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Zig Products are fully guaranteed for a period of 1 year from the date of first purchase against faulty workmanship or materials.

Zig Electronics Ltd will repair any such items free of charge provided they have been installed and used in accordance with our instructions.

In the event of a fault the product should be returned to the place of purchase for repair or replacement under the terms of this guarantee.

This guarantee does not in any way affect your statutory rights under the Sale of Goods Act, 1979.

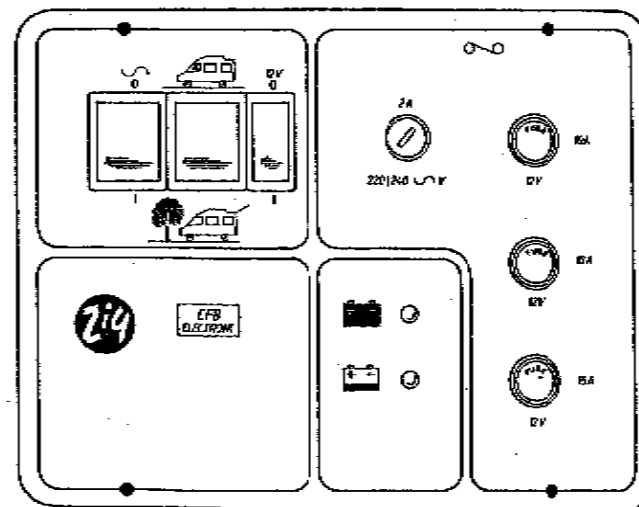
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THE ZIG C.F.8 MOTORHOME, CARAVAN & BOAT BATTERY CHARGING & DISTRIBUTION SYSTEM

INSTRUCTIONS FOR USE AND FITTING



IMPORTANT FEATURES

- Automatic electronic charging control.
- Suitable for touring, motorised caravans and boats.
- Mains battery charging, up to 12 amps depending on battery state.
- Charging from vehicle or boat generator.
- Mains voltage to 12 volt conversion - up to 4.5 amps continuous current.
- Switched selection of source, car/boat or auxiliary battery.
- Double pole illuminated mains switch.
- Safety - The C.F.8 incorporates no less than 6 protection devices to eliminate overheating and overcurrent problems.
- Complies with I.E.C. and SMMT regulations.



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INSTRUCTION FOR USE

Please read these instructions carefully before operating the electrical equipment in your caravan. * An asterisk denotes reference to Figure 1.

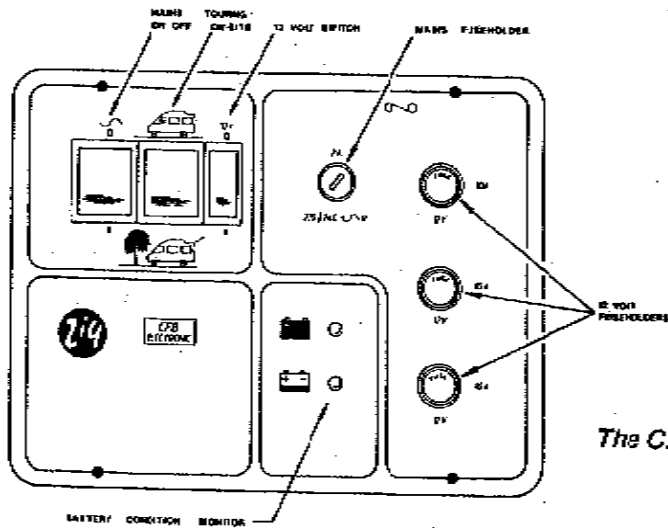


Figure 1
The C.F.B Control Panel

1. The Caravan/Boat Battery

If the manufacturer, or your dealer, has not fitted a battery, we recommend that one is fitted in order to get the best out of your ZIG electrical system. Most manufacturers allocate a space for the battery and supply the necessary cable for connection. In this case, simply locate a new battery in the space provided and connect the wires to the battery; red to positive, black to negative. The 25 amp line fuse (supplied) should be connected in the positive lead. Note that if blue and white wires are used blue is positive, white is negative. It is important that a proper connection is made to the battery using terminals and screws. Crocodile clips must never be used, they deteriorate quickly and are a fire risk. A smear of petroleum jelly should be applied to the battery terminals. See No.4 in "Important Notes", regarding batteries.

If the manufacturer has not allocated a space for the battery, refer to "Fitting the battery" in "INSTRUCTIONS FOR FITTING".

2. Using your 12 volt equipment

Turn on the "12 volt switch" and set the "TOURING/ON-SITE" switch to "ON-SITE" (down position). 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.

3. Charging from the Mains

Ensure that a mains supply is available to your caravan through the external mains input socket and set the "MAINS ON-OFF" to "ON". The "TOURING/ON-SITE" switch should be set to the "ON-SITE" position. Automatic electronic charging regulation is fitted to the C.F.B. This means that it will only charge the battery as required and will not overcharge the battery.

N.B. Do not leave the charger switched on for long periods, when the caravan is not in use.

4. Charging from the Vehicle

When the vehicle is attached to the car and the "TOURING/ON-SITE" switch is set to the "TOURING" position (up position), charging of the auxiliary 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 two batteries. Note that in motorised caravans, charging from the vehicle requires only the setting of the "TOURING/ON-SITE" switch to "TOURING" and running the engine.

5. The Battery Condition Monitor*

The purpose of this device is to warn that the caravan 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 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 4 fuses fitted to the C.F.B.

The mains fuse is fitted in the smaller of 4 fuseholders on the front panel and is rated at 2 amp (5 amp for 110V units); it is a standard 20mm x 5mm glass quick blow fuse. This fuse holder can only be removed with a screwdriver (this is to comply with electrical safety regulations).

The three 10 amp fuses mounted on the right of the panel protect the various accessories connected to the ZIG system and are standard 1¼" glass quick blow fuses. The fuses are removed by turning the cap anticlockwise.

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

In the event of a fuse blowing there exists a fault in the circuit protected by that fuse, and the cause should be ascertained before replacing the fuse. It is important to remember that a fuse is fitted for the protection of the circuit and is a safeguard against fire and injury. Never remove the front panel with mains, battery or car connected. There are no user serviceable parts inside.

7. Using the C.F.8 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 electronic items fitted such as strip lights, radio, T.V., water heaters, etc.

IMPORTANT NOTES

1. Due to the powerful output available, the unit will get warm 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 or rear of the case with clothing or similar items, this will cause the thermal cutout to operate more frequently and will reduce the efficiency. Note that the thermal cutout is completely automatic, it will re-set when conditions return to normal.
2. **Refrigerators**
These should never be connected to the C.F.8.
(see INSTRUCTIONS FOR FITTING).
In a properly wired system, the fridge is connected directly to the vehicle battery by an independent cable. Its operation, is not affected by the C.F.8 controls. The fitting of a ZIG RM14 relay will ensure that the fridge only draws current when the engine is running.
3. The main "ON-OFF" switch lights up to show that mains is available, but it has no effect on any other mains equipment which may be fitted. It serves only to switch on and off the battery charger incorporated in the unit. Never connect any other mains equipment to the C.F.8.
4. **Batteries**
For best results a battery designed specifically for leisure use should be fitted. Obviously the choice will be dictated by cost and space available, but the largest capacity possible the better. It is not recommended to use batteries with less than 60Ah capacity. On no accounts should a car battery be used as it will give poor results and fail quickly.
5. **WARNING**
If the battery is very discharged, the loads on the 12V system should be reduced to below the rated output of the battery charger. This will enable the charger to restore the battery to full capacity quickly and prevent any overloading of the charger.

6. 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 connections should be checked at least on every excursion.

Mains Electricity

The Zig Charging and Distribution unit is designed to run on 220 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. 220 volts, efficiency in mains charging will be reduced.

The C.F.8 has been specially designed to operate safely on mains electricity in a caravan or boat. 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 for your own safety. Remember mains voltage can be fatal.

Using the C.F.8 in boats

The unit is suitable for use in motor cruisers, motor sailers and smaller boats, particularly when they are moored for long periods in marinas where mains electricity is available and it is undesirable to run the engines for long periods. The instructions for caravans apply in all cases except where references are made to connecting the car and 7 pin sockets, etc. It is particularly important in marine use that all switches are placed in the OFF position before the battery is disconnected, as this eliminates the risk of sparks.

FAULT FINDING CHART

SYMPTOM	REMEDY
12 volt appliances work but battery not charging from mains.	Check centre switch is in ON-SITE position. Check mains 2A fuse and Mains supply to caravan. If thermal cut-out has operated, allow time for this to re-set.
12 volt appliances work from auxiliary battery only. Battery not charging from engine.	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.

INSTRUCTIONS FOR FITTING

Please read these instructions carefully before commencing work.

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

Air should be allowed to circulate freely over the back of the unit. Ventilation to the compartment, in the form of two 25mm holes top and bottom must be provided.

Access to the mains inlet socket will be required, so the position of the C.F.8 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 box is allowed for wiring.

Cut a rectangular hole 178mm (7 ") x 125mm (4 "). The C.F.8 will overlap this hole thereby covering any jagged edges. The minimum size of the compartment for the C.F.8 must be 205W x 150H x 125D. This will give the minimum clearance all round which must be allowed, i.e. 25mm.

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

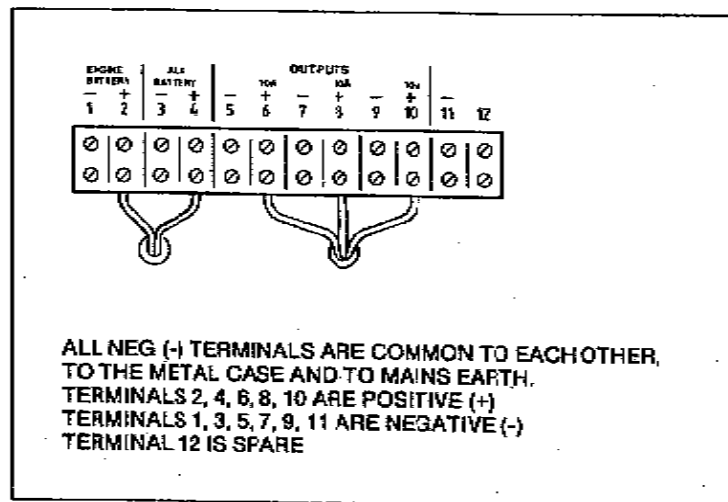


Figure 2
Terminal Connections to the C.F.8

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 the cable of at least 2.5mm² (50/0.25) refer to *Figures 2 and 3*, and connect terminals 1 and 2 (Vehicle Battery) to the 12S cable (Supplementary 7 core, usually grey) as follows:-

No. 1 on C.F.8 to No. 3 on 12S (Negative)
No. 2 on C.F.8 to No. 4 on 12S (Positive)

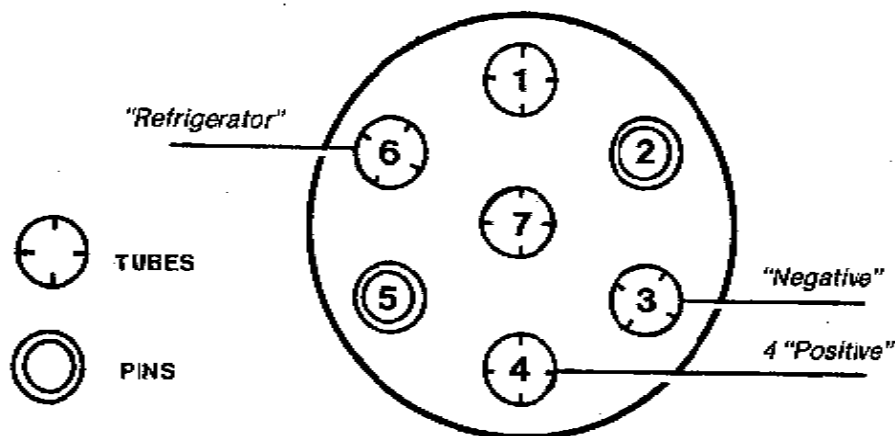


Figure 3 The 12S Plug (Rear View)

Do not connect your car at this stage.

If you are wiring a boat or motorised caravan, connect No. 1 to earth, and No. 2 to the engine battery.

A 25 amp line fuse must be fitted in the positive line (No. 2 on C.F.8) as near to the battery as possible.

At this stage a suitable position for the auxiliary battery should be chosen. This should be ventilated to the outside at the battery top and bottom levels 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 2.5mm² (50/0.25) cable to the C.F.8 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.8.
Negative to No. 3 terminal block on C.F.8.

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.

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.8 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.

Refer to *Figure 4*.

Water pump to No's 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 UNIT.

Due to the high current drawn by refrigerators, they should be wired to the engine battery in such a way that they only operate whilst the engine is running. A Zig RM14 relay will ensure that the main battery will not be flattened by the fridge when the engine is not running.

The wiring for the fridge should be an entirely separate fused system. Do not attempt to connect to terminal 2 on the C.F.8, as this will prevent battery charging.

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	240 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 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 "TOURING/ON-SITE" switch in the "TOURING" 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 vehicle

If your car does not incorporate a 12S supplementary plug you are strongly recommended to fit one. The 12N socket is fully utilised for road lighting, and the cable used with the 12S system is of larger diameter and current capacity, more suited to the needs of a modern caravan. Connections are made as in Figure 3.

The cable used must have a minimum dimension of 2.5mm² (50/0.25). 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. 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 will 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 RM.14 which comes complete with fitting instructions and is simple to fit.

When the car wiring is complete, the caravan 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 1.5mm² and should be regularly inspected for damage. When the mains is connected, switch on the MAINS ON/OFF control on the C.F.8 and check that it lights up. Set the "TOURING/ON-SITE" switch* to on site, 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.

Positive Earth Vehicles

The ZIG C.F.8 is designed for use with negative earth systems, but be modified if required for use with positive earth systems. Further information is available on request if required.

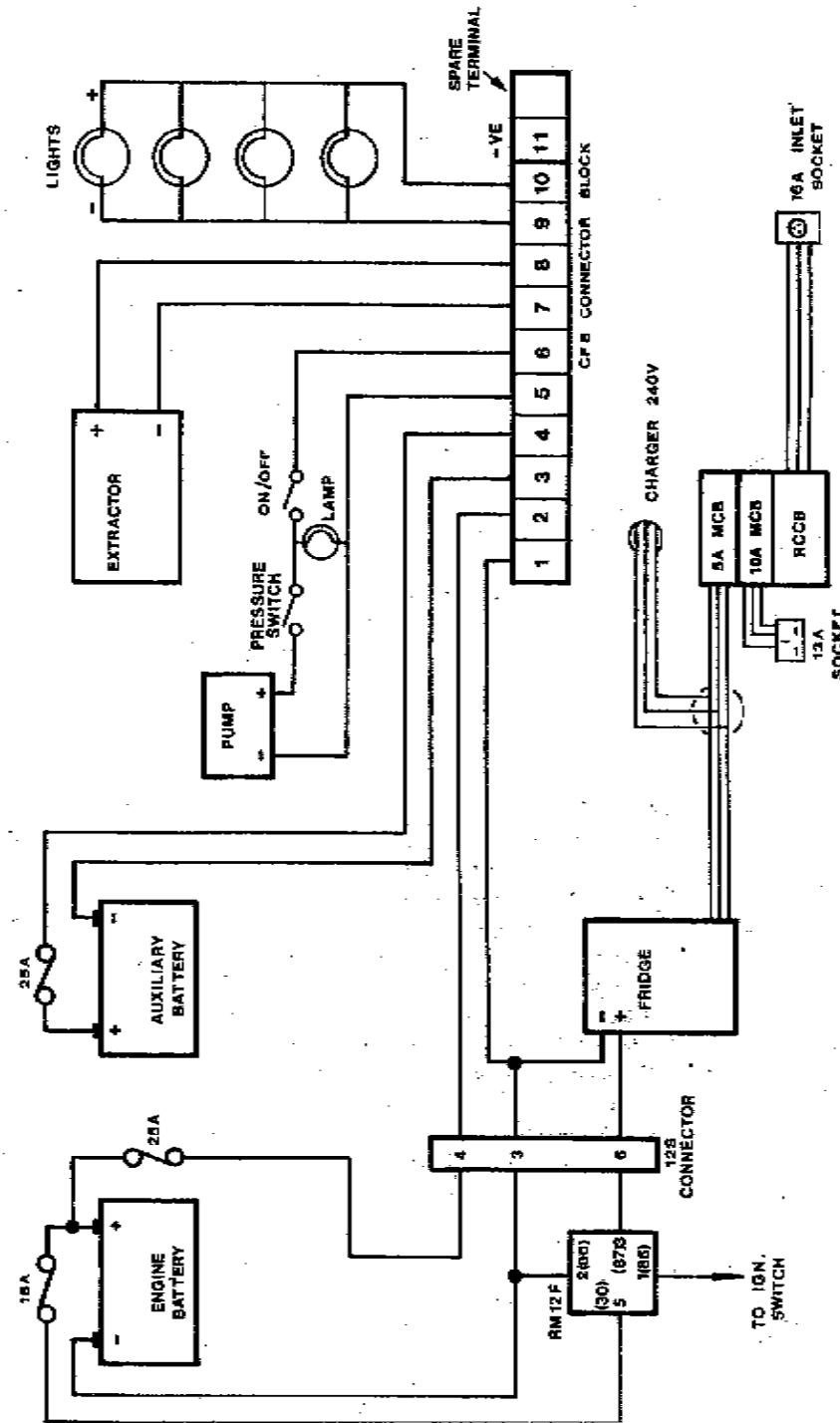


Figure 4 Suggested Wiring Diagram for the C.F.8

The 12S connector may be deleted if wiring a motorhome or boat.