Starks Electrical
we're switched on

www.starkselectrical.co.uk
Call Russell 01425 460419

Circuit Protection Devices

Before we dive into the consumer units, let's briefly look at the devices:

Main Switch

Isolates the entire consumer unit and all devices. Turning this switch to 'OFF' will cut power to all circuits that are terminated in the consumer unit - which is usually all circuits in the house. Nearly all consumer units are supplied with a 100a main switch.

RCD - Residual Current Device

Protects a bank of circuits from earth leakage or 'Residual Current' - for example - cutting through the lawnmower cable. Protecting a bank of MCBs means that earth leakage on one circuit will cut power to all other circuits protected by that RCD and is considered a form of **'nuisance tripping'**. The most common domestic RCD is rated at 80Amp 30mA. Click here if you want to know more about RCDs.

MCB - Mini Circuit Breaker

Protects cables and devices from overload and consequently fire. Under the latest '17th Edition Wiring Regulations', all MCBs must be used in conjunction with an RCD in order that the circuit is also protected against earth leakage.

MCBs are commonly available in the following amperages: 6a, 10a, 16a, 20a, 32a and 40a. Click here if you want to know more about MCBs.

RCBO - Residual Current Breaker + Overload

A special device which combines the functionality of both and RCD and MCB, protecting against both overload and earth leakage. This offers complete **circuit separation** negating **nuisance tripping**. RCBOs are more expensive than MCBs.

SPD – Surge Protection Device

The ability of an SPD to limit overvoltage's on the electrical distribution network by diverting surge currents is a function of the surge-protective components, the mechanical structure of the SPD, and the connection to the electrical distribution network.
An SPD is intended to limit transient overvoltage's and divert surge current, or both. It contains at least one nonlinear component.
In the simplest terms, SPDs are intended to limit transient overvoltage's with a goal of preventing equipment damage and downtime due to transient voltage surges reaching the devices they protect.

For example, consider a water mill protected by a pressure relief valve. The pressure relief valve does nothing until an over-pressure pulse occurs in the water supply. When that happens, the valve opens and shunts the extra pressure aside, so that it won't reach the water wheel.
If the relief valve was not present, excessive pressure could damage the water wheel, or perhaps the linkage for the saw. Even though the relief valve is in place and working properly, some remnant of the pressure pulse will still reach the wheel. But pressure will have been reduced enough not to damage the water wheel or disrupt its operation. This describes the action of SPDs. They reduce transients to levels that will not damage or disrupt the operation of sensitive electronic equipment.

www.starkselectrical.co.uk
Call Russell 01425 460419

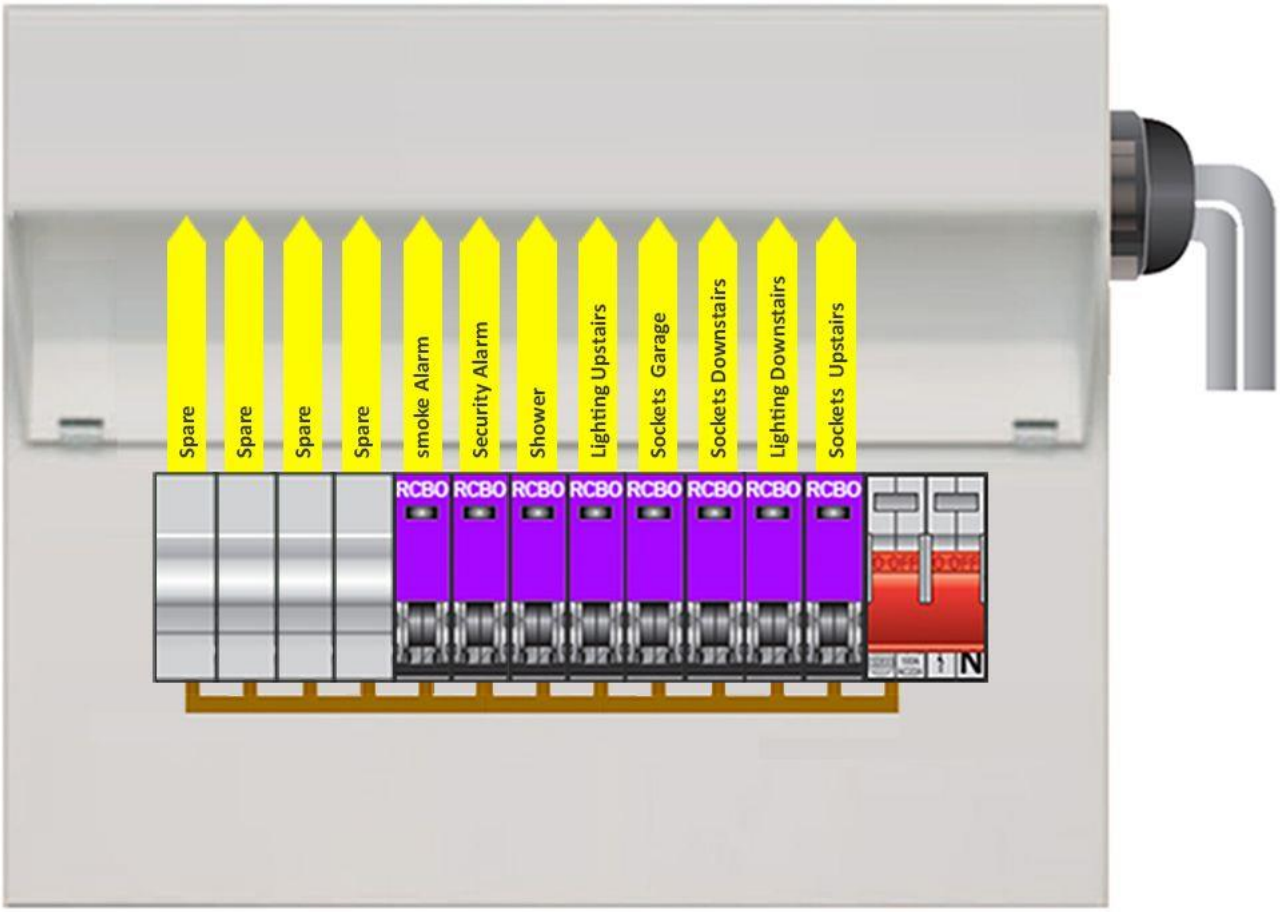
The Four Main Types of Consumer Unit

Main Switch Consumer Unit

A **'Main Switch Consumer Unit'** is so called because it is supplied empty of all protection devices except the main switch. Whilst it may be populated with an RCD and MCBs.

It is usually populated exclusively with RCBOs as shown in our image, but theoretically could be populate with RCD and MCBs.

Many electricians consider this the best circuit protection solution as each circuit is protected from overload and earth leakage **individually**, thus preventing nuisance tripping caused by earth leakage on other circuits.



Starks Electrical
we're switched on

www.starkselectrical.co.uk
Call Russell 01425 460419

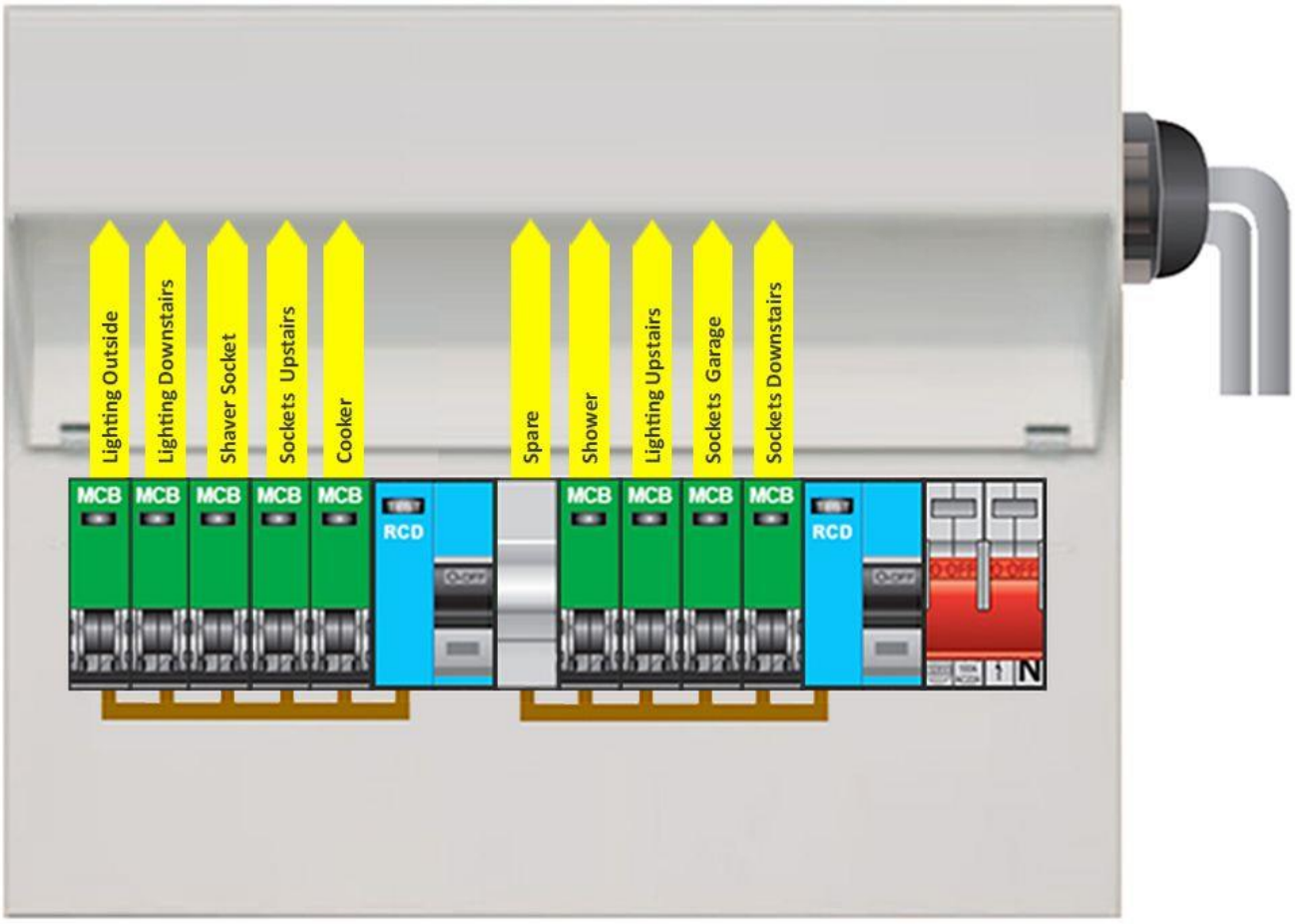
Dual RCD Consumer Unit

A **'Dual RCD Consumer Unit'** is supplied with the main switch and two RCDs and offers a cheaper solution. Our image shows a typical installation with the two banks of MCBs protected from earth leakage by the RCDs.

Consideration must be given to circuit design in this scenario. You should not, for example put all the lighting circuits on the same RCD as an earth leakage fault on one of those circuits will cut power to the whole bank, leaving you without any lighting.

Despite the limitations of dual RCD consumer units, they remain extremely popular due to the cost. Indeed, most 'fully loaded' consumer units are dual RCD configuration.

This is something we do not really offer or fit anymore. Purely down to having an issue with tripping on once circuit, this will cause you to lose power to half of your home.



Starks Electrical
we're switched on

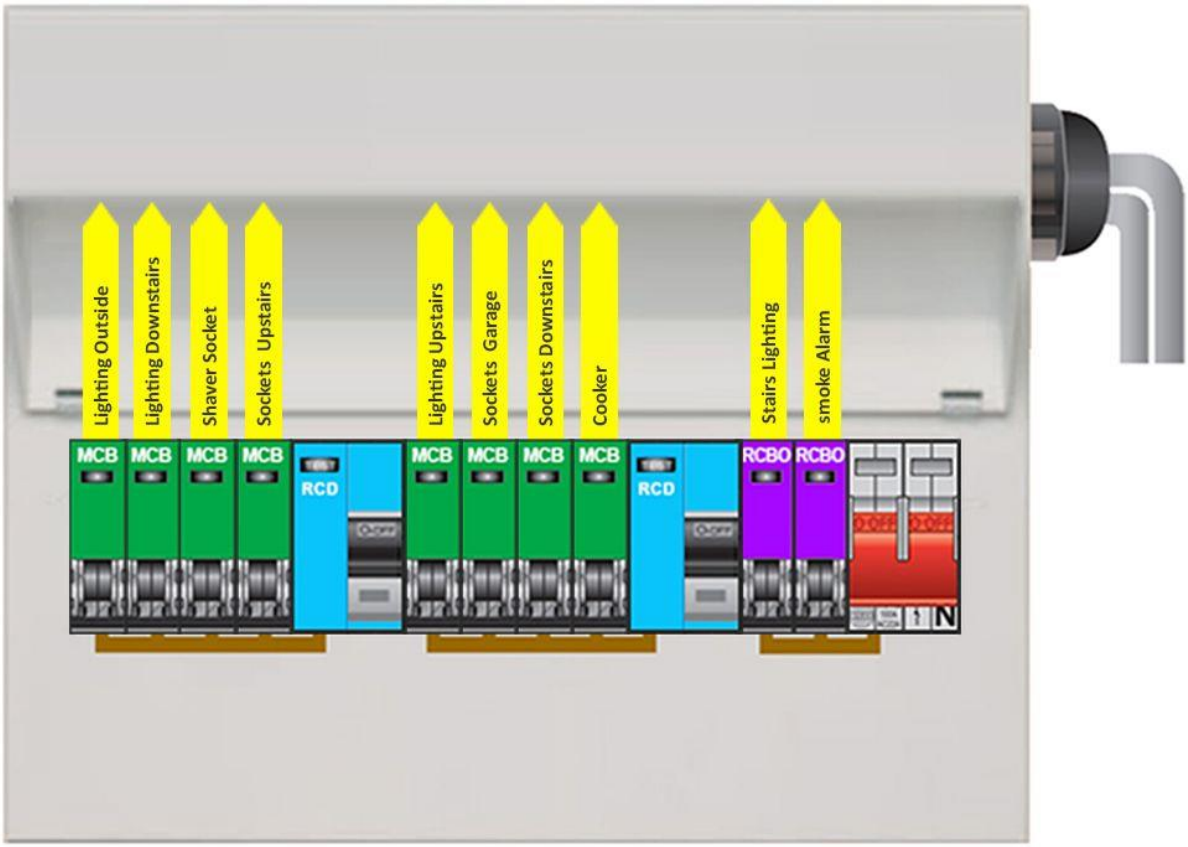
www.starkselectrical.co.uk
Call Russell 01425 460419

High Integrity Consumer Unit

With three neutral bars, which in essence gives three banks of circuits - A **'High Integrity Consumer Unit'** offers the best of both worlds...

Allowing for the use of RCBOs and two banks of MCBs they offer total circuit separation for critical circuits and highly cost effective protection for standard circuits.

High Integrity consumer units are becoming increasingly popular with electricians - because they make circuit design easy - and homeowners - because they offer excellent protection without breaking the bank. They are particularly good in projects requiring 12 or more circuits.



RCD Incomer Consumer Unit

An 'RCD Incomer' consumer unit is a special type of protection device, generally used in workshops, garages, garden offices and sheds which use small numbers of circuits.

The defining difference between this and other types of consumer unit is the fact that it does not have a 'Main Switch'. Isolation of the board is handled by the single RCD. In other words, all incoming electricity is managed by the RCD - hence the name.

This type of consumer unit offers no circuit separation as it may only be populated with MCBs. Earth leakage on every circuit in the arrangement is dealt with by the one RCD. That means that a residual current fault on any circuit will knock out power to all other circuits. For this reason they are almost never used in the main dwelling.