Tackling a small workshop

Bill Allan continues his look at supplying electricity to a small detached outbuilding

In the last issue we covered the supply of electricity from domestic premises with a TN-S or a TN-C-S supply to a standard garage with no extraneous-conductive-parts. This time we'll consider how to supply a small detached workshop which has extraneous-conductive-parts, in this case, a water supply.

We'll look first at a situation where the house has a TN-S supply and then we'll consider how the job needs to be done if the house has a TN-C-S supply. The presence of the water supply is significant because in situations where an installation serves a detached building which contains extraneous-conductive-parts, such as metal water and gas pipes, Regulation 413-02-02 requires that a main earthing terminal (MET) be provided within the detached building to facilitate the connection of main equipotential bonding conductors.

In addition, Regulation 547-02-01 contains differing requirements concerning the cross-sectional area of main bonding conductors, depending on whether the supply is TN-C-S or not.

TN-S supply

Fig. 1 shows one way in which it can be supplied from a TN-S supply in the house. The supply cable is a three-core 6mm^2 cable, having live conductors with a cross-sectional area of 6mm^2 and a 6mm^2 cpc which is considered to be of adequate current-carrying capacity for this particular workshop.

The cpc is taken from the earthing bar in the existing consumer unit in the house to the earthing bar in the consumer unit within the garage. The cable is protected against overcurrent by a 40 A mcb in the existing consumer unit. The cable is terminated in a four-way consumer unit within the workshop. A main equipotential bonding conductor with a cross-sectional area of 6mm^2 (to comply with Regulation 547-02-01) connects the incoming metal water pipe to the earthing terminal in the local consumer unit.

'TT' the workshop

If the workshop was some distance away, from the TN-S supply in the house, it may prove economic to run a 2-core 6mm^2 cable to the workshop (rather than a 3 core cable) and use an earth electrode to provide an earth at the workshop. The workshop would then form part of a TT system.

TN-C-S (PME) supply

Now we consider the same workshop supplied with the same 6mm^2/ 6mm^2 cable but in this case the supply in the house is TN-C-S (PME). As the minimum cross-sectional area for a main equipotential bonding conductor in a TN-C-S system is 10mm^2 (see Regulation 547-02-01), we would have to use a 10mm^2 main equipotential bonding conductor in the workshop.

This would involve running a separate 10mm^2 protective conductor from the main earthing terminal in the house to the workshop. The 6mm^2 cpc in the three-core cable could be left unconnected at either end. Fig. 2 shows this arrangement.

If the detached building required a larger supply than the one shown, the cross-sectional area of the supply cable would obviously have to be greater and, in that case, it may be that the cross-sectional area of the protective conductor in the composite supply cable would be adequate for use as a main bonding conductor.

TT installation

Another option we could consider is to arrange the outbuilding to form part of a TT installation and this is what is shown in Fig. 3. Making the workshop part of a TT installation involves the use of a local earth electrode instead of using the earth from the house. The earthing should be disconnected at the outbuilding end within an adaptable box or by means of an insulating gland.

This allows the overcurrent protective device in the main building to operate if a phase to earth fault should occur on the supply cable. A local RCD protects the circuits within the workshop.

Conclusion

This article, together with the previous one and the diagrams in each, has attempted to provide clear guidance for the supply of electricity to typical remote outbuildings. No doubt other questions will arise but we hope that most of them have been answered. If you have any views on this subject feel free to air them online at the members' Forum at www.napit.org.uk

with water supply

Fig 1 **Where the supply is TN-S**

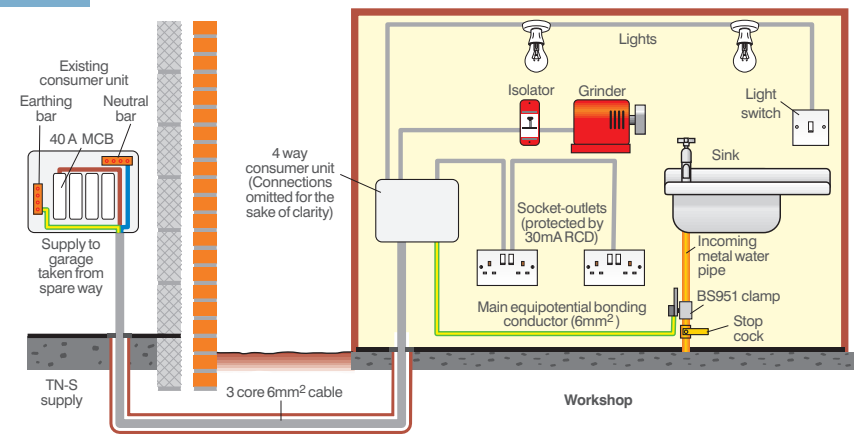

Fig 2 **Where the supply is TN-C-S**

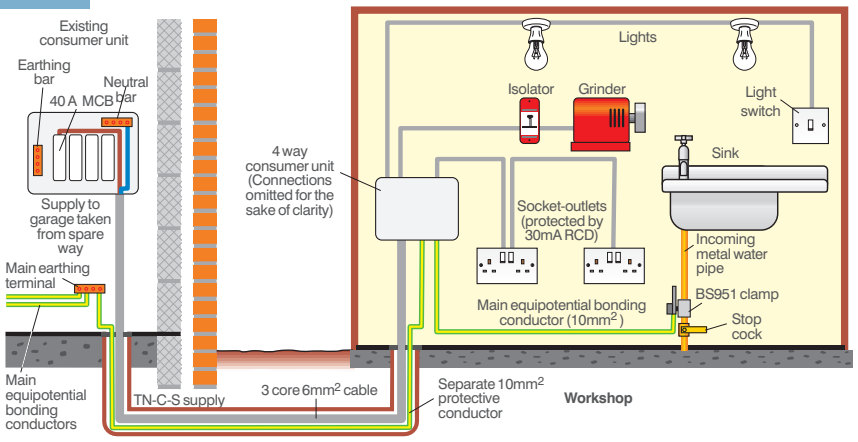

Fig 3 **Opting for a TT system**