GUARANTEE

Your ZIG product has been designed to give long and trouble free service, if it should fail to function correctly, please return it to the manufacturers stating where and when it was purchased, together with FULL details of the fault, noting that we cannot be responsible for goods inadequately packed, damaged in transit, or unidentified.

If the manufacturers consider that the problem is due to faulty components or workmanship, the unit will be repaired free of charge.

This guarantee does not affect your statutory rights.

ZIG ELECTRONICS LTD.,
[redacted]

THE ZIG C.F.10 CARAVAN & BOAT BATTERY CHARGING & DISTRIBUTION SYSTEM

INSTRUCTIONS FOR FITTING AND USE

ZIG ELECTRONICS LTD.,
[redacted]

INSTRUCTIONS FOR FITTING

Please read these instructions carefully before installation.

Choose a suitable position for the unit, considering the following points:-

Air should be allowed to move freely over the back of the unit.

Access to the mains inlet socket will be required, so the position of the C.F.10 and this socket should be chosen at the same time.

Access to the caravan battery and the wiring to the accessories will also be required.

A suitable position will usually be found in the side of a wardrobe, cupboard, etc., provided access to the rear of the box is allowed for wiring.

Cut a rectangular hole 220mm(8⅝") x 80mm (3⅛"), the C.F.10 will overlap this hole thereby covering any jagged edges.

To clear the connection to the fridge, there must be 235mm (9¼") clearance behind the panel.

Fit the unit into the hole, using battens at the rear of the screw holes, if the panel is very thin. Glueing the battens will assist removal of the unit, if necessary. Secure with screws provided.

Wiring

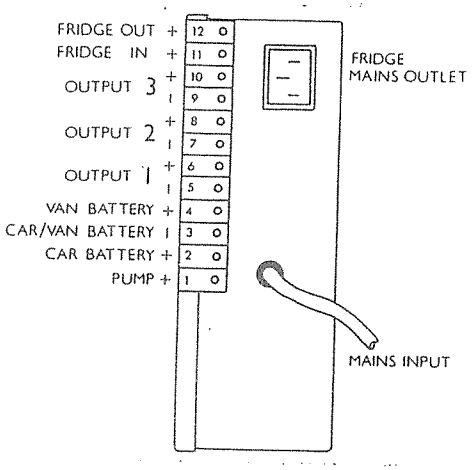

Figure 1
Terminal Connections to the C.F.10

Suitable cable can be bought from most car accessory shops. Great care should be taken in wiring the unit, its performance will depend on how this is done - **UNDER NO CIRCUMSTANCES USE CABLE SMALLER THAN RECOMMENDED.**

Using cable of at least 2mm² (28/03) refer to *Figures 1 and 2*, and connect terminals 1 and 2 (Vehicle Battery) to the 12S cable (Supplementary 7 core, usually grey) as follows:-

No.3 on C.F.10 to No.3 on 12S (Negative)
No.2 on C.F.10 to No.4 on 12S (Positive)

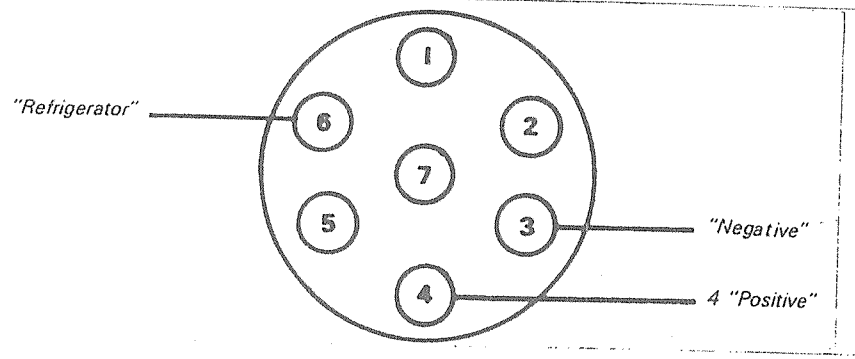

Figure 2 The 12S Socket

Do not connect your car at this stage.

If you are wiring a boat or motorised caravan, connect No.3 to earth, and No.2 to the positive terminal of the main battery, the starter solenoid provides a convenient connection in most cases.

A 25 amp line fuse must be fitted in the positive line (No.2 on C.F.10) as near to the alternator as possible.

At this stage a suitable position for the auxiliary battery should be chosen. The position should be ventilated at the battery top level and in boats should be kept well away from liquid gas containers. The battery should be mounted so that it cannot tip over and the surface beneath it should be protected from corrosion due to accidental spillage. Connect the battery using 2mm² (28/03) cable to the C.F.10 fitting the in-line 25 amp fuse (supplied) in the positive cable as near as possible to the battery.

Battery positive (via fuse) to No.4 terminal block on C.F.10
Negative to No.3 terminal block on C.F.10

Never use crocodile clips to connect the battery, these deteriorate quickly and are a fire risk.

Always use proper terminals and screws and smear the connections with petroleum jelly.

Batteries

Choice of battery will be dictated by the space available the cost and the amount of use, but it must be of the lead acid type, 6 cells and 12 volts. For most installations, a battery of between 40 and 50 ampere/hour will suffice. Car

batteries are designed to supply the very high current required to start an engine, this sort of use is never called for in a caravan and it is therefore not necessary to buy expensive multi-plate types for caravan use. One of the latest maintenance-free batteries designed for the purpose will give the best service. On average a fully charged battery will last approximately one week with careful use, 3/4 weeks with help from the car, as explained in the section "Selection of the 12 volt source". Under no circumstances use a battery which has been scrapped for car use due to faulty cells etc., always purchase a new battery which will give years of service.

Before making any further connections, temporarily remove the in-line fuse from its holder. For motorised and boats, remove the other in-line fuse, as well.

The various accessories can now be connected to the C.F.10 sharing the load between the three 10 amp outlets as equally as possible. The outlets are wired to No's 6, 8 and 10 (all positive) and the corresponding negative connections are No's 5, 7 and 9. As all the negative connections are joined to each other, it does not matter which are used for each fuse outlet. The water pump has a separate switched outlet - terminal 1. The following system is suggested:-

Water pump to No.1 and 5, Awning Light, Water Gauge etc. to 5 and 6
Fan, cooker hood, etc. to No's 7 and 8.
Lighting to No's 9 and 10.

UNDER NO CIRCUMSTANCES MUST A REFRIGERATOR BE CONNECTED TO THE OUTPUT TERMINALS.

Due to the high current drawn by refrigerators, they should only be wired to a main battery in such a way that they only operate whilst the engine is running. A Zig RM12 relay will ensure that the main battery will not be flattened by use without the engine running.

Do not attempt to connect to terminals 2 on the C.F.10 this will prevent adequate battery charging. The fridge is supplied via the 15A fuse on the front panel, connections being made to terminals 11 and 12 as shown in the diagram.

When all the 12 volt connections are complete, the mains connections can be made. The mains input plug and socket should be of the polarised type, i.e. connection can only be made one way round. Suitable sockets can be obtained from caravan accessory shops and chandlers. They should be to B.S.4343. Fit the socket in a suitable position and connect the white mains cable as follows:-

BROWN	**to**	**LIVE**	**INPUT**
BLUE	**to**	**NEUTRAL**	**200/250 VOLTS A.C.**
GREEN/YELLOW	**to**	**EARTH**	**50/60 Hz.**

Do not connect the mains supply at this stage.

Check all the wiring carefully, looking particularly for stray strands which may short to earth. Protect the mains cable from damage by securing with cable clips.

Replace the auxiliary battery 25 amp line fuse and referring to "INSTRUCTIONS FOR USE" check that all the 12 volt accessories function correctly.

For motorised caravans and boats, replace the other 25 amp line fuse and check that current is available with the **"TOWING/ON-SITE"** switch in the **"TOWING"** position.

In the case of touring caravans, it is important to ensure that your car is properly wired before connecting to the van. If your car has previously been wired for touring, check carefully that it has been done in accordance with the following instructions. Alternatively proceed to wire the vehicle as follows:-

Wiring the Car

You are strongly recommended to fit the new 12S supplementary plug and socket to your car, for a number of reasons, the 12N original socket is now fully utilised for road lighting if fog lights are used, also the cable used with the 12S system is of a larger diameter and better suited to the large current demands of modern caravans. Connections are made as in *Fig.3*

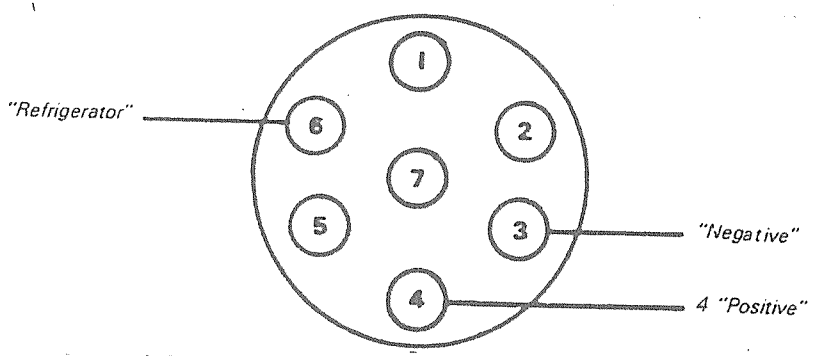

Figure 3 The 12S Plug

The cable used must have a minimum dimension of 2mm² (28/03). The connection to terminal 4 on the 12S must be taken right back to the vehicle battery and a 25 amp line fuse **MUST** be fitted in this line as near to the battery as possible. Remember that any cable between the battery and the fuse is unprotected and is a fire risk. This fuse is fitted to protect your car and passengers, as well as the caravan, and must **NOT** be omitted. Connection to terminal 3 on the 12S should be made directly to earthed metal at the rear of the car. If you are fitting a cable for a refrigerator, this goes to terminal 6 on the 12S, noting that a separate cable must be run back to the battery again with a 25 amp line fuse. Do not attempt to join terminal 6 to terminal 4, this will severely limit the charging current available and could result in the 'fridge flattening the caravan battery.

A much better method is to wire the 'fridge through a relay so that it will operate only when the ignition is on. A suitable relay is the ZIG R.M.12 which comes with fitting instructions.

When the car wiring is complete, the van can be connected and the ZIG system checked out as described in the "INSTRUCTIONS FOR USE".

Connecting the Mains

The mains supply should be obtained from a domestic supply of 200 to 240 volts from a fused connection point. If a 13 amp household plug is used, this should be fitted with a 3 amp fuse. The cable used to connect the mains should be 3 core sheathed flexible mains cable not less than 0.75mm² (6 amp) and should be regularly inspected for damage. When the mains is connected, switch on the 240V ON/OFF control on the C.F.10 and check that this lights up. Set the **"TOWING/ON-SITE"** switch to mains, and temporarily disconnect the batteries (by removing the fuses) check that the 12 volt equipment is working correctly. Reconnect the two batteries. Installation is now complete.

Split Chargers

With modern batteries, split chargers are not necessary, as batteries are now much more tolerant to equalisation. The relay type of split charger causes the major problem that current is only available from the vehicle battery when the ignition switch is on, thereby preventing use of the vehicle battery to assist the life of the caravan battery. The diode type of split charger causes voltage drop, this limits the charging current making it necessary to remove the battery for charging if mains is not available. If your car is already fitted with a split charger, we recommend that you remove - or bypass it. If you disconnect a split charging relay, ensure that a 25 amp line fuse is fitted next to the car battery, as described in **"Wiring the Car".**

Positive Earth Cars

The ZIG C.F.10 is designed to be used with negative earth systems only but can be adapted in various ways to opposite polarity. If this problem arises, **ZIG ELECTRONICS LTD.** will be pleased to supply further information on request.

Your ZIG power supply is rigorously tested to the British Standard for battery chargers, B.S. 3456 part 2 section 3.25 to ensure safe use under all conditions.

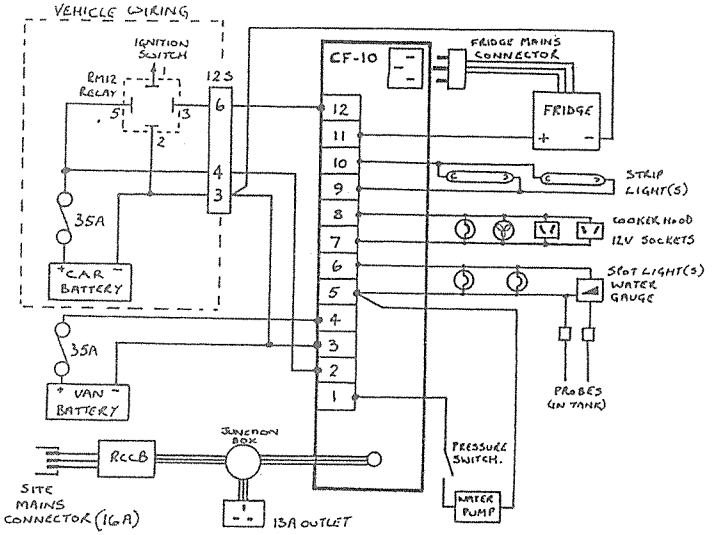

Figure 4 Suggested Wiring Diagram for the C.F.10

INSTRUCTION FOR USE

Please read these instructions carefully before operating the electrical equipment in your caravan.

1. **Using your 12 volt equipment**

   Turn on the **"12 volt switch"** and set the "CAR/VAN" switch to "VAN". The battery condition indicator will light either red or green, depending on the state of battery, and the 12 volt equipment in the caravan will be operative. This switch need only be turned off when the caravan is not in use. Note that the 'fridge is independently wired and is not controlled by this switch. If it is desired to use current from a car, set the "CAR/VAN" switch to "CAR". *(The car must of course be connected).*

2. **Charging from the Mains**

   Ensure that a mains supply is available to your caravan through the external mains input socket and set the "240V ON-OFF" to "ON". The "TOWING/ON SITE" switch should be set to the "ON SITE" position. Fully automatic electronic charging regulation is fitted to the C.F.10 this means that it will supply only the current the battery needs, overcharging will not occur.

   NOTE: It is not possible to charge the car battery from the ZIG unit.

3. **Charging from the Vehicle**

   When the caravan is attached to the car and the "TOWING/ON SITE" switch is set to the "TOWING" position, charging of the caravan battery will take place when the vehicle engine is running. The amount of charge depends on a number of factors - the state of charge of both batteries, the cable in use and the distance between the car and caravan batteries.

4. **Selection of 12 volt source**

   It is possible to choose the source of 12 volt current for the caravan from either the car or caravan battery. This facility will be found very useful when on sites without mains electricity, as it will allow the car to run the caravan equipment when it is on site, leaving the caravan battery well charged for periods when the car is moved. To use the car, simply connect the 7 pin plug and socket (either direct or through an extension lead) and set the "CAR/VAN" switch to "CAR" - when the car is removed, reset this switch to "VAN". IMPORTANT: to effect this operation the right-hand switch MUST be in the on-site position. It is important to remember that if the car is not driven for long periods and the switch is left in the "CAR" position. THE CAR BATTERY WILL BE FLATTENED.

4. Maintenance is not required other than to keep the front panel clean with a dry cloth. It is, however, important to make a check from time to time on the condition of wiring in the caravan, in particular, the seven pin plugs and sockets and the mains input connection.

The biggest consumer of current in a caravan is usually the lights - these are highly efficient in modern vans but they are used for longer periods than most other appliances. Take care that lights are not left on when not in use.
Water pumps use quite heavy currents but as they are only used intermittently, the total consumption is quite small.
Monochrome T.V.'s use quite small currents, but do remember to turn off after watching a programme. Colour T.V.'s should only be used when mains is available, as the consumption will flatten a 40 a/h battery in about 4 hours.
Take care when fitting extras to your van, they may use very small currents themselves, but a number of items left on for 2 weeks continuously could use all your available battery supply.
Lamps which use incandescent bulbs (car type), such as spotlights, etc., are very much less efficient than striplights and should only be used for short periods.
Note that these will accept an 18w or 21w car bulb instead of the original 10w supplied. Two 21 watt bulbs will drain your battery in about 8 to 10 hours.
If you use the type of shaver invertor with switched contacts, never leave your shaver lead plugged in.

Mains Electricity

The Zig Charging and Distribution unit is designed to run on 200 to 240 volt A.C. mains electricity. NEVER CONNECT TO A D.C. SUPPLY. In remote parts of Europe and the whole of the U.S.A., the supply is 110 volt A.C. The unit will not charge from the mains with this supply, although no harm will be done if it is connected to 110 volt. The 12 volt equipment will, of course, work normally, including charging from the car. Note that where the supply is low i.e. 200 volts, efficiency in mains charging will be reduced.

The C.F.10 has been specially designed to operate safely on mains electricity in a caravan. It is protected by a double pole mains switch, double wound mains transformer and fuses. It will remain safe even if the polarity of the mains is reversed. THIS DOES NOT APPLY TO OTHER MAINS EQUIPMENT IN THE CARAVAN. If you wish to fit extra mains appliances in the caravan, you should consult a qualified electrician and the use of an Earth Leakage Circuit Breaker is strongly recommended. Remember mains voltage can be fatal.

N.B. Mains charging cannot be effected with the switch in the "TOWING" position. Extra care should be taken with cars fitted with dynamos, as these do not provide as much output as alternators.

5. **The Battery Condition Monitor**

The purpose of this device is to warn that the caravan battery is becoming discharged. The red light will glow when the battery voltage is below 11 volts, above this voltage the green light will glow. No harm will come to the system or the battery if the accessories are used when the red light is on, and it will be found that possibly another few days reserve of current is available after the red light first appears. A true reading will only be given when all the 12 volt equipment is switched off and when neither charging system is in operation. The red light may come on when an appliance is switched on, this is normal - current surges cause momentary voltage drop. It is important to remember that the battery monitor is not a charging indicator. The fact that the green light is on does not mean that the battery is fully charged. Even with a flat battery the green light will glow if either charging system is operating, due to the high terminal voltage present at the battery.

6. **The Fuses**

There are 6 fuses fitted to the C.F.10.

The mains fuses are in the smaller of 6 fuseholders on the front panel and are standard 20mm x 5mm glass quick blow fuses. The fuse holders can only be removed with a screwdriver (this is to comply with electrical safety regulations).

The three 10 amp fuses mounted in the centre of the panel protect the various accessories connected to the ZIG system and are standard 1¼" glass quick blow fuses. Access to the fuses is by turning the holder ¼ turn in the direction of the arrow on the front.

The 15 amp fuse controls the 12 volt 'fridge.

All the fuses are available world wide from electrical and radio dealers. Under no circumstances should a fuse of a different type or value be fitted.

WARNING:

Under no circumstances should a fuse of different size or rating to that stated be fitted. Should a fuse blow for any reason the fault must be diagnosed before replacement.

7. **Using the C.F.10 as a Converter**

When a mains supply is connected to the caravan, the unit can be effectively used as a mains to 12 volt converter, to power the 12 volt equipment in the caravan. It does this by replenishing the power drawn from the battery and will automatically adjust this power to the amount being drawn from the battery. Note that the unit will work without a battery installed in the caravan, but we do not recommend this type of use, a battery provides the necessary smoothing required by the increasing number of electronic items being fitted to modern caravans - items such as strip lights, radio, T.V., water heaters, etc.

IMPORTANT NOTES

1. Due to the powerful output available, the unit will get quite hot during mains charging. An automatic thermal cutout is fitted, which will switch the unit off, if for any reason it reaches too high a temperature. It is important, therefore, not to obstruct the front of the case with clothing or similar items, this will cause the thermal output to operate more frequently and will reduce the efficiency. Note that the thermal cut-out is completely automatic, it will re-set when conditions return to normal.

2. The 12 volt part of the 'fridge is connected to the car via the C.F.10. Note that if it is switched on when the engine is not running, there is a risk of flattening the battery. It is recommended that a relay (RM12) is fitted to the vehicle to prevent this possibilty.

3. The 240V "ON-OFF" switch lights up to show that mains is connected to the caravan. It serves only to switch on and off the battery charger. The "FRIDGE", "ON-OFF" switch turns the supply to the 'fridge ON or OFF. Never connect any other mains equipment to the C.F.10.

FAULT FINDING CHART

SYMPTOM	REMEDY
12 volt appliances work but battery not charging from mains.	Check TOWING/ON SITE switch is in ON SITE position. Check mains fuses and Mains supply to caravan. If thermal cut-out has operated allow time for this to re-set.
12 volt appliances work from caravan battery only. Battery not charging from car.	Check car wiring, especially 7 pin plug & socket. Check car line fuse. N.B. if a split charger has been fitted to the car, power will only be available when the engine is running.
None of 12 volt appliances work.	Check battery line fuse. Check 12v switch is ON.
12 volt appliances work only when mains connected.	Check battery line fuse or battery connections.
Small T.V. picture and dim lights.	Battery nearly flat. Charge battery.
Battery monitor red light flickers when water pump operated.	Normal, due to voltage drop caused by motor surge.
Unit gets hot for long periods and thermal trip can be heard operating.	Faulty battery or excess current being drawn by appliances. Turn off some equipment until battery charged. If this persists, check battery for faulty cell.
Persistent blowing of one of 10 amp fuses.	Check the appliances supplied by this fuse. To isolate these, switch on all equipment, remove fuse and note which equipment stops working.
Battery line fuse blows when battery connections made.	Battery connected wrong way round.
Radio interference when mains charging.	Check battery line fuse, interference may occur if battery is very low, but will cease when it is fully charged.