

THE MANUFACTURERS RESERVE THE RIGHT TO CHANGE  
OR MODIFY SPECIFICATIONS IN ORDER TO MAINTAIN THE  
STANDARDS OF MODERN TECHNOLOGY. ANY CHANGES  
TO THESE SPECIFICATIONS WILL BE AUTHORISED BY  
B.E.A.B.

## **Users' Manual**

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**Converter / Charger  
Models 2S4VT & 2S4VC**  
Manufactured to the requirements  
of BS3456

## Preface

### Converter Charger 2S4V 'Users' Manual'

This manual will familiarise you with our Electrical Power Supply Converter / Charger model 2S4V, which may be fitted to your caravan during its manufacture or later as an extra. There are 2 types of 2S4V front panel: front panel 'A' ( FPA ) and front panel 'C' ( FPC ). Each type may have terminal block or cable connections at the rear of the unit - refer to the 'Installation Manual' for details.

We recommend you read this manual fully before you use your 2S4V unit. If you are installing your own unit, or if you wish for more technical details, you should refer to the 'Installation Manual'.

## Contents

Page	Section
1	1) Introduction: i) Charging the battery; ii) Converting power from the mains; iii) General use of a 2S4V; iv) The battery.
4	2) Controls: i) Front panel style FPA; ii) Front panel style FPC.
6	3) Operating your 2S4V unit: i) General principles; ii) Charging from the tow car.
8	4) Faults and remedies.
8	5) Some notes on safety.
10	6) 2S4V technical specifications.

## 1. Introduction

12 volt systems - usually powered by a car battery - have been in use for many years in the world of caravanning, and this has led to a requirement for a charger to replenish the battery. The ever increasing number of sites with mains facilities also means that a caravan may have extra electrical circuits to provide the caravanner with more comfort and facilities without the constant worry of having enough battery power to supply lights, water pump etc.

The 2S4V Converter / Charger unit is designed to meet modern caravanning requirements by providing:

- 1) a charging current for the on-board battery;
- 2) a safe - fused and switched - distribution system for the caravan electrical circuits;
- 3) a source of switched and fused mains power for the fridge.

### I. Charging the Battery

The 2S4V charger is defined as a "float charger". This means that it has a fixed ceiling voltage - around 14.5 V - and the charging current allows the battery to float up to this ceiling, by which time the charging current falls to zero.

### II. Converting power from the mains

When 240V A.C. mains is available on the caravan site, it is possible to "plug in" and, provided this is done correctly, the charger may be "switched on" allowing the normal caravan electrical circuits to be used, even when the battery is "on charge".

### III. General use of a 2S4V

When the charger is working hard heat will be generated which may cause the front panel to become warm to the touch; this is quite normal. The unit's circuitry includes 1 heat sensing switch, a number of fuses and 1 current sensing switch which provide safety "cut-outs" on both a temporary (self-resetting) basis and a permanent (non self-resetting) basis - for any more serious problems which may occur.

When the system is connected to the mains and the various 12V distribution circuits are in use, the charger will supply a portion of the current being drawn and this "slows down" the rate of discharge of the battery. However, care should be taken to ensure that the current drawn over an extended period does not exceed the capacity of the battery / system combination.

Remember, if you take out 5Amps for 2 hours (10Ampere hours) it may take 5 hours at a 2Amp charge rate to put the 10Ampere hours of charge back into the battery.

**!!! WARNING !!!**  
***You can discharge a battery faster than it can be recharged, you should therefore allow for the discharge / recharge cycle.***

However, the 2S4V is designed for continuous use when connected to the mains, and under normal circumstances the battery will recharge overnight - restoring power taken out during the day.

### IV. The battery

The battery you use will depend on your requirements.

A car battery of 40AH capacity will provide continuous current of 24Amps for 20 hours; a tony battery of 90AH capacity will provide a continuous current of 2Amps for 45 hours. The disadvantage of the car battery is that it is physically designed for high current discharge over short periods of time. A car battery used for low current discharge tends to have a very much reduced life.

A battery of the "stand-by" type is designed for being continuously on charge and then providing limited use at relatively low current output is far better, and will last considerably longer.

The battery used should not contain less than 6 cells rated at 2V (nom) each, and have a capacity of not less than 38AH.

The battery should be given a booster charge before using the caravan and a maintenance charge every three months.

**It is important that the Battery is fitted into a Compartment that is vented to the outside.**

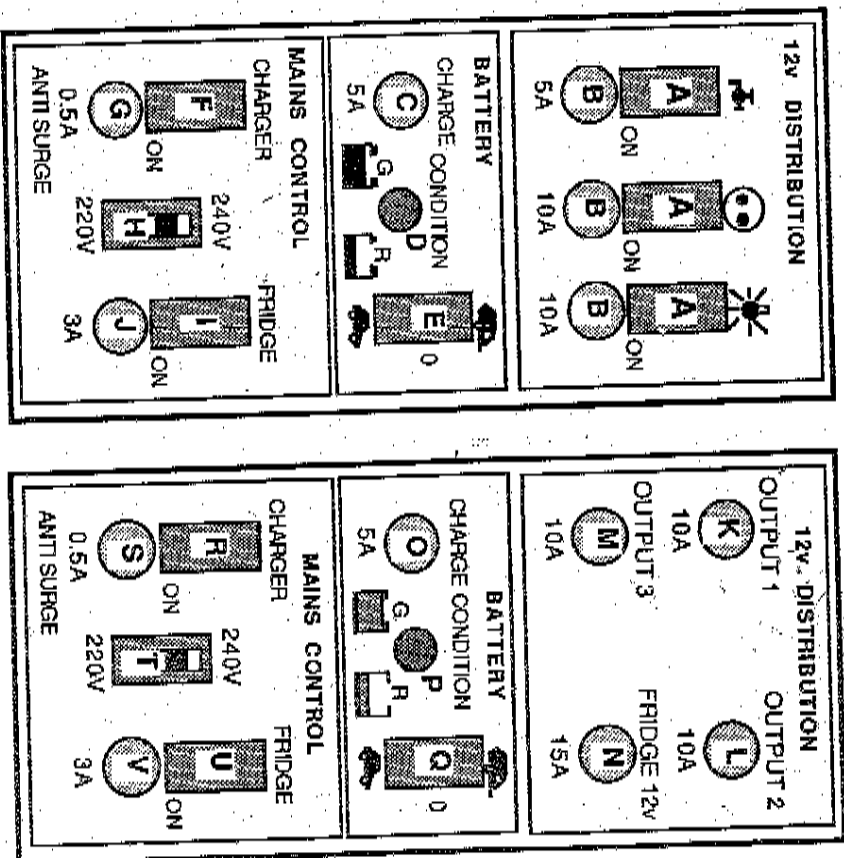


Diagram 1: 284V Controls

## 2. Controls

### 1. Front panel style FPA (see diagram 1)

The various symbols on the front panel of your 284V are designed to give you the maximum information.

**3 SWITCHES (A)** provide the various distribution circuits with control and isolation. The switch on the left is 'water', in the centre 'socket' and on the right 'lights'.

**FUSES (B)** under each switch provide protection for that circuit only.

**FUSE (C)** is a 5A fuse and protects the transformer from excessive loads.

**BATTERY CHARGE CONDITION LIGHT (D)** is a "two in one" device; when your battery is discharged to 11V the device switches from green to red.

**SWITCH (E)** is a battery change-over switch. When in the 'caravan' position power for lights, auxiliary and water pump come from the caravan battery. On some models when this switch is in the mid position '0' both sources are isolated.

When in the 'car' position power is drawn from the car battery, or from an auxiliary battery. The tow car, or auxiliary battery, must be plugged into the 12S socket for this purpose.

**SWITCH (F)** provide 240V A.C. mains on/off switch for the charging unit.

**FUSE (G)** is the mains input fuse and is rated at 500mA (0.5A) and should be of the "anti-surge" or "slow-blow" type.

**SWITCH (H)** (where fitted) is the mains voltage selector switch.

**SWITCH (I)** and **FUSE (J)** provide isolation and protection for the fridge 240V A.C. mains circuit. Some units may not have fridge fitted.

## II. Front panel style FPC (see diagram 1)

**FUSE OUTPUT 1 (K)** provides protection for circuit only.

**FUSE OUTPUT 2 (L)** provides protection for circuit only.

**FUSE OUTPUT 3 (M)** provides protection for circuit only.

**FUSE FRIDGE 12V (N)** provides protection for fridge circuit only.

**FUSE (O)** is a 5A fuse and protects the transformer from excessive loads.

**BATTERY CHARGE CONDITION LIGHT (P)** is a "two in one" device, when your battery is discharged to 11V the device switches from green to red.

**SWITCH (Q)** is a battery charge-over switch. When in the 'caravan' position power for lights, auxiliary and water pump come from the caravan battery. On some models when this switch is in the mid position "0" both sources are isolated.

When in the 'car' position power is drawn from the car battery, or from an auxiliary battery. The tow car, or auxiliary battery, must be plugged into the 12S socket for this purpose.

**SWITCH (R)** provide 240V A.C. mains on/off switch for the charging unit.

**FUSE (S)** is the mains input fuse and is rated at 500mA (0.5A) and should be of the "anti-surge" or "slow-blow" type.

**SWITCH (T)** (where fitted) is the mains voltage selector switch.

**SWITCH (U) and FUSE (V)** provide isolation and protection for the fridge 240V A.C. mains circuit. Some units may not have fridge fitted.

## 3. Operating your 2S4V unit

### I. General principles

- 1) Read, understand and follow the section on safety (section 5).
- 2) Plug the correct caravan connections into a suitable 240V A.C. or 220V A.C. outlet.
- 3) Ensure mains voltage selector switch (where fitted) is appropriately set for the local supply.
- 4) Switch on fridge and check the switch illuminates.
- 5) Switch on 12V lights.
- 6) Switch on charger 240V mains and check:
  - a) the switch illuminates.
- 7) Check that the battery condition light is "green".
- 8) Switch on 'water' and check for correct operation.
- 9) Switch on other 12V appliances and check for correct operation.
- 10) Switch off the 12V D.C. supply.
- 11) Check the fridge for correct operation.
- 12) The unit is now ready for operation.

### Notes

For extra safety the distribution circuits - 'water', 'socket' and 'lights' - should be switched "OFF" when not in use (FPA and FPB only).

Fuses must be replaced only with a fuse of equivalent value - all fuse values are clearly stated directly under the fuse.

It is not possible to put both car (or auxiliary) battery and the caravan battery "in parallel". Thus the "flattening" of both batteries is avoided.

### II. Charging from the tow car

This is completely automatic provided that the tow car is fitted with both the 12N (Normal) and 12S (Supplementary) sockets. The 12S should be wired for relay operation within the car as per the "split charge" relay system.

This fitting should be carried out by a competent fitter to BS AU 177A. Refer to the car wiring diagram (see diagram 2).

#### 4. Faults and remedies

- 1) Any distribution circuit failure - check the appropriate fuse and replace as required with a fuse of equal value. Also check the main battery fuse.
- 2) The green or red battery level light fails to illuminate - check battery and battery fuse and replace as required.
- 3) Either mains switch fails to illuminate - check the appropriate fuse and replace as required.
- 4) 2SAV fails to charge the battery - check the 5A fuse marked "CHARGER".
- 5) If other faults are apparent, or the above action fails to produce a remedy, then seek the advice of your dealer.

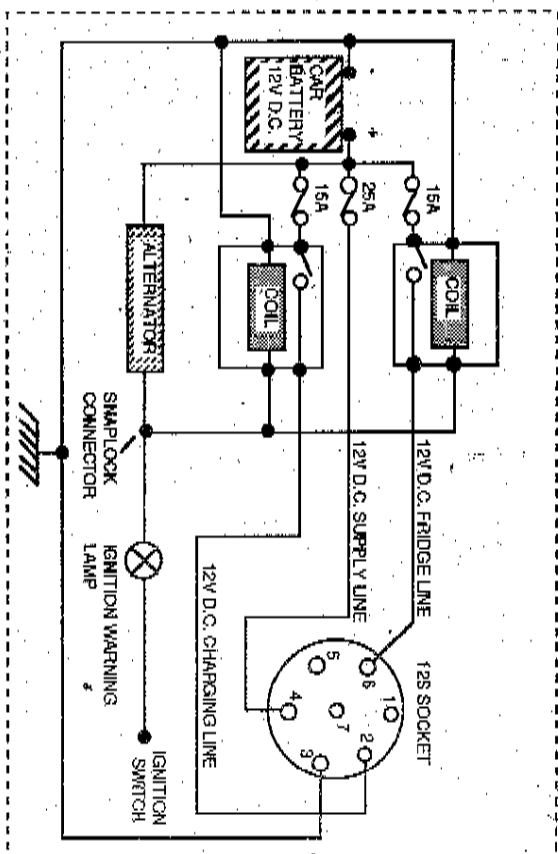
### 5. Some notes on safety

All electricity is potentially dangerous and can, if mistreated or abused, cause fires, injury and even death. Observance of the rules of safety is essential for the correct and safe operation of the electrical system in your caravan. These rules are:

- 1) Never switch on "power" to your caravan until you are completely satisfied that:
  - i) all connections are secure;
  - ii) all switches are "off";
  - iii) a good earth connection is made;
  - iv) the mains voltage selector switch (where fitted) is appropriately set for the local supply.
- 2) Never leave any wires showing unprotected - even 12V D.C.
- 3) Never "up-rate" a fuse.

## NOTE

A fuse is a device which will rupture due to excessive current - the excessive current will "BURN" the fuse. Since a fuse "BURNS OUT" it is clear that a fuse is designed to run warm, and over a long period



**Diagram 2: Circuit diagram - wiring to car**

of time a fuse may blow for no apparent reason. This is not a fault, fuse links can become "tired" and rupture through long term fatigue.

If a fuse ruptures immediately on replacement **do not attempt to increase the fuse rating** as you may cause irreparable damage to the wiring and control circuits - not to mention the caravan itself. Instead look for the reason for the fuse blowing, or better still seek the advice of a competent and professional electrician.

- 4) **Never** assume that 12V D.C. is O.K. A well charged battery can cause tremendous damage to wiring and equipment if the wiring of the battery is mishandled or mistreated.
- 5) **Never assume - ALWAYS CHECK.**
- 6) A properly connected earth to the mains hook-up is also essential and should be checked regularly for correct operation. This can be done by a competent and qualified electrician.
- 7) **Circuit breakers.** If your caravan is fitted with circuit breakers they should be regularly tested for correct operation.
- 8) **Mains hook-up.** 240V A.C. mains is a very clean and safe form of power provided the following rules of safety are adhered to:
  - i) Always use the recommended plugs and sockets for 240V A.C. mains;
  - ii) Ensure that the correct size of cable is being used;
  - iii) Ensure that the proper connections are made and are secure;
  - iv) Ensure that correctly rated fuses are fitted.

## 6. 2S4V technical specifications

Input  
240V A.C.

Frequency  
50Hz

Power  
50W

Rated Outputs  
12V D.C.  
2.25Amps

Max Current Output  
4 amps

Open Circuit Output Voltage  
14.5V (nom) D.C.

Secondary Input  
Rechargeable lead acid 12V battery (6 cells Min Capacity 38Ah)

Charging Current  
4 amps at 10V battery terminal voltage

Charger Type  
Float Charger

## Mains Fuses

Front panels FPA & FPC  
The fuses fitted to the mains side are 20mm glass cartridge type.

Charger 0.5A anti-surge  
Edge 3amp (quick-blow)

Temperature trip integral to transformer

Low Voltage Transformer  
Secondary

This unit incorporates full double insulation and has a safety isolating transformer to BS 3535  
4.5A x 125° thermal / current cut out

## 12V Distribution

All the fuses fitted to the 12V side of the 2S4V unit are 1.25 inch by 0.25 inch glass cartridge type.

All these fuses are standard and available from most electrical retailers or as a spares kit from the manufacturer.

Front panel FPA  
Water 5amps  
Socket 10amps  
Lights 10amps

Front panel FPC  
Output 1 - 3.10amps  
Edge 12V 15amps

