

Customer Witness Testing Guide

This guide is aimed at explaining why we need to **witness test** equipment which is being connected to our network, what we actually do when we complete this testing, and what you can do to help this process run more smoothly.

→ Why do we need to complete Witness Testing?

When an application to connect generation is received, design work is completed to ensure that the local network can accept the electricity generated, and continue to operate within the required legal limits. The first priority when operating an electrical distribution network is to ensure that it is operated in a safe manner. However, sometimes the generator or network may operate abnormally causing faults. When this happens we can't allow the generator to continue to backfeed a fault and/or create an island network which poses further risk. Therefore it is essential to ensure loss of mains protection, where the generator will automatically disconnect protecting staff and assets.

'Witness testing' is where we, the network operator, attend the site of your generator to witness your commissioning engineer test the protection systems associated with your generator and ensure they operate correctly.

→ What do we do when we complete Witness Testing?

We will attend site and satisfy ourselves that the equipment meets the required specifications for disconnecting a generator from the local distribution network in the event of abnormal operation.

There are a number of tests that must be completed, and these can vary depending on;

- ➔ The size of the generation (capacity)
- ➔ The type of the generation (solar, wind etc.)
- ➔ The type of equipment being used (whether it has been type tested)
- ➔ Previous experience with an installer or a certain type of equipment



Principle Systems

A guidance document has been produced by the Energy Networks Association (ENA) which is called G59/3. This document provides the engineering recommendations for connecting generation. We operate to the requirements of this document and it is recommended that any installer connecting a generator is fully acquainted with this document.

Under G59/3 the process for witness testing depends on the nature of the system. The principle systems are:

- ➔ Type-tested systems (no G59/3 relay required)
- ➔ Non type-tested systems (G59/3 relay required)
- ➔ Short-term parallel systems (G59/3 relay required)



Included below is further guidance which relates to the three principle systems highlighted above;

Type-tested Systems

→ What is a type-tested system?

A type tested system is one which has been approved by the Energy Networks Association (ENA) and for which they have issued a certificate to the manufacturer to confirm conformity of the type tested system requirements.

An example of this would be a 200kW solar PV system using type-tested inverters <50kW.

→ Why do we witness test?

It is our responsibility as a Distribution Network Operator to ensure that generation connected to our network and the associated protection system meets the requirements of G59/3.

For type-tested systems we have an “approved list” of installers. We will add you to this list once we have witnessed one of your installations to our satisfaction.

An ‘approved’ installer in our Southern Electric area will be able to witness test their own installations up to 500kW. We will review this on a regular basis.

Please note that if the generating system includes a device limiting export capacity we will attend in person. We always reserve the right to witness test any site.

→ How do we carry out a witness test?

As a customer you must complete appendix 13.2 of the G59/3 document and comply with the requirements of G59/3 testing that relate to schematics and labelling etc. Witness testing for type-tested systems is based on this document. As an installer it is your responsibility to ensure that G59/3 protection settings have been set up on the type-tested equipment.

Schematics/single line diagrams and appropriate labelling should be displayed at both the point of connection to the network (which is often the customer’s main board) and the location of the installation. The schematic should be relevant to the site and not simply a typical system. If the system changes, you should inform SSEPD as a further witness test may be required and you should also update the schematic diagram at the point of connection.



Labelling is very important and we expect to see:

- Dual/multi supply labels
- The inverter and associated isolators/ Miniature Circuit Breaker (MCB) clearly labelled
- PV on roof labels (where applicable)
- DC and AC live cable labels

All isolators should be lockable for safety when working on the generation system.

Non type-tested Systems

→ What is a non type-tested system?

A non type-tested system is one that uses non type-tested factory approved equipment (as defined in G59/3) which means a G59/3 relay must be used.

Some examples of this would be:

- A Hydro, Wind and Solar PV system using non type-tested inverters with a G59/3 protection relay
- A CHP System
- An Anaerobic Digester with a gas engine
- A diesel engine

It is worth noting that sometimes type-tested equipment can be used as part of a non type-tested system and therefore still requires a witness test as a G59/3 relay would be in use. Any additional equipment in the install (e.g. inverter) containing G59/3 protection should be set to mirror the settings applied in the G59/3 relay.

→ Why do we witness test?

It is our responsibility as a Distribution Network Operator to ensure that generation connected to our network is safe and the associated protection system meets the requirements of G59/3.

All non type-tested systems need to be witness tested however this can be at our discretion at Low Voltage.

→ How do we carry out a witness test?

An SSEPD engineer will witness the customers/installers appointed commissioning engineer perform the G59/3 test in accordance with appendix 13.3 of G59/3. In addition further tests will need to be performed and witnessed such as:

- Proving the timing of the generation circuit breaker/contactors
- Dynamic loss of mains response
- Loss of control/auxiliary supply to G59/3 equipment response

In addition to the tests specified above you must complete appendix 13.2 of the G59/3 document and comply with the requirements of G59/3 testing that relate to schematics and labelling etc.

Schematics/single line diagrams and appropriate labelling should be displayed at both the point of connection to the network (which is often the customer's main board) and the location of the installation. The schematic should be relevant to the site and not simply a typical system. If the system changes, you should inform SSEPD as a further witness test may be required and you should also update the schematic diagram at the point of connection.



Labelling is very important and we expect to see:

- Dual/multi supply labels
- The inverter and associated isolators/MCB's clearly labelled
- PV on roof labels (where applicable)
- DC and AC live cable labels

All isolators should be lockable for safety when working on the generation system.

Infrequent Short-term parallel Systems

→ What is an infrequent short term parallel system?

A short-term parallel system is one that uses non type-tested factory-approved equipment (as defined in section 7.3 of G59/3). G59/3 states that the system is allowed to run in parallel with the Network for a maximum period of 5 minutes per calendar month and no more frequently than once a week. A common example of this is a back-up diesel generator system.

→ Why do we witness test?

It is our responsibility as a Distribution Network Operator to ensure that generation connected to our network is safe and the associated protection system meets the requirements of G59/3.

All infrequent short-term parallel non type-tested systems need to be witness tested however this can be at our discretion at Low Voltage.

→ How do we carry out a witness test?

An SSEPD Engineer will witness the customers/installers appointed commissioning engineer perform the G59/3 tests in accordance with the settings in section 10.5.7.2 on page 64 of G59/3. In addition further tests will need to be performed and witnessed such as:

- Prove the timing of the generation circuit breaker/contactors
- Dynamic loss of mains response
- Loss of control/auxiliary supply to G59/3 equipment response
- Maximum parallel timing test

In addition to the tests specified above you must complete appendix 13.2 of the G59/3 document and comply with the requirements of G59/3 testing that relate to schematics and labelling etc.

Schematics/single line diagrams and appropriate labelling should be displayed at both the point of connection to the network (which is often the customer's main board) and the location of the installation. The schematic should be relevant to the site and not simply a typical system. If the system changes, you should inform SSEPD as a further witness test may be required and you should also update the schematic diagram at the point of connection.



Labelling is very important and we expect to see:

- Dual/multi supply labels
- The inverter and associated isolators/ MCB's clearly labelled
- PV on roof labels (where applicable)
- DC and AC live cable labels

All isolators should be lockable for safety when working on the generation system.