

SOLAR – AN INSTALLERS VIEW



Created by Mark Allison

With thanks to Michael Stott and Sam Featherstone for
input and images

LOFT SITED

Equipment in lofts regardless of lighting and access.

This causes an immediate maintenance and access issue for occupiers and installers. Lofts spaces should not be places batteries OR inverters are situated.

Especially so on timber backing boards when in timber framed homes as per 2 of these images.



ROOF CONDITION

We are finding many solar systems installed on roofs that are not only past an expected lifespan but also actively leaking.

Greater installer awareness is needed around general roof structure, the importance of appropriate survey and understanding the liability we can take on through adding solar PV.



SWITCHGEAR

Never mind bidirectional power flow. We find countless examples of PV systems installed on shared RCDs (that are tripping) of type AC variety most weeks. We then have the difficulty in evidencing DC blinding and such when a single RCCB is used for a solar circuit or type AC flavor.

This installation, or part of it, is protected by a device which automatically switches off the supply if an earth fault develops. Test quarterly by pressing the button marked 'T' or 'Test'. The device should switch off the supply and should then be switched on to restore the supply. If the device does not switch off the supply when the button is pressed, seek expert advice.

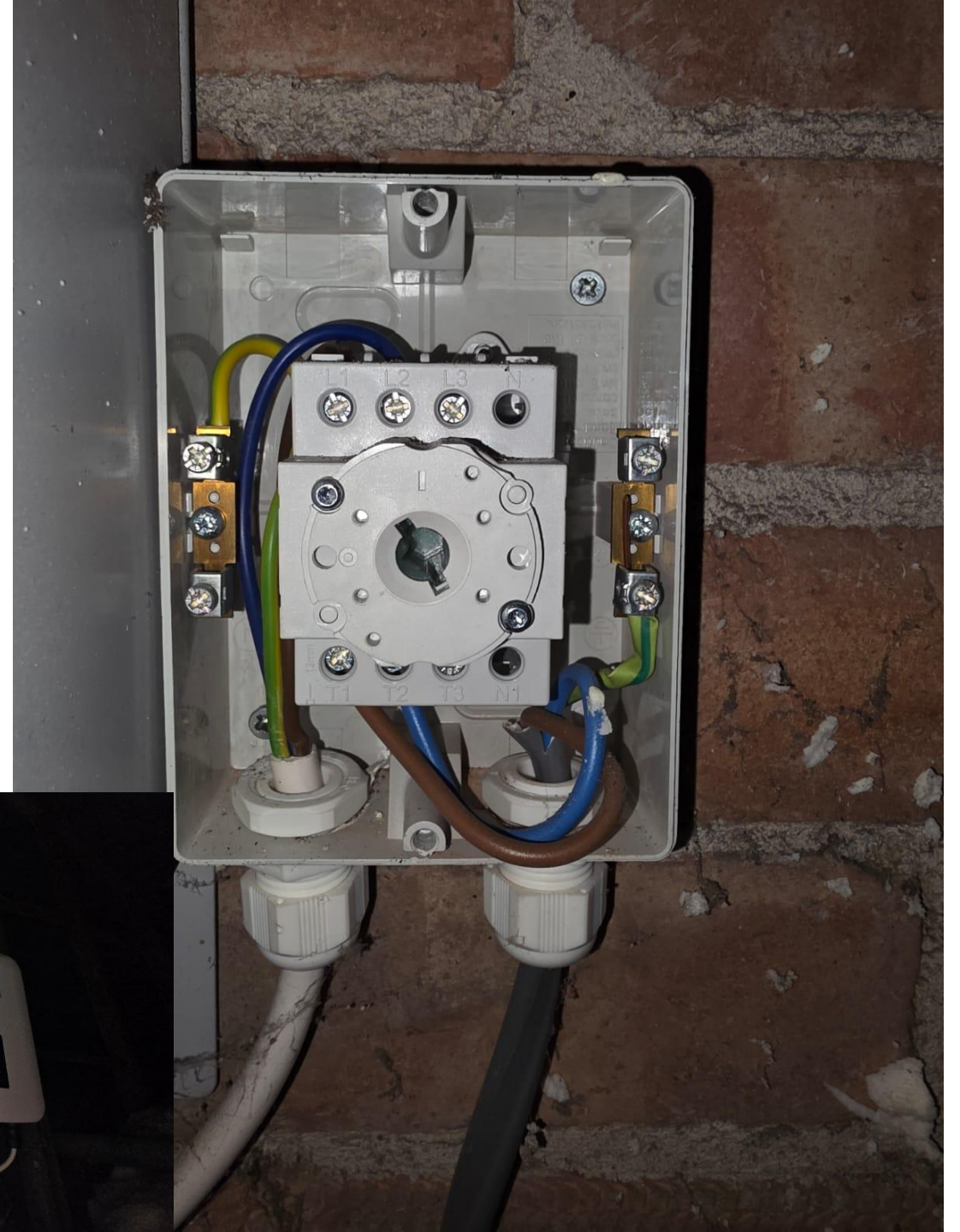


ISOLATORS

The AC isolator on the right is from that shared RCD pic prior clearly separated to stop earth leakage tripping the RCD.

However isolators are VITAL in the fixed wiring for both AC and DC. We need to stop the very poor messaging around removing isolation points and improve capability and knowledge in how they should be installed.

System below with NO AC or DC isolation in the fixed wiring.



THE ROOF

Lots to consider here from earthing rails on both AC and DC cabled systems. You can see an Enphase AC system bottom left and normal DC cables in the other 3 images. All insulated and sheathed and all tied to the rails. We pretend to keep potential for earth faults away from class 2 systems but this is the reality. Which draws us towards a favorite topic of mine SWA in DC systems.

It should not be a thing that mounting systems which are “MCS approved” one week become unapproved the next. This has very recently happened and is causing installers all kind of headaches. Who redresses that as it absolutely should not be installers.

We also have the penetration of the roof itself. We use dektite kits or ground out oval tube to minimise access for water and insects. You can see a bad example of fitting a dektite entry opposite

MC4s have had lots of coverage (much needed) but more around matched connectors and securing them off roof surfaces should be done often!





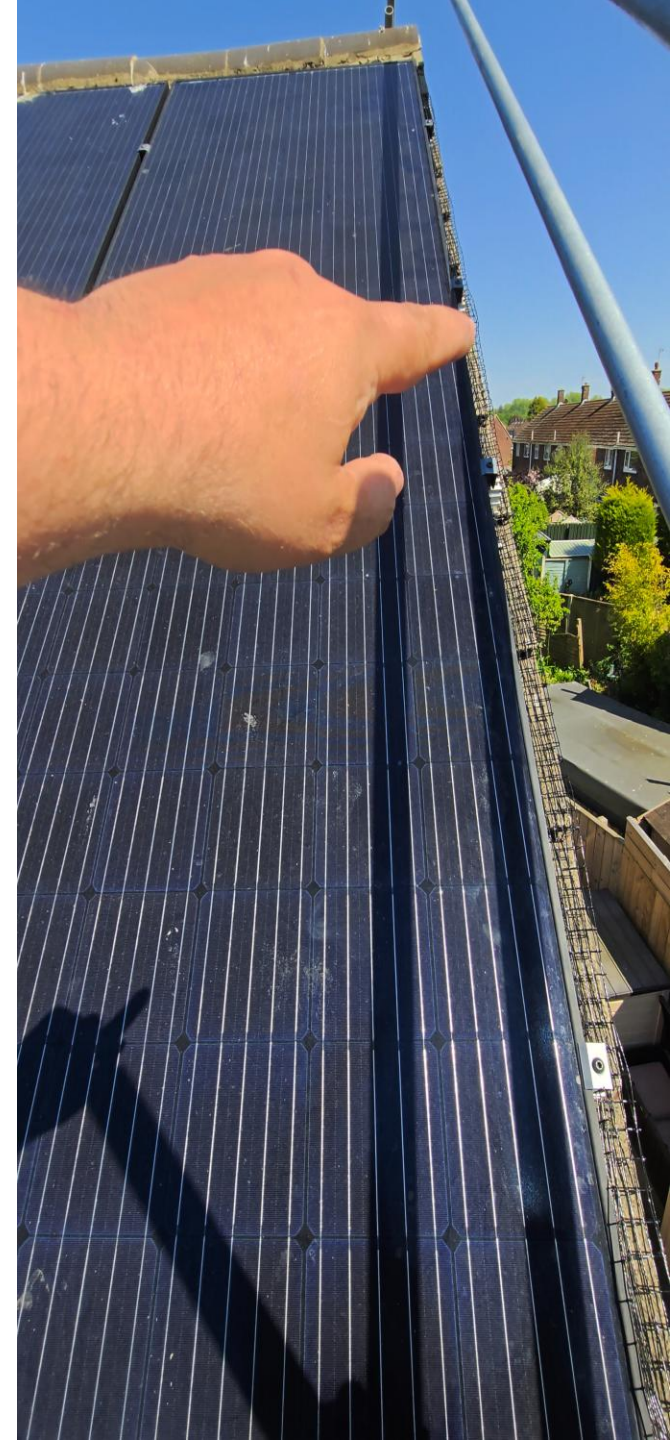
OLDER SYSTEMS

We have lots of older FIT systems in the UK and outside of rogues going door to door selling new inverters and panels to vulnerable consumers we have no real drive to encourage maintenance and testing.

This system on the left was covered in bird mess and had 4 nests under it. Nesting birds can not be disturbed so some knowledge here among installers another vital thing to deliver. Along with the health issues around bird/rodent mess etc. System on the right missing hooks, very close to the edge.

We then have the issues around faults identified and installation companies long since failed with warranty providers finding every excuse under the sun to never pay out.

My question is does industry want to support a journey away from those boom and bust times and ensure a better level of quality for consumers as we truly enter the mass adoption phase.





VARIED ROOFS

Installers have a wide range of roofs to deal with. From slate, concrete, clay and steel. Considerations around earthing, grinding hooks out, keeping hooks off the tiles below.

The former to prevent the likes of capacitive coupling. The latter to keep water, wind and insects out of the roof spaces for the long term.

You can see here some solar limpets that had worked loose causing the array to rattle and leak!

We need to know the approved mounting list on MCS is both accurate and reliable

BATTERY LOCATIONS

Recent guidance in the form of the PAS is excellent and exactly what we need generally. However it is overly restrictive in areas we can use outdoors. In particular around windows that while excluded outside could be fine to utilise the same room on the inside.

This is most challenging on terraced homes which are plentiful in the UK.

However we are still finding systems installed into loft areas. The image on the left had a 97kg battery sat on the chipboard floor with no securing at all. So the main thrust around messaging to stop installations in lofts is applauded by myself and many other installers pricing systems against those who simply pay no regard to said guidance.





The issues

Nesting birds and rodents under arrays and around cable runs are one of the biggest issues we find on aged systems. From cables chewed under floors, in lofts and around array frames.

To rodent/bird “waste” covering MC4 connectors to the point of failure and damaging the underside of panels themselves.

Bird guard and optimisation/rapid shutdown should be a bare minimum in terms of regulatory requirements

SOLUTIONS



Bird guard which retains air flow, is metal coated and provides a safe zone under arrays to protect the protective measure of double/reinforced insulation. Along with wider bird/rodent deterrents.

Optimisation to monitor panels individually for hot spots, hot connectors, arcs, earth faults(<1s) and enable rapid shutdown (30s)

Adequate training and gate keeping so we have less issues with poorly terminated isolators (AC and DC) and MC4 connector.

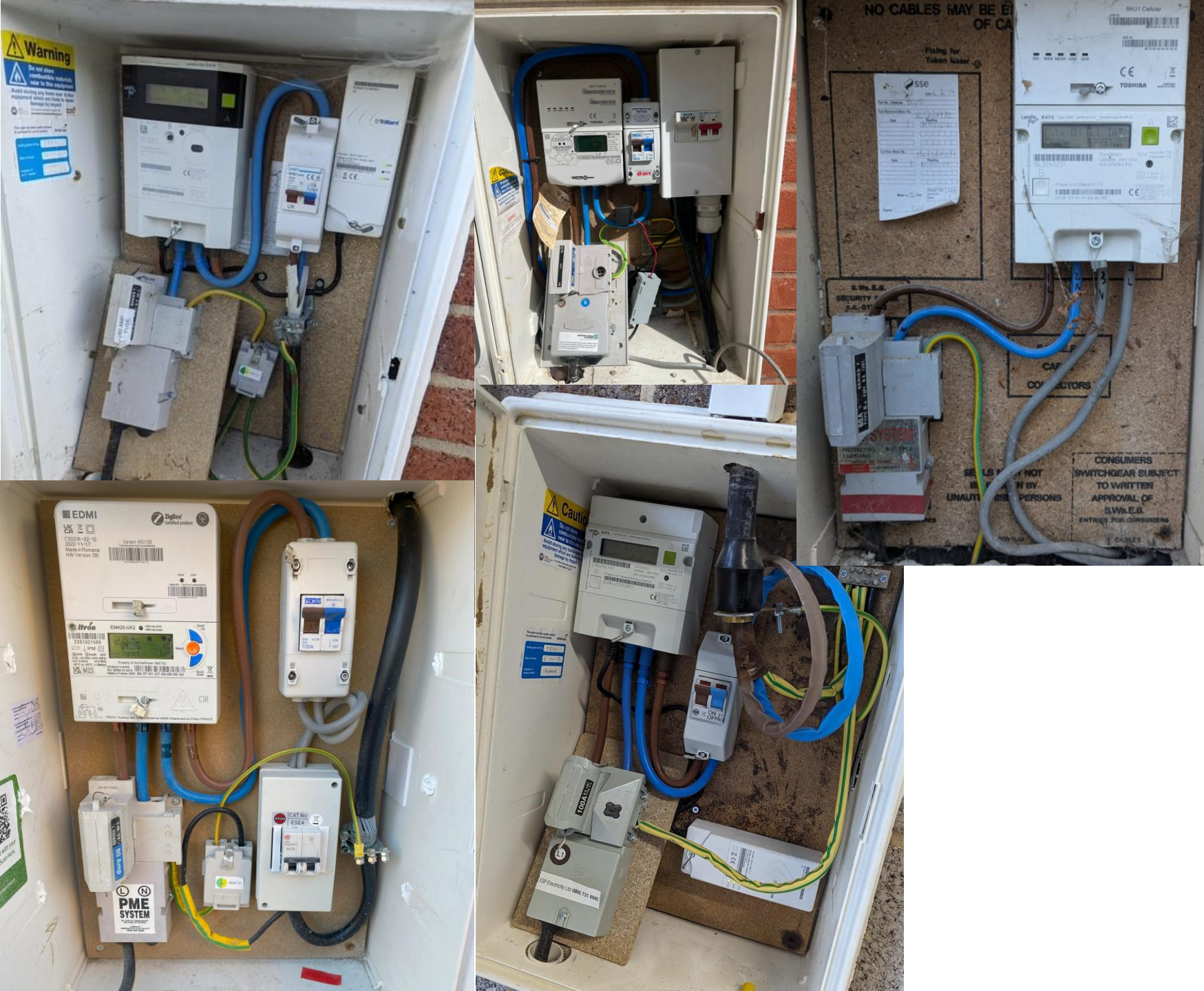
MCS notifications to include pictures of hooks, roof penetrations and other main installation components.

METER CABINETS

New build developers need to stop terminating SWA in this way. Any basic insulation within a meter cabinet should be a C2 code minimum and industry/wrag should re evaluate the current thoughts around that. Because we are seeing more and more of this and its an accident waiting to happen.

We also need the meter operators and DNOs to understand many gateway configurations will require a switch fuse in the cabinet or allow for adjacent cabinets for installers.

Outdoor consumers unit should be banned unless ventilated and heated



EARTHING

Outside of the move to install support electrodes on PME could we have some defined values on “backup” electrodes for islanded systems. Many of these are installed in very urban areas with huge overlap of earthing systems in the mass of earth and lots of buried services.

While the likes of condudisc exist for safer installation methods. When commercial decisions are made, it is often electricians stood on the end of a hammer driving these rods into the ground to reduce costs.

I am not sure on what value they bring with so much other buried metalwork already on most systems. Especially considering an unknown R_a requirement. Backup generators for example are often no more than tent pegs!



PROTECTING CABLES



We have new cable innovations all the time and a new one to aid installers in reaching those protected safe zones under bird/rodent guarded panels is PV ultra and PV ultra SWA.

I believe a recent industry article in wiring matters has made a mistake in how regulations would be applied around this cable type when unearthed.

With suggestion the cable itself would need to be within PVC trunking or conduit. This is causing many installers including myself confusion as it makes no sense.

As shown in the prior images if our protective measure is largely double/reinforced insulation and we know rodents are causing that to fail with NO operation of protective devices why would we not encourage protecting them more robustly. Especially considering the current approach is to use regular SWA cable which is debatable on its compliance with reinforced insulation to the armours.

This could be a globally important innovation to reduce PV failures and fires one I think industry would do well to promote.

I am not affiliated with Doncaster cables and this should be looked at urgently. The messaging is pretty simple with any buried DC PV. Never direct in the ground. Otherwise use all the tools at hand to maintain your protective measure.

I see posts most days of installers burying PV DC direct in the ground especially on field/ground mount arrays. Discouraging and educating around that is very important. But not at the expense of the wider upsides to cable construction of this type.



MODERN SYSTEMS

Many inverters of today come with advanced monitoring capabilities. From arc detection to earth fault and IR monitoring. These can be used to effectively shutdown DC voltages at source when used with optimisers.

With gateway and backup functions available its important to educate installers around N-E bonds on islanded systems and how to test for them on commissioning.

A proper test document for island capable systems would help this.

Time of use tariffs should only be allowed with in date EICRs. We are modifying a traditional load profile into a condensed window. Putting pressure/stress on main switches, busbars, terminations beyond a traditional design. Essentially building in the doomsday Christmas day scenario that could occur every single night.

We see some shocking things working in residential homes of the UK and the thought of that condensed loading on existing equipment will not bring good outcomes.



WHY?



A121
ELECTRICAL
TRAINING ⚡

POWERSONIC
ELECTRICAL



Installation examples are on my YouTube channels and we have regular discussions on the renewables podcast about all of these topics. Direct with other installers, consumers, manufacturers and people of industry. Please feel free to look at some of those for further details or contact me directly on the below details

THANK YOU



Mark Allison



07507879497



Mark@powersonic.co

www.powersonic.co