

CROSSED WIRES

JOHN WICKERSHAM RESPONDS TO A QUESTION RAISED BY MANY CARAVANNERS

A number of members have been seeking advice recently on the subject of reversed polarity. It's a problem seldom encountered on British sites, so it's not mentioned in the instructions for connecting to an electricity supply (pp601-603) in the *Sites Directory & Handbook*.

On the other hand, a reversal of the live and neutral supply is not unusual abroad, so guidance is given on pp97-98 in *Caravan Europe 2002*. Further advice appears in the very detailed Information Leaflet entitled *Mains Electrical Installations in Trailer Caravans and Motor Caravans* – which I strongly recommend (please enclose an A5 SAE with all requests for Information Leaflets).

But what is reversed polarity? And why do Continental caravanners seem less concerned about it than their British counterparts?

REVERSED POLARITY EXPLAINED

Anyone who has wired a 13amp plug will know that:

- the live cable has a brown insulation sleeve
- the neutral cable has a blue insulation sleeve
- the earth cable has a yellow/green insulation sleeve

The importance of connecting these three cables to the correct pins on a plug is clarified on all electrical appliances and products. If the live and neutral cables are mistakenly reversed, a 'reversed polarity' situation is created.

Unfortunately, electricians sometimes wire-up supply pillars on Continental campsites with reversed polarity.

REVERSED POLARITY AND APPLIANCES

As far as electrical appliances are concerned, many modern products are

“But what is reversed polarity?”



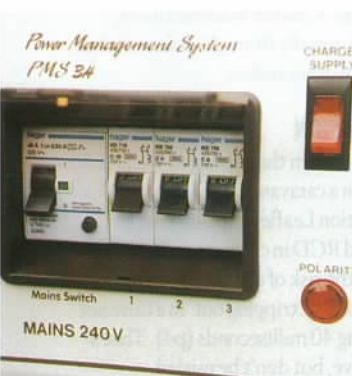
As part of the change to the connections used in Britain, this new hook-up at Les Ranchisses combines traditional French couplings (left) with the international-style couplings on the front

unaffected by reversed polarity. For instance, light bulbs and 'two-pin' plug appliances like shavers operate irrespective of their connection. Even 'polarity-sensitive' appliances are usually made with internal circuitry which rectifies a reversal situation.

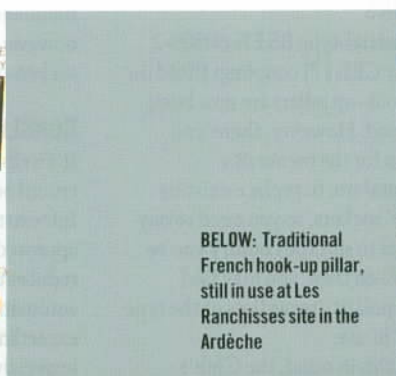
The problem principally concerns user safety, and this in turn is related to the type of switches fitted in Britain.

INFORMATION

W4 Ltd, Unit B, Ford Lane Industrial Estate, Arundel, West Sussex BN18 0DF
Tel: 01243 553355
(Suppliers of socket testers, 230v kits and double-pole switched sockets).



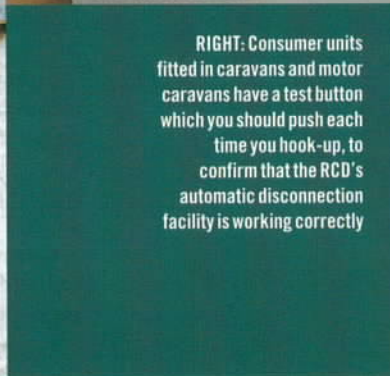
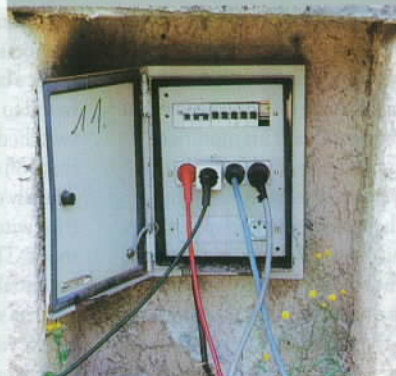
ABOVE: On the Plug-in-Systems PMS 3H Power Management System, there's a polarity reversal indicator on the lower right-hand side of the unit



BELOW: Traditional French hook-up pillar, still in use at Les Ranchisses site in the Ardèche



LEFT: This Power Management unit has a mains polarity indicator on the upper part of the casing



RIGHT: Consumer units fitted in caravans and motor caravans have a test button which you should push each time you hook-up, to confirm that the RCD's automatic disconnection facility is working correctly

A FRENCH ADAPTOR BEING RE-WIRED TO DEAL WITH REVERSED POLARITY

Undo the screws and pull back the cover from the connections

Loosen the clamp to release the cables

Refit the blue cable into the hole normally used by the brown cable, and vice versa; earth cable stays the same. Make sure all cables are secure

Reinstate the end cap of the unit

To make it abundantly clear that my adaptor has been wired with reversed live and neutral connections, some striped tape was used

CONTINENTAL SWITCHING

In most European countries, switches for operating lights and the switches on mains sockets are 'double-pole' types. This means that when something is switched OFF, the flow of current is arrested on both the live and neutral conductors. So even if a site hook-up pillar has reversed polarity, power cannot reach an appliance when its switch is turned to the OFF position.

BRITISH SWITCHING

The British tradition is different. Even in a correctly wired household or caravan supply, we have single-pole switches which operate only on the live supply. When a switch is in its OFF position, power is prevented from reaching the appliance or electrical fitting. This means that, when a light is switched OFF, you can change a faulty light bulb secure in the knowledge that no power is reaching the fitting.

This situation changes, however, if the polarity is reversed. If you connect your caravan to a hook-up wired with reversed polarity, the appliance or a light socket will remain live even when the switch is in the OFF position. The switch still controls the appliance's operation but now it interrupts the flow of current on the way out of the fitting. But this makes even a simple job like changing a light bulb much more dangerous because the holder remains live irrespective of the position of the switch.

ADAPTORS

The industrial-type BS EN 60309-2 (formerly CEE 17) couplings fitted on British hook-up pillars are now being used abroad. However, there's no obligation for the owner of a Continental site to replace existing 'old-type' sockets, so you need to buy an adaptor to suit the country you're visiting. Even then, you may find reversed polarity regardless of the type of socket in use.

With this in mind, the Club's Information Leaflet points out that frequent travellers to the Continent often buy two adaptors, one of which is owner-modified to reverse the live and neutral connections. This modified adaptor must be clearly labelled and kept for reversed-polarity hook-up pillars. These 'corrective adaptors' are not permitted to be sold, which is why competent owners have to prepare their own or get an electrician to carry out the modification as shown on this page.

STRATEGY WHEN THERE IS REVERSED POLARITY

Always follow the step-by-step coupling-up procedure described on p601 of your *Directory & Handbook*. Then establish the polarity of the hook-up supply:

Some caravan/motor caravan consumer units have a red light to show there's reversed polarity. In the absence of a warning light, use a polarity tester.

It's best to remedy reversed polarity at the hook-up pillar:

- In some countries you can insert an adaptor the other way round in order to change the polarity
- Sometimes you'll find the polarity connections are different on a neighbouring hook-up pillar
- Alternatively, you can use a modified adaptor

In the absence of a solution, the Club advises that a "caravan mains electrical installation should not be used while a reversed polarity situation exists."

IMPROVEMENTS

The control units fitted in British caravans manufactured from 1994 onwards are fitted with double-pole switched Residual Current Devices (RCDs) and double-pole Miniature Circuit Breakers (MCBs). This improves the safety element, although you should not assume this gives you full protection (see below).

The Concept range of switched sockets from W4 Accessories features double-pole switching, and W4 mains wiring kits include double-pole switched sockets; this is confirmed on their plastic mouldings. Caravan manufacturers, however, usually fit single-pole switched sockets of other makes.

CONCLUSION

It's well-known that having an RCD is crucial on a caravan. The Club Information Leaflet explains that an approved RCD in correct working order reduces the risk of electrocution by automatically 'tripping out' in a time not exceeding 40 milliseconds (p4). That's impressive, but don't be misled.

If you were to touch a live connection by accident, you're certain to get a brief but nasty shock – as I once found to my surprise. Double-pole switched RCDs and MCBs do not mean that you can treat a mains supply system casually on the assumption that their trip switches will prevent you getting a shock. That's not true! Equally, the potential dangers of using a reversed-polarity supply must not be ignored. So follow your Club's advice and enjoy your caravanning in safety.