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Energy UK Retail Health and Safety
**Micro-generation Equipment Isolation
(Small Scale Embedded Generators)**

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Author

Kevin G. Downie
Retail H&S Consultant

Owner

Kevin G. Downie
Retail H&S Consultant

Issue Authority

Alan Dickson
Retail Operations H&S
Manager

Contents

1. Scope2

2. Related Documents/Regulations2

3. Amendments2

4. Micro-Generation Equipment3

 4.1. Installation Diagrams & Photographs.....4

 4.2. SSEG Identification and Isolation Procedure7

Table of Figures

Figure 1 - Typical Micro-generation Installation.....4

Figure 2 - Typical Installation Highlighting Position of Isolators.....5

Figure 3 - Typical Micro-Generation Dual Supply Warning Label.....7

Table of Photographs

Photograph 1- Typical Installation Showing Isolators and Labelling.....6

1. SCOPE

This document details some examples of installed micro-generation equipment (Small Scale Embedded Generators (SSEG)) and the procedure for safe working and isolation of these systems while exchanging supplier metering equipment.

2. RELATED DOCUMENTS/REGULATIONS

- Energy Networks Association, Engineering Recommendation G83/2 - Connection of Generation <3.68kW
- Energy Networks Association, Engineering Recommendation G59/3-2 - Connection of Generation >3.68kW
- Electricity Safety, Quality & Continuity Regulations 2002 (as amended)
- BS 7671 Requirements for Electrical Installations (IET Wiring Regulations)
- BS EN 50438: 2013 Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks
- Company Safe Working Instructions & Guidelines
- Activity Risk Assessments

3. AMENDMENTS

Rev	AMENDMENT DETAILS	Date
1	New Document	June 2017

4. MICRO-GENERATION EQUIPMENT

This section describes the procedure for effective identification and isolation of customers' on site Small Scale Embedded Generators (SSEG). This could be in the form of solar (photovoltaic), wind, hydro, motor-driven, or ground/air source heat pump generation or a combination thereof.

Such micro-generation systems installed in domestic and similar premises are normally rated up to 16 amps per phase at a nominal voltage of 230 volts, which corresponds to 3.68kW (see ENA, Engineering Recommendation G83/2) on a single phase supply and 11.04kW (see ENA, Engineering Recommendation G59/3-2) on a three phase supply. Given this loading, additional care must be exercised when working at the metering location at properties with SSEG.

Micro-generation systems (SSEG's) create another source of electrical energy, (connected in parallel with the mains supply) creating d.c. voltage which is converted to a.c. voltage by an inverter. The a.c. voltage produced by the generating system **must be isolated** along with incoming Distribution Networks Operator's (DNO) a.c. voltage mains supply before any work is carried out on the electrical installation and verified as NOT LIVE at the supplier's meter terminals. If not isolated there may be voltage present, or generated at the cables coming from the micro-generator source.

Micro-generation systems should automatically isolate themselves upon loss of the incoming mains supply. This is to prevent back feed onto the distribution network in the event of a mains failure. When the meter operator isolates the meter, the micro-generation system should automatically isolate straight away. Manual isolation by operating the isolator switches shall always be carried out in addition to the automatic isolation. Micro-generation equipment cannot be unplugged; therefore it must be isolated at the relevant customer consumer unit and isolator switches.

Details of the general requirements for connecting a SSEG are contained in the Energy Networks Association Engineering Recommendations ER G83, ER G59 and in BS EN 50438. Micro generation system installers must be registered under the Micro-generation Certification Scheme (MCS) and must refer to the manufacturers' documentation and installation procedures to confirm that the micro-generator and associated equipment complies with the relevant requirements of ER G83, ER G59 or BS EN 50438.

Warning labels must be fitted as a minimum at the following:-

- The DNO's fused cut out
- The supplier's meter position
- The customer's consumer unit(s)
- The input and output terminals of the micro-generator/inverter
- The points of isolation for both the mains supply and the micro-generator supply

4.1. Installation Diagrams & Photographs

The following installation diagrams and photographs illustrate a typical installation example with micro-generation installed with correct isolators and warning labels fitted.

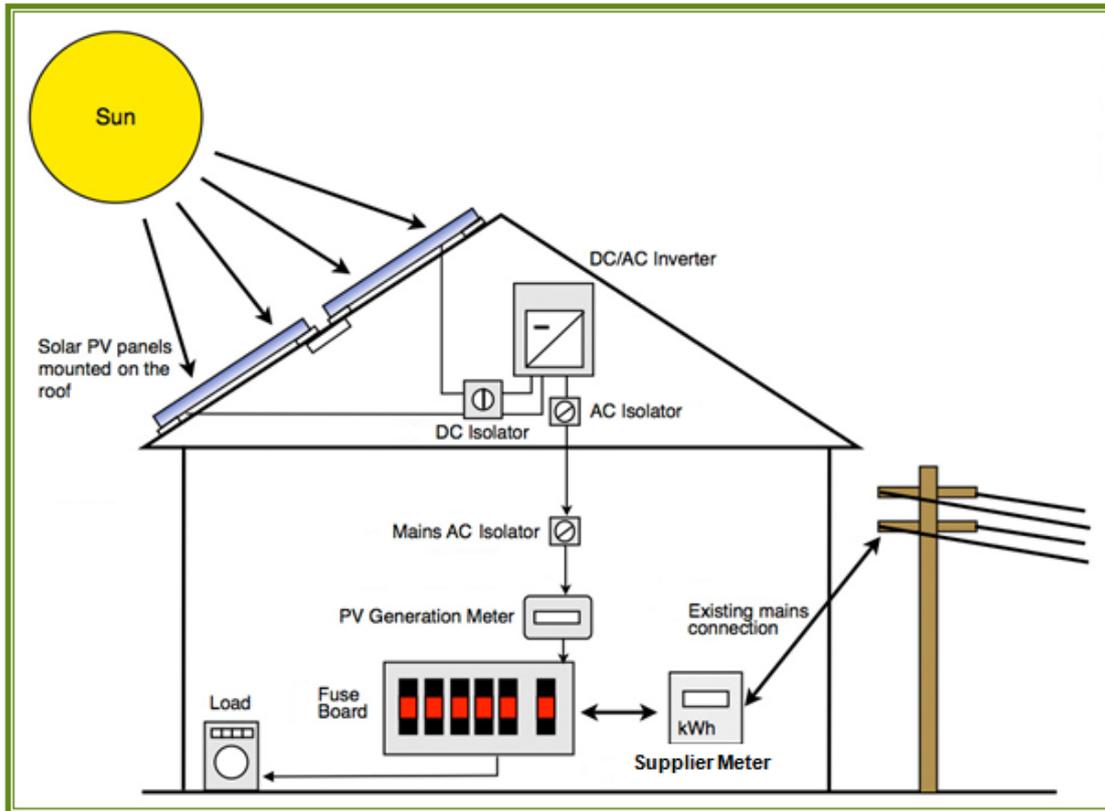


Figure 1 - Typical Micro-generation Installation

The Figure 1 above shows a simple installation with the correct isolators installed for d.c. voltage and a.c. voltage at the generator inverter.

Although not shown, there will be a supplier isolator switch installed between the supplier meter and the fuse board/consumer unit.

There should also be a wiring diagram of the micro-generation system on site or with the customer detailing the installation and any isolation and/or re-set procedures on restoration of the supply.

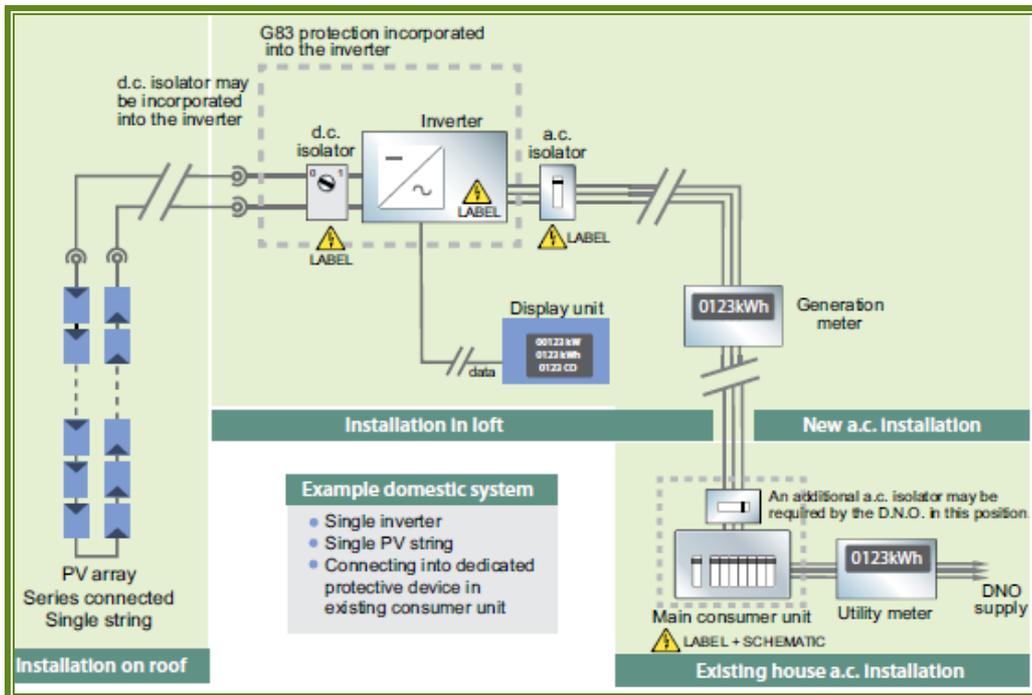
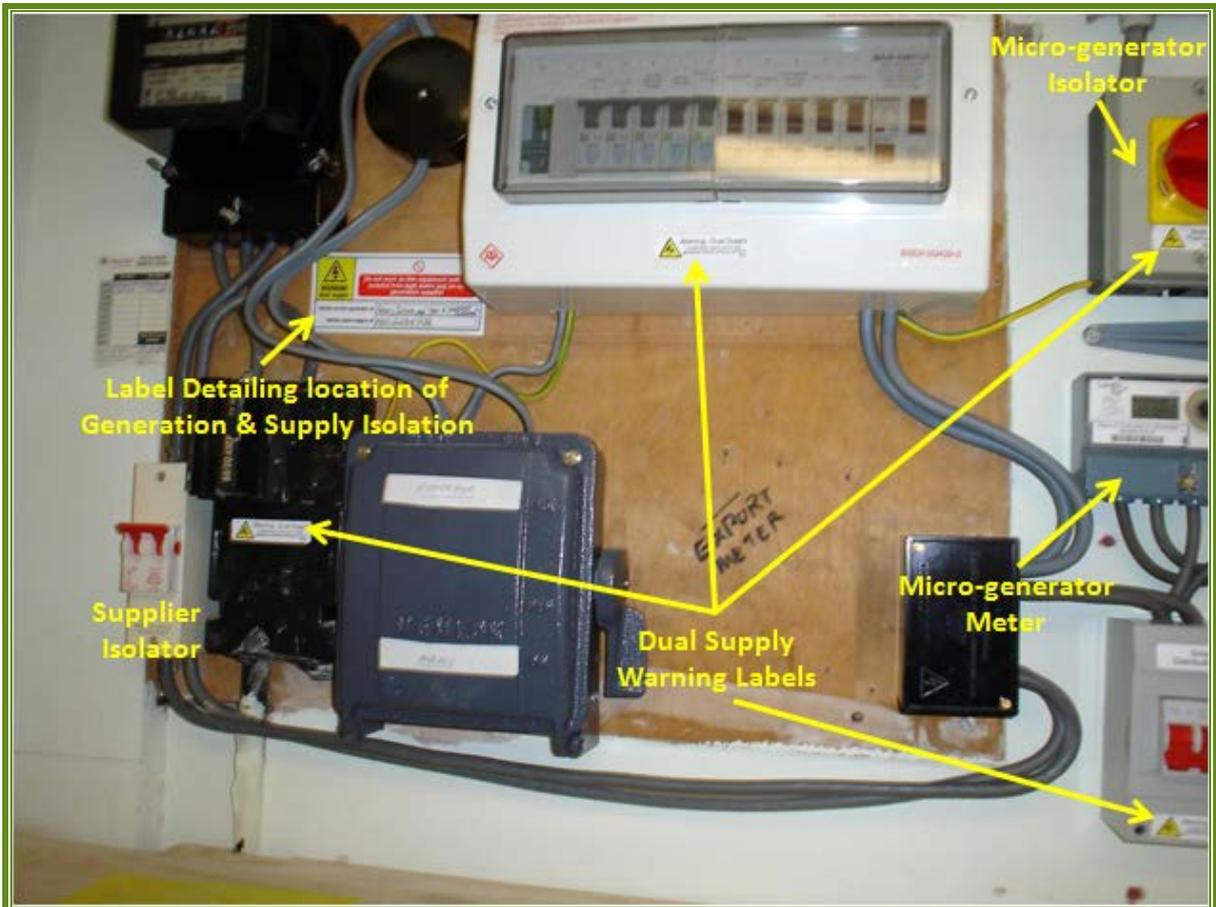


Figure 2 - Typical Installation Highlighting Position of Isolators

The Figure 2 above shows a typical installation with the correct isolators installed for d.c. and a.c. voltage at the generator inverter and also the positioning of some of the required warning labels.

Although not shown, there will be a supplier isolator switch installed between the supplier meter and the consumer unit.

There should also be a wiring diagram of the micro-generation system on site or with the customer detailing the installation and any isolation and/or re-set procedures on restoration of the supply.



Photograph 1- Typical Installation Showing Isolators and Labelling

The above photograph shows a completed installation with the correct isolators installed for isolation of the supply a.c. voltage and the generator/inverter a.c. voltage with a label fitted that details the location of both isolating points.

Dual supply warning labels have been fitted to all necessary equipment.

There should also be a wiring diagram of the micro-generation system on site or with the customer detailing the installation and any isolation and/or re-set procedures on restoration of the supply.

4.2. SSEG Identification and Isolation Procedure

Meter fixing operatives must be aware of the potential of a micro-generation system having been installed in any premises and therefore must take additional safety precautions and ensure isolation of both the incoming DNO supply **and** the micro-generation supply. Refer to the following procedure:

1. Conduct a visual survey of the external of the premises to determine if there are any obvious signs of a micro-generation installation
2. On entering the customer’s premises, ask and verify with the customer if they have any micro-generation equipment installed and ask the customer where the equipment is installed – this may be in the loft/attic/basement or at the supply and meter position
3. Once verified with the customer that there is on-site micro-generation, assess the supply and metering position to understand how this has been connected. Some customers may not be aware if they have and SSEG/ micro-generation installation. In this case proceed with caution and contact your team leader/line manager if you have any concerns.
4. Look for labels indicating micro-generation equipment at mains supply terminals, meter positions, consumer units and double pole isolator switches. If micro-generation is installed, there should be dual supply warning labels fitted detailing where to isolate the micro-generator and the incoming mains supply as shown below:

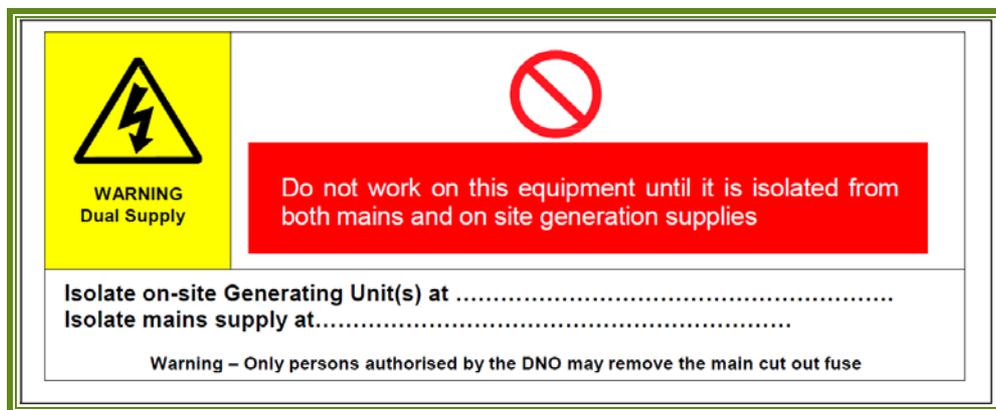


Figure 3 - Typical Micro-Generation Dual Supply Warning Label

5. Isolator switches for micro-generation systems should be installed at locations shown in the previous diagrams and photographs. If you cannot locate an isolator switch for the micro-generation system, then consult with the customer to ascertain the isolator position before proceeding. Remember that it is not acceptable practice for operatives to enter areas such as attics/lofts to locate isolators for micro-generation systems
6. Where an installation has been identified as not having been installed correctly or where the micro-generation system cannot be isolated, the job must be stopped. Contact your team leader/line manager for advice.

7. Where isolating equipment has been installed in remote locations such as attics/lofts, stop and inform your team leader/line manager. It is not acceptable practice for operatives to enter areas such as attics/lofts to locate isolators for micro-generation systems
8. If all is in order **and before continuing with the task** and isolating the supply, it is important to establish that there will be no issues attributed to the isolation and re-energisation of the supply. Verify with the customer any re-set requirements on re-energising the mains supply and turning the SSEG installation back on. Reference should be made to any on-site drawings and guidance
9. Verify the polarity at the meter terminals and supplier isolator switch
10. In domestic premises, the operative may isolate the customer's installation. This includes micro-generation, where installed, by switching off all consumer units and main isolator switches before removing the main cut out fuse
11. In industrial and commercial premises, the customer or their representative **must** isolate the customer's installation themselves by switching off all main switches before the main cut out fuse/s are withdrawn
12. Turn all isolator switches (supplier and micro-generator) and the customer's consumer unit main switch to the "OFF" position
13. Remove the supply cut-out fuse and carry out all testing for LIVE/ NOT LIVE at the supply meter terminals and isolator switch
14. Where correct isolation has NOT been achieved, i.e. still LIVE, then STOP, consult the customer and also contact your team leader/line manager for further advice
15. Once proven NOT LIVE, carry out and complete the job task
16. When finished, ensure that all consumer units and isolator switches switched off previously are switched back on and that all equipment has been energised and has been reset accordingly