



# ELECTRICAL INSTALLATIONS OUTDOORS: A SUPPLY TO A DETACHED OUTBUILDING

By John Ware

In this article, we will consider the requirements when supplying a detached garage, or shed, from a dwelling

**IN THIS EXAMPLE**, the user has requested a small supply be provided to a detached garage to feed lighting and socket-outlets. The supply to the dwelling is PME.

Initially we will assume that the garage contains no extraneous-conductive-parts, such as a metallic water supply or other earthed metalwork.

Two methods of meeting the user's requirements will be discussed:

1. The preferred method, where the supply is taken from a spare way in the existing consumer unit
2. Where the supply to the garage will be spurred from an existing ring final circuit.

At the end of the article we will discuss:

- what to do if the garage has an extraneous-conductive-part such as a metal water pipe
- verifying the existing installation, including the assessment of the earthing and bonding arrangements
- protection of the cables, and
- inspection, testing and certification.

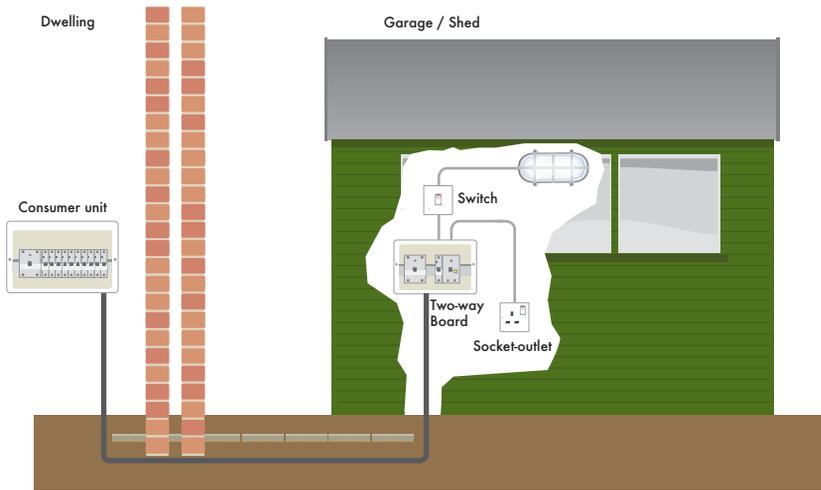
The electrical contractor making the addition to the installation must ensure all the applicable requirements placed by BS 7671 are met including the provision of protection against both direct and indirect contact, the correct selection of protective devices, the correct sizing and routing of cables and the earthing and bonding arrangements.

The requirements of all parts of the Building Regulations must be met and this work is notifiable.

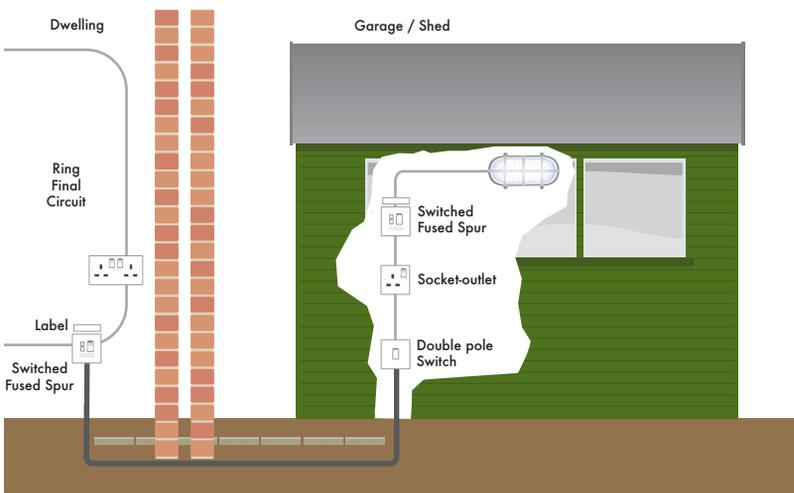
**1. Garage is to be supplied from a spare way in the consumer unit and a small two-way distribution board is to be provided in the garage (fig 1).**

A suitably sized circuit-breaker should be fitted in the spare way in the dwelling's consumer unit and a cable run out to the small two-way consumer unit in the garage. The two-way consumer unit in the garage should be fitted with circuit-breakers for the two final circuits such as 6A for the lighting circuit and 16A for the socket-outlet circuit. The socket-outlet is very likely to be used to supply portable equipment outdoors and RCD protection must be provided by an RCD with a rated residual operating current not exceeding 30mA. RCD protection should be provided by means such as:

- An RCBO in the dwelling's consumer unit for the garage supply, or
- An RCCB in the dwelling's consumer unit, or
- Selecting a device that includes RCD protection as



**Fig 1: Garage supply taken from a spare way in the consumer unit**



**Fig 2: Garage supply taken from a spur off the downstairs ring final circuit**



**A Type B 6kA, 30mA, 1 module, 32A, RCBO**

[Illustration courtesy of MK]

the main switch for the small two-way consumer unit in the garage, or

- Protecting the socket-outlet circuit in the garage with an RCBO, or
- Providing an SRCD (a socket-outlet incorporating RCD protection) for the socket-outlet in the garage.

**2. Garage is to be supplied from a spur from the ground floor ring final circuit (fig 2).**

If the ring final circuit is suitable for the additional load, the garage could be supplied from a fused spur inserted in the ring and a cable run out to the socket-outlet in the garage. In the garage a fused connection unit could be employed for the lighting circuit. Once again RCD protection should be provided for the socket-outlet, which is very likely to supply portable equipment outdoors.

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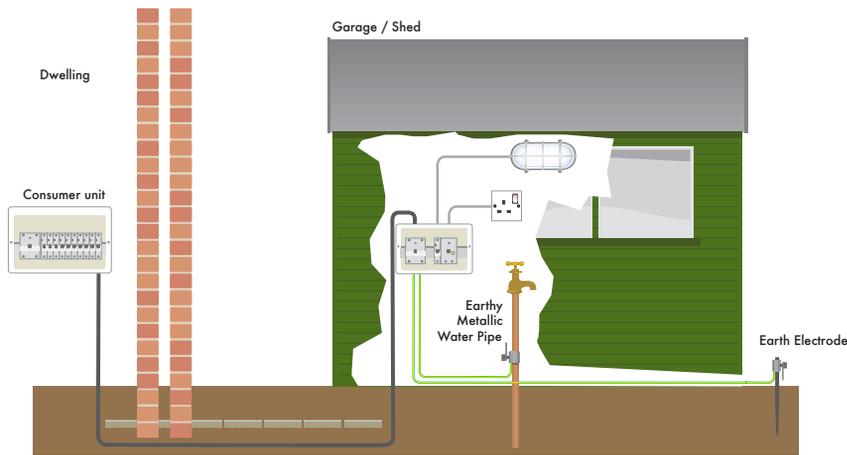


Fig 3: Garage installation made part of a TT system

### Where the garage contains an extraneous-conductive-part such as a metal water pipe

Among the options open to the installation designer are to make the installation in the garage part of a TT system or to provide main equipotential bonding to the extraneous-conductive-part in the garage.

#### TT system

One possibility the electrical contractor may decide upon is to supply the garage from a spare way in the consumer unit and make the small installation in the garage part of a TT system (fig 3). A local earth electrode must be provided at the garage. The metal water pipe must not be used for this purpose (Regulation 542-02-04). To achieve protection against indirect contact for both circuits in the garage an RCD must be employed. Main equipotential bonding will need to be provided at the garage connecting the metal water pipe and any other extraneous-conductive-parts to the earthing terminal in the small distribution board (Regulation 413-02-02). An exposed-conductive-part connected to one means of earthing must not be simultaneously accessible with an exposed-conductive-part connected to another means of earthing (Regulation 413-02-03 refers). Where the installation in the garage is supplied by an armoured cable, the armour or any protective conductor in the cable must not be connected to and must not be simultaneously-accessible with any exposed-conductive-parts in the outbuilding.

#### Main equipotential bonding

Another possibility is to include the garage within the installation in the main dwelling and provide main equipotential bonding, in accordance with Table 54H (PME conditions apply), in practice this would mean a

10mm<sup>2</sup> main bonding conductor would be required to connect the water pipe in the garage with the Main Earthing Terminal in the dwelling.

#### Verify the existing installation

The electrical contractor must verify that the rating and condition of existing equipment, including that of the distributor, should be adequate for the additional load and that the existing earthing and bonding arrangements are also adequate (Regulation 130-07-01 refers). It is possible that the increased load placed by the garage would overload an existing ring final circuit if the second option (above) was adopted.

#### Protection of the cables

The cable run from the house to the garage must be suitably protected either by being run overhead (see Regulation 412-05-01) or buried in the ground (Regulation 522-06-03 refers). Where cables are installed in areas inhabited by rodents, such as might be found in a garage, the wiring system must be capable of resisting damage caused by gnawing (Regulation 522-10-01).

#### Inspection, testing and certification

Inspection and testing must be performed to confirm the adequacy of the relevant parts of the existing installation, which will support the changed requirements, the upgrading of the existing installation necessary to support the addition or alteration, and the addition or alteration itself. The requirements for initial verification are contained in Chapter 71 of BS 7671 and further information on the requirements for inspection and testing is given in the IEE Publication Guidance Note 3 Inspection and Testing. Compliance with BS 7671 must be verified for every addition or alteration (Regulation 721-01-02 refers). Requirements for certification and reporting in respect of electrical installations are given in Chapter 74. An Electrical Installation Certificate must be provided to the owner of the installation giving details of the extent of the installation covered by the certificate, with a record of the inspection and the results of the testing (Regulations 741-01-01 and 743-01-01). ■