

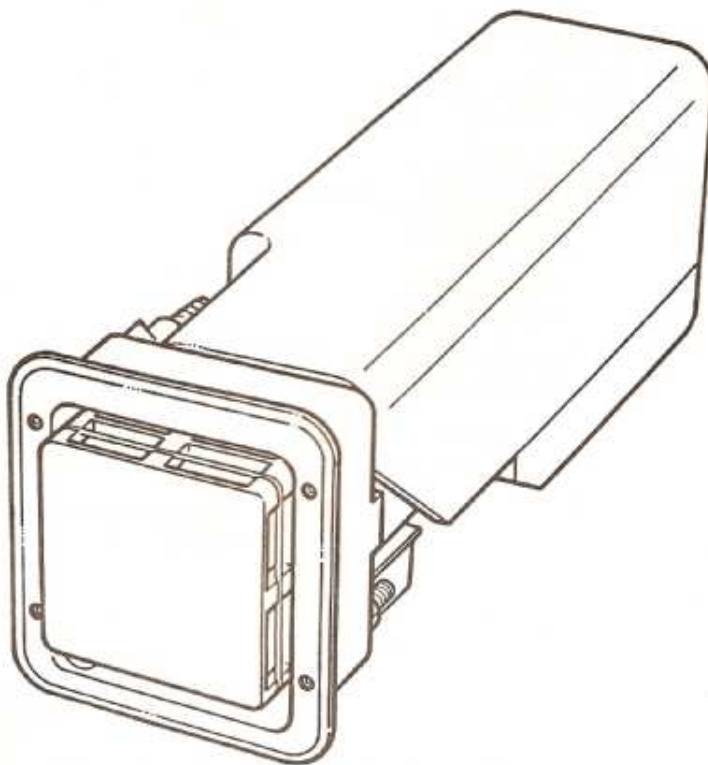
CARVER

CASCADE 2

&

CASCADE 2 GE

CARAVAN WATER HEATER



INSTALLATION INSTRUCTIONS

LEAVE THESE INSTRUCTIONS WITH THE USER

1:0 SPECIFICATIONS

| | |
|-------------------|---|
| Water capacity | 9 litres (2 gallons) |
| Water connections | Male nozzles to suit 12mm bore reinforced hose. The cold inlet incorporates a non-return valve. |
| Water supply | Maximum recommended pressure from pump 1.4bar (20p.s.i.) or from header tank 13m (40ft) head. |

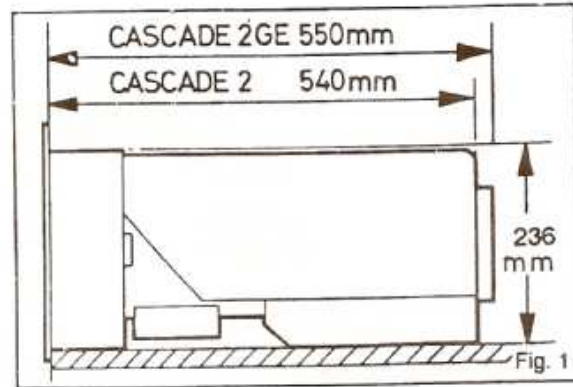
NOT SUITABLE FOR DIRECT CONNECTION TO THE MAINS WATER SUPPLY.

| | | |
|--------|-------|---------------------|
| Weight | Empty | 5.64 kg (12.4 lbs) |
| | Full | 14.64 kg (32.4 lbs) |

| OPERATION | GAS | MAINS ELECTRIC |
|------------------------|---|--|
| | Cascade 2 & 2GE | Cascade 2 GE only |
| Temperature Range | 70°C approx. non-adjustable | 70° C approx. non-adjustable |
| Insulation Heat Loss | 3° C per hour | 3°C per hour |
| Efficiency | Better than 75% | N/A |
| Gas Connection | Female DIN coupling to suit 8mm or ¼" o/d copper pipe. | N/A |
| Gas Supply Pressure | Butane at 28 mbar OR Propane at 37 mbar | N/A |
| Gas consumption | 87 gm/hr (3oz) when firing. Approx 140 grams (5oz) per day to supply 23 litres (5 gallons) of hot water. | N/A |
| Electrical Supply | Nominal 12v DC Negative earth only | 220-240v AC. 50 Hz |
| Electrical Consumption | 250 mA Heating 25 mA Standby | 2.75A at 240v (660w) 2.5A at 220v (605w) |
| Fuses | Not Supplied 5A Recommended | Not Supplied. 5A recommended |
| Warm up Time | Typically some water at 55°C to 60°C available after 30 mins of switching on. | Typically some water at 55°C to 60°C available after 55 mins of switching on. |
| User Control | Remote controller with indicator lights, supplied with heater. | Not supplied. Recommended Double Pole illuminated switch outlet with a contact gap of at least 3mm in each pole and fused at 5 amp. |
| Safety Features | Pressure relief valve set at 3 bar and fusible plug set at 96°C both venting onto burner. | As Gas Only plus over temperature thermostat with manual reset at 85°C |
| Other Features | The electronic burner control features protection against flame failure, gas supply interruption and low voltage. | |

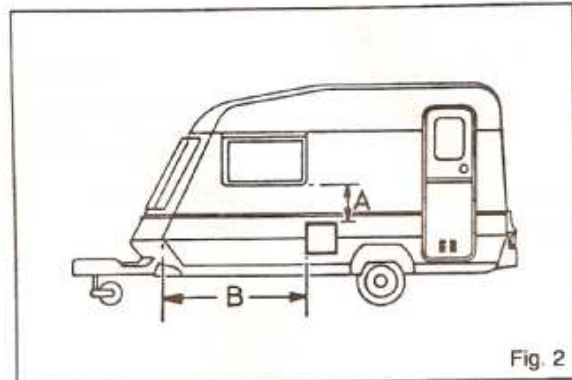
4:0 SELECTING THE POSITION

Choose a flat vertical wall without interference of trims etc. if possible.
 Ensure that the overall depth of the heater will fit into the locker or cupboard (see fig 1).
 Ensure that any trims can be refitted or cut to make a water tight seal and a neat installation.
 Structural sections within the walls of the caravan should be avoided for safety reasons.
 Ensure the rear of the appliance (ie tank end) is always supported or fitted at floor level.



4:1 BALANCED FLUE TERMINAL POSITION

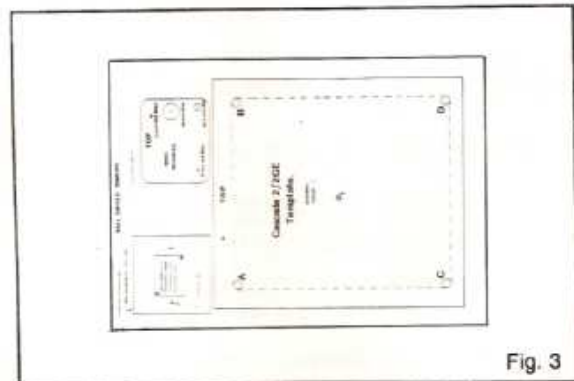
| Location | Minimum dimension |
|-------------------------------|-------------------|
| A Below an opening window | 300mm |
| B Vertical corner (see fig 2) | 600mm |



5:0 CUTTING THE HOLE

At the centre fold of these instructions you will find a sheet of paper on which is printed the template for fitting the heater and the wallswitch.

Remove the template from these instructions (see fig 3.) and separate it into two templates.



6:0 INSIDE THE CARAVAN

Temporarily tape the template to the inside wall at the position required. Ensure that the bottom of the template, i.e. the line CD, is to the floor or above any strength beam in the base of the wall. Mark the 'O' position through the template onto the wall.

Remove the template and drill a 4mm dia. hole through the inner and outer walls at the 'O' position. Ensure that the drill is kept square to the wall.

7:0 OUTSIDE THE CARAVAN

The pilot hole drilled through the wall will allow the template to be positioned correctly on the outside wall.

Tape the wall template (see fig 4.) and align the 'O' position with the previously drilled hole. Ensure that the template is square to the caravan body. The line CD should be level with the caravan floor or above any strength beam on the base of the wall.

Drill four 10mm dia. holes at the positions A, B, C, & D as shown on the wall template. The drill should pass through the inner and outer walls. Using a jigsaw or padsaw cut to the lines shown on the template. (see fig 5)

Remove all traces of the template and masking tape from the caravan wall.

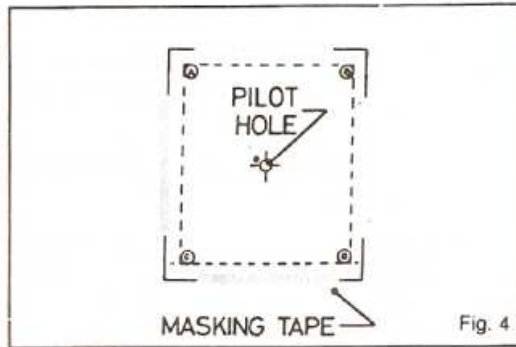


Fig. 4

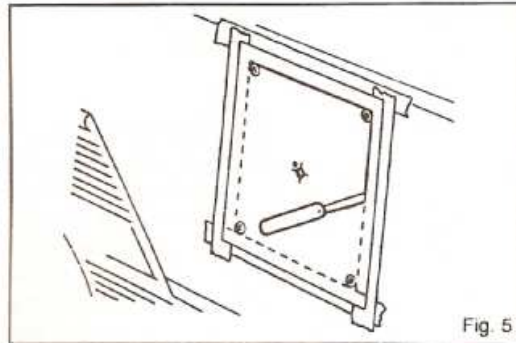


Fig. 5

8:0 LINING THE HOLE

The hole in the caravan wall must be lined with timber to give a firm support for holding the heater in position. (see fig. 6)

Before fitting the timber lining first remove any insulation from between the inner and outer walls to the depth of the timber. The finished hole size should be 240mm x 212mm.

Use a silicone sealant to seal the lining to the inner and outer walls. Secure the inner walls to the lining with panel pins. The panel pins should be fitted within 10mm of the edge of the hole at the top and sides only. Trim the edges of the hole to remove any burrs etc... The use of silicone sealant is to prevent water from entering the walls and floor of the caravan.

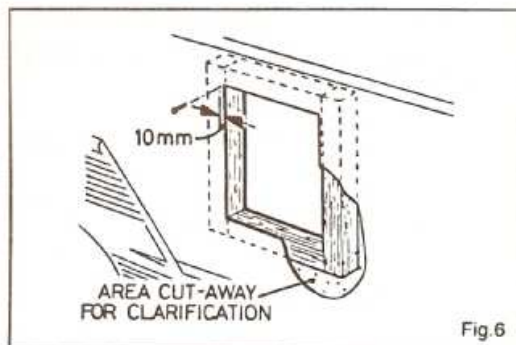


Fig. 6

9:0 240 VOLT CONNECTION (GE ONLY)

Any work on mains electric should be carried out by a competent electrician working to the current IEE Regulations.

Ensure the caravan is isolated from the mains supply before starting any work.

The illuminated double pole switched outlet fused at 5amp should be located in a position convenient for easy operation by the user, ie. on the outside of the bedding locker adjacent to the Cascade 2 GE. The mains cable should be connected from the fused outlet to either the RCCB or joined into the existing wiring via a 15amp junction box.

The cable required to connect the Cascade 2 GE to the fused mains outlet should be to a minimum standard of 3 core double sheathed (blue, brown and green/yellow) with a cross sectional area of 1.5mm². Estimate the length of cable required from the fused outlet to the Cascade 2 GE and allow extra to enable the heater to be partially withdrawn through the side of the caravan with-out disconnection.

Remove the plate covering the electrical connections of the Cascade 2 GE.

Prepare the end of the cable as shown in fig. 7.

Pass the prepared end through the cable entry and under the cable clamp.

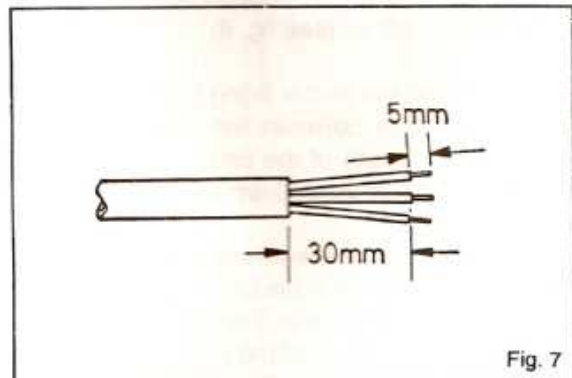


Fig. 7

Connect the cable into the three way terminal block (see fig 8). The brown wire is connected to the terminal marked 'L', blue to the 'N' and the green/yellow to the 'E'

Tighten the cable clamp taking care not to damage the cable or screws.

Replace the cover plate with the 3 screws provided.

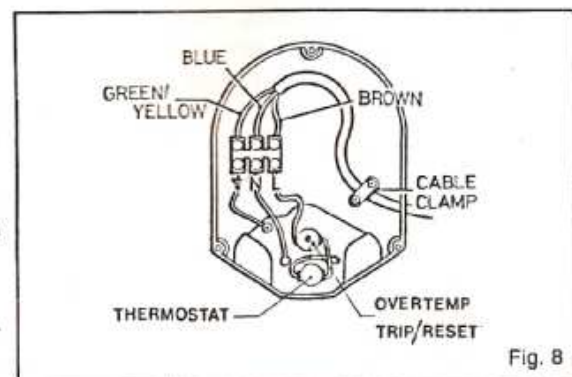


Fig. 8

10:0 WATER CONNECTIONS

10:1 Use ONLY reinforced FOOD QUALITY opaque hose to avoid unpleasant tastes and smells in the water.

Note: the reason for the use of opaque hose is that this reduces the possibility of the build up of algae in the system.

10:2 When connecting into the water supply pipes it is advisable to use a 'Y' connector as this does not reduce the flow to the same degree as a 'TEE'. (see fig.9)

Connect the cold feed hose for the heater to the existing cold water supply by the use of a 'Y' connector. Allow enough length on the hose to make the connection to the heater through hole in the wall of the caravan (see fig. 10).

Complete the hot water system allowing enough hose to make the connection to the heater through the hole in the caravan wall.

10:3 Pumps & Taps

Taps which control the pump by a switch in each tap are considered most suitable but the heater will also work on systems using a pressure switch to control the pump (provided that the pressure operating the switch is below 1.4bar). Where a pressure switch is used temperature fluctuations can be expected when showering.

11:0 FITTING THE HEATER

11:1 Ensure that the 4 core cable is connected to the electronics module at the bottom of the heater.

Offer the heater through the hole in the wall making sure that the multicore cable and the 240 volt cable in the case of the C2GE are not trapped under the heater.

Make the water connections... The cold water inlet is fitted to the bottom hose connector of the heater, this connector also incorporates a non return valve. The hot water flow hose fits to the top connector. Secure the hoses to the connectors using suitable pipe clips. (see fig. 11)

Coat the black flange with a film of mastic to provide a water tight seal with the caravan wall.

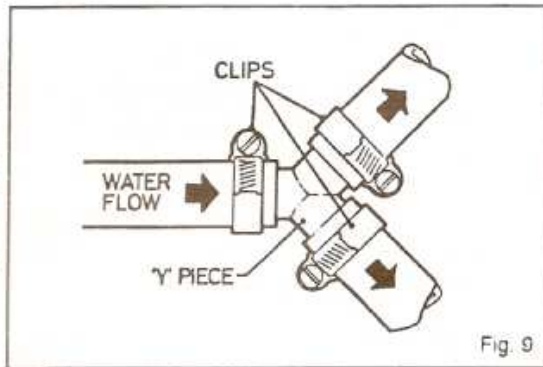


Fig. 9

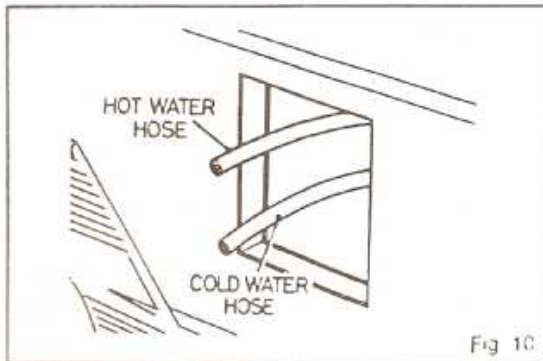


Fig 10

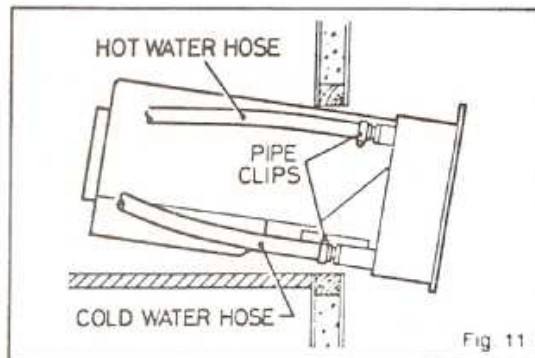


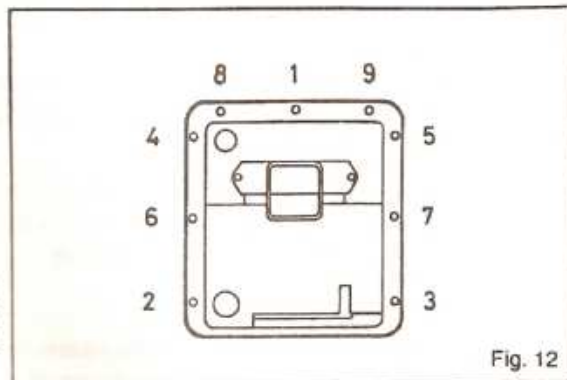
Fig 11

11:0 CONTINUED

Push the heater fully home and using the flange holes as a guide drill through the outer skin of the caravan wall with a 4mm dia. drill.

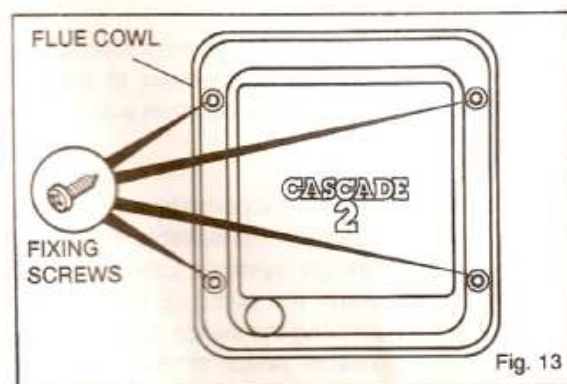
Secure the heater flange to the wall by progressively tightening the screws to compress the mastic seal. (see fig. 12)

If this water heater is fitted above floor level, support the underside of the water heater tank insulation so that the tank is horizontal, and there is no strain on the outer wall.



11:2 Remove any excess mastic taking care not to damage the caravan paintwork.

Fix the cowl into position on the flange using the four stainless steel screws. Ensure that the cowl is the correct way up. (see fig. 13)



12:0 FINAL 240 VOLT CONNECTION (GE ONLY)

Take note of recommendation made in section 1:0. The 240 volt wall switch should be located in a position convenient for easy operation by the user. e.g. on the outside of the bedding locker. The mains cable should be either directly connected to the RCD or joined into the existing wiring via a 15amp junction box.

Connect the heater cable to the fused outlet supply. Clip the cable securely to the caravan structure and ensure that the cable is long enough to allow partial withdrawal of the heater through the caravan wall for servicing.

13:0 WALL SWITCH

Remove the backing from the wall switch template and place in the required position. Take note that the 4 core cable is only 3 metres long. Therefore run the cable to the wall switch location before drilling any holes. Drill the holes to the sizes shown on the template.

NOTE: Spare cable should be allowed at the heater module to allow servicing to be carried out.

Fix the wall switch with the two screws provided.

Feed the 4 core cables and power 2 core cables through the 18mm dia. hole and connect onto the input pins (see fig. 14)

Connect the wall switch to the 12 volt supply.

The Caravan wiring colour code is as follows:

Green... 12 volt positive (live)

White...12 volt negative (earth)

Note: some caravans are wired with blue as positive (live) so exercise caution on the 12 volt wiring.

Note: A 5 amp fuse must be fitted in the supply to the heater.

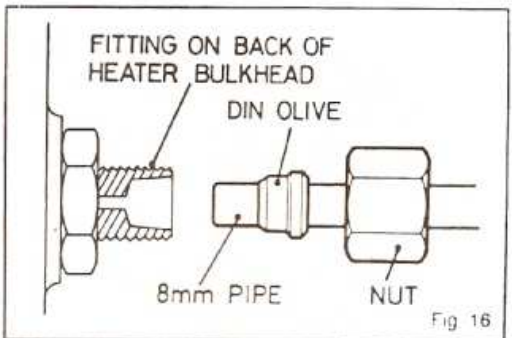
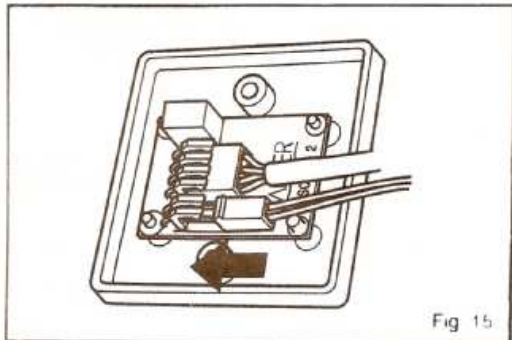
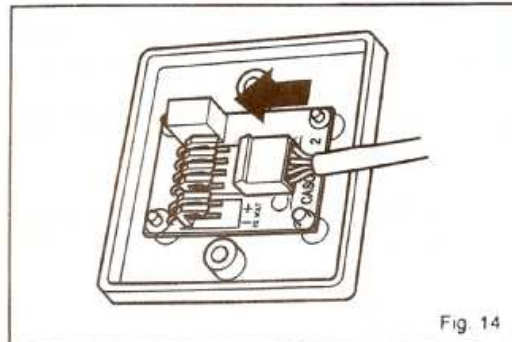
Ensure that the polarity of the wiring to the wall switch is correct. (see fig. 15)

14:0 GAS CONNECTION

Ensure that the gas supply is turned off at the cylinder.

Connect the heater to the caravan gas system via. an approved isolating valve. The gas inlet fitting is suitable for 8mm or 1/4" dia. copper pipe. The 8mm dia. pipe DIN gas fitting should be assembled as in fig. 16. The olive for the 1/4" dia. pipe is symmetrical.

It is recommended that a 25mm dia. gas drop hole be drilled through the floor adjacent to where the gas supply joins the heater. When this recommendation is followed the gas feed must be separated from the bedding locker with an enclosure to maintain compliance with the caravan ventilation regulations. The bedding locker lid may form the top of the enclosure to give access to the isolating valve.



14:0 CONTINUED

Turn on the gas supply at the cylinder and leak test the gas system using soapy water or other approved methods.

15:0 FINAL TEST

Recheck the installation and where necessary clip any pipes and cable securely.

Turn on the gas at the cylinder and at the isolating valve.

Switch on the 12 volt supply.

Place the pump in a full container of water.

Turn on the hot taps until air free water flows from the taps, this will indicate that the heater is full of water.

16:0 TO USE GAS HEATING

1...Ensure that the gas and 12 volt supply are on.

2...Turn on at the wall switch

3...If a green light shows continuously then the heater is working satisfactorily.

4...If green and red lights show after approx. 10 seconds press the OFF button, wait 3 minutes and press the ON button again.

5...If green and yellow lights show then the voltage to the control is too low. Recharge the battery. (See Fig. 17)

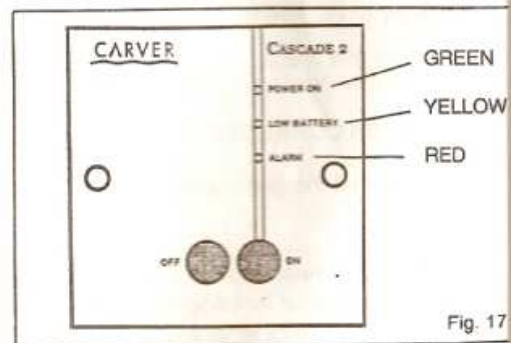


Fig. 17

17:0 ELECTRIC TESTING (GE ONLY)

1...Ensure that the 240 volt supply to the caravan is connected and that the RCD is switched on.

2...Switch on the 240 volt supply to the heater.

3...Wait to check that the water is warming.

18.0 HEATER FAULT TRACING GUIDE

| GAS OPERATION | | | |
|---|--|---|---|
| Primary Symptom | Secondary Symptom | Cause | Cure |
| When switching on from cold no indicator lights come on | Heater does not operate | Reversed power supply | Check connection from caravan wiring to wall switch |
| | | Power not reaching heater | Check wiring from wall switch to caravan supply |
| | | Fuses not in place or blown | Check for wiring fault and replace fuse |
| When switching on from cold green light only comes on and stays on. | Heater does not operate No fail light. Ignitor not working. Gas valve not working. | Multi-pin plug disconnected at wall switch or heater. | Re-connect multi-pin plug |
| When switching on from cold green & yellow lights come on | Heater does not operate Battery condition low causing pump to run slowly. | Voltage at wall switch below 10.5v | Charge up caravan battery |
| When switching on, green light comes on and after 10 seconds the red as well. | When listening to the heater during this sequence a click should be heard followed by intermittent ticking for 10 seconds. | Air in gas supply pipe | Purge pipe by switching off and off again. Repeat if necessary. |
| | | No gas supply | Check isolation valves & bottle |
| | | Incorrect gas pressure | |
| | | Intake of flue obstructed | Check and clear |
| | | Water coming from cowl | Pump pressure too high |
| Yellow light comes on when pump is operated | Pump runs slowly | Poor connection at multi-pin plug in wall switch or on heater | Pull out and reinsert plugs |
| | | Low battery voltage or inadequate pump wiring | Check and charge battery. If not successful. Check wiring. |
| Red light comes on after about 30-45mins. with water and steam from cowl | No continuous water flow from cowl when pump is running | Pressure relief valve operating on temperature rise | Pump pressure too high |
| | Continuous water flow from cowl when pump is operated | Fusible plug blown indicating thermostat failure | Do not continue to use heater. Seek service attention. |
| MAINS ELECTRIC OPERATION | | | |
| Mains immersion heater does not operate | Indicator light on isolating switch not alight | Caravan not connected to site supply | Connect |
| | | RCD in caravan tripped | Reset and try again. If not successful seek service attention. |
| | | Site supply not adequate | Switch off. Seek warden attention. |
| | Indicator light on isolating switch alight | Over temp. thermostat operated | Check water & press reset button |
| | | Fails again | Switch off & seek service attention |

IF FAULT PERSISTS CONSULT YOUR CARVER APPROVED DEALER.

CARVER

CASCADE 2 & CASCADE 2 GE

CARAVAN WATER HEATER USER'S INSTRUCTIONS

CAUTIONS

THE water heater flue cowl is located on the outside of the caravan and must not be obstructed in any way. During winter caravanning do not use if the cowl is likely to become blocked with snow. **ALWAYS** wait 3 minutes before attempting to relight the heater after switching off or the heater going to fail-safe shutdown.

WATER heaters (as with all other gas appliances) should be switched off and the gas cylinders turned off when the caravan is in motion.

THIS water heater does not contain asbestos or asbestos related products.

ANNUAL SERVICE As with all gas appliances it is recommended that this heater be serviced annually by a Carver approved dealer only.

FROST and sterilising see separate note on the back page.

If you have any problems with this water heater seek the advice of your nearest Carver approved dealer.

GENERAL DESCRIPTION

The Cascade 2 and Cascade 2 GE are storage water heaters with a 9 litre (2 gallon) capacity. The heater is installed through the wall of the caravan with only the flue cowl visible.

All the gas operational parts are contained within a single module which can easily be removed by a competent gas fitter from the outside of the caravan.

Control of the gas operation of the Cascade 2 and Cascade 2GE is made from the wall mounted remote controller inside the caravan. On the front are the indicator lights which show the state of the heater. The lights on this controller do not show that mains electricity is being used.

The Cascade 2 GE requires the use of mains electricity which can be used as an alternative to the gas operation or used with the gas to facilitate a faster warm-up. The immersion element can be used on 220 or 240 volt 50Hz and is rated at 605 and 660 watts respectively. The mains operation should be via a double pole switched outlet with a contact gap of at least 3mm in each pole fused at 5 amp.

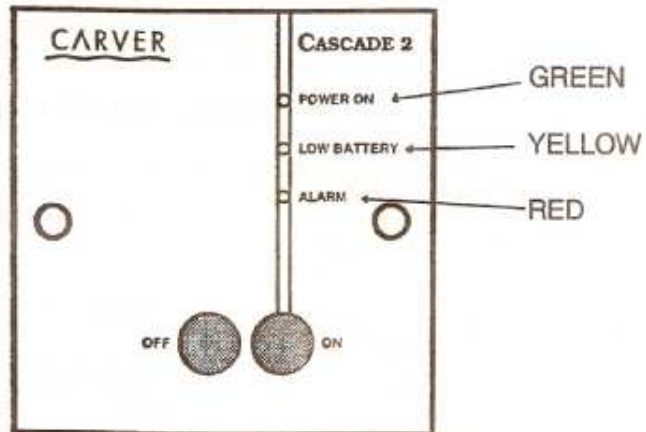
The thermostat for the mains electric and gas operation is not adjustable and is set to give a water temperature of approximately 70°C.

Two safety features are included on the Cascade 2 these being:

- 1) A pressure relief valve which opens if the internal pressure exceeds 3 bar (44 p.s.i.) then closes when the pressure drops.
- 2) A fusible plug located behind the cowl. If the temperature rises to high this plug melts and sprays water onto the burner thus causing the heater to close down.

The cascade 2 GE in addition to the above safety features also incorporates a resettable high limit thermostat.

GAS OPERATING INSTRUCTIONS CASCADE 2 & CASCADE 2 GE



1. BEFORE SWITCHING ON

- a. Ensure that the gas is turned on and that the system is full of water i.e. water flows from the hot taps.
- b. Check that the 12 volt supply is connected and switched on. DO NOT use a battery charger as the only source of supply.

2. TO LIGHT THE HEATER

- a. Press the ON button
- b. A continuous green light indicates that the heater is working satisfactorily.

3. TO SWITCH THE HEATER OFF

- a. Press the OFF button.

4. THE LIGHTS INDICATE

- a. GREEN. The heater is working satisfactorily.
- b. GREEN AND YELLOW. The DC voltage is below the 10.5 volts that is required to operate the heater. Recharge the battery.
- c. GREEN and RED. The heater has failed to ignite or that the heater has gone to safety shut down. This is usually due to failure of the gas supply or air in the gas system after fitting a new cylinder.
Switch the heater off and WAIT 3 MINUTES before attempting to relight the heater.
If air in the gas system is the problem several attempts may be necessary before the heater ignites.

MAINS ELECTRICITY OPERATING INSTRUCTIONS CASCADE 2 GE

Ensure that the caravan is connected to the site mains and the supply is adequate. (the immersion heater uses approx 2.75 amps.)

1. TO SWITCH ON

Switch on the isolation switch. If it is the illuminated type the light should indicate that the heater is working.

2. THERMOSTAT

The thermostat can not be adjusted and is pre-set to approx 70°C.

3. OVER TEMPERATURE

IMPORTANT

If the mains electrical supply to the heater is switched on but the heater is not working the over temperature thermostat may have operated.

This can be due to:

- a. Switching the heater on without water in the tank. Always check that the heater is full of water before switching on.
- b. Failure of the normal operating thermostat.
Manually reset the over temperature thermostat by pressing the button in the centre of the electrical connection box. If the operating thermostat has failed the over temperature thermostat will again trip out. If this occurs **DO NOT USE THE IMMERSION HEATER AND CONSULT YOUR CARVER DEALER.**

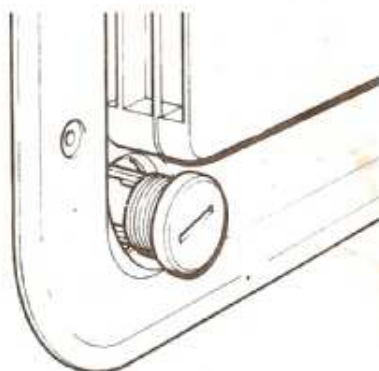
FROST PRECAUTIONS

IMPORTANT

During periods when the heater is likely to freeze (e.g. when the caravan is stored during the winter) it **MUST** be drained down to prevent damage.

TO DRAIN THE SYSTEM PROCEED AS FOLLOWS:

1. Park the caravan on level ground.
2. Ensure that the gas and electricity are turned off.
3. Open all hot and cold taps and shower heads if fitted.
4. Remove drain plug and store in safe place in caravan (e.g. kitchen sink).



The water system will now drain-this is likely to take considerable time (at least one hour). Remember that at least 9 litres (2 gallons) of water should drain from the system.

At the start of the season insert the drain plug and sterilise the system by using a sterilising fluid, e.g. Chempro SDP or similar.

DO NOT USE DOMESTIC BLEACH, CAMDEN TABLETS OR SODIUM METASULPHIDE.

(If a Crystal Water System is fitted, remove the filter and refit only the end cap of the filter as the carbon filter reduces the effectiveness of the sterilising agent. It is recommended to fit a new filter at the start of the season.)

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