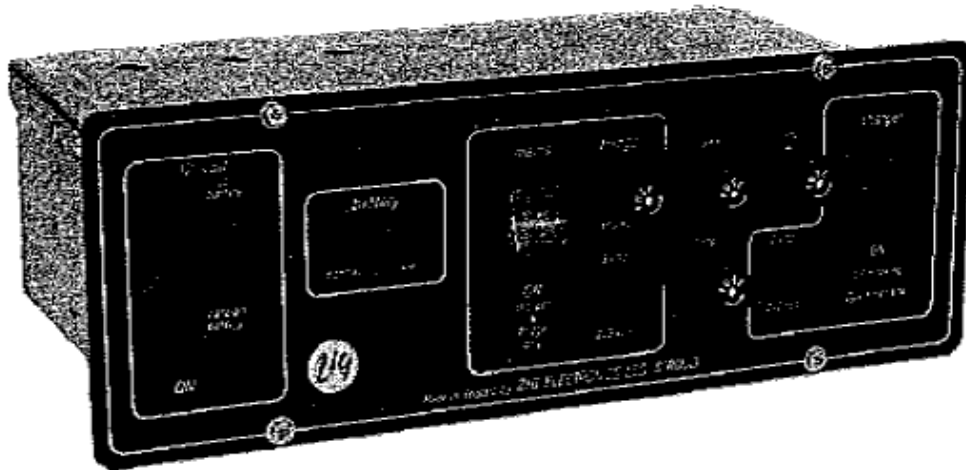


# THE ZIG C.F.9 CARAVAN BATTERY CHARGING & DISTRIBUTION SYSTEM

## INSTRUCTIONS FOR USE AND FITTING



### IMPORTANT FEATURES

- Fully automatic electronic charging control.
  - Suitable for touring and motorised caravans
  - Mains battery charging, up to 12 amps depending on battery state.
  - Charging from vehicle or generator.
  - Mains voltage to 12 volt conversion – up to 4.5 amps continuous current.
  - Switched selection of source, car or auxiliary battery.
  - Double pole illuminated mains switch.
  - Safety – The C.F.9 incorporates no less than 8 protection devices to eliminate overheating and overcurrent problems.
- Facility for 'fridge (12 volt and mains supply).



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## INSTRUCTIONS FOR USE

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

### 1. The Caravan 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 "CAR/CARAVAN" switch to "CARAVAN". 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/CARAVAN" switch to "CAR". *(The car must of course be connected).*

### 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 "CHARGER" switch should be set to the "ON" position. Fully automatic electronic charging regulation is fitted to the C.F.9 this means that it will supply only the current the battery needs when the caravan is in use.

*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 caravan is attached to the car and the "CHARGER" 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.

6. **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/CARAVAN" switch to "CAR" - when the car is removed, reset this switch to "CARAVAN". **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.**

*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.*

6. **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.

7. **The Fuses**

There are 6 fuses fitted to the C.F.9.

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 on the right of the panel protect the various accessories connected to the ZIG system and are standard 1/4" glass quick blow fuses. Access to the fuses is by turning the holder 1/4 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**

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

## FAULT FINDING CHART

SYMPTOM	REMEDY
12 volt appliances work but battery not charging from mains.	Check centre switch is in mains 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.

## INSTRUCTIONS FOR FITTING

### INTRODUCTION

*Please read these instructions before starting installation work.*

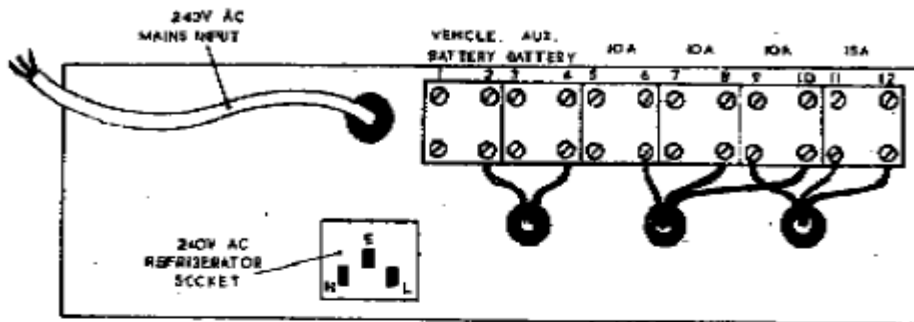
Choose a suitable position for the C.F.9. unit, bearing in mind the following:

1. The minimum size of the compartment for the unit must be: 190 mm deep, 330 mm wide and 130 mm high, this will give the minimum clearance all round which must be allowed, i.e., 25 mm with extra at the rear for the fridge connector.
2. Air should be allowed to circulate freely over the back of the unit. Ventilation to the compartment, in the form of two 25 mm holes top and bottom, parallel to the front panel and centrally over the unit.
3. Access to the mains inlet socket will be required, so the position of the C.F.9 and this socket should be chosen at the same time.
4. Access will be needed to the caravan battery, and to the wiring for the electrical accessories.
5. **WARNING THIS APPLIANCE MUST BE EARTHED.**

The side of a wardrobe or cupboard is usually a satisfactory mounting point, provided there is access to the terminal strip and the refrigerator socket on the back of the C.F.9 unit.

Cut a rectangular hole 280 mm. (11") x 83 mm (3 ¼") at the mounting point. If the panel is very thin, fix battens to the back of the top and bottom edges of the hole, and secure the unit with the screws provided. Gluing the battens in place will make removal of the unit easier, should this be necessary.

## WIRING

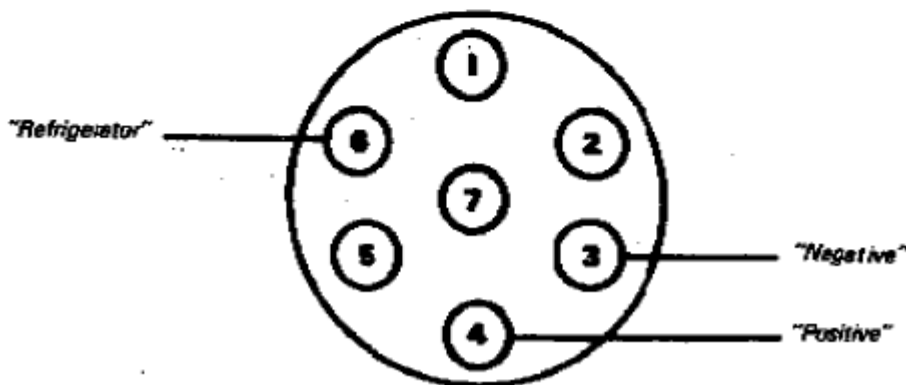


*Figure 1.*

*Terminal connections*

**WARNING: UNDER NO CIRCUMSTANCES USE CABLE SMALLER THAN THAT RECOMMENDED.**

Suitable cable can be bought from most motor accessory shops. Care should be taken when wiring the unit, and if there is any doubt a qualified electrician should be consulted.



*Figure 2. 12S plug*

1. Disconnect the 12 S plug and socket between the car and the caravan.
2. Using cable of at least 2 mmsq (28/03):
  - (a) Connect negative terminal (-) 1 on the C.F.9 unit to negative terminal 3 on the 12 S plug.
  - (b) Connect positive terminal (+) 2 on the C.F.9 unit to positive terminal 4 on the 12 S plug.

Do not connect your car at this stage.

If you are wiring a motorised caravan, connect No. 1 to earth, and No. 2 to the main battery, the starter solenoid provides a convenient connection in some cases.

A 25 amp line fuse must be fitted in the positive line (No. 2 on C.F.9) as near to the main battery as possible.

At this stage a suitable position for the auxiliary battery should be chosen. The position **MUST BE VENTILATED TO THE OUTSIDE**. 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 mmsq (28/03) cable to the C.F.9 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.9.

Battery negative to No. 3 terminal on C.F.9.

**NEVER** use crocodile clips to connect the battery, these deteriorate quickly and are a fire risk. **AVOID FLAMES AND SPARKS NEAR THE BATTERY.**

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 caravans, remove the other in-line fuse as well.

The various accessories can now be connected to the C.F.9, sharing the load as equally as possible. The outlets are wired to No's 6, 8 and 10 (all positive) and the corresponding negative connections are 5, 7 and 9. As all the negative connections are joined to each other, it does not matter which one is used for each fused outlet.

The following system is suggested: (Fig. 3).

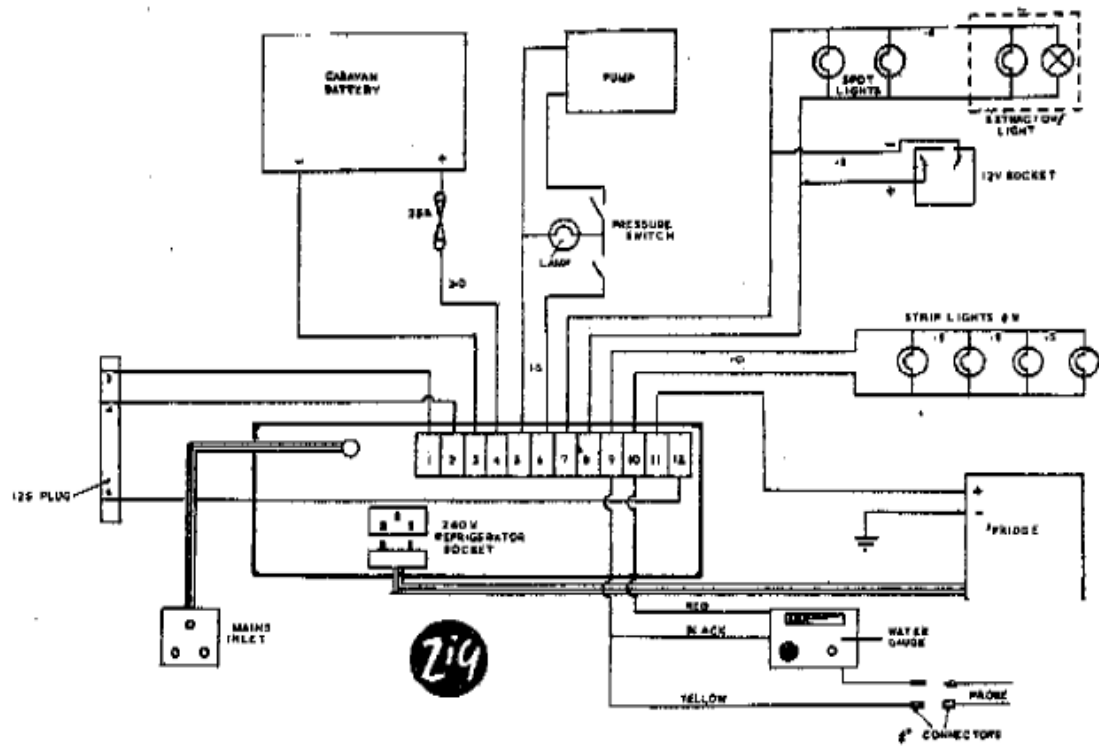


Figure 3.  
Suggested wiring diagram for C.F.9



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 POSITIVE TERMINALS 2-10.**

#### Connecting the refrigerator

Due to the high current drawn by a refrigerator, it should be wired to the main battery in such a way that it will operate only while the vehicle engine is running. The Zig RM12 relay, which comes with fitting instructions, will ensure that the main battery is not used for the refrigerator unless the engine is switched on.

The Zig C.F.9 unit is provided with two circuits for electricity supply to a caravan refrigerator. One for 12 volts DC, and the other for AC mains voltage.

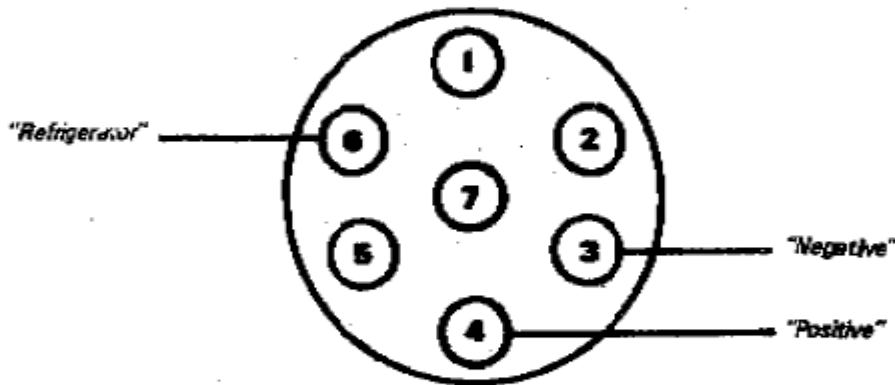


Figure 4. 12S plug

#### 12 Volts DC

Connect terminal No. 11 on the C.F.9 unit to terminal 6 (red cable) on the 12S plug. (fig. 4). Connect the 12 volt positive wire from the refrigerator to terminal 12 on the C.F.9 unit.

These two terminals are a convenient method for connecting the refrigerator, and provide protection for it through the 15 amp fuse on the front panel of the unit. They are not otherwise part of the unit's circuitry and should not be used for connecting other appliances.

Connect the negative wire from the refrigerator to negative earth, preferably to the 12S plug termination (No.3); in motorised caravans, go direct to the chassis at the nearest available point.

## WIRING THE CAR

You are strongly recommended to fit the new 12 S supplementary plug and socket to your car, for a number of reasons, the 12 N original socket is now fully utilised for road lighting if fog lights are used, also the cable used with the 12 S system is of a larger diameter and better suited to the large current demands of modern caravans. Connections are made as in fig. 4.

The cable used must have a minimum dimension of 2 mmsq (28/03). The connection to terminal 4 on the 12 S 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 car 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 12 S 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 12 S, 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.

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

### USING THE MAINS SUPPLY TO THE CARAVAN

The mains supply should be obtained from a domestic supply of 200 to 240 V A.C. from a fused connection point. Caravan site supplies use the B.S. 4343 outlet and suitable couplers can be obtained from most caravan accessory shops.

The cable used to connect the mains should be 3 core sheathed flexible mains cable not less than 2.5 mm sq. and should be regularly inspected for damage. When the mains is connected, switch on the MAINS ON/OFF control on the C.F.9 and check that this lights up. Set the "TOWING-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.

#### 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".

**WARNING**, if the battery is discharged, the load drawn by the accessories in use must not exceed the rated output of the charging system, i.e., 4.5 amps. If this is done thermal cutouts in the unit will operate to switch off the supply to prevent overheating.

## **GUARANTEE**

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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