



## Upgrade of Existing Caravans and Motorhomes to AS/NZS 3001 Requirements

### 1. General

There is a problem with nuisance tripping with electrical installations in caravans, motorhomes, house buses, etc. This is in circumstances where the installation does not have a RCD fitted to the switchboard and when the installation is plugged into a power supply that has a RCD protected socket outlet, the RCD protecting the socket outlet, will trip. One solution used to stop this tripping has been to remove the link between the neutral bar and the earth bar on the switchboard. However, if the link is not replaced and the installation is plugged into a non-RCD protected supply, it will create a dangerous and illegal situation.

This safety bulletin describes the work required to upgrade the installation to AS/NZS 3001 requirements and to overcome this problem. It also describes the work required to replace damaged or unserviceable or in-line RCDs in the supply cord.

**Note** - where caravan is mentioned in this bulletin, it means a caravan, motorhome, or house bus, etc.

1.1 There is NO mandated requirement in the Electricity Regulations (as amended by the 2002 amendment) to upgrade existing installations in caravans to the new AS/NZS 3001 requirements. However, due to problems caused by not having a RCD and the obvious advantages of having a RCD installed, it is strongly recommended that they be fitted.

1.2 The information provided below details the work required in circumstances where:

- (i) voluntary upgrading is being carried out by the owner to provide an increased level of electrical safety when a connection to mains power supply is made; or
- (ii) the connection of the caravan to a domestic

residence (or caravan park) in which the socket outlets are RCD protected, to prevent those RCDs from tripping; or

(iii) the replacement of a damaged or unserviceable in-line RCD in the supply lead by a RCD mounted in the caravan switchboard.

1.3 The removal of the neutral to earth link in a caravan or the removal of the in-line RCD in the supply lead, without the fitting of an RCD in the caravan switchboard, means that the caravan would NOT comply with the NZS 3019 Section 7 requirements and would be considered "electrically unsafe".

### 2. Work required

2.1 The work required to enable removal of the neutral to earth link in a caravan switchboard or the removal of an in-line RCD in the supply lead, is the fitting of a 30mA type A RCD and the provision of load limiting in the switchboard.

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2.2 The use of a 30mA type A RCBO (RCD with overload facility) provides the switchboard main switch, RCD function and load limiting in a single fitting. Alternatively, a RCCB (RCD without overload facility) may be used but must be associated with a MCB to provide current limiting. The RCD is required to be double pole (switches both active and neutral) with both conductors connected through the RCD. The maximum current rating of the RCBO or MCB used for load limiting is the lower of the current rating of the supply lead and/or supply lead fittings.

### 3. Switchboard

3.1 Where it is proposed to retain the existing switchboard and there is insufficient room to mount the RCBO or RCCB and a MCB in the switchboard, the RCBO or RCCB and MCB may be mounted in a suitable enclosure adjacent to the switchboard. If the RCD is not clearly visible when looking at the switchboard, a permanent notice advising the location of the RCD, must be placed on the switchboard.

3.2 For caravan installations that have been fitted with a RCD to protect external socket outlets, it is permissible to re-arrange the RCD wiring so that the RCD device provides the same connections as detailed in 3.3 below. The RCD device then provides RCD protection for all fixed wiring. If the RCD fitted is a RCCB type, an additional MCB to provide load limiting may be required, or alternatively, it should be replaced by a RCBO to provide RCD protection and loading limiting in one fitting.

3.3 The wiring from the inlet plug or permanently connected supply lead connection box should be connected through the RCBO or RCCB and MCB and then to the existing protective devices (fuses or MCBs) in the switchboard, with the neutral to earth link removed. If the design of the switchboard does not allow the removal of the existing main switch, this may remain.

3.4 Attention is drawn to the AS/NZS 3001 clause 3.4.1 requirements to which any new wiring must comply. The requirement is that new wiring

should be multi-stranded insulated and sheathed cables or flexible cords having not less than seven strands and a conductor cross-sectional area of not less than

1mm<sup>2</sup>. The use of a minimum 1.5mm<sup>2</sup> flexible cord is recommended for any new wiring due to vibration effects and, if used, all cord terminations at fittings should be consolidated with purpose-made ferrules.

3.5 Particular care should be taken to preserve double insulation and strain relief of live (active and neutral) conductors of all wiring to the input terminals of the RCD. This requirement is achieved by the fitting of correctly coloured sleeving to all exposed primary insulation. The use of plastic cable ties fixed to the enclosure and the incoming cable or cord near the RCD input terminations will provide the strain relief requirement. Likewise, if normally earthed metal is adjacent to the RCD input terminals, screening of the earthed metal with insulating material will be necessary adjacent to the input terminals of the RCD to prevent any live conductors making contact with normally earthed metal, in the event of the wiring becoming disconnected.

### 4. Inspection, Certification and Verification

4.1 On completion of upgrading, the work should be inspected and certified as detailed in regulations 37 and 39 of the Electricity Regulations 1997 and AS/NZS 3000 section 6. Note, this includes the functional testing of the RCBO or RCCB using a purpose-made tester. Certification of the upgrading work and inspection must be carried out on a Certificate of Compliance (CoC) by a registered electrician with a valid practicing license.

4.2 It is recommended that the caravan's existing and new wiring then be inspected and tested for compliance with NZS 3019 section 7 requirements for the issue of a Warrant of Electrical Fitness by a registered electrical inspector. If compliant, a new Warrant of Electrical Fitness can be issued and placed in a prominent place on the caravan e.g. on the switchboard. Only a registered electrical inspector with a valid practicing license can issue a Warrant of Electrical Fitness.