



Guidelines – Connecting to Ring and Radial Circuits

NOTE:

This document mainly provides guidance on wiring in relation to mains (domestic electricity supply) switching applications. The guidelines are based on UK electrical fittings and UK electrical regulations. Installers in other countries will recognise similar basic principles but must consult and adapt to their own regulations

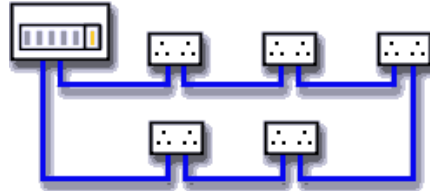
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Guidelines for wiring IDRATEK mains units to ring and radial circuits

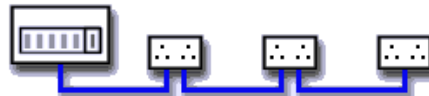
UK electrical installations are typically wired using radial (spur) and ring circuits. These are used for both lighting and sockets and can be interconnected as required. This practice however, must be done in accordance with the IEE 16th Edition Wiring Regulations.

1. Ring Final Circuits



UK installations use 13A socket outlets, wired using 2.5mm² flat twin in a ring circuit, with both ends terminating at the consumer unit (CU). The CU then provides protection by utilising either a fuse or miniature circuit breaker (MCB). A 30/32A (Type B) MCB is usually fitted as the protective device for a socket ring, although Type C and Type D MCBs may be fitted for heavily inductive loads as they offer greater tolerance to high start-up currents and prevent nuisance tripping. A ring circuit is favoured since it provides twice the capacity margin and will always supply power to each outlet if there is a break in the circuit, i.e. two routes to each outlet.

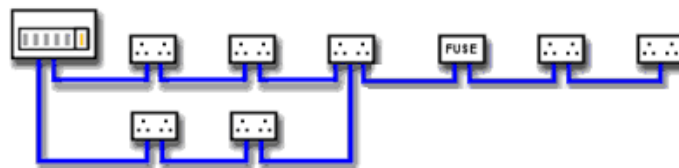
2. Radial Final Circuits



Radial circuits may also be used in UK installations and differ from a ring circuit as only one end of the cable terminates at the consumer unit. Furthermore, the protective device (MCB) is typically half the rating (i.e. 16A).

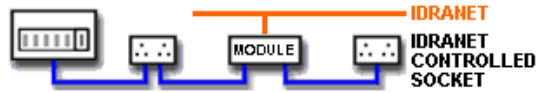
3. Wiring a radial circuit from a ring circuit

It is common practice to wire a radial from a ring circuit but this must include an additional protective device(s), since the ring circuit is capable of delivering twice the current under a short circuit fault current, that the radial circuit may be wired for. Therefore, the first item 'downstream' from such a connection must be a protective device, a fused consumer unit (FCU) rated at 13A is typically used as they are conveniently available as a single gang unit.



4. Wiring an IDRATEK module from a radial circuit

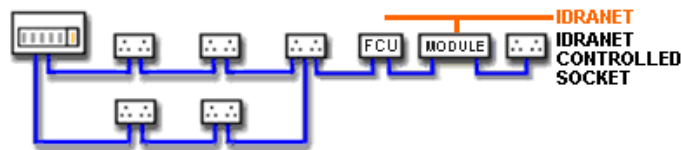
When wiring an IDRATEK power switching module (such as SRH/DRH) on a radial circuit, the module should be wired such that it switches the LIVE conductor. The NEUTRAL and EARTH conductors should 'pass-through' since there is no need to break these. Since the radial circuit is already protected by either a) a fuse/MCB in the consumer unit, or b) an FCU/fuse when taken from a ring circuit, no additional circuit protection is required **provided that the FCU/fuse is rated to the module capacity**. Some IDRATEK modules do provide additional fusing themselves in which case this condition may be relaxed.



5. Wiring an IDRANet controlled spur from a ring circuit

It is also possible to use an IDRATEK module (such as SRH/DRH) to control the power delivered to a spur by wiring it from a ring circuit. This may often be a convenient way of providing IDRANet controlled outlets next to existing 'always powered' outlets. As with a traditional radial circuit, there is a limit as to how many outlets can be supplied and this should be checked against the IEE 16th Edition Wiring Regulations, as it differs from one installation to the next.

As in section 3. (Wiring a radial circuit from a ring circuit) the radial circuit must be protected by an additional protective device, such as a FCU. With this method, at least 3 additional single gang pattresses must be fitted, one for the FCU, one for the IDRATEK module and one for the network controlled socket outlet.



The cable from the back of the ring socket to the FCU must be suitably rated, i.e. at least 32A (4mm²). A short circuit fault in this piece of cable could deliver 16A from each direction of the ring up to the maximum current for that circuit (set by the MCB probably to 32A).

The IDRATEK module only switches the LIVE conductor, so the NEUTRAL and EARTH conductors may effectively 'pass-through'. It should be noted however, that in order to comply with the isolation requirements of the 16th Edition, a mechanical isolation device must be included if the circuit needs to be isolated for maintenance purposes. The IDRATEK module provides only 'functional switching' in accordance with the regulations and not isolation. For many circuits, such isolation is inherently provided by the circuit protective device in the consumer unit, i.e. turning the MCB off, will isolate the circuit.

In respect of lighting circuits, such isolation must be provided to allow safe replacement of faulty bulbs for example. A lighting circuit may use IDRATEK modules such as the DRB range, but again these only provide functional switching and not isolation. If in doubt consult a qualified electrician.

In some circumstances, it may be possible to reduce the number of additional pattresses from 3 to 2, but maintaining the same functionality. This is only possible if the IDRATEK module provides additional fusing and is rated accordingly for that circuit.

In this method, the ring circuit is cut and the NEUTRAL conductors are wired direct to the back of the network controlled socket outlet (NCS), thus maintaining the ring for the NEUTRAL. This is repeated for the EARTH conductor using the earthing stud provided on the back of the socket outlet itself or preferably the metal pattress. The LIVE conductors are then joined using a suitably rated terminal block (32A or above) with an additional 2.5mm² conductor wired into this terminal block. This single core is then wired to the common terminal of the IDRATEK module and a second 2.5mm² single core cable is taken from the normally

open (typically) terminal of the IDRATEK module, back to the LIVE terminal of the socket outlet. IDRATEK recommend that such cables are colour coded red in accordance with electrical practices.

6. Safety considerations

Before commencing any electrical work, ensure that the power is removed and that the circuit you are working on is isolated.

IDRATEK modules have been designed with safety in mind and when they are correctly used in accordance with the specified operating conditions should not cause problems. IDRATEK cannot be held responsible under any circumstances if modules are fitted outside the recommended operating conditions.

On January 1st 2005, it became a legal requirement in the UK for all electrical work to be checked by a qualified person(s) in accordance to the 16th Edition Wiring Regulations. If in doubt, always consult a qualified electrician.