



# Engineering Recommendation G100

## Issue 1 Amendment 1 2017

### Technical Requirements for Customer Export Limiting Schemes

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### **Amendments since publication**

<b>Issue</b>	<b>Date</b>	<b>Amendment</b>
Issue 1	July 2016	New issue
Amnd 1	March 2017	Revision to the following sections/appendices to enable fast track application process for ERG83 Energy Storage Systems.  5.2.3 – Voltage Assessment  7.4 – Fail Safe Tests  Appendix B – Information to be provided relating to Fail Safe Tests

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## Foreword

This Engineering Recommendation (EREC) is published by the Energy Networks Association (ENA) and comes into effect from July, 2016. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “EREC G100”, which replaces the previously used abbreviation “ER G100”.

This document defines the technical design requirements for **Export Limitation Schemes** which limit the net site export to below an agreed maximum and are installed on the **Customer’s** side of the **Connection Point**.

## 1 Purpose

The purpose of this Engineering Recommendation (EREC) is to provide guidance on the connection of **Customer Export Limiting Schemes (ELS)** that operates in parallel with the **Distribution Systems** of licensed **Distribution Network Operators (DNOs)**.

The guidance given is designed to facilitate the connection of **ELS** whilst maintaining the integrity of the **Distribution System**, both in terms of safety and supply quality.

This EREC is intended to provide guidance to **Customers** planning to use an **ELS** and to **DNOs**.

This document shall be read in conjunction with EREC G83 and G59.

As the cost of generation continues to reduce, many **Customers** are now seeking to increase the amount of generation installed within their premises to offset their import requirements. Where the **DNO** has assessed that an increase in generation export capacity will require costly or time-bound upstream reinforcement, some **Customers** may choose to restrict the net export from their connection rather than wait for or contribute to the reinforcement.

A typical **ELS** may be used in the following scenarios:

- Over-sizing the generation and limiting the peak output
- Increasing flexibility of on-site demand at times of peak output
- Guaranteeing a defined export limit.

## 2 Scope

This document applies to **ELSs** installed by **Customers** to restrict the **Active Power** exported at the **Connection Point** or to prevent voltage limits on the **Distribution System** from being exceeded. For the avoidance of doubt, limitations on the connection or the operation of generation due to fault level exceedance will still apply.

This document does not apply:

- to control systems that are used to measure and control the output of a **Generating Unit** without reference to the exported **Active Power** or the voltage at the **Connection Point**
- where the **Power Station Capacity** is less than the **Agreed Export Capacity** at that **Connection Point**

This document applies to **HV** and **LV** connections but may be used at higher connection voltages at the discretion of the **DNO**.

An **ELS** may not be compatible with some flexible connections. For example, in an area managed under **active network management**, an **ELS** might counteract the instructions issued by the management system thus restricting deployment. It will be the responsibility of the **DNO** to assess the suitability of an **ELS** in these situations and authorise accordingly.

## 3 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

### 3.1 Standards publications

BS 7671	Requirements for Electrical Installations. IET Wiring Regulations.
BS EN 61000-3-2	Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)
BS EN 61000-3-3	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current 16 A per phase and not subject to conditional connection
BS EN 61000-3-11	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current 75A and subject to conditional connection
BS EN 61000-3-12	Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current $>16$ A and $\leq 75$ A per phase.

### 3.2 Other publications

Engineering Recommendation G5	Planning levels for harmonic voltage distortion and connection of non-linear equipment to transmission systems and distribution networks in the United Kingdom
Engineering Recommendation G59	Recommendations for the connection of generation plant to the <b>Distribution Systems</b> of licensed <b>Distribution Network Operators</b>
Engineering Recommendation G83	Requirements for the connection of small scale embedded generators (up to 16A per phase) in parallel with Public <b>Low Voltage</b> Distribution Networks
Engineering Recommendation P2	Security of Supply
Engineering Recommendation P28	Planning Limits for Voltage Fluctuations Caused By Industrial, Commercial and Domestic Equipment in the UK

## 4 Terms and definitions

For the purposes of this document, the following terms and definitions apply. Words and expressions printed in bold type throughout the document are defined in this section.

### 4.1 Active Network Management

Using flexible network customers autonomously and in real-time to increase the utilisation of network assets without breaching operational limits, thereby reducing the need for reinforcement, speeding up connections and reducing costs.

### 4.2 Active Power

The product of voltage and the in-phase component of alternating current measured in units of watts, normally measured in kilowatts (kW) or megawatts (MW).

### 4.3 Agreed Export Capacity

The maximum amount of power (expressed in kW) that is permitted to flow into the **Distribution System** through the **Connection Point**. The **Agreed Export Capacity** shall be no lower than 3.68kW per phase.

### 4.4 Agreed Import Capacity

The maximum amount of power (expressed in kW) which is permitted to flow out of the **Distribution System** through the **Connection Point**.

### 4.5 Apparent Power (VA)

The product of voltage and current at fundamental frequency, and the square root of three in the case of three-phase systems, usually expressed in kilovolt-amperes ('kVA') or megavolt-amperes ('MVA').

### 4.6 Connection Point

A point on the **Distribution System** that provides **Customer** with a connection allowing power to flow to or from the **Distribution System**. Typically this would be the **DNOs** fused cut out or the metering circuit breaker.

### 4.7 Control Unit (CU)

The equipment forming part of the **ELS**. The functions of the **CU** typically include:

- To store the **Agreed Export Capacity**)
- To monitor the values being read by the **PMU**
- To detect if the **PMU** value established by the **PMU** exceeds the **Agreed Export Limit**
- To send control signals to the **Generating Unit(s)** interface and load interface units
- To detect any system error (fail-safe protection)

### 4.8 Customer

A person who is the owner or occupier of premises that are connected to the **Distribution System**.

### 4.9 Declared Voltage

In respect to **Low Voltage** supply shall be 230 Volts between phase and neutral conductors at the **Connection Point**.

In respect to **High Voltage** supply the **Declared Voltage** shall be determined by the **DNO**. The voltage shall be defined between 2 phase conductors at the **Connection Point**.