

Consumer Units

What are consumer units?

Consumer units have been called many different names over the years, such as fuse box, fuse board and dis-board. They are typically installed in domestic premises to provide control, distribution and protection to the various final circuits within the installation.

What are the requirements of BS 7671:2018 today, for consumer units in dwellings?

Over the years the requirements have changed drastically, in the 1960s it was acceptable to install a consumer unit with a wooden back box, fuses were typically, the rewirable type providing protection against overcurrent and short-circuit and protection from electric shock, but what is required in the current edition of the IET Wiring Regulations, BS 7671:2018?

Protection from spread of fire

From January 2016, The IET Wiring Regulations required that consumer units in domestic (household) premises were manufactured from non-combustible material. The intent is to contain any fire within the enclosure, to minimise the spread of fire and to remove an additional source of fuel for the fire, i.e. the plastic material. There is substantial evidence to show that if there is a deficiency within a plastic consumer unit, such as, a loose connection, they can burn and release toxic gases. This could have more severe consequences if the consumer unit is installed on an escape route, for example, in a hallway or under the stairs.

Circuit protection

Within the enclosure itself, circuit protective devices are installed to protect the final circuits. Typically, there is a main switch which serves as an isolation device only and does not offer any electrical protection. However, this could be used in an emergency to isolate the whole installation, for example, if someone was receiving an electric shock or overheating was evident. Fuses provide protection against overcurrent and short-circuit faults and the modern equivalent is the circuit-breaker. These devices are rated in amps (A) and there will be one installed per final circuit within the installation, for example, cooker, shower, socket-outlets and lights.

Protection from electric shock

Generally, all circuits within the domestic installation will have requirements for additional protection by means of a Residual Current Device (RCD). RCDs are required to protect people from electric shock and the rating of these devices is stated in milliamps (mA), so they are thousands of times more sensitive than circuit-breakers or fuses. The usual arrangement is for two RCDs to each protect a number of circuits within the installation. This is to prevent danger or inconvenience to the user in the event of a fault. For example, where upstairs and downstairs lighting circuits are split over two separate RCDs, if one RCD operates, the other circuit will continue to operate thus preventing the user from being plunged into complete darkness. RCDs incorporate a test button to prove the mechanical operation of the device and should be tested at a maximum frequency of six months.

Protection from fire

RCDs will also provide some protection from fires arising from insulation faults within the installation. There is a recommendation in the latest edition of the IET Wiring Regulations, BS 7671:2018, to incorporate Arc Fault Detection Devices (AFDD) to protect from fire. Please see separate article on AFDD.

Protection from surge

A new regulation in the latest edition of the IET Wiring Regulations has a requirement to incorporate protection against surges. Please see the separate article on SPDs here.

How much does a consumer unit cost?

As there are different types of protection and sizes of installation the costs of a replacement consumer unit can vary. Typical costs for a domestic consumer unit within a domestic installation can range from £500-£2000 including installation.

Basic homeowner checks

The electrical installation in a privately-owned domestic property should be inspected and tested at a maximum frequency of once every ten years. If the dwelling is rented out, the electrical installation should be inspected and tested at a maximum frequency of once every five years or at change of occupancy. These maximum frequencies are often reduced as the inspector of the installation may become aware of particular issues that could affect the ongoing use of the installation, for example, dampness within a property could affect the safety of the electrical installation or older wiring could be safe for use at the moment but evidently deteriorating.

However, there are certain checks that the homeowner can perform themselves more regularly.

RCDs are an important safety device which should be tested every six months. There should be a label present on the consumer unit and it will advise how and when to test the RCD.

This can be done by pressing the button marked 'T' or 'Test'. The device should switch off when the test button is pressed, the operator can then reset the switch to restore the supply. If the device does not switch off the supply when the button is pressed, seek expert advice from a registered electrical contractor.

The consumer unit is required to have a minimum IP rating to prevent a person from touching live parts and to prevent conductive or combustible materials from falling into the consumer unit. If you can see a gap or hole big enough to fit a finger in, it is likely that it will not be safe or compliant with the IET Wiring Regulations. Fire protection should also be installed at cable entries to ensure fire cannot spread. If in doubt consult a registered electrical contractor for further advice.

Cables must be protected from abrasion, this means they must not be in contact with sharp edges where they enter the metallic consumer unit, an example of providing this protection is to use a rubber grommet to prevent contact with the sharp edge of the consumer unit. Cables usually have a white or grey outer sheath for protection with blue and brown inner cores, the inner cores should not be exposed or visible and the cable should enter the consumer unit with sheath covering the inner cores completely until it is inside the enclosure.

Cables must be supported to ensure there is no mechanical strain on the connections. Meter tails, these are the cables between the electricity meter and the consumer unit, are often unsupported and carry the largest load within the installation; loose connections can cause fire. Ensure all visible cables, including the meter tails, are adequately supported.

A keen sense of smell is one possible way of detecting something is wrong within the consumer unit, if a burning smell is noticed, excessive heat or smoke is detected, or evidence of burning or charring is evident, the installation should be isolated immediately and without delay and consult a registered electrical contractor for further advice.

Common problems

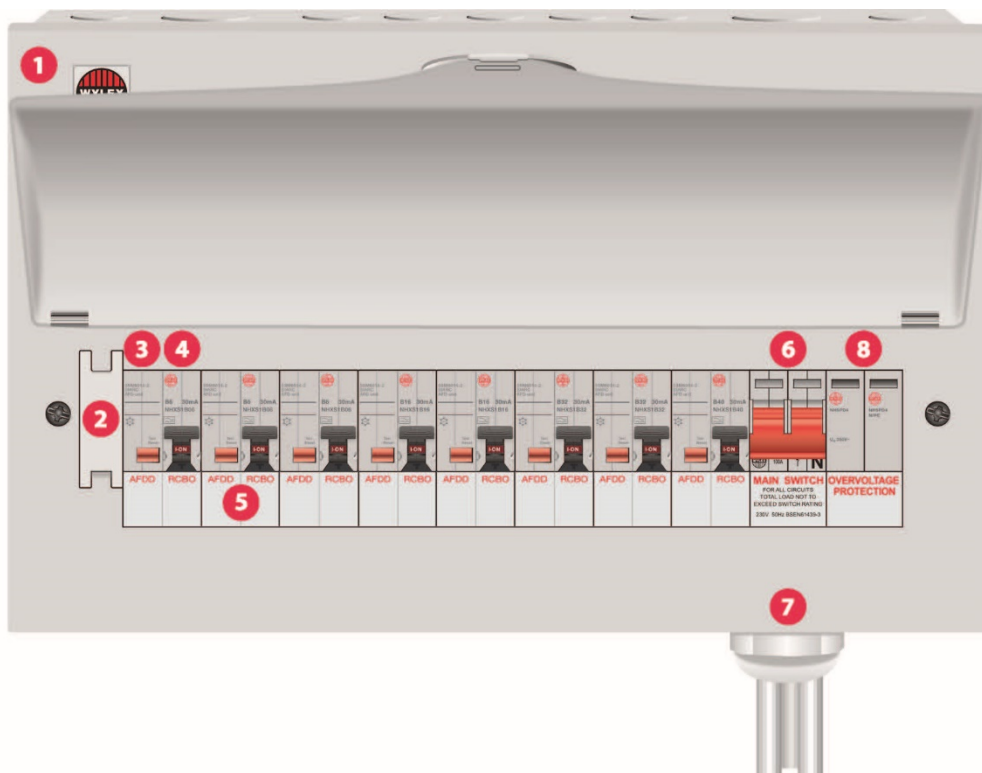
Remember the consumer unit is there to protect you so if a circuit-breaker fuse or RCD trips, it is likely to be a fault with an appliance connected to the installation as opposed to the installation itself. However, faults on the installation can occur and are more likely following DIY, such as hanging pictures or shelves.

The tripping of a protective device could possibly be caused by a faulty appliance, which is plugged in to a socket-outlet. The homeowner can perform a simple fault-finding exercise to determine if this is the case by removing the plugs of all the appliances from the associated socket-outlets, it is important to remove the plug completely from the socket-outlet and not just turn the appliance off at the socket-

outlet. When all the appliances and equipment have been removed the affected circuit-breaker or RCD could be reset and if it stays on appliances can be plugged in one at a time to determine the faulty piece of equipment. The faulty item of equipment should not be used further unless it has been repaired. If the circuit-breaker or RCD does not reset with everything unplugged, consult a registered electrical contractor who will be able to test the installation and diagnose the fault.

Another cause could be something as simple as a lamp (light bulb) that has blown or failed, however, this is more common with tungsten type lamps which are becoming less common. The homeowner would simply have to reset the affected lighting circuit-breaker or RCD and the power would be restored. A further inspection of the light fittings would indicate a lamp had blown or failed and could be confirmed as the cause of the fault.

It should be noted that attempting to reset a circuit-breaker or RCD on a fault repeatedly could damage the device so this procedure should be kept to a minimum number of attempts before consulting a registered electrical contractor for further guidance.



1. Metal enclosure (For fire protection)
2. Blanking modules (To prevent access to live parts)
3. AFDD (Arc Fault Protection)
4. RCBO (Residual Current Circuit Breaker with Overcurrent protection)
5. Circuit labelling (identification purposes)
6. Main switch (For isolation purposes)
7. Main supply cable entry point
8. Surge protective device (For protection against overvoltages)