the heater and the ventilation speed by comparing the SET TEMPERATURE with the internal temperature.	
MANUAL FRESH AIR  	The +/- keys enables the user to change the PRE-SET TEMPERATURE. The  +/- keys allows changing the VENTILATION SPEED. In this mode, the machine automatically controls the compressor and compares the SET TEMPERATURE with the internal temperature.	
MANUAL WARM AIR  	The +/- keys enables the user to change the PRE-SET TEMPERATURE. The  +/- keys allows changing the VENTILATION SPEED. In this mode, the machine automatically controls the heater and compares the SET TEMPERATURE with the internal temperature.	
VENTILATION 	The  +/- keys allows changing the VENTILATION SPEED. The system only operates the fan inside the vehicle. In this mode, compressor and heater do not run.	



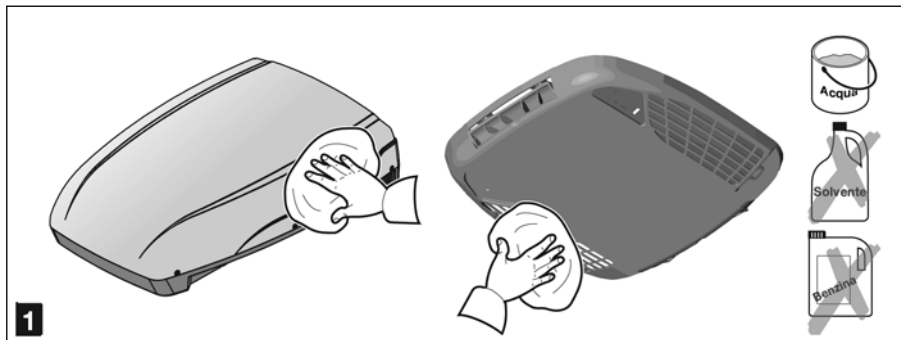
Fitted Equipment

Technical data

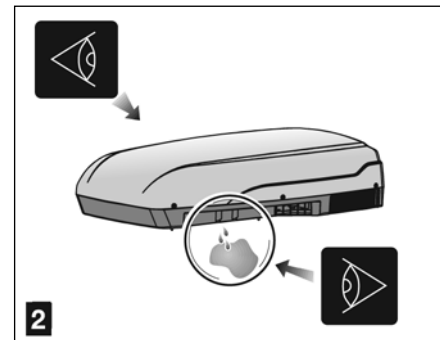


Description	Measurement unit	Model B2100
Refrigerant gas (type-quantity)		see data plate
Refrigerating yield	Watt/h	2050
Cooling consumption	W	910
Heating capacity	W	1200
Electrical rating	V-Hz	230-50
Protection degree	IP	X4
Conditioned air volume	m ³ /h	380
Max internal volume of the vehicle (with insulated walls)	m ³	25
Weight	kg	34

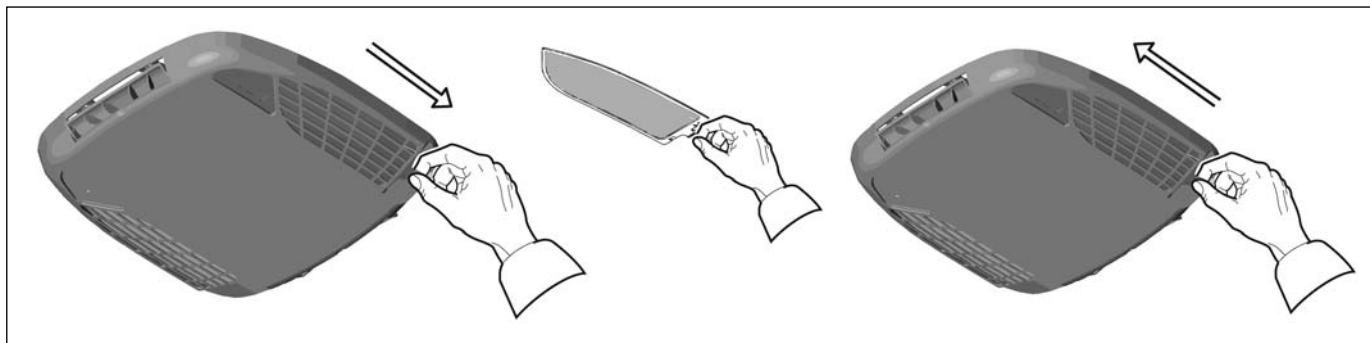
Ordinary maintenance



Cleaning: Periodically clean the air conditioner and remove dust with a damp cloth. When necessary, use a mild detergent. Do not use petrol or solvents.



Checks: Regularly check the air conditioner and make sure that the water outlet holes are not clogged.



Filter cleaning: Periodically carry out this operation; wash the filter with detergent solution and allow to dry before refitting.



Fitted Equipment

Trouble shooting, Maintenance & Recycling

Problem	Solution													
	Temperature less than 18°C	Temperature over 40°C	Check the set point temperature	Defective thermal protection	Switch wrongly positioned	Defective heating resistance	Refrigerant gas is not enough	Damaged compressor	Thermal exchange batteries are dirty	Defective internal fan	Air filter is clogged	Defective external fan	Water outlet holes are clogged	Damaged sealing gasket
	 Operations to be carried out by the user  Operations to be carried out by authorised personnel													
The air conditioner does not cool sufficiently														
The air conditioner does not heat enough														
No air circulation into vehicle														
Water leaks into vehicle														
The air conditioner does not start														
The air conditioner stops running														
														
														

Extraordinary maintenance

For the best performance of your air conditioner, have your dealer/workshop clean it thoroughly before use.

In particular, make sure that:

1. Thermal exchange batteries
2. Water outlet holes are properly cleaned.

Recycling

Regarding disposal and recycling, follow the national or local regulations. To this end, address to the authorised environment bodies.

ASH FRAMED DOORS

In order to provide customers with the latest designs of door furniture it is possible, due to the use of natural wood, that warping may occur. This should not detract from the correct functioning of items fitted in the caravan.

SHOWER

When using the shower, always ensure that the shower screen is fully closed thus avoiding water spray on unprotected areas.

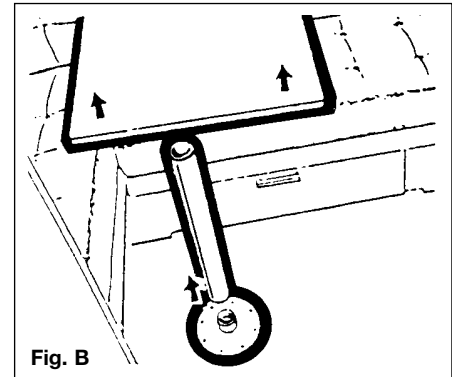
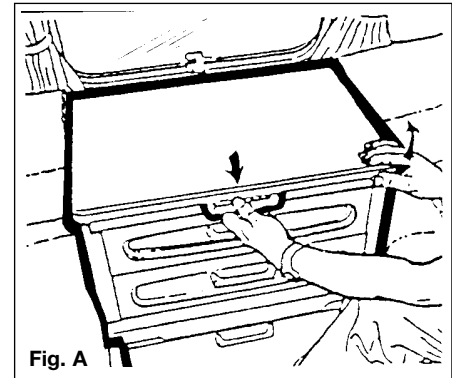
TABLES

Slide top of drawers out and fold back to form convenient table. (Fig. A)

The pedestal table can be swung round for easy access to the seating and then re-positioned afterwards. (Fig. B)

Tables stored in the table storage compartment must be securely clipped into place whilst in transit.

CAUTION: When erecting the free standing table, be careful to avoid trapping fingers.



Fitted Equipment

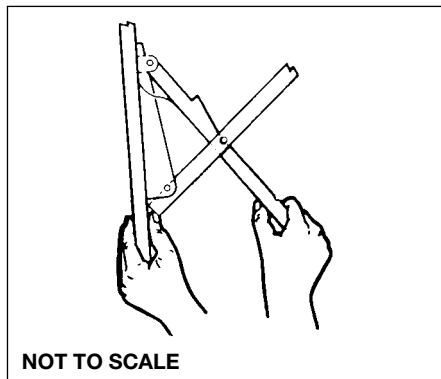


Table Storage

To avoid damage care must be taken when removing tables from their stored position.

Where two tables are stored together in a low level storage area care should be taken to remove the table positioned opposite the hinged edge first.

12V READING LAMP

Care should be taken when making directional adjustment, metal lamps when in use become very hot.

FIXING OF AWNINGS

In order to avoid puncturing the outer skin of the caravan wall, it is recommended that awning poles are fixed to your caravan using load spreading eyelet pads or rubber sucker pads.

Attaching awning brackets and associated fixings to your caravan by using mechanical methods which pierce the outer skin of the caravan wall can allow water ingress which will invalidate the product warranty.

Important:

Care must be taken when using an awning as poles and suckers can cause damage to exterior side panels.

Awnings should be taken down in strong winds to protect the side panels from cosmetic damage and dents from the awning poles.

Note:

Awnings should be kept ventilated when discharging products of combustion exhaust into them.

Awning Sizes

Due to the various awning types and sizes the awning sizes provided in the Service and Warranty Handbook are for guidance only.

Specific awning sizes must be confirmed with the dealer or awning manufacturer prior to purchase.



MAINTENANCE

Modifications	144
Caravan Exterior	144
Caravan Interior	144
Winterisation/Storage	145
Alko Running Gear	147
Care and Maintenance	147
Axle Types	149
Spare Parts	150
Braking System Adjustments.....	151
AK160, AK300 and AK350 Operation.....	154
AKS 2004 Operation	156
Trouble Shooting	166
Accessories	168
Corner Steadies	168
Shock Absorbers	168
Stabilisers.....	168
Road Wheels.....	168
Jockey Wheel	169
Spare Wheel Carriers	169



Maintenance

MODIFICATIONS - DIY WORK

Owners need to be aware that carrying out DIY modifications to your caravan may in certain instances, invalidate the warranty cover and could also affect the safety and structure of the caravan.

Before carrying out any DIY work within the warranty period (3/5) years please check with your nearest Swift Group dealer or contact Supercare customer services on 01482 875740 for advice.

CARAVAN EXTERIOR

Aluminium Panels

The stove enamelled paintwork is very durable and easy to clean owing to the high gloss properties.

Plastic Panels (GRP/ABS)

These are used for front and rear panels and, in some cases, for roof and side panels.

Cleaning

For both aluminium panels and plastic panels.

1. Wash the caravan regularly with mild detergent. Rinse with cold water and leather off.
2. For better protection a similar coloured good quality car wax may be applied.

When cleaning Sikaflex sealed areas, use Domestos/water.

WARNING: Under no circumstances use any abrasive cleaning agents or solvents on the exterior panels.

Care should be taken as the silicon in some polishes can attack the rubber used on the exterior for seals and gaskets.

Mouldings

All mouldings are of anodised aluminium and will retain their lustre for a long period if no abrasive materials are used to clean them.

Acrylic Windows

Wash windows carefully, as you would with the paintwork of your car, do not scrub windows prior to removing surface dirt and film with a hose pipe - trapped dirt could cause scratching.

Wash with a solution of warm soapy water, windows can then be dried off with a leather.

Small scratches can be removed, consult your dealer.

Catches and stays do not require any special attention or lubrication.

Condensation

As your caravan is double glazed you may occasionally get condensation inside the double glazing. This is particularly so in severe weather change (usually spring and autumn) and is easily cured in dry weather.

- i) Remove the plastic plugs from interior top of each window.
- ii) Leave unplugged for approximately 1-4 hours until condensation has cleared.

WARNING: Do not wash your caravan with a high pressure washer as these can permanently damage the seals of your caravan.

Changing Exterior Bulbs

ALWAYS REPLACE LIKE FOR LIKE

For individual replacement bulb specification, refer to your Service Handbook.

Generally road lighting bulbs can be easily replaced by unscrewing and removing the lens from the exterior of the caravan, however once the high level brake lamp is removed from its housing there are further screws to undo at the back of the lamp to gain access to the bulb housing.

CARAVAN INTERIOR

Follow these guidelines to ensure your investment is receiving the very best attention.

Side Walls, Roof Lining

A simple wipe over with a damp cloth and a very mild detergent is all that is needed.

Soft Furnishings

Should be vacuumed occasionally to remove grit and sand and help to keep its smart appearance and ensure long life. The upholstery can be cleaned with a mild, reputable upholstery cleaner. It is recommended that the curtains and pelmets are specialist cleaned only. The foam used in cushions is manufactured to meet fire regulations. It requires time to return to its normal position after prolonged use.

Work Surfaces

You should not stand very hot items on any of the work surfaces, especially models with polycarbonate moulded sinks and drains.

Cupboard Catches

It is advisable to lightly oil all cupboard catches, sliding bolts and hinges from time to time.

Bathroom, Shower Room and Kitchen Equipment

All the Thermoplastic parts in these areas have easy clean surfaces. To ensure long life and prevent damage you must not use any cleaning materials at all and ensure water temperatures do not exceed 70°C, (putting cold water in first is suggested). After every use it is essential that you rinse with clean water only and wipe with a soft damp cloth. Failure to follow these simple instructions may result in premature failure or cracking which will not be covered by any guarantees (including extended warranties).

Furniture

A simple wipe over with a damp cloth should be all that is required. Polishing with a proprietary brand of wax polish enhances and maintains furniture in showroom condition.

It must be remembered that because the frames of the doors are made of ash, which is a natural product, they can be affected by temperature and humidity and may bow under certain conditions. As conditions change they should revert to their original positions.

Kitchen Drainer and Cutting Board

You should not stand hot items on the removeable plastic kitchen drainer. To wash use only warm soapy water, do not use chemicals and bleach.

The round wooden kitchen cutting board can be lightly brushed with vegetable oil to enhance it.

Changing Interior Bulbs

Remove the lens or lampshade to access the bulb.

ALWAYS REPLACE LIKE FOR LIKE

For individual replacement bulb specification, refer to your Service Handbook.

WINTERISATION/STORAGE

This is probably an opportune moment to arrange for the caravan to have its annual service at your appointed dealer.

The following applies wherever your caravan is stored particularly during the winter months.

Do not park near trees or larch type fences, due to possible wind damage.

Keep any grass around the floor of the caravan short, to maintain air flow and stop any possible damp getting into the caravan.

It is advised that the caravan is ventilated regularly throughout the winterisation /storage period, opening windows, doors and rooflights when possible.

General

All moving parts should be checked for free operation.

Clean all cooking appliances and refrigerator.

Lubrication should be carried out at the points illustrated in the general notes on chassis maintenance (page 98).

Charge up the on-board battery every 2 months.

Check alarm battery condition every 2 months and charge if necessary.

Leave the refrigerator door open.

Leave furniture doors and lockers open to allow air to circulate fully.



Maintenance

Condensation

Condensation will occur when humidity levels rise. Correct heating and ventilation will help reduce this. When cooking or in wet inclement weather increased ventilation through windows and rooflight will be required.

Soft Furnishings

Clean and dust the upholstery and if possible remove before placing the caravan into winter storage. Alternatively, stand the cushions on their edges to allow circulation of air. This will reduce the possibility of dampness from condensation.

Keep curtains or blinds closed, to minimise fading of furniture.

If the blinds and/or flyscreens remain down for a prolonged period of time, re-tensioning of the springs will be necessary before re-use.

Wheels and Tyres

Do not store in one position with partially deflated tyres. The tyre walls will suffer and do present a real danger of blow outs, especially when travelling at faster speeds than are allowed in the UK.

The wheels should be turned every couple of weeks or even better, the wheels removed and the caravan placed on "winter wheels" or axle stands.

If you are removing the wheels, follow the jacking procedure for changing a wheel.

Check your tyres regularly for signs of age

and deterioration, particularly wear, cracking and blistering. If in doubt consult a reputable tyre fitter.

Water System

Ensure water pump is turned off.

Lift kitchen sink unit lid and clip in open position.

All single lever mixer taps, including the shower control, should have the lever moved to the central position and lifted to the open position for hot and cold.

All conventional taps should be opened.

Remove shower head. Let the shower hose drain into the shower tray and then return to holder.

Drain water tanks if fitted:

Internal tanks- open inline valve adjacent to the tank. Valve is open when handle is inline with valve.

Open system drains. Remove red drain plug from under the floor of the vehicle (Fig.1) and place in drawer.

Drain water heater. Open yellow handle on inline valve adjacent to heater. Valve is open when handle is vertical.

Before recommissioning the system reverse all above actions. (See Taps in Services section)

The Thetford Cassette porta potti is easily winterised for storage. Empty the fresh water tank using the drain tube/fresh water tank level indicator (level indicator on electronic

Push up collar (A) to release and pull plug (B) down to remove.

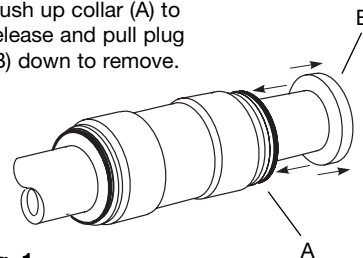


Fig. 1

models only). Pull the lever indicator/drain tube down from top plug position and outward through door opening to drain water from the tank.

Empty the water fill funnel by pulling the bottle away from tank. Remove the small water cap on the filler bottom, allowing water to drain from the water funnel. (Not C-200 toilet).

Do not tighten caps, this helps in keeping unit dry.

The pour out spout and vent plug can be removed. Seals should be greased if necessary with acid-free vaseline.

Recomissioning the Water System

Fill the fresh water tank on the Thetford Cassette porta potti using a hose or jerrycan until the water in the funnel reaches the neck. Tank capacity is 15 litres. Aqua Rinse may be added to improve cleaning of bowl and flushing of unit.

Replace cap. Swing back the water fill funnel until it touches the water tank.

Add Aqua Kem (100 ml) into the Cassette (or 120 ml if using Aqua Kem Bio) through the pour out spout. Add small amount of water through the pour out spout and replace the cap.

It is advisable after storage to flush the water system initially with a sterilising agent (such as Milton), and then with water repeating until the system is well flushed through.

Connect the pump.

Fill the system with water until water flows freely from the hot taps. About 2 gallons of water will be required. Close the hot taps.

Appliances

Before starting caravanning after storage check all gas appliances and electrical points.

Note: Preferably not less than once a year, the electrical installation should be inspected and tested by a qualified electrician.

After storage it is advisable to air the caravan and clean throughout, especially cooking appliances and the refrigerator.

Replace the bedding and wheels if they were removed for storage.

Important

Always follow the manufacturers recommended procedures after use of fitted equipment in the caravan and before storing for any length of time.

ALKO RUNNING GEAR

CARE & MAINTENANCE INSTRUCTIONS FOR YOUR AL-KO CHASSIS AND COMPONENTS

General Information

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

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

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

The chassis is Hot Dipped Galvanised. This is regarded as one of the best forms of corrosion protection. **It does however require minimal maintenance in certain circumstances and should, if properly maintained, last the lifetime of the vehicle.**

When new, the chassis is of a bright and shiny appearance. As the galvanising cures during the initial 2/3 month period, this will

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

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

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

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

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



Maintenance

Drilling or Welding of Parts or Accessories

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

Failure to comply will invalidate all warranties.

Independent Suspension

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

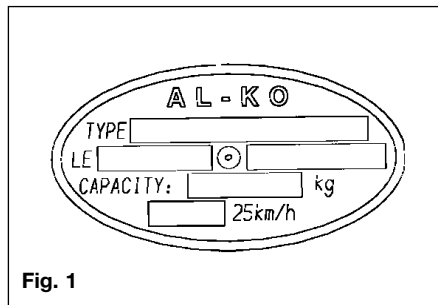
Loadings on Coupling Heads, Overrun Assemblies and Axles

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

The **maximum axle loading** is that stamped on the oval (Fig. 1) plate located in the centre of the axle, facing rearwards. The third line down marked "Capacity" is the **maximum permitted axle loading and must not be exceeded.**

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

Enter your Axle details for future reference:



Loading

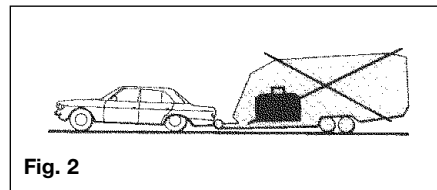
Loads to be carried in the caravan should be placed directly over, or as close as possible to the axles, otherwise the handling will be impaired.

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

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

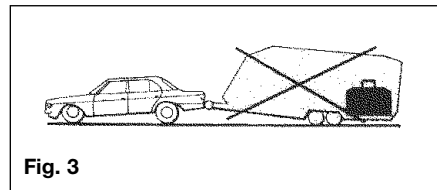
Load Too Far Forward (Fig 2)

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



Load Too Far Back (Fig. 3)

High skid risk together with poor braking effect.



Load Over Axle (Fig 4)

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

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

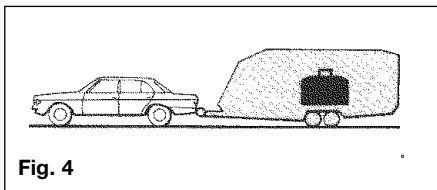


Fig. 4

AXLE TYPES

Safety Precautions

No welding is permitted on AL-KO Axles

It is important that the wheel and hub/ brake drum are compatible. This mean that the PCD, wheelbolts and inset must all be compatible with both the hub/brake drum and the wheel rim.

Particular attention must be paid to the recommended torque figures for the wheelbolts (see pg 18).

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

Operating Instructions

Service Brake

When the towing vehicle is braking or travelling down hill, the overrun device shaft is pushed in (dependent on the magnitude of the thrust on the shaft) and presses on the overrun lever. This acts on the bowden

cables and expander mechanism, which in turn expands the brake shoes applying the wheel brakes.

Hand Brake

With the gas strut version, pull the handbrake lever until upright. With the spring cylinder version, pull the handbrake lever right up to the last tooth. The caravan is then braked.

IMPORTANT NOTE

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

Maintenance and Cleaning

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

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

NOTE: The hub bearing is not protected against water ingress. Check wheel brake linings for wear every 10,000 kilometers or every 12 months via the inspection hole (Fig. 5/Item 1). Adjust if necessary. Where continuous travel in hilly regions or high mileage is experienced, earlier inspection and adjustment may be necessary.

Maintenance

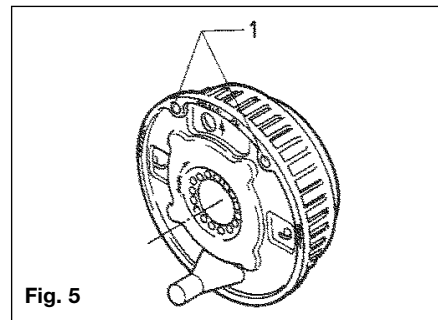


Fig. 5

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

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



Maintenance

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

“Standard Axle” Maintenance (taper roller bearings)

After 1500 km or 6 months

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

After 10,000 km or 12 months

Check quantity and quality of grease, renew if necessary.

Check the wear of the wheel brake linings every 10,000 Km or every 12 months through inspection hole (Fig. 5) and adjust if necessary. Where continuous travel in hilly regions or high mileage is experienced, earlier inspection and adjustment may be necessary.

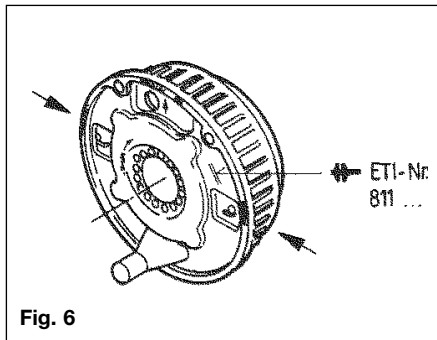


Fig. 6

SPARE PARTS

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

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

To establish the correct spare parts required for your axle you should always quote the axle type (axle identification plate Fig. 1,

page 148) and Spare Part Identification no. (ETI No.), which will be stamped onto the wheel brake or on the identification plate (Fig. 6). Please establish these numbers before contacting AL-KO or a Service Agent.

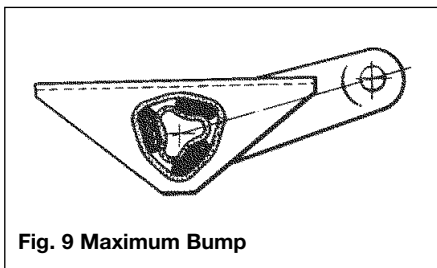
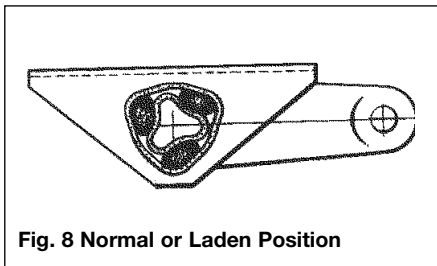
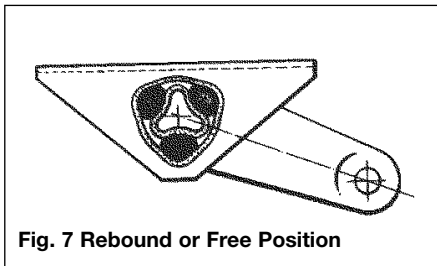
The AL-KO rubber suspension axle has been designed and developed to suit all types of road conditions and is maintenance free.

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

Figs. 7, 8 & 9 show the deformation of the rubber elements at the extremes of suspension movement.

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

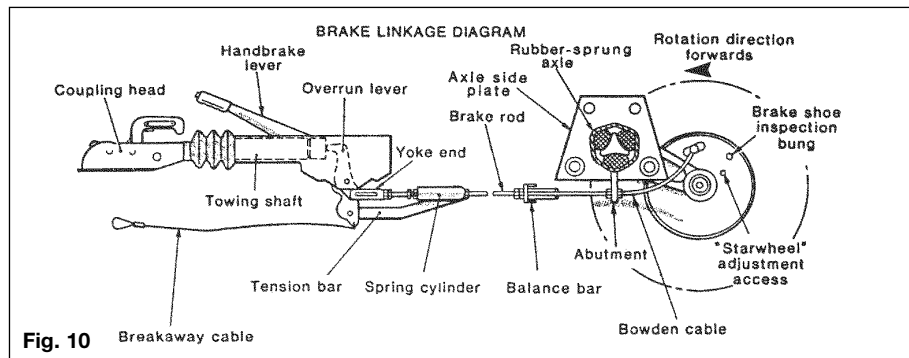
For Trouble Shooting & Fault Finding please see Table 1 on page 166.



AL-KO BRAKING SYSTEM ADJUSTMENT

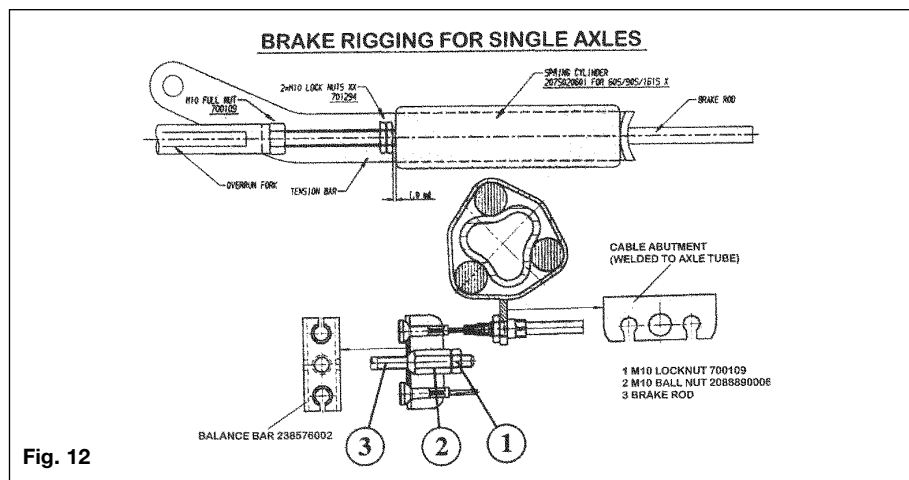
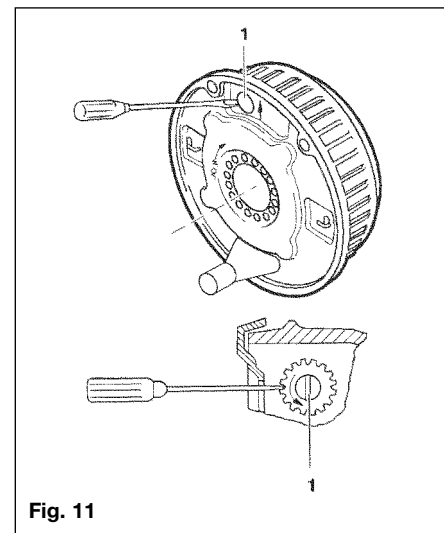
1. Ensure the towing shaft with coupling head is pulled **FULLY FORWARD**. (Fig. 10).
2. Release the handbrake to the **FULLY OFF** position. If the handbrake will not go down the whole way because of the fairing or any other obstruction; then the fairing must be cut away and/or the obstruction removed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

Maintenance



Brake Linkages

It is recommended that all brake linkage threads are lightly greased for protection.



towing shaft. Note! Over adjustment to the long ball nut (Fig. 12/Item 2) could induce movement of the inner brake cable, reducing the effective clearance of the brake shoes. If the overrun lever will not make contact, it is possible the two lock nuts, forward of the spring cylinder, are incorrectly adjusted. Loosen the nuts and adjust brake rod as above (Figs. 10 & 12).

13. Adjust the two locking nuts, forward of the spring cylinder (Fig. 10), (on some chassis a single Nyloc nut is used) to give 1 mm of clearance on the spring cylinder. This cylinder (the energy store for the handbrake operation) must be able to rotate **ONLY**, not slide on the brake rod. (Fig. 12). (If the overrun assembly is fitted with a gas strut handbrake then no spring cylinder is fitted - therefore ignore this paragraph).
14. **CORRECT ADJUSTMENT** of the linkage is checked by operating the handbrake lever so that when the second or third tooth is engaged, a slight braking force is felt on the road wheels.
15. **OVER ADJUSTMENT** of either the wheel brakes or linkages, will result in difficult reversing causing the wheels to "lock-up".
16. When parking, the handbrake lever **MUST ALWAYS** be engaged into the fully

upright position (90°). This is to compress the spring within the spring cylinder and thereby create an energy store which will automatically engage the brakes further should the caravan move. If difficulty is experienced in this operation, try easing the caravan backwards with one hand while engaging the handbrake fully with the other. This manoeuvre should not be attempted on a rearwards facing slope. In this case wheel chocks should be used combined with the handbrake. See page 164 for all handbrake operations.

17. Finally, if the road wheels have been removed, re-tighten using a calibrated Torque Wrench to 88 Nm (65 lbs/ft) - on all M12 wheel bolts - in sequence, i.e. North, South, East, West **NOT** clock or anti-clockwise (refers to steel rims only). Remember to over-tighten is just as dangerous as to under-tighten, as this can distort the wheel rims. Avoid the use of power wrenches.

IMPORTANT - The torque settings should be rechecked after 50 Km. Wheel bolts should **NEVER** be lubricated.

Coupling Heads/Combined Stabiliser Devices

Your Caravan will be fitted with either a standard coupling head or a combined stabiliser/coupling unit. If your caravan is

fitted with an AKS 1300 Stabiliser, please request Part No. 1385106 for full operating instructions. If fitted with AKS 2700, request Part No. 1385107.

Safety Precautions

Always ensure that the coupling head is properly connected to the tow vehicle's towball every time you couple up. If this procedure is not carried out correctly, the caravan/ trailer may become detached from the towing vehicle!

Maximum possible articulation of the coupling head must not exceed $\pm 25^\circ$ vertically and $\pm 20^\circ$ horizontally - see Fig 13.

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

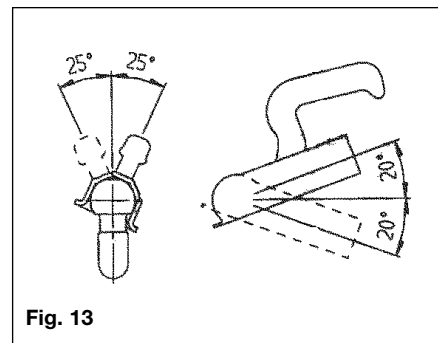


Fig. 13

Maintenance

Operation

For Coupling types AK160, AK300 & AK350.

Coupling Up

Open coupling handle. To do this pull the coupling handle up (Fig. 14) in the direction of the arrow.

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

Put the open coupling onto the towball. The coupling handle automatically and audibly clicks into position. In the interests of safety, press the handle down by hand (Fig. 14).

The coupling head is correctly connected when the green cylinder part of the safety indicator is visible (when viewed from the side - Fig. 14/Item 2).

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

Caution

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

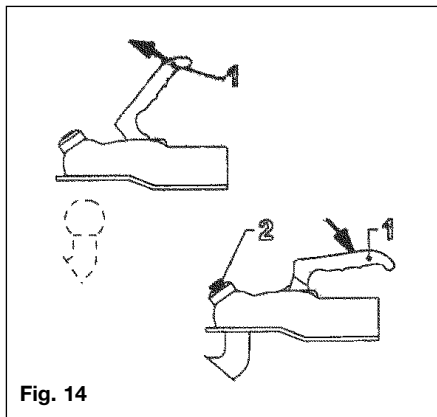


Fig. 14

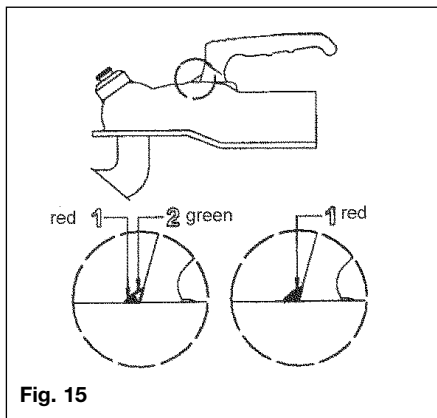


Fig. 15

Uncoupling

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

Wear Indicator

A wear indicator on the coupling head (Fig. 15) shows whether the wear limit of the towing vehicle's towball or the trailer coupling has been reached or not.

For this purpose, hitch up the trailer to the towball and drive the unit for approx. 500 m. This will set the coupling head adjustment. Following this, check the wear indicator as follows.

If the green indicator is visible on the coupling (with the coupling engaged Fig. 15), the coupling head is in good condition or the wear on the towball is within permissible limits.

When the green indicator on the coupling handle is completely covered over and only the red portion is visible (Fig. 15), this could be caused by the following:

- The towball has reached the lowest wear limit of 49.61 mm dia.
- Both coupling head and towball are showing signs of wear.

- Towball is in good condition with 50mm dia, but the coupling head is showing an excessive level of wear.

Caution

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

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

Operation

For coupling types AK7, AK 10/2 or AK252. (This type of coupling is normally fitted to trailers or older model caravans).

Coupling Up

Push the safety lever (Fig. 16/Item 1) up with the index finger and lift the handle up and forwards. Put the opened coupling onto the towball with the handle pulled up and in addition press down by hand. The coupling will close by applying a light pressure. Press the handle down by hand until the catch snaps out (Fig. 16).

The coupling head is correctly engaged when the green cylinder part of the safety indicator is visible (Fig. 16/Item 2).

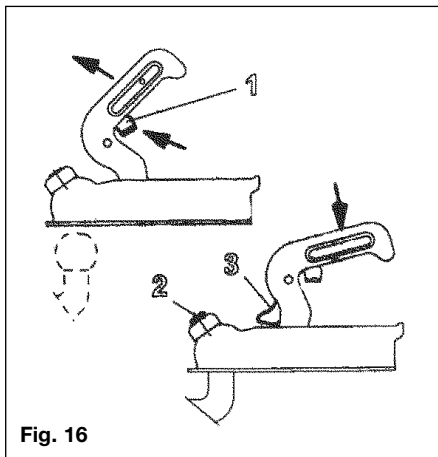


Fig. 16

Caution

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

Uncoupling

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

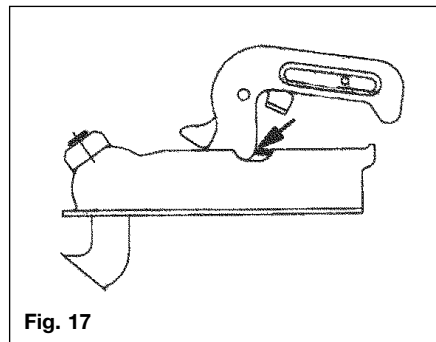


Fig. 17

Wear Indicator:

If the handle reaches the back of the cutaway portion of the housing, when the coupling head is engaged (Fig. 17) there will be play between the towball and coupling head. Automatic re-adjustment is no longer possible and the assembly will need inspecting.

Caution:

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

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



Maintenance

Servicing & Cleaning

Lubrication Points (Fig. 18)

Clean Towball

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

For Troubleshooting and Fault Finding please see Table 2 on Page 167.

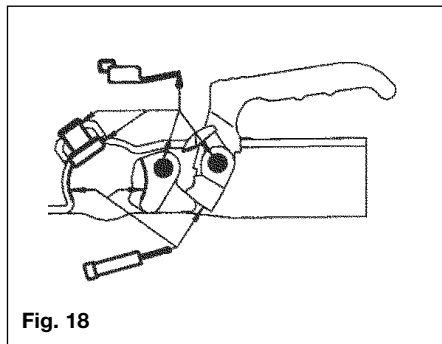


Fig. 18

Operating Instructions for AKS 2004

REGULATIONS

1. The AKS 2004 must be used in conjunction with 50 mm dia. towballs which conform to EC Directive 94/20 (DIN 74058 or local equivalent).

2. Suitable for attachment to drawbars or approved overrun braking equipment for single (and tandem axle) caravan/trailers, with a minimum weight of 200 Kg and a maximum permissible weight of 2000 Kg.
3. EC design approval has been given to the AL-KO AKS 2004 coupling under permit No. e1*94/20*0930*00.

RESTRICTIONS OF USE

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

Clearances for Stabiliser Handle (Fig. 19)

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

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

Max. 50 mm (C) clearance between the centre of the towball and top of the overrun assembly or fairing, to ensure

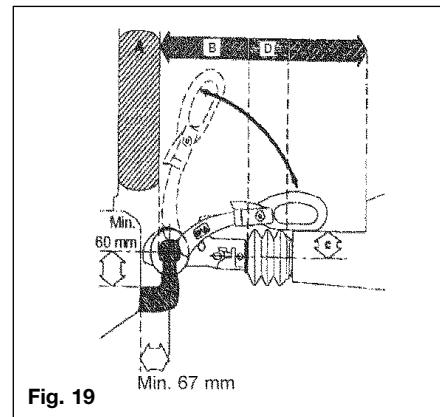
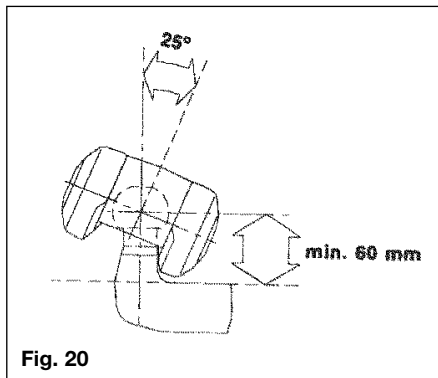


Fig. 19

both coupling handle and stabiliser handle do not foul on operation.

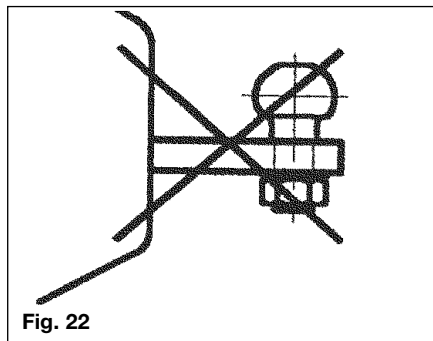
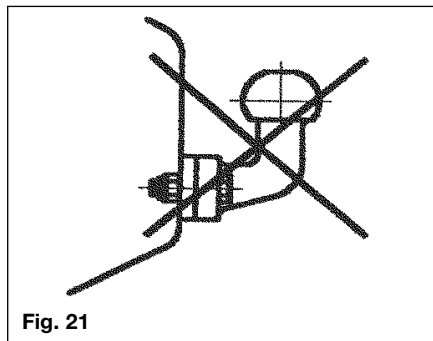
Maintain the same clearances for other manufacturers' overrun assemblies.

2. Not suitable for use with overrun devices which can revolve above 25° (Fig. 20).
3. Swan Neck towbars (fixed or detachable) are suitable for use with the AKS 2004 providing they comply to EC Directive 94/20 and have the required minimum 60 mm clearance, measured from the centre of the towball (Fig. 20).



SAFETY WARNINGS

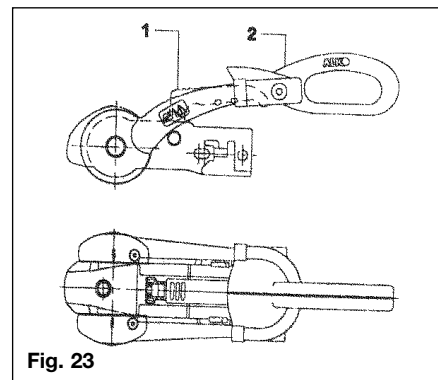
1. In accordance with EC Directive 94/20, couplings of type A 50-1 cannot be used (see Fig. 21), your warranty will be invalid if this type of towball is used.
2. For UK use, please use the extended neck towball (type A50-X).
3. A bolted-in type ball coupling (Fig. 22) is only permissible if the thread is locked or welded.
4. The AKS 2004 cannot be used with a laterally attached reversing lever, on the left side, when facing direction of traffic.
5. The towball must be free from grease, paint and other residue, otherwise the stabilising effect will be greatly reduced.



6. If friction pads become contaminated with grease, they should be replaced.
7. The AKS 2004 should only be operated by one person, when opening or closing the handle, to reduce injury risks.

AKS 2004 Delivery Specifications

Coupling handle (Fig. 23/Item 1),
Stabiliser Lever (Fig. 23/Item 2)



Preparation for coupling/uncoupling

The Stabiliser lever (Fig. 24/Item 2) must be in the uppermost position (open).

Coupling

Pull the coupling handle (Fig. 25/Item 1) up in the direction of arrow. The coupling mechanism has an open position ie. as long as the AKS2004 is not placed on the ball, the handle will remain open. Put the opened coupling onto the clean towball. The handle must now make an audible click and return to the flat position.



Maintenance

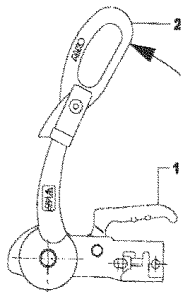


Fig. 24

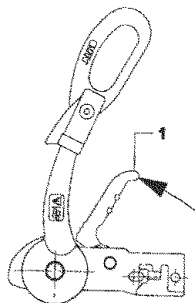


Fig. 25

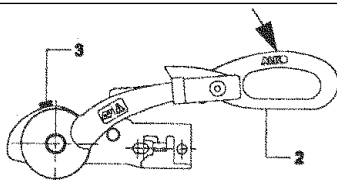


Fig. 26

Warning: The coupling is correctly engaged when the green edge of the safety indicator button is visible (Fig. 26/Item 3).

Stabiliser Unit

To operate the Stabiliser (once coupled to the towball), simply press the stabiliser lever down as far as it will go (Fig. 26/Item 2).

Uncoupling

Pull the stabiliser lever handle up as far as it will go, open the coupling handle and lift the AKS2004 from the towball. With larger nose loads, coupling and uncoupling can be made easier by using the jockey wheel to assist lifting.

Please Note: The friction pads (Fig. 27/1,2,3) are pressed against the towball and hence generate a stabilising/damping force. These pads are therefore subject to wear over time, however they will have a long service life (circa.30,000 Miles), provided they are well maintained and kept free of grease/dirt.

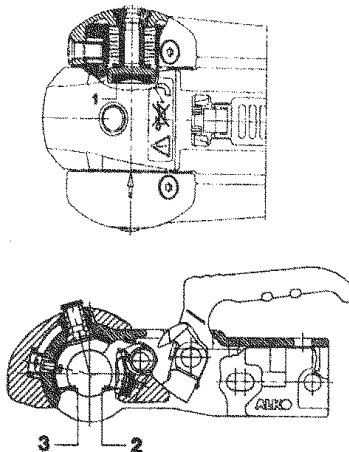


Fig. 27

Checking the efficiency of the left/right friction pads

1. Couple up AKS 2004.
2. Open Stabiliser lever (Fig. 28/Item1).
3. Close Stabiliser lever until resistance is felt (ie friction pads are in contact with the ball but not yet under pressure).
4. If the arrow on the arm (Fig. 28/Item 4) is before or on the marked area (Fig. 28/Item 2) the friction pads are still as new (See A)

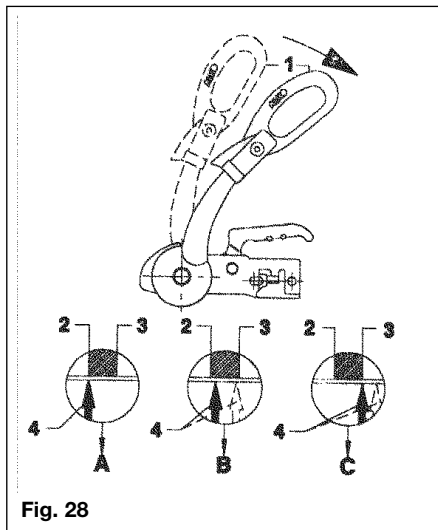


Fig. 28

5. The arrow on the arm should lie between the marked area on the soft dock (See B)
6. If the arrow on the plate reaches or passes the marked area on the soft dock then the friction pads need replacing (See C).

Please Note: It is not necessary to adjust the friction pads

Manoeuvring

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

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

1. During opening or closing, the AKS must only be operated by one person.
2. Press stabiliser lever down by hand force only DO NOT use your foot or an extension bar, this will damage the components (Fig. 29).
3. When opening or closing the stabiliser lever, please ensure your hand does not touch the coupling handle - you may accidentally trap your fingers! (Fig. 29).

Noises whilst driving

As a rule, the friction pads of the AKS 2004 do not make a noise during driving. Any clicking, creaking or squeaking noises that do arise may be due to the following:

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

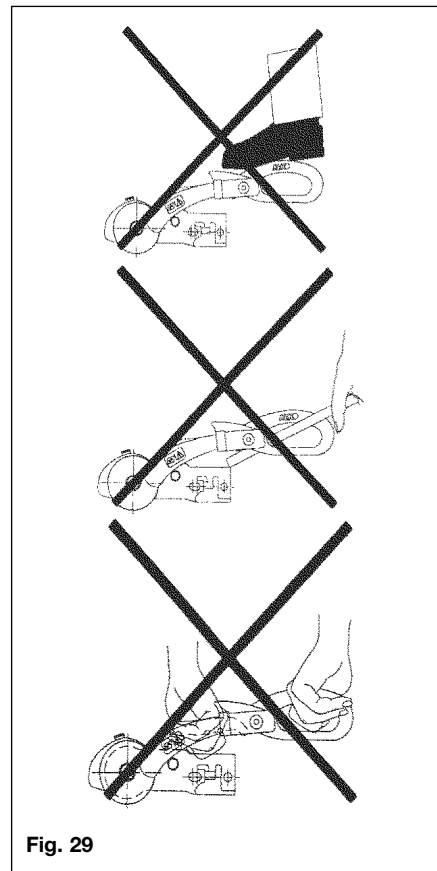
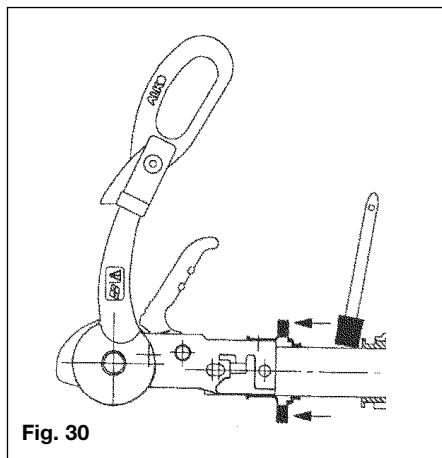


Fig. 29

Maintenance

Remedial Action

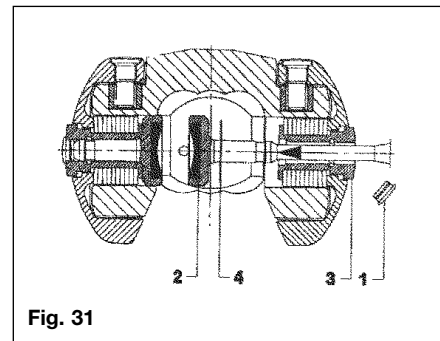
- Clean the tow ball and friction pads by lightly rubbing the surface (100-120 grit emery paper).
- Lubricate the drawshaft sleeve via the grease nipples. In addition, push the gaiter forward and grease (DIN 51 825 KTA 3K) the exposed part of the shaft (Fig. 30).
- Visit a specialist workshop to have the ball holding area checked for damage and the locking mechanism for function. If necessary, change the towball.



Servicing and Cleaning

Friction Pad Replacement (please replace one at a time)

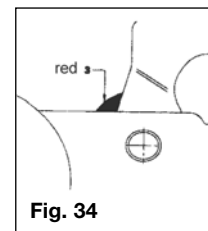
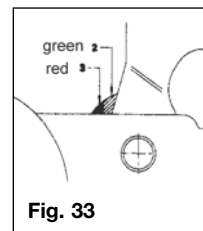
- Uncouple AKS 2004.
- Remove protective caps (Fig. 31/Item 1) with the aid of a small screwdriver.
- Press worn out pad inwards and remove (use punch and hammer) (Fig. 31/2)
- Insert new friction pad from below (after first re-inserting shim washers if they were present) and press in as far as it will go (Fig. 31/Item 4 & Fig. 32).



Checking the efficiency of the front/rear friction pads

- Couple the AKS 2004 to the towball but do not activate the stabiliser.
- If a green indicator is visible (on the handle), then the AKS 2004 is in a new condition or the pads and towball are within the permissible limits (Fig. 33/Item 2).
- If only a red indicator is visible (Fig. 34/Item 3), then this may have the following causes:
 - AKS 2004 is okay but the towball has reached the lowest limit of 49.61mm
 - AKS 2004 shows signs of wear
 - Towball is in a new condition (50mm) but the front/rear friction pads show a high degree of wear.

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



Friction Pad Replacement (Front/Rear only)

1. Uncouple the AKS 2004
2. Remove the rubber soft dock (pull up and off) Fig. 35/Item 1 & Fig 36.
3. Press the safety indicator outwards and secure with SW14 hex. spanner (not included), (Fig. 35/Item 2).
4. Remove cheese-head screws (Fig. 35/ item 3 & Fig 36), using special torx tool.
5. Press friction lining recess (Fig. 35/Item 4) inwards and pull down and out.
6. Open coupling handle (Fig. 35/Item 8).
7. Remove countersunk head cap screw using special torx tool (Fig. 35/Item 5 & Fig. 37).
8. Press friction pad inwards with a screwdriver and remove from ball cup.
9. Fitment of new linings takes place in reverse. Tighten screws 3 & 5 to 5 Nm.
- 10) Replace rubber soft dock, insert top section first then bottom.

Important Maintenance and Cleaning Advice:

1. The towball should be cleaned regularly to remove grease or other residue, the use of Thinners, White Spirit or Brake Cleaner is recommended - otherwise the stabilising effect will be severely reduced.

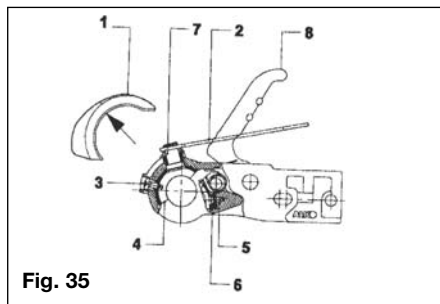


Fig. 35



Fig. 36



Fig. 37

2. If friction pads are contaminated, they should not be cleaned but replaced.
3. The surface of the towball must be free of grooves, rust or seizing marks.
4. Towballs coated (with paint or similar) must have this surface completely removed (use 100 or 120 grain emery paper). If this is not done, increased towball wear will occur and may cause damage to the AKS 2004 components.
5. In Winter, carefully spray only the visual indicator with de-icer.

Lubrication

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

- a) Clean all parts thoroughly.
- b) Areas may only be covered with a thin film of grease (Fig. 38).
- c) Use multipurpose grease DIN 51825 KTA 3K.

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

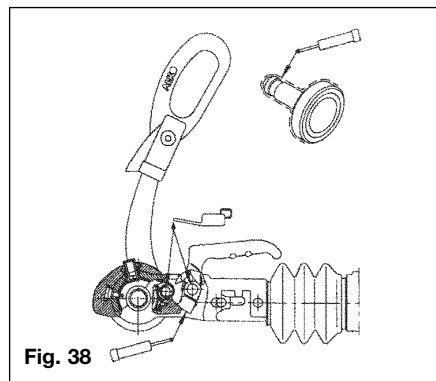


Fig. 38

AL-KO SECURE IMOBILISER

Refer to the User Instructions Kit supplied.



Maintenance

Overrun Devices

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

Safety Precautions

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

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

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

Operation

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

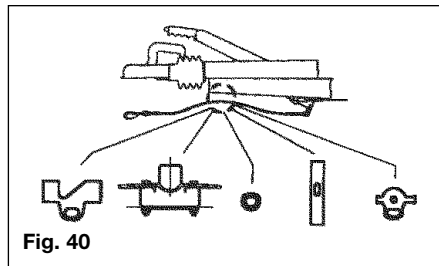
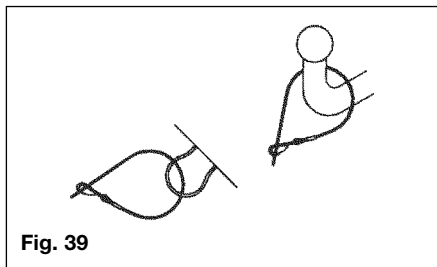
Coupling Up

Manoeuvre towing vehicle or trailer to coupling point.

Overrun devices fitted with 50 mm coupling head

Fully open coupling head handle and secure hitch onto the towball. See pages 10 and 123 (coupling up).

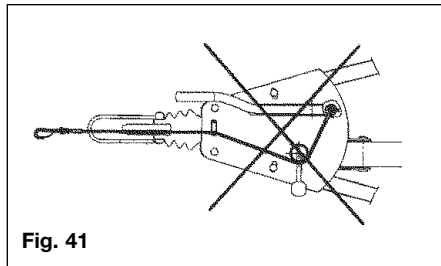
Thread the breakaway cable through the breakaway cable guide provided (Fig. 40) and connect it to attachment point provided on towing bracket (Fig. 39). Please refer to 'Braked Trailers Use of Breakaway Cables' for further detail.



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

1. The breakaway cable **MUST** run through the breakaway cable guide.
2. The breakaway cable **MUST NOT** be wrapped around the jockey wheel, as this disables the emergency brake (Fig. 41).
3. The cable **MUST** run as straight as possible and not be restricted.
4. Ensure the cable is long enough to allow for cornering and will not become taut or snag during use, as this could result in the handbrake operating whilst towing.

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



Overrun device fitted with Eye End

Lock the eye end into the eye end jaw assembly and see operating instructions for vehicles fitted with eye end jaw assembly.

Overrun Device Fitted with 50 mm Coupling Head

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

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

Ensure handbrake is fully off by pushing it fully down (Figs. 42-46).

Remove wheel chocks if fitted and stow safely.

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

Coupling Up (Euro-Overrun Devices)

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

Slacken Jockey Wheel Clamp handle and raise complete assembly through cutout in body to its highest position (ensure it doesn't come into contact with the brake rod assembly), fully tighten Jockey Wheel Clamp handle to ensure the Jockey Wheel is firmly held in position (Fig. 45).

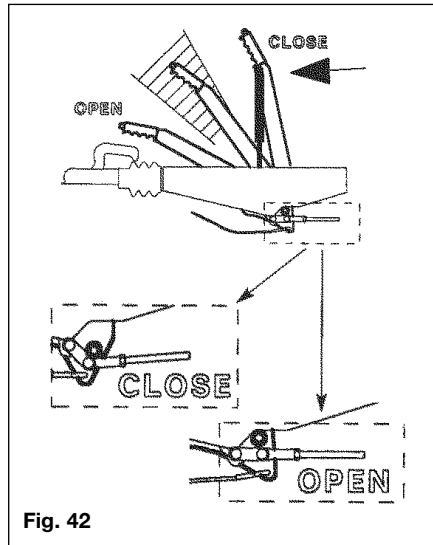


Fig. 42

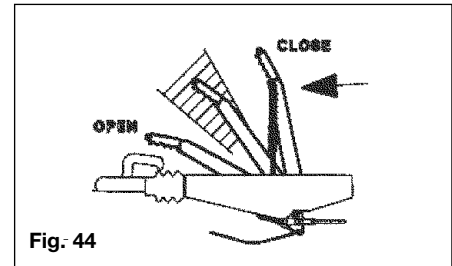


Fig. 44

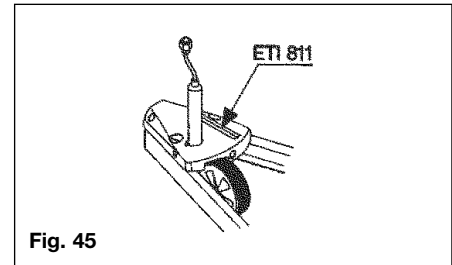


Fig. 45

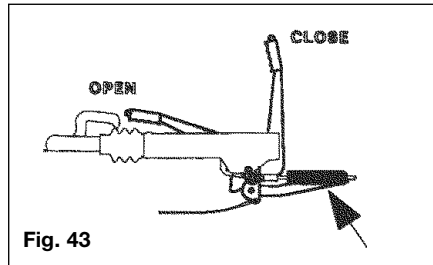


Fig. 43

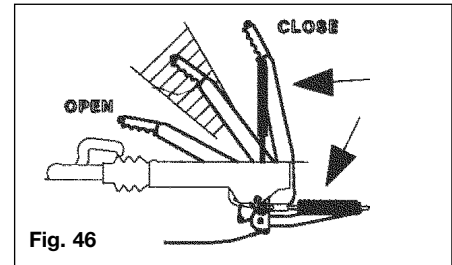


Fig. 46



Maintenance

Uncoupling (All Types)

Secure caravan/trailer by chocking both wheels. Apply handbrake fully. There are 4 different handbrake systems (See Figs 42-46). With all four systems please observe the following:

Handbrake Lever With Gas Strut (Fig. 42)

Ensure handbrake is fully applied (as highlighted). This will ensure that the gas strut will automatically re-apply the wheel brakes if the trailer starts to roll backwards.

To Release

Press the handbrake push button fully home and firmly press the handbrake lever back into the off position (handbrake horizontal).

Caution: If the handbrake is not fully applied as detailed above, there is danger that the trailer could roll backwards!

Caution: The brake rod must not be under tension/bowed when the handbrake is disengaged, otherwise the breakaway mechanism will not function.

Handbrake Lever With Spring Cylinder (Fig. 43)

Apply handbrake fully ensuring that handbrake is in the vertical position. This will ensure that the spring cylinder energy store is fully loaded and will automatically re-apply the wheel brakes if the trailer starts to roll backwards.

Caution: If the handbrake is not fully applied as detailed above, there is danger that the trailer could roll backwards!

Automatic Handbrake Lever (Fig. 44)

Ensure handbrake is fully applied (as highlighted). This will ensure that the gas strut or spring cylinder will automatically re-apply the wheel brakes if the trailer starts to roll backwards.

Caution: If the handbrake is not fully applied as detailed above, there is danger that that the trailer could roll backwards!

To Release

Firmly push the handbrake lever back into the off position (Handbrake horizontal).

Handbrake Lever With Spring Cylinder and Gas Strut (Fig. 46), normally fitted to commercial units:

Ensure handbrake is fully applied (as described). This will ensure that the gas strut or spring cylinder will automatically re-apply the wheel brakes if trailer starts to roll backwards.

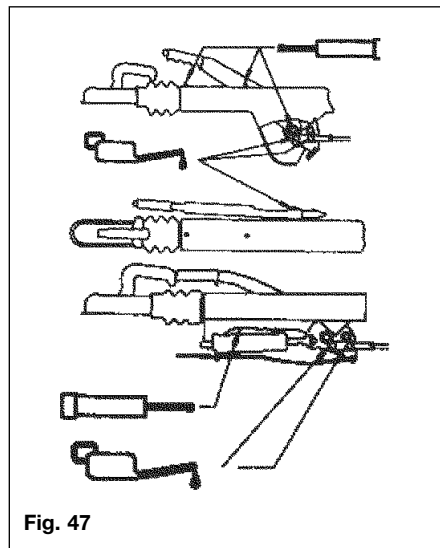
Caution: If the handbrake is not fully applied as detailed above, there is danger that the trailer could roll backwards!

To Release

Press the handbrake push button fully home and firmly press the handbrake lever back into the off position (handbrake horizontal).

Servicing

Every 10,000 - 15,000 Km or every 12 months: Lubricate/grease all sliding and moving parts of the overrun device as shown in Fig. 47.



Recommended lubricant. General purpose grease to DIN 51825 KTA 3KA.

Servicing and care of hot dip galvanised parts

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

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

Spare Parts

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

If repair work or servicing is required, AL-KO have a large network of AL-KO service stations throughout Europe. To establish the correct spare parts required you should always quote the model and type of overrun device in question along with the ETI No. which is stamped into the overrun device

housing. The ETI number for the Euro Overrun can be found on the handbrake lever (See Fig. 45).

For Troubleshooting and Fault Finding, please see Table 3 on Page 167.



Trouble Shooting & Fault Finding

Table 1 Axles

Fault	Cause	Remedy
Poor Braking	Linings worn or damaged. Brake Linings not bedded in. Brake set up incorrect.	Replace Brake Linings. Will pass after braking a few times. Reset Brakes as page 151 & ensure system is lubricated.
Difficulty in Reversing	Braking system set too tightly. Auto-Reverse lever too stiff.	Reset Brakes as page 151. Lubricate and free off Reverse Lever.
Brakes Overheating	Incorrect setting. Braking system not fully released. Overrun lever stuck. Damage or Corrosion to braking system	Reset Brakes as page 151. Check Handbrake has been released & the system is running freely. Lubricate and free off Reverse Lever. Check system as page 151 and repair or renew parts as necessary.
Handbrake Force Low	Incorrect setting of the brakes. Linings not bedded in.	Reset brakes as page 151 and lubricate as necessary. Will pass after braking a few times.
Uncomfortable ride or Uneven Braking	Loose braking adjustment. Damper defective. Axle shock absorbers defective.	Reset brakes as page 151. Check and replace damper if necessary. Replace shock absorber.

Table 2 Coupling Heads

Fault	Cause	Remedy
Coupling does not engage onto ball	Ball diameter too large. Ball could be damaged or deformed. Coupling head dirty or defective.	Change ball to correct size. Fit new ball. Clean & Lubricate coupling and replace if necessary.
Difficulty in Uncoupling	Ball damaged or deformed. Coupling damaged or deformed. Coupling head under pressure from damper.	Fit new ball. Replace if necessary. Pull forward a few inches to to relieve pressure
Too much play in the coupling	Coupling damaged or deformed Ball too small	Replace if necessary. Fit new ball.

Table 3 Overrun Devices

Fault	Cause	Remedy
Poor Braking	Overrun shaft tight. Overrun shaft corroded. Body housing damaged.	Lubricate overrun shaft and replace any damaged parts.
Brakes Overheating During Towing	Handbrake not fully released. Braking system incorrectly set. Incorrect attachment of breakaway cable.	Release handbrake. Reset brakes as page 151. Ensure correct attachment as listed on page ? or refer to Braked Trailers Use of Breakaway Cables sheet.
Handbrake Force Low	Defective gas strut. Incorrect setting of spring cylinder.	Replace gas strut. Reset spring cylinder as page 151.
Brakes Apply During Deceleration or Downhill Travel.	Overrun damper is defective.	Replace the overrun damper.



Maintenance

ACCESSORIES

Corner Steadies

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

Shock Absorbers

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

Stabilisers

AL-KO overruns can be fitted with a range of AL-KO Stabiliser devices (if not already fitted as standard), dependent on the maximum gross weight of the caravan. AL-KO stabilisers operate on a friction type basis, whereby friction pads grip onto a **dry, grease free towball**. It is important to note that the AKS range of stabilisers are suitable for use with swan neck, fixed or detachable type towbars or the special AL-KO Extended Neck Bolt-On Towball. We do not approve

the use of any other bolt-on type towball, other than the AL-KO Towball. Failure to use the correct towball may result in product failure and will invalidate your warranty.

The AKS range is available in three different models: The AKS 1300 is suitable for caravans up to a maximum gross weight of 1360 Kg, the AKS 2700 up to 2700 Kg and the new AKS 2004 up to 2000 Kg. Each Stabiliser can also be retro-fitted with an AL-KO Security Device and Safety ball, to ensure maximum theft Deterrent (please see our accessory price list for further details). All 'Red' coloured AL-KO Security Devices have full TUV and Sold Secure Approvals and are available from most good caravan dealers or direct from AL-KO Mail Order on 0800 074 4334.



AKS 1300 &
Security Device



AKS 2700 &
Security Device



AKS 2004 &
Security Device

Road Wheels

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

Important: Standard AL-KO caravan chassis use M12 wheel bolts. These **must always only** be tightened to the correct torque setting:

- Steel wheels 88 Nm (65 lbs/ft)
- Alloy wheels 115 Nm (85 lbs/ft)

in sequence, (i.e. North, South, East, West); **NEVER** clock or anti-clockwise. **ALWAYS** use a **calibrated torque wrench, do not** use a corner steady brace, power or electric wrench. It is as dangerous to overtighten wheel bolts as it is to not tighten them sufficiently.

Important: The torque settings should be re-checked after 50 Km.

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

- M10 - 49 Nm (36 ft. lb)
- M14 - 135 Nm (99.5 ft. lb)
- M16 - 210 Nm (155 ft. lb)

Maintenance

Special Note -Aluminium Wheels

For aluminium wheels use M12 x 1.5 pitch 26mm thread length 10.9 Grade 60° conical fixing.

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

Tyres

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

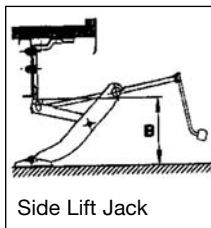
Jacks

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

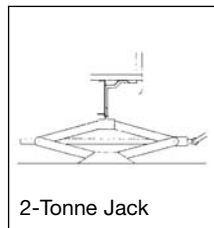
NOTE: It is essential that the car and caravan are hitched together before commencing jacking. All AL-KO chassis from 1992 onwards have 2 holes punched in the chassis members, each side (rear of the axle); to accept the brackets for the Jack(s). (See Accessory Price List).

Corner Steadies may be used for stability ONLY, when the caravan is in the jacked position.

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



Side Lift Jack

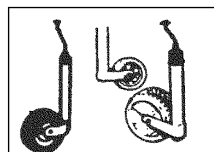


2-Tonne Jack

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

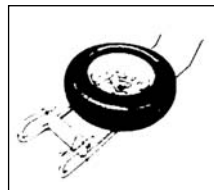
Jockey Wheel

Lubricate screw thread and wheel spindle periodically.



Spare Wheel Carriers

Each caravan has a set of punched holes in the chassis member to facilitate the fitting of a spare wheel carrier. The assembly is of a strong, lightweight construction and zinc plated for all-weather protection.



There are 3 variants to suit most AL-KO chassis (record your tyre size on this booklet for future reference).

The carriers can be fitted for left or right hand operation and are easy to fit.

The telescopic frame tubes should be lubricated periodically.

RECORD YOUR SPARE WHEEL CARRIER INFORMATION HERE:

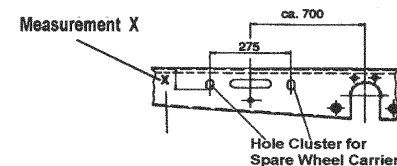
Caravan Make (eg Abbey)

Caravan Model (eg Spectrum 520)

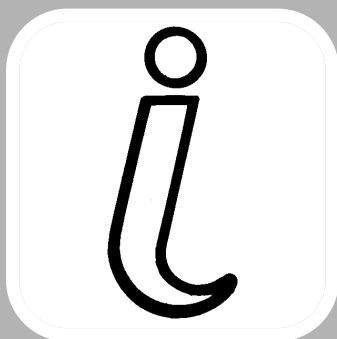
Year of Manufacture

Tyre Size (eg 175R 14 99).....

Dimension 'X' in mm
(taken from following diagram)







GENERAL DATA

Fault Finding	171
Water	172
Gas	174
Cassette Toilet	175
Useful Information	176
Owners Club	176
Spares and After Sales	176
Repair Facilities	176
Caravan Clubs.....	177
Motoring Associations	177
Trade Association.....	177
CRIS	177



Fault Finding

WATER

Problem	Possible Cause	Remedy
Water not flowing from any tap when operated but pump runs	Freshwater tank empty Pump wired in reverse Pump not primed Pipe inlet or outlet pipe disconnected Pump pipes restricted by kinking Blockage in pump inlet or outlet pipe Blocked in-line filter of pump filter Air leak in suction line to pump	Check Check wiring, refer to pump manufacturers instructions Refer to pump manufacturers instructions Check connections Check pipes run Check, starting inside freshwater tank Dismantle and clean Check for bubbles & secure with clip
Pump does not run	Pump or tap incorrectly wired Pump fuse blown Battery disconnected Pump seized or overheated Pressure pump sensing switch may have failed Contacts may be faulty Wiring connections may be faulty On switched tap version, microswitch could be faulty	Refer to pump/tap manufacturers instructions Check wiring connection and then replace with fuse of correct rating Check connections Refer to pump manufacturers servicing instructions Refer to pump manufacturers servicing instructions Check contacts in plug and socket are clean and making contact Check wiring connections Disconnect wires from microswitch and join together. If the pump operates, microswitch should be replaced
Water flows from cold tap but not from hot	Feed pipe to water heater incorrectly connected to the heater outlet Blockage in hot pipeline Heater inlet or outlet pipes kinked preventing flow Hot tap not connected Hot tap failed or blocked Heater non-return valve jammed	Refer to installation instructions Disconnect pipes and inspect Check and re-route if necessary. Ensure that hose is Carver recommended type Refer to installation manual Disconnect and inspect Seek service attention

WATER (continued)

Problem	Possible Cause	Remedy
Water flows from hot tap but has reduced flow from cold	Cold water pipe kinked preventing flow Blockage in cold pipe line Cold tap not connected Cold tap failed or blocked If a water filter is fitted, the cartridge is exhausted	Check and re-route if necessary Disconnect pipes after 1st Y connector and check up to tap Refer to installation instructions Disconnect and inspect Replace cartridge
Reduced flow from both hot and cold taps	Battery condition low causing pump to run slowly If new taps have been fitted they may be restricting flow Pump needs servicing Partially blocked pump filter or in-line filter, if fitted Pump outlet pipe kinked restricting flow Water leak	Check battery state of charge, refer to electrical supply note Disconnect and check that they have at least 1/4" (6.3mm) bore Refer to pump servicing instructions Dismantle and clean if necessary Check and re-route if necessary Check all water connections
Reduced flow from either tap	Y' connector(s) fitted incorrectly Pipe kinking restricting flow Bore size difference in taps	Refer to installation instructions Check and re-route if necessary Use taps of equal bore size
Warm water flows out of cold tap	Hot water back-feeding into cold line, usually if mixer tap or single outlet hot and cold taps being used	Fit non-return valve in cold supply, near tap
If pump motor runs steadily and will not stop	Battery voltage may be too low (below 10.5 volts)	Check that there is water in the container Adjust switch and/or re-charge battery Check all connections in pipework



Fault Finding

GAS

Problem	Possible Cause	Remedy
Hob does not light	No gas Air in pipe	Check level of gas in bottle Check gas bottle valve is on Check gas taps are on Purge system Refer to hob manufacturers instructions
Oven does not light	No gas Air in pipe	Check level of gas in bottle Check gas bottle valve is on Check gas taps are on Purge system Refer to oven manufacturers instructions
Space heater or central heating	No gas Over gassed Air in pipe	Check level of gas in bottle Check gas bottle valve is on Check gas taps are on Check exhaust outlet is clear Turn off appliance, wait 2 minutes and try again Purge system Refer to space heater or central heating boiler manufacturers instructions
Fridge does not light	No gas Air in pipe	Check level of gas in bottle Check gas bottle valve is on Check gas taps are on Purge system Refer to fridge manufacturers instructions
Water heater does not light	No gas Air in pipe	Check level of gas in bottle Check gas bottle valve is on Check gas taps are on Purge system Refer to water heater manufacturers instructions

CASSETTE TOILET

Problem	Remedy
Bowl does not drain when toilet is flushed. Cassette is overfilled	DO NOT REMOVE CASSETTE. While inside the caravan turn flush knob anti-clockwise to open valve blade and leave it in the open position. Open access door on side of caravan. Rotate pour-out spout outward. Place appropriate size container under spout cap. Remove cap carefully. Allow bowl contents to drain into container. This will lower the water level in the bowl. Replace cap and return pour-out spout to stored position. DO NOT REMOVE CASSETTE. Go inside the caravan and turn the flush knob clockwise to close valve blade. Now, the cassette may be removed following the normal removal and emptying procedure.
Odours	Use proper amount of holding tank deodourant specified on bottle.
Toilet tissue does not fit into compartment.	Since some tissues are supplied on larger rolls, it may be necessary to use some tissue before storing into compartment.
Soiled bowl after flushing	Partially fill bowl to cover soiled portion of bowl. Next flush will dissolve waste. Tip: Leave valve blade open during use.
No power to add water to toilet bowl	Check cassette safety sensor switch and fuse-holder for proper engagement and operation. Note: Cassette has to be removed to reach switch and fuse. Insert cassette and try adding water to toilet bowl. Toilet can be flushed manually. Add water. Add water to bowl from a separate container. Turn flush knob anti-clockwise to open valve blade. Turn clockwise to close valve blade.
Cassette cannot be removed	Check for obstacles under retaining clip. Depress retaining clip several times to check operation. Remove cassette. Flush knob and valve blade in partial open position. Close valve blade by moving knob clockwise. CAUTION: If valve blade is open during cassette removal, severe damage to system can occur. Never force insertion or removal of the cassette tank.
Valve blade mechanism sticks or is hard to open	Spray light film of silicone on blade.
Major unit malfunction	Contact your original Caravan Dealer.



Useful Information

OWNERS CLUB

The Owners Club is a completely independent organisation run for the benefit of the caravan owners. They have numerous rallies during the year in various parts of the country and every third year there is a 'Works Rally' where owners have the opportunity to visit the factory. Apart from the friendliness and companionship the Club generates it is also actively engaged in charity work for those less fortunate than ourselves. The address of the Secretary of the Owners Club can be obtained from Supercare (SML Ltd), Tel: 01482 875740 or from the Swift Group website.

SPARES AND AFTER SALES SUPERCARE

There are numerous items available from your dealer ranging from door catches through to spare wheels and touch-up paints. Please note that all after sales enquiries must be directed through your supplying dealer. The after sales service at the factory is geared to support our dealer network as is the service provided by appliance manufacturers.

In the interest of safety, replacement parts for an appliance shall conform to the appliance manufacturers specifications and should be fitted by them or their authorised agents.

Note: Please remember to quote chassis number when ordering any items from your dealer.

Customer Care

Tel: 01482 875740

Fax: 01482 840082

NOTE:

The times for contacting Customer Care by telephone are:

9am to 4pm Monday to Thursday.

9am to 12.45pm Friday.

Swift Group Website

www.swiftleisure.co.uk

Swift Group E-Mail Enquiry

enquiry@swiftleisure.co.uk

REPAIR FACILITIES

Should you be unfortunate enough to suffer a major accident with your caravan it is comforting to know that we have a completely separate repair shop facility where their fully trained experts will undertake all types of major damage repair work.

Repairs of a minor nature should be referred first to your local dealer.

The enjoyment of caravanning can be greatly enhanced by membership of one or more of the various caravanning, motoring and holiday clubs. Here are some useful addresses:

CARAVAN CLUBS

The Caravan Club,
East Grinstead House,
East Grinstead
West Sussex, RH19 IUA
Tel: 01342 326944
www.caravanclub.co.uk

The Camping and Caravanning Club,
Greenfields House,
Westwood Way,
Coventry,
West Midlands.
Tel: 01203 694995
www.campingandcaravanningclub.co.uk

MOTORING ASSOCIATIONS

Automobile Association (AA)
Fanum House,
Basingstoke,
Hants. RG1 2EA
Tel: 0990 448866
www.theaa.co.uk
e-mail: customer.services@theaa.com

RAC Motoring Services

RAC House,
M1 Cross,
Brent Terrace,
London, NW2 1BX
Tel: 0990 722722
www.rac.co.uk

Green Flag National Breakdown

PO Box 300,
1, Cote Lane,
Leeds, LS99 2LZ
Tel: 0345 670345

TRADE ASSOCIATION

National Caravan Council
Catherine House,
Victoria Road,
Aldershot,
Hampshire, GU11 1SS
Tel: 01252 318251
www.martex.co.uk/ncc
e-mail: mail@martex.co.uk

CRIS

HPI Equifax
Dolphin House,
New Street,
Salisbury,
Wiltshire SP1 2TB
Tel: 01722 411430/422422

Swift Group Limited
Dunswell Road, Cottingham,
East Yorkshire HU16 4JX
Tel: (01482) 875740
e-mail: enquiry@swiftleisure.co.uk
web site: www.swiftleisure.co.uk

© 2005 SWIFT GROUP LTD



Index

- A** Accessories 168
 Aftersales 176
 Air Conditioning 132
 Alarm System 58
 Alde Heating System 73
 AL-KO Running Gear 147
 Arrival on Site 19
 Ash Framed Doors 141
 Awnings 142
- B** Barbeque Point 121
 Battery 54
 Bedding 124
 Blinds 126
 Blizzard Air Conditioners 132
 Brake Linkages 152
 Braking System 151
 Breakaway Cable 15
 Bunks 125
- C** Caravan Clubs 177
 Caravan Terms 2
 Cassette Toilets 117
 Chassis Number 24
 Children 23
 Comet Roma Single Lever
 Mixer Tap 33
 Corner Steadies 10
 CRIS 177
- D** Doors
 Entrance 127
 Ash Framed 141
 Doorscreen 126
 Driving Licence 4
- E** Electrical Control Module 51
 Electrical Control Panels 46
 Electricity Supply 40
 Arrival on Site 40
 Consumption Figures 43
 Generator 58
 Mains Inlet Cable 42
 Overseas Connections 41
 12V 60
 Electrical Supply Module 50
 Escape Paths 23
- F** Fault Finding 172
 AL-KO Running Gear 166
 Cassette Toilet 175
 Gas 174
 Water 172
 Fire 22
 Fire Extinguisher 23
 Flyscreens 126
 Fumes 24
 Fuses (DC) 53
 Fuses (road lights) 50
- G** Gas Supply 37
 Butane 37
 Connection 39
 Fault Finding 174
 Flue Installations 39
 Gas Bottles 37
 Hoses 37
 Precautions 38
 Propane 38
 Regulator 37
 Safety Advice 38
 Ventilation 39
 Generator Guidelines 58
 Glossary and Checklist 4
 Grill 110
- H** Habitation Relay 58
 Handling 17
 Heating 67
 Heki Rooflight 127
 Hob 109
 Hotplates 110
- I** Inboard Water Tanks 30
 Insurance 24
- J** Jacking Points 19
 Jockey Wheel 169
- L** Levelling 19
 Loading and Distribution of Weight 7
- M** Maintenance 143
 Exterior 144
 Interior 144
 Modifications/DIY 144
 Winterisation/Storage 145
- Microswitch Taps 32
 Microwave Oven 113
 Mirrors 16
 Motoring Associations 177
 Motorway Driving 17
 Moving Off 16
- N** Noseweight 4
- O** Omnivent Rooflight 131
 Oven 111
 Overseas Electrical Connections 41
 Owners Club 176
- P** Passengers 15
 Preparing for the Road 7
 Loading & Distribution of Weight 7
 Other Considerations 9
 Pre-load Checklist 7
 Pre-low Checklist and
 Hitch Up 10
 Stability 8
 Towing Vehicle - Rear
 Suspension 8
 Pullman Bunks 125
- R** Reading Lamp (12V) 142
 Refrigerators 83
 Dometic RM7371 & RM7291 84
 Thetford Absorber 94
 Reich Kama Single Lever
 Mixer Tap 34
 Repair Facilities 176
 Reversing 17
 Road Lighting 14
 Rooflights 127
- S** Safety and Security 21
 SC20 Control Panel 73
 Security 24
 Services 27
 Electricity 40
 Gas 37
 Water 30
 Shock Absorbers 168
 Shower 141
 Smoke Alarm 22
 Solar Panel 57
 Space Heaters 67
- Spares and After Sales 176
 Speed Limits 17
 Stability 8
 Stopping on a Hill 19
 Stoves Hobs, Grills and Ovens 109
- T** Tables 141
 Taps 32
 TEB Fan 70
 Thermal Insulation 39
 TP 5000 Thermostat 79
 Thetford Absorber Refrigerator 94
 Thetford Cassette C-200 117
 Towing Code 2
 Towing Vehicle Terms 3
 Trade Associations 177
 Transformer/Charger Unit 52
 Truma Compact Crystal 2 29
 Truma Space Heaters 67
 Truma Ultraheat Heating 70
 Truma Ultrastore Water Heater 64
 Truma Waterline 31
 TV aerials 122
 TV Inlet 121
 Tyres 169
- V** Ventilation 23
- W** Water 28
 Heater 64
 Pumps 29
 Tanks and Systems 30
 Weights 2
 Wheels 10
 Changing 18
 Rims 10
 Torque 18
 Windows 127
 Winter Maintenance
 and Storage 145

