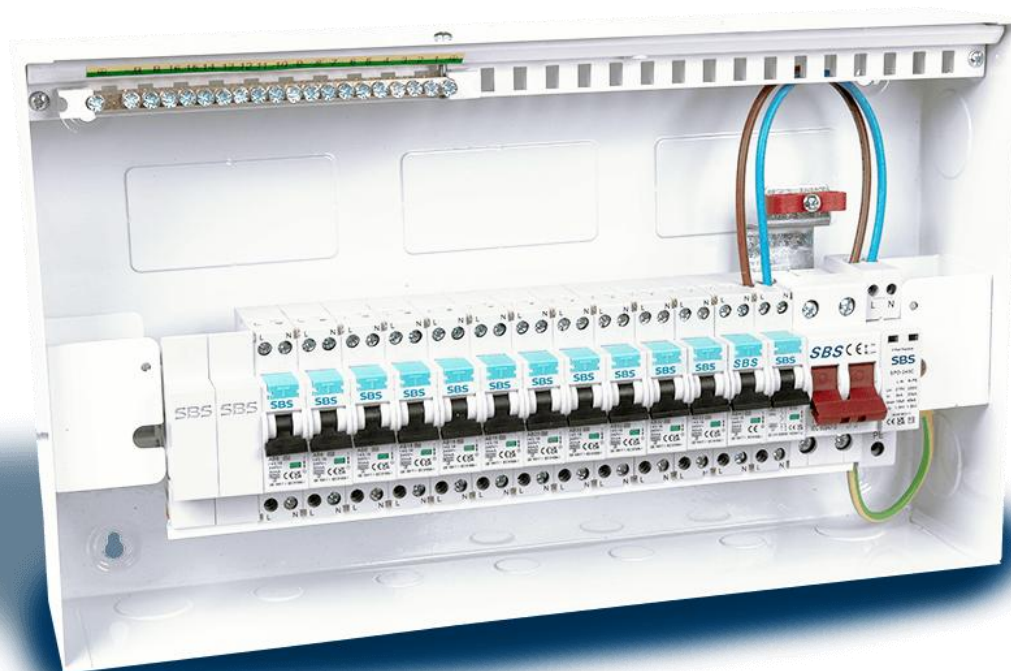


# CONSUMER UNIT HANDOVER GUIDE

Please review this brief guide to familiarise yourself with your new electrical protection devices.



Images are illustrative and may not match the appearance or branding of the equipment installed

Congratulations on the purchase and installation of your new consumer unit. This equipment is an improvement on what was fitted before and offers the latest in electrical safety, convenience, and room for future expansion.

Your new consumer unit contains various devices to keep you and your wiring safe. The equipment installed has the following benefits:

- All-metal construction to contain a fire in the unlikely event of a fault such as a loose connection or the catastrophic failure of a protective device.
- Segregation of circuits to minimise disruption in the event of a fault condition.
- Shock protection on all individual circuits\* to automatically cut the power should a leak to earth of no more than 30mA be detected.
- Overcurrent protection to prevent your wiring from overheating under both normal operation and in the event of a fault.
- Surge protection to remove noise and spikes on the incoming supply that may otherwise damage your sensitive electronic appliances\*\*.
- Arc fault protection (at least where required by BS7671 or explicitly specified by a customer).
- Room for future expansion.
- Type-AC and Type-A residual current protection to ensure an earth leakage will trip off the power even with up to 6mA of DC leakage in-circuit.
- Full inspection and testing with the results detailed on the accompanying Electrical Installation Certificate.
- The backup of a two-year no-quibble on-site warranty.

To maintain the high standard of workmanship and to keep the electrical safety of the installation as robust as it now is, any servicing, additions or alterations should only be performed by persons who meet the criteria of a 'Skilled' person under Chapter 2 'Definitions' of BS7671, the IET Wiring Regulations. Modifications to any part of the electrical installation by persons who are not qualified, skilled or insured to be undertaking such work may result in a decrease in the electrical safety of the installation or unwanted issues such as trip events through faults subsequently being introduced that are detected and properly acted upon by your new consumer unit.

Faults caused by third-party alterations which cause damage to the consumer unit are not covered under any standard warranty terms.

This guide, along with the accompanying certification, should be kept safely together as a record of the work undertaken. Any alterations or amendments afterwards should also be documented and kept with this information to form a 'service history' for the property which will aid in any future sale, rental or building work.

\* Earth leakage protection may be omitted on certain circuits by design where such protection isn't required or is being provided by an alternative means such as armouring.

\*\* Surge protection may be omitted under certain circumstances or if refused by the duty holder/homeowner.

Please familiarise yourself with the following component parts and how to check for correct operation.

## THE MAIN SWITCH



The main switch is usually red in colour and is OFF when switched into the down position as pictured above, ON when switched into the up position. Under normal circumstances, the main switch will always be on and would only be turned off should all circuits on the consumer unit need to be de-energised. This may be the case if major building work is being undertaken, the property is to be vacated for a significant time, damage has occurred because of events such as flood or fire, the consumer unit is being altered or other off-nominal circumstances.

A 'dual tariff' consumer unit may have two main switches, one for the peak supply and one for off-peak. The off-peak switch will shut off heaters that are normally only operated at selected times of the day by an external timer or smart meter.

If you wish to turn the main switch on or off, you should first turn off all protective devices (see Individual Circuit Protection).

There may be a second main switch housed in an external isolator near the consumer unit or your electricity meter. If so, the purpose of this is to isolate the supply before it gets to the consumer unit. This too would normally be in the ON position and only needs to be turned off if the consumer unit itself is to be altered or replaced.

## THE SURGE PROTECTION DEVICE (SPD) ASSEMBLY



The Surge Protection Device may be yellow, orange or grey and may have an associated circuit breaker adjacent to it. The job of the SPD is to iron out electrical spikes on the incoming line which might be caused by equipment such as arc welders, motors, compressors or switching loads in nearby properties, weather events such as indirect nearby lightning strikes or other induced electrical noise which may damage the sensitive electronic devices found in any modern home. The SPD will eventually wear out and has 'flag windows' at the top to indicate its status which should periodically be visually checked. If the windows are black or green (depending on model), the SPD should still be functional. If a flag window is red, the SPD requires replacement and is no longer performing its task. These flags are mechanical and are not illuminated, so you may need to inspect them with a torch if your consumer unit is in a dark location. Replacing a failed SPD is a straightforward task for any electrical contractor.

If the SPD is to perform its task, any associated circuit breaker should always be ON (switch in the up position). Only if the SPD fails might the circuit breaker switch itself off, in which case the flag window(s) should show it has failed.

The SPD is a passive component which draws no current even when on, therefore it costs nothing to run and there is no benefit to switching it off except if a replacement is to be fitted. Its presence is advantageous; however it is not a guarantee your electrical appliances will be immune from breaking down or becoming damaged.

## INDIVIDUAL CIRCUIT PROTECTION



With some exceptions, each individual circuit on your consumer unit now has a device which monitors for two different faults: *overcurrent* and *earth leakage*. The former can cause your wiring to overheat, increasing the risk of fire, whereas a leakage fault will see electric current escaping from a circuit - perhaps through you if you're in touch contact with something live. Either way, the protective device should automatically switch off and quickly remove the power to prevent damage or injury.

Your electrical installation has been subdivided into many individual circuits so that any single fault will cause minimum disruption. This may be different to older consumer units you've lived with where a fault on one circuit may have caused half or even all the other circuits in the property to lose power. Older consumer units may have also lacked the earth leakage protection wholly or partially, further increasing the risk of electric shock.

Some circuits in your new consumer unit may lack the earth leakage function where it isn't required, for example an armoured cable serving an outbuilding. Such a circuit will have overcurrent protection by a breaker (left in the picture above). A device incorporating earth leakage protection may look very similar, but the difference is given away by the inclusion of a button which has a 'T' for TEST on the device (right and in red in the picture above).

BS7671 (the IET Wiring Regulations) recommends you push the TEST button on any device that has one at least twice a year to verify its mechanical functionality. Pressing the TEST button should result in a physical trip causing the circuit to lose power, so only use the TEST button when you and others in the property have prepared for it, i.e., no desktop computers are on, no internet calls are in progress, the washing machine isn't halfway through a cycle, Coronation Street isn't on, etc. A good way to remember this regimen is to be in the habit of performing the check when the clocks change as an interruption to power often requires you to reset clocks on many appliances anyway.

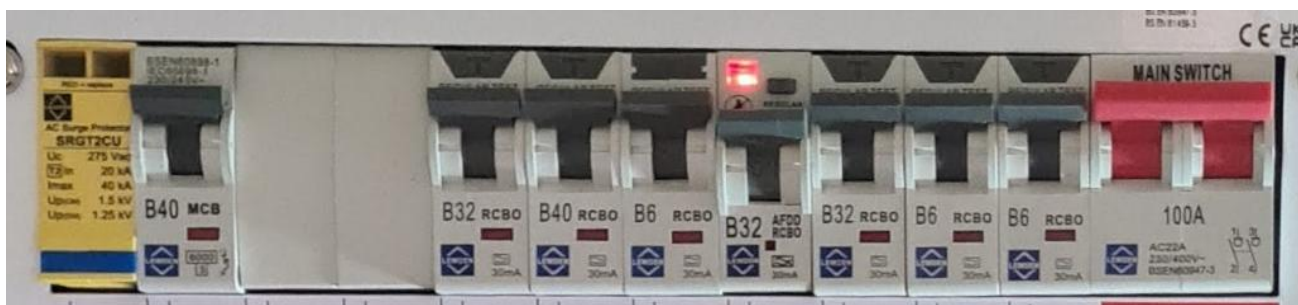
Pushing the TEST button so that the device trips proves it is operating mechanically and it serves to keep the mechanism from seizing up which can happen to electromechanical devices that are otherwise left in a static position over a long time.

If the device fails to operate when the TEST button is depressed, it may require replacement by someone skilled to perform such work.

Most of these devices also tend to have a mechanical flag window which shows GREEN when off/safe and RED when energised.

## ARC FAULT DETECTION DEVICES

Certain installations are required to have AFDDs installed on some circuits. This technology is relatively new to the UK and quite expensive, so is not installed as standard. If the wiring regulations, or you the customer, have specified arc protection be present, then you'll have one or more devices in your CU each with an illuminated LED indicator such as the example shown toward the middle of this picture:



The illuminated indicator on most AFD models will be red to show an “energised” state, the same as a mechanical flag window on the neighbouring devices, however some brands have adopted a green indicator for this role even though green has traditionally symbolised a ‘safe’ or de-energised state. Increasingly, new models are coming to market with non-standard colours such as blue or white to show the device is powered.

If an AFDD trips, it will be for one of five reasons: an overload, a residual current leak, a self-test failure, an overvoltage event or an arc fault. When switching the device back on, it is important to watch what the LED shows – note down any flash pattern displayed. Unfortunately, LED colours and patterns vary wildly between manufacturers and model ranges, however noting how the indicator acts will help diagnose what kind of fault has caused the trip.

AFDDs also incorporate a TEST button and require the same twice-yearly check to verify mechanical operation.

## **WARRANTY SUPPORT**

Your new equipment is covered by a warranty against manufacturing defects and workmanship of the installation. Any issues regarding equipment as supplied and how it has been installed will be dealt with under the terms of the warranty with the following exceptions...

- We reserve the right not to provide support where non-payment in full has been received for the invoicing relating to the supply of goods and services.
- Third-parties have since made alterations to the supplied equipment, or the circuits connected to it, that now results in impaired performance.
- Damage has occurred via an external and unrelated means such as fire, flood, vandalism, accident etc.
- Tripping or other fault conditions are found to be as a result of defective consumer appliances and are not related directly to the fixed wiring as tested or incorrect operation of the equipment as installed.

Where third-parties are undertaking new additions or alterations to the electrical installation, they would be responsible for their own materials and workmanship along with any subsequent issues arising from their actions. Should they be unwilling or unable to resolve any perceived problems they've introduced, or if you don't want them back on site, time can be booked to perform any necessary inspection, testing, fault finding or remedial work, however it would be chargeable at the current rate and not covered under warranty.

The inspection, testing and equipment selection should mean no 'nuisance' trip events occur unless faulty appliances are now connected to the electrical installation which causes the consumer unit to act as designed by cutting the power when the fault is detected. Warranty support would not extend to any inspection and testing to identify such faulty equipment when not part of the fixed wiring; that work being chargeable if required.

Your statutory rights are not affected.

## **NEXT INSPECTION**

BS7671, the IET Wiring Regulations, recommends your electrical installation is fully inspected and tested by skilled persons at least every ten years. For rental or commercial properties, the maximum is five years. Older installations may see a recommended reinspection frequency that is much shorter. As wiring systems age, connections will work loose, exterior elements become weathered, insulating materials break down and mechanical parts seize. Where an inspection has identified an existing installation has degraded since new, the next inspection date may be sooner than the maximum permitted to allow for re-testing before physical problems such as malfunction in operation or unwanted trip events arise. The next inspection date does not mean the installation is guaranteed to be fault free until then or that the installation will be unsafe after then.

The recommended date of next inspection for your installation can be found on the accompanying certificate and on a notice affixed on or near to the consumer unit itself (note that it may be located under the cover flap).

Your home insurance may be invalidated against injury or damage sustained from an electrical fire or shock if the recommended date for next inspection is allowed to lapse without action. The date should be bought forward if you know the installation has been subject to damage or deterioration.

You're under no obligation to use your installer for subsequent inspection and testing when next due, although they do perhaps have the advantage of familiarity with your installation through the work performed here.

If your contractor is claiming they can undertake inspection and testing work through affiliation with a membership scheme such as NICEIC and NAPIT, then it is important you check you can verify such membership is current and correct. If not with one of these organisations, you can ask your contractor to provide a covering letter confirming they are suitably qualified/experienced and insured to be undertaking such work.

Advice on hiring an electrician can be found at <https://inaec.org/advice>



## Choosing an electrical contractor

In the UK, anyone can claim to be an Electrician, therefore when hiring a spark some basic checks are prudent. If any person or business displays any of the following insignia, use the links here to verify that membership is current and the scope of work they're to be engaged on is included.

### Current electrical schemes

The following organisations exist today specifically for electrical contractors in England and Wales. These entities will promote their members as being "trustworthy" over all others and may offer arbitration in the event of a disagreement, but they are unlikely to provide much further assistance should a job go bad and they have a financial interest in not cancelling a member of their scheme...



We start with the National Inspection Council for Electrical Installation Contracting (**NICEIC**) which is a trading name for Certsure LLC running two primary Competent Persons Schemes as *Accredited Contractor* and *Domestic Installer* depending on whether a member undertakes commercial/domestic or just domestic work. In around 2022, the DI scheme took over from an older Certsure CPS which was branded as **ELECSA**, thus bringing all members under the NICEIC marque. Anyone displaying an NICEIC logo should have a verifiable membership number and will appear on a search at <https://niceic.com>



Any member of the National Association of Professional Inspectors and Testers (**NAPIT**), another Competent Persons Scheme set up in 2006, will have a unique membership number and can be verified at <https://search.napit.org.uk>. Their current logos are left and centre; the logo on the right is an ancient variant from the mid-2000s.



The Electrical Contractor's Association (**ECA**) is a trade association rather than a CPS and offers benefits to its members mainly skewed toward larger organisations working in the commercial and industrial sectors. ECA seem to be haemorrhaging members as it's (rightly or wrongly) perceived as something of a dinosaur-old-boys-funny-handshake-club. Any individual or organisation still waving this logo around can be checked at <https://www.eca.co.uk/find-a-member>. ECA, along with Electrical Safety First, owns Certsure LLC which trades under the NICEIC name, so many ECA members are also NICEIC accredited in an arrangement not dissimilar to cousins intermarrying. It's uncommon for your average domestic electrician to be affiliated with the ECA, since ECA apparently have no idea of there even being an electrical industry working on dwellings, therefore they offer little benefit to that end of the industry despite the nosedive they're in. Nonetheless, rogue traders like to use this logo fraudulently because it's been around since 1901 and lurks vaguely in the consciousness of the great unwashed British public.

### Chapters:

INAEC: Home

What's a CPS and Part P?

The CPS problem

Choosing an electrical contractor

Introducing INAEC

but... what about landlord reports?

Summary

Get the logo!

## TROUBLESHOOTING

<b>Symptom:</b>	<b>Issue:</b>
<i>The circuit protective device trips off when a particular appliance is plugged in or turned on.</i>	The appliance may be faulty.
<b>Reason:</b>	
<p>If there are physical indications of a problem when the appliance is plugged in or switched on such as an audible bang, crackle, sparks, smoke, discolouration or a bad smell, then the appliance should be withdrawn from service until such time as it can be repaired by a competent person or replaced outright. If there are no physical indications of a problem and the protective device simply trips off, then the appliance may have an earth leakage fault. This kind of fault may not have been apparent on an older consumer unit which wasn't monitoring for such, but will be an issue with any modern consumer unit.</p>	
<b>Action:</b>	
<p>The protective device is tripping off for a good reason and no attempt should be made to defeat it or to work around it. If further advice or investigation is required, contact a reputable electrician who will have the tools, expertise and test equipment to diagnose the fault further.</p>	

<b>Symptom:</b>	<b>Issue:</b>
<i>The SPD flag window(s) are red</i>	The SPD is no longer functional
<b>Reason:</b>	
<p>The Surge Protection Device in your consumer unit monitors the voltage of the incoming supply and will 'dump' any spikes through the installation's earthing system before they get a chance to damage sensitive electronic equipment downstream such as modern televisions, computers and gaming consoles. The SPD will eventually wear out, something that may happen gradually over a long period of time, or suddenly if there is an event such as a nearby lightning strike.</p>	
<b>Action:</b>	
<p>Contact a reputable electrician who will be able to replace the SPD module.</p>	







<b>Symptom:</b>	<b>Issue:</b>
<i>Intermittent tripping</i>	One or more faulty appliances are connected, or... The electrical installation is being affected by external influences such as moisture ingress, or... Damage has been sustained to the electrical installation.
<b>Reason:</b>	
The fixed wiring was fully tested and passed as healthy when the new consumer unit was installed, so if tripping issues are occurring after the fact then there has been a change since that testing was undertaken. Either one or more appliances have subsequently been connected that are themselves faulty, or the electrical installation has since been exposed to external influences such as moisture, heat, flora and fauna, or the installation has been damaged such as by drilling in the wrong place or rodents chewing cables.	
<b>Action:</b>	
The protective device is tripping off for a good reason and no attempt should be made to defeat it. Identify the function of the circuit that is tripping. If serving socket outlets, unplug appliances to see if the situation stabilises. Check any exterior electrics for signs of ingress by water or insects. Pay special attention to undersink sockets, electrics in bathrooms and appliances that use water directly such as a washing machine or dishwasher, as well as those that are exposed to moisture such as a fridge, freezer, clothes dryer, etc. If further advice or investigation is required, contact a reputable electrician who will have the tools, expertise and test equipment to diagnose the fault further.	

<b>Symptom:</b>	<b>Issue:</b>
<i>The protective device doesn't trip when the TEST button is pressed</i>	The protective device may be mechanically faulty, or... A DC leakage greater than 6mA may be saturating the device.
<b>Reason:</b>	
The human heart requires around 50mA of current for an electric shock to be potentially fatal, so the residual current function of your protective devices will cause the power to trip off should a leak of between 16 to 30mA be detected. The device should operate within 0.3 seconds which is quick enough to prevent injury or death. If the device has become mechanically siezed, then it requires replacing. If there is a DC leak greater than 6mA into the AC circuit from a faulty appliance, then that can saturate the residual current detection function and 'blind' the device to any AC leakage causing it not to operate, even if the TEST button is pressed.	
<b>Action:</b>	
Contact a reputable electrician who will have the tools, expertise and test equipment to diagnose the fault further.	

<b>Symptom:</b>	<b>Issue:</b>
An AFDD is tripping off	<p>One or more faulty appliances are connected, or...</p> <p>The electrical installation is being affected by external influences such as moisture ingress, or...</p> <p>Damage has been sustained to the electrical installation, or...</p> <p>There is an issue with the AFD device itself, or its supply.</p>
<b>Reason:</b>	
<p>An AFDD can usually report on up to five fault conditions: overcurrent, earth leakage, arc fault, overvoltage or self-test failure. Even then, some models can break it down further and distinguish arc events as between either a series or parallel arc fault. Observe the LED indicator when the device is powered back on (assuming it stays powered on), as this will show a fault code sequence which, in its most basic form, will consist of:</p> <p>flashing in a certain pattern for a few seconds to indicate an arc fault, overload or self-test failure, or...</p> <p>not flashing at all to indicate an overload or earth leakage fault.</p> <p>More advanced models will offer a different code for each condition to better assist in diagnosing the issue or even have a companion app for reporting fault codes.</p> <p>Usually the installer will affix a label to the consumer unit which provides a key for the flash sequences.</p> <p>Check for any mains outlet ‘network extenders’ in use as these are known to upset AFDDs. They manipulate the AC waveform to communicate and these alterations can be erroneously detected as arc faults.</p>	
<b>Action:</b>	
<p>The protective device is tripping off for a good reason and no attempt should be made to defeat it. Identify the function of the circuit that is tripping and follow the guidance in the <i>intermittant tripping</i> section to try and narrow down the cause. If unsuccessful, contact a reputable electrician who will have the tools, expertise and test equipment to diagnose the fault further as AFDD fault finding can become quite complicated and involved especially when the device reports an arc fault.</p>	

<b>Symptom:</b>	<b>Issue:</b>
<p><i>A different Electrician says this equipment is no longer compliant and needs to be upgraded</i></p>	<p>The installation has failed a future inspection following later changes to BS7671, the IET Wiring Regulations, or... Another electrician performing work on site has suggested, perhaps strongly, that you should have this equipment updated following changes to BS7671.</p>
<b>Reason:</b>	
<p>BS7671, the IET Wiring Regulations, is updated periodically to reflect changes in technology and methodology. Today's standard is 18<sup>th</sup> Edition Amendment 3 released on 31<sup>st</sup> July 2024. Before 18<sup>th</sup> Edition in 2018, surge protection generally wasn't fitted. Before 17<sup>th</sup> Edition Amendment 3 in 2015, consumer units could be made of plastic. Before 17<sup>th</sup> Edition in 2008, some circuits could routinely omit earth leakage protection. As we go back through the editions and amendments, the evolution of the consumer unit to where it is today can be followed.</p> <p>Your equipment is compliant with the standard in force at the time of design and installation, however sometime in the future, BS7671 will be updated again and will recommend other changes or innovations considered not routine today. This does not mean your installation is now suddenly somehow unsafe, illegal or unable to provide the level of protection it was designed for. BS7671 is not retrospective and when a new edition or amendment is published, there is no requirement to apply those changes to existing older installations. When 17<sup>th</sup> Edition Amendment 3 pulled the plug on plastic consumer units in 2015, it meant installations designed from 1<sup>st</sup> January 2016 had to use metallic enclosures, not that anyone who had a plastic consumer unit now had to get it changed, nonetheless, an avalanche of iffy 'inspectors' happily went around sticking danger notices onto plastic enclosures and telling worried clients who didn't know any better that they now <i>had to</i> fork out for an expensive upgrade. BS7671 is a non-statutory publication; it's word is not law, it's a recommendation for a minimum standard as to how to do things going forward from the point of publication.</p> <p>One change that's likely is the wider adoption of Arc Fault Detection Devices which entered the mainstream market from 18<sup>th</sup> Edition Amendment 2 in 2022 requiring their presence in certain installations such as high-rise buildings, HMOs, student accommodation and care homes. AFDDs are not currently required in dwellings and their cost would bump up most consumer units over the £1000 mark. Nonetheless, it is expected they will be required in dwellings in the future and that their cost will drop as volume of sales increase.</p> <p>If, on a future inspection, an inspector says your consumer unit <i>requires</i> upgrading or even that it's now <i>"illegal"</i> for not complying with whatever recommendations are made in 19<sup>th</sup> Edition and beyond, perhaps because you don't have AFDDs, then they are likely talking nonsense. This equipment has been installed and certified to 18<sup>th</sup> Edition Amendment 3; it doesn't have to comply with what may come some years from now unless there is a demonstrable reason to back up their reasoning. An 'inspector' who doesn't know this is either chancing their arm for unnecessary work or they are not a competent inspector at all making it likely any report they author will be nonsense.</p> <p>If another electrical contractor is sucking air through their teeth and claiming an expensive upgrade is required, there's a good chance they too are either trying it on for more work or they are ignorant of their falsehoods. Either way, do you really want them working on your home?</p>	
<b>Action:</b>	
<p>Kick the cowboy muppet out and appoint a decent electrical contractor.</p>	

# WARNINGS

	<p>230VAC is present within the consumer unit enclosure, associated accessories and wiring. No part of the live installation should be readily accessible without the use of a tool (BS7671 Chapter 41: Protection Against Electric Shock, Section 416; Regulation 416.2.4 (i)). Please report damaged panels or enclosures for repair.</p>
	<p>The electrical supply to the consumer unit must be turned off at an external isolator, where present, before the cover is removed and the Main Switch(es) in the consumer unit itself must be in the OFF position prior to any disassembly. Only 'skilled' persons as defined in Chapter 2 of BS7671, the IET Wiring Regulations, should be permitted to remove the cover. Kitchen/bathroom fitters and your handyman pal from down the pub will not meet this requirement and should keep their screwdriver in their trousers.</p>
	<p>Only devices that are type-tested should be installed in the consumer unit enclosure. The brand of any protective devices subsequently installed should match that of the enclosure or be passed as compatible by the manufacturer to maintain compatibility with BSEN61439. Where devices are installed that lack type testing approval and/or require modification of the enclosure or its internal parts (busbar arrangements, neutral bar, earth bar, DIN rail etc.) or alterations to the layout or construction of the equipment, the installer performing the deviation becomes "the manufacturer" and accepts the overall liability and obligations as stated in regulation 536.4.203 (note 2).</p>
	<p>Wiring installations installed prior to European harmonisation of wiring colours (2004-2006) may have colours to two versions of BS7671 either as a result of this, or older, work. Care should be taken when performing extension, alteration or repair to ensure the function of any conductor is correctly identified.</p>
	<p>The operation of earth leakage and arc fault devices should be mechanically verified at least twice a year as outlined in this manual. Failure to perform these checks may result in the device seizing.</p> <p>The status of the Surge Protection Device should be visually verified on occasion as outlined in this manual. Failure to replace a failed SPD may result in an increased failure rate of electronic appliances.</p>
	<p>Please refer to any site-specific warning notices mounted at or near the consumer unit(s) or the source of the installation. Some notices may be located under a lid or flap or in a separate enclosure or room where metering equipment is located.</p>