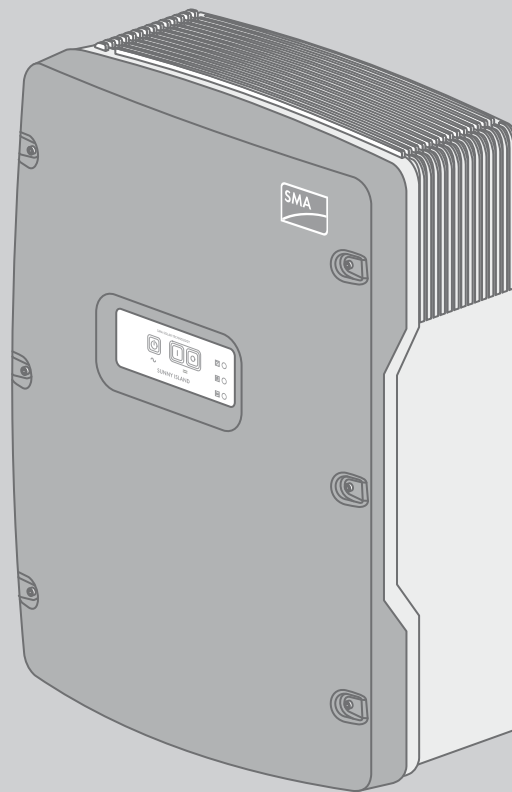




System Description

SMA FLEXIBLE STORAGE SYSTEM in the United Kingdom

Adjustment of electrical connection and configuration for the low-voltage grid in the United Kingdom of Great Britain and Northern Ireland



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SMA Solar Technology AG

Sonnenallee 1
34266 Niestetal
Germany

Tel. +49 561 9522-0
Fax +49 561 9522-100
www.SMA.de
E-mail: info@SMA.de

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Table of Contents

| | | |
|----------|---|-----------|
| 1 | Information on this Document | 5 |
| 1.1 | Validity | 5 |
| 1.2 | Content of this Document | 5 |
| 1.3 | Target Group | 5 |
| 1.4 | Additional Information | 5 |
| 1.5 | Symbols | 6 |
| 1.6 | Nomenclature | 6 |
| 2 | Safety | 7 |
| 2.1 | Intended Use | 7 |
| 2.2 | Safety Information | 7 |
| 3 | Planning | 8 |
| 3.1 | Planning the Installation of the SMA Flexible Storage System | 8 |
| 3.2 | Planning the Installation of the Battery-Backup System | 9 |
| 4 | SMA Flexible Storage System (Self-Consumption Only) | 10 |
| 4.1 | Circuitry Overview of a Single-Phase SMA Flexible Storage System | 10 |
| 4.2 | Circuitry Overview of a Three-Phase SMA Flexible Storage System | 11 |
| 5 | Battery-Backup System | 12 |
| 5.1 | Single-Phase Battery-Backup System | 12 |
| 5.1.1 | Automatic Transfer Switch of the Single-Phase Battery-Backup System | 12 |
| 5.1.2 | Circuitry Overview of the Single-Phase Battery-Backup System | 13 |
| 5.2 | Three-Phase Battery-Backup System | 14 |
| 5.2.1 | Automatic Transfer Switch of the Three-Phase Battery-Backup System | 14 |
| 5.2.2 | Circuitry Overview of the Three-Phase Battery-Backup System | 15 |
| 6 | Extended Configuration of the Sunny Island | 16 |
| 7 | Changing the Configuration of the PV Inverters | 17 |

1 Information on this Document

1.1 Validity

This document is valid for the following device types:

- HM-20 (Sunny Home Manager 2.0) from firmware version 2.00.00.R
- SI4.4M-12 (Sunny Island 4.4M) from firmware version 1.00.xx.R
- SI6.0H-12 (Sunny Island 6.0H) from firmware version 1.00.xx.R
- SI8.0H-12 (Sunny Island 8.0H) from firmware version 1.00.xx.R

1.2 Content of this Document

This document summarizes the information required in Great Britain and Northern Ireland for the installation of an SMA Flexible Storage System or an SMA Flexible Storage System with battery-backup function.

1.3 Target Group

The activities described in this document must only be performed by qualified persons. Qualified persons must have the following skills:







- Knowledge of how an inverter works and is operated
- Knowledge of how batteries work and are operated
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable standards and directives
- Knowledge of and compliance with this document and all safety information
- Knowledge of and compliance with the documents of the battery manufacturer with all safety information

1.4 Additional Information

Links to additional information can be found at www.SMA-Solar.com:

| Document title | Document type |
|--|-----------------------|
| SMA Smart Home | Planning Guidelines |
| SMA Flexible Storage System with Battery-Backup Function | Planning Guidelines |
| List of Approved Batteries | Technical Information |

1.5 Symbols

| Symbol | Explanation |
|---|--|
|  DANGER | Indicates a hazardous situation which, if not avoided, will result in death or serious injury |
|  WARNING | Indicates a hazardous situation which, if not avoided, can result in death or serious injury |
|  CAUTION | Indicates a hazardous situation which, if not avoided, can result in minor or moderate injury |
|  NOTICE | Indicates a situation which, if not avoided, can result in property damage |
|  SKILLED PERSON | Indicates that only the following section contains tasks that must be performed by qualified persons |
|  | Information that is important for a specific topic or goal, but is not safety-relevant |
| <input type="checkbox"/> | Indicates a requirement for meeting a specific goal |
| <input checked="" type="checkbox"/> | Desired result |
| x | A problem that might occur |

1.6 Nomenclature

In this document, the SMA Flexible Storage System with battery-backup function is referred to as battery-backup system.

2 Safety

2.1 Intended Use

When using the SMA Flexible Storage System and the battery-backup system in Great Britain and Northern Ireland, an external grid and PV system protection must be installed. Contact your grid operator to check which standards are locally applicable for the planned battery-backup system:

- G83/2: Engineering Recommendation G83, Issue 2
- G59/3: Engineering Recommendation G59, Issue 3

This standard must comply with the external grid and PV system protection.

Use the SMA Flexible Storage System and the battery-backup system only in accordance with the enclosed documentation and with the locally applicable standards and directives. Any other use may cause personal injury or property damage. Alterations to the SMA Flexible Storage System and the battery-backup system, e.g., modifications and conversions, are permitted only with the express written permission of SMA Solar Technology AG. Unauthorized alterations will void guarantee and warranty claims and usually void the operating license. SMA Solar Technology AG shall not be held liable for any damage caused by such changes. Any use of the SMA Flexible Storage System and the battery-backup system other than that described in the Intended Use section does not qualify as appropriate. The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and observe all instructions contained therein.

2.2 Safety Information

WARNING

Danger to life due to incorrect installation and configuration

Incorrect installation of the products in the SMA Flexible Storage System can result in death or serious injury.

Incorrect configuration of the Sunny Island can result in death or serious injury.

This document is a supplement to the documentation that is provided with each product. This document does not replace any locally applicable standards or directives.

- Read and observe the documentation supplied with the products.
- Observe all applicable local standards and directives.

3 Planning

3.1 Planning the Installation of the SMA Flexible Storage System

| Procedure | Required information | See |
|---|---------------------------------------|--|
| 1. Connecting the SMA Flexible Storage System | Information and system description | System description "SMA Flexible Storage System" |
| | Circuitry overview | Section 4, page 10 |
| | Connecting the Sunny Island inverters | System description "SMA Flexible Storage System" |
| | Connecting the Sunny Home Manager | |
| 2. Basic configuration of the Sunny Island During the first ten operating hours, set the country data set of the Sunny Island to AS4777 . | - | System description "SMA Flexible Storage System" |
| 3. Extended configuration of the Sunny Island | - | Section 6, page 16 |
| 4. Commissioning the SMA Flexible Storage System | - | System description "SMA Flexible Storage System" |

3.2 Planning the Installation of the Battery-Backup System

| Procedure | Required information | See |
|---|---|---|
| 1. Connecting the battery-backup system | Procurement of the automatic transfer switch* | Planning Guidelines "SMA Flexible Storage System with Battery-Backup Function" |
| | Information and system description | System description "SMA Flexible Storage System with Battery-Backup Function" |
| | Circuitry overview | Section 5, page 12 |
| | Connecting the Sunny Island inverters | System description "SMA Flexible Storage System with Battery-Backup Function" |
| | Connecting the Sunny Home Manager | |
| 2. Basic configuration of the Sunny Island During the first ten operating hours, set the country data set of the Sunny Island to AS4777 . | - | System description "SMA Flexible Storage System with Battery-Backup Function" |
| 3. Extended configuration of the Sunny Island | - | Section 6, page 16 |
| 4. Changing the configuration of the PV inverters | - | Section 7, page 17 |
| 5. Commissioning the battery-backup system | - | System description "SMA Flexible Storage System with Battery-Backup Function" |

* An automatic transfer switch can be purchased from enwitec electronic GmbH & Co.KG. When setting up the automatic transfer switch independently, make suitable provision for external grid and PV system protection.

4 SMA Flexible Storage System (Self-Consumption Only)

4.1 Circuitry Overview of a Single-Phase SMA Flexible Storage System

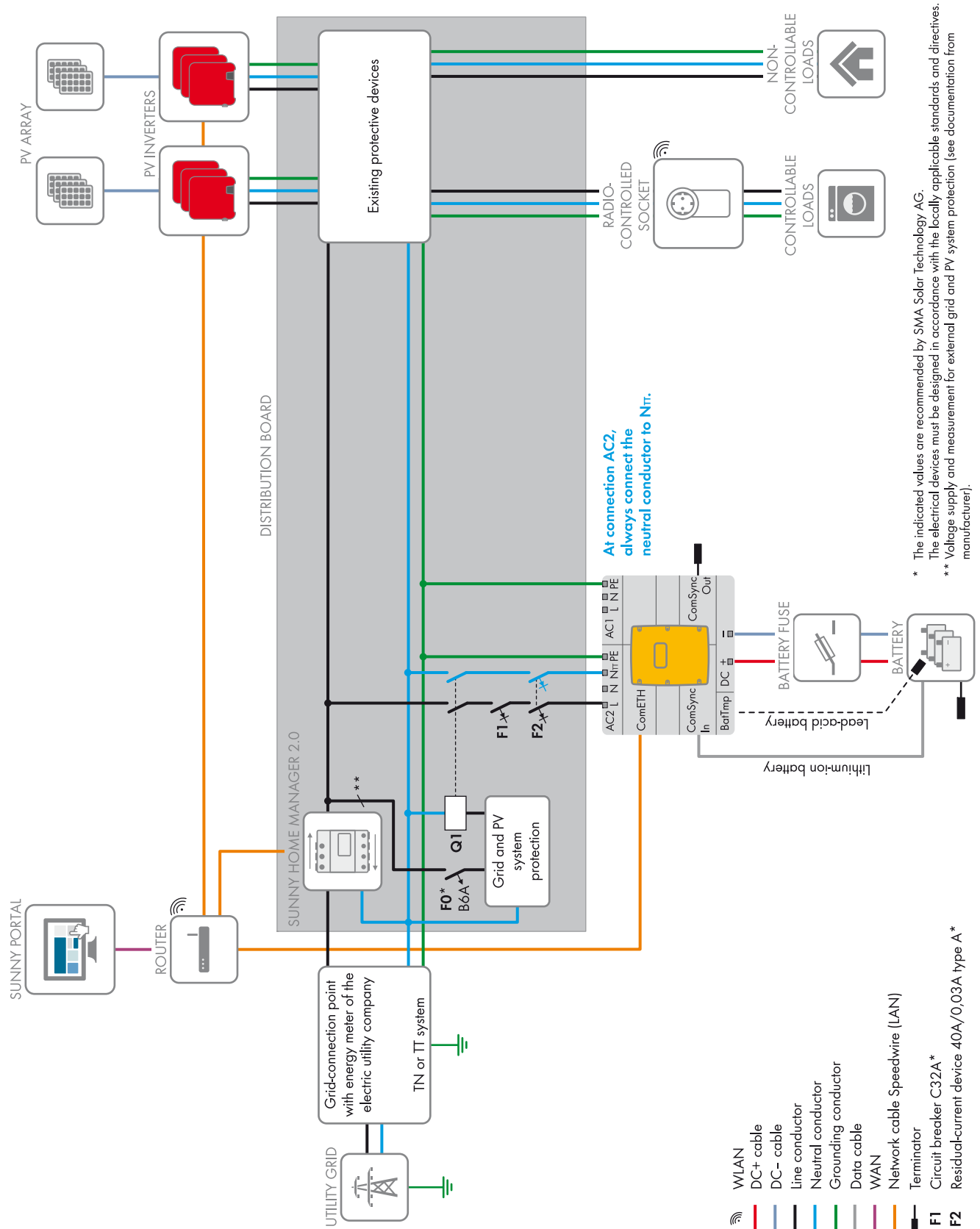


Figure 1: Circuitry overview of a single-phase SMA Flexible Storage System in Great Britain/Northern Ireland

4.2 Circuitry Overview of a Three-Phase SMA Flexible Storage System

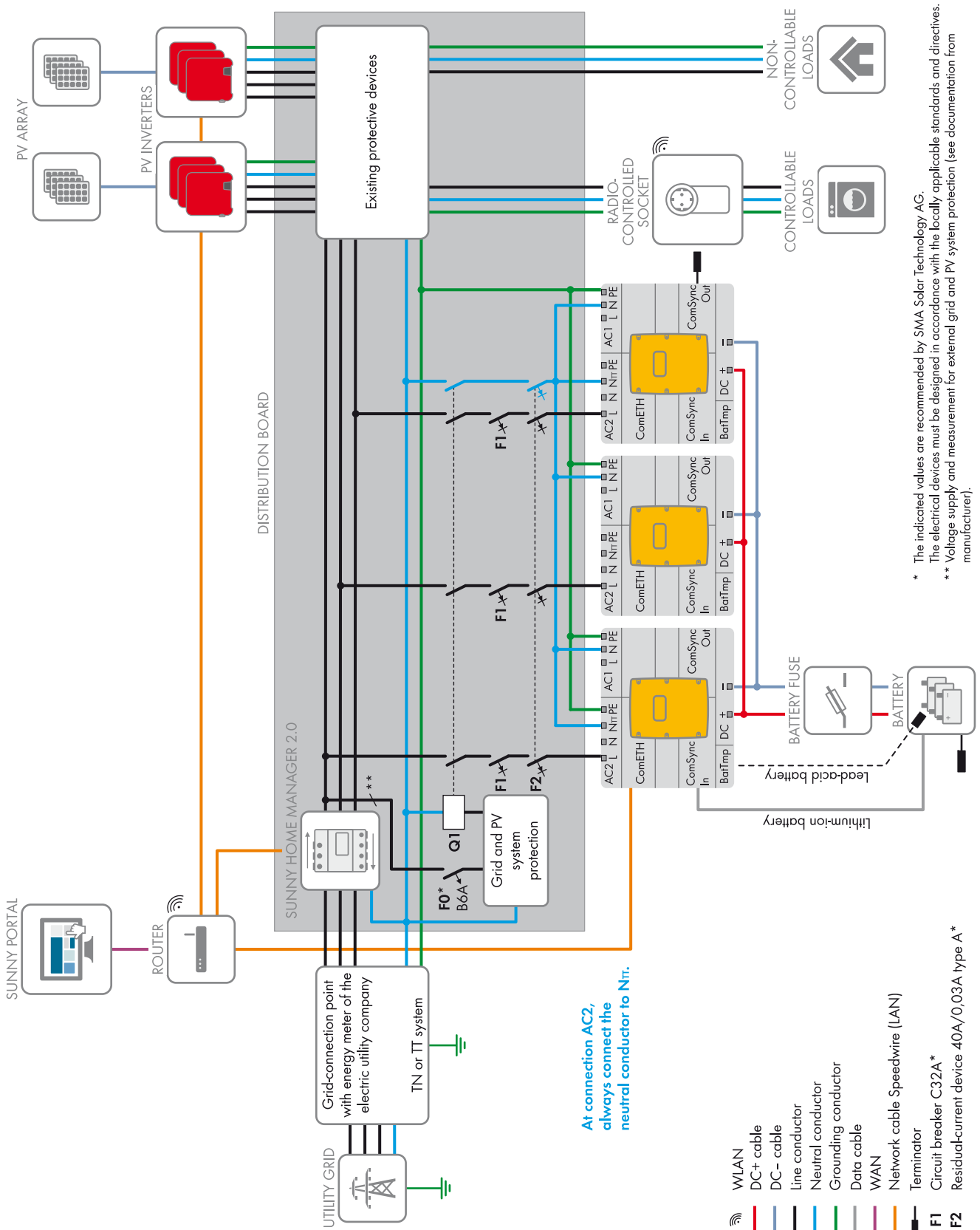


Figure 2: Circuitry overview of a three-phase SMA Flexible Storage System in Great Britain/Northern Ireland

5 Battery-Backup System

5.1 Single-Phase Battery-Backup System

5.1.1 Automatic Transfer Switch of the Single-Phase Battery-Backup System

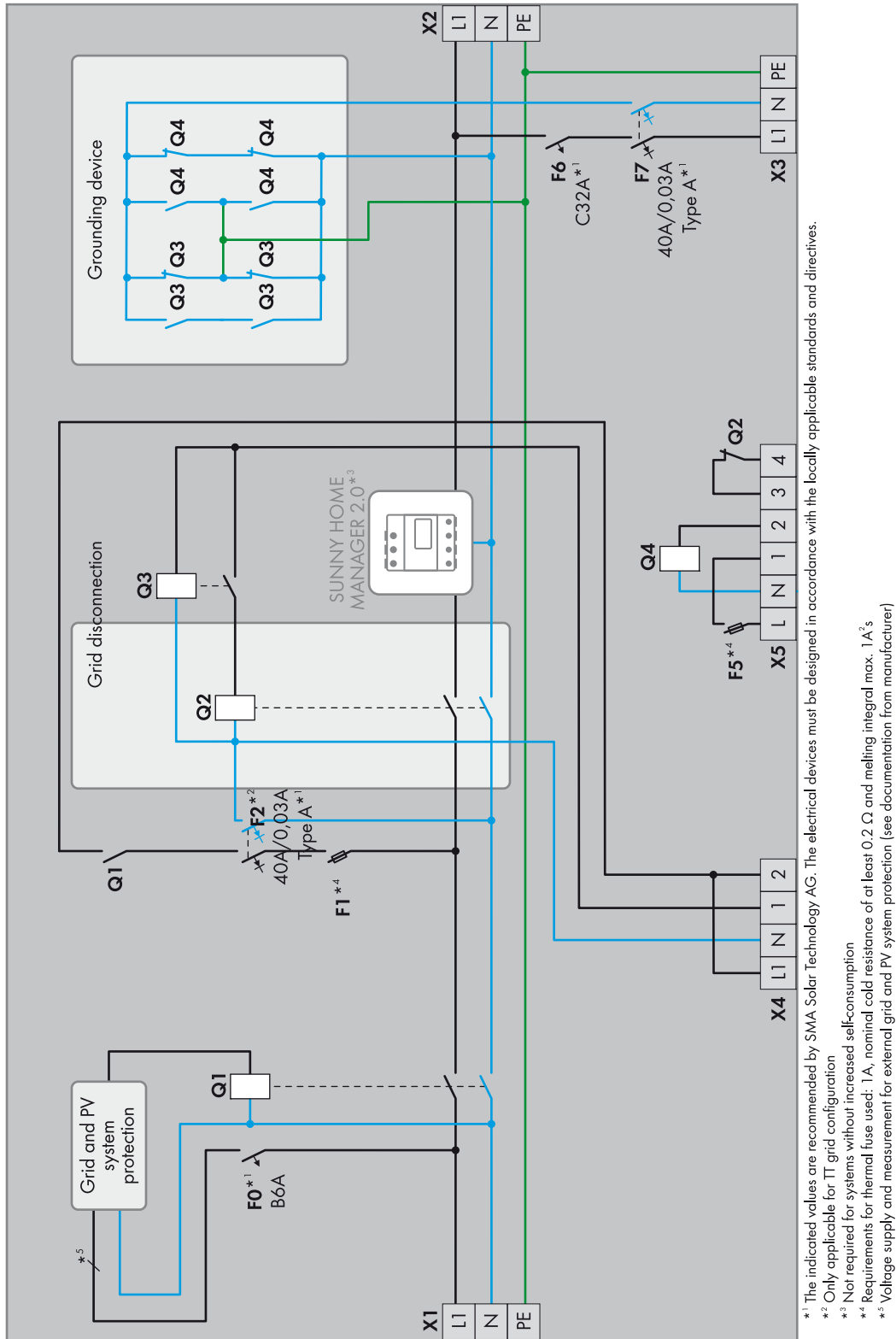


Figure 3: Schematic diagram of the automatic transfer switch for a single-phase battery-backup system in Great Britain/Northern Ireland

5.1.2 Circuitry Overview of the Single-Phase Battery-Backup System

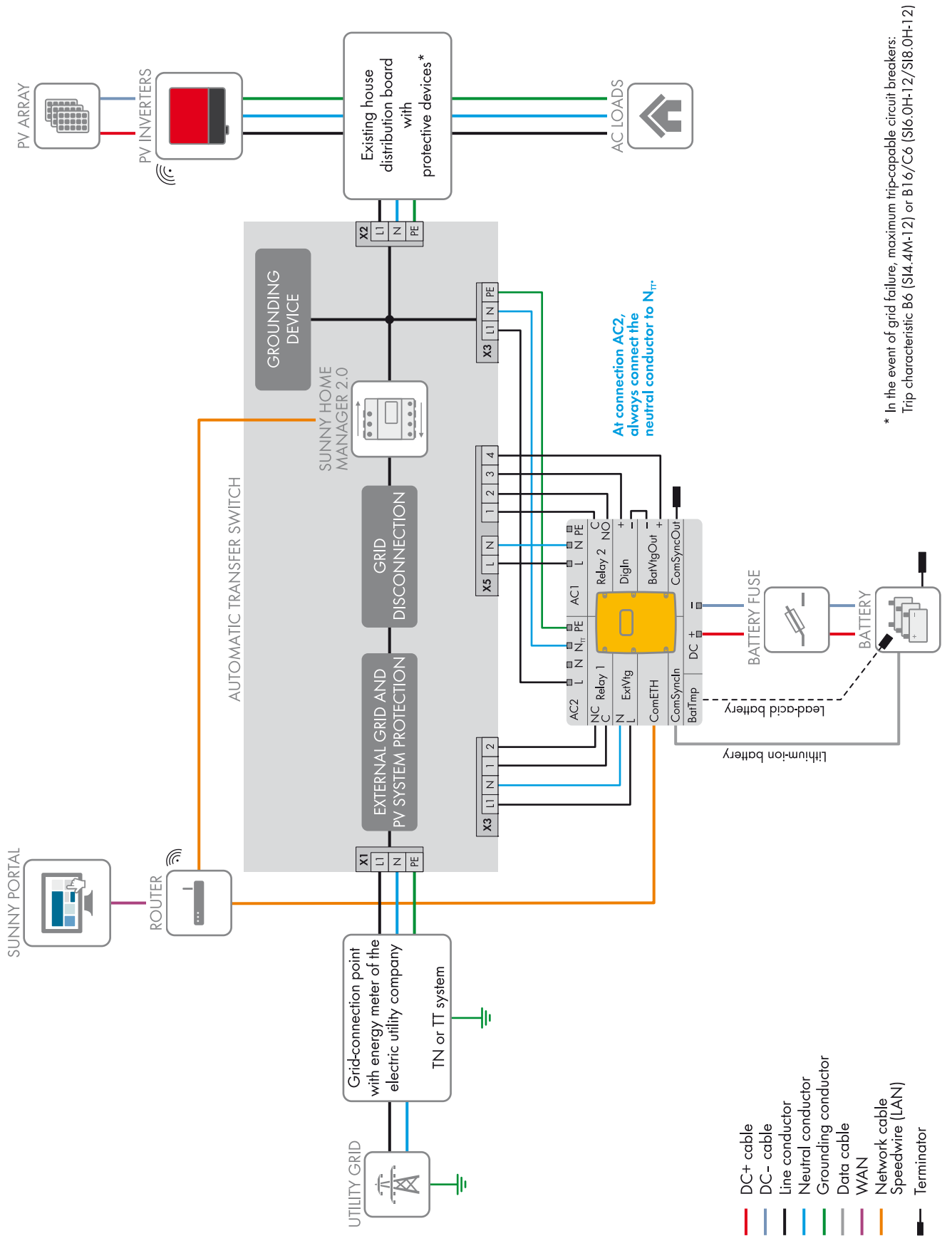


Figure 4: Circuitry overview of a single-phase battery-backup system in Great Britain/Northern Ireland

5.2 Three-Phase Battery-Backup System

5.2.1 Automatic Transfer Switch of the Three-Phase Battery-Backup System

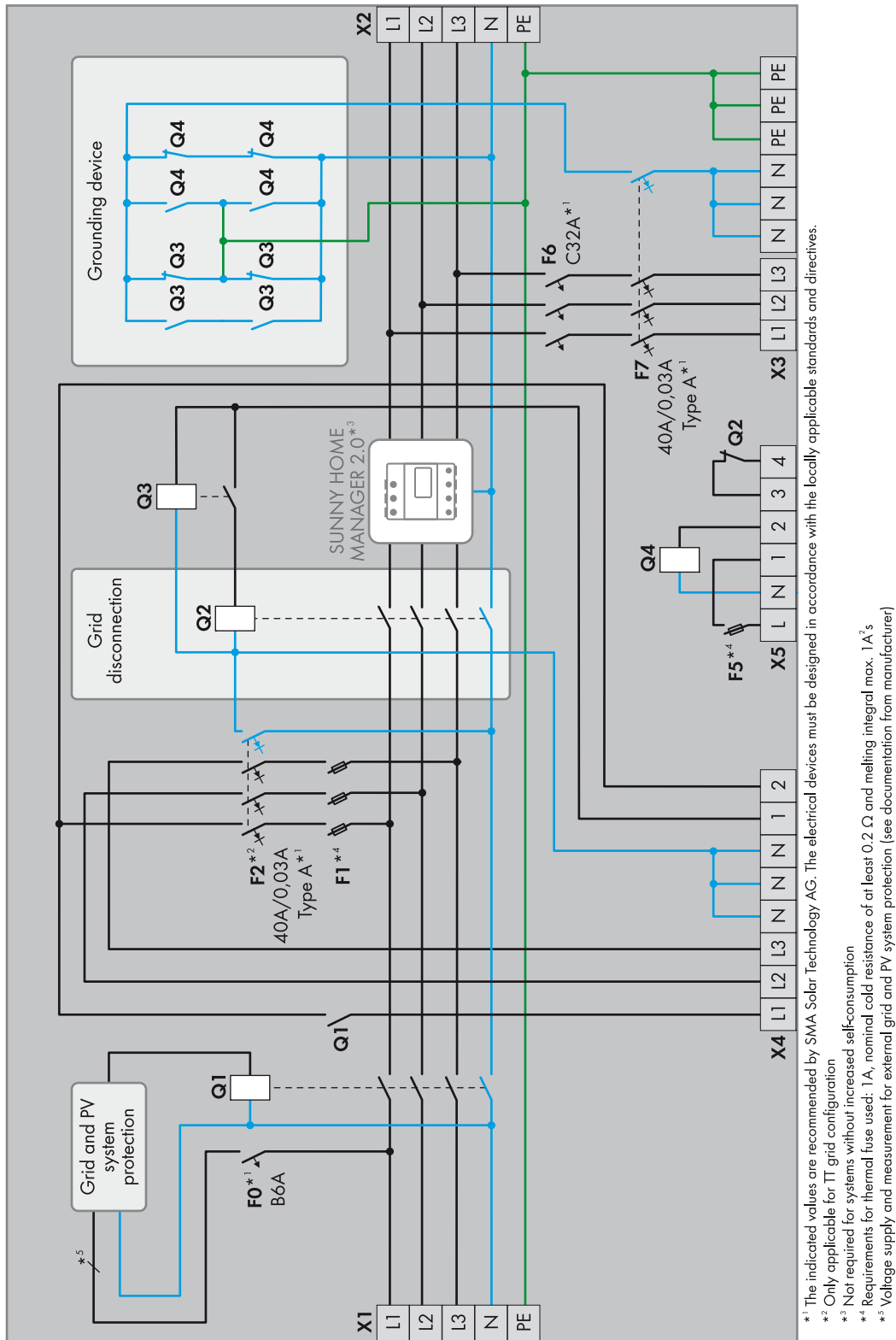


Figure 5: Schematic diagram of the automatic transfer switch for a three-phase battery-backup system in Great Britain/Northern Ireland

5.2.2 Circuitry Overview of the Three-Phase Battery-Backup System

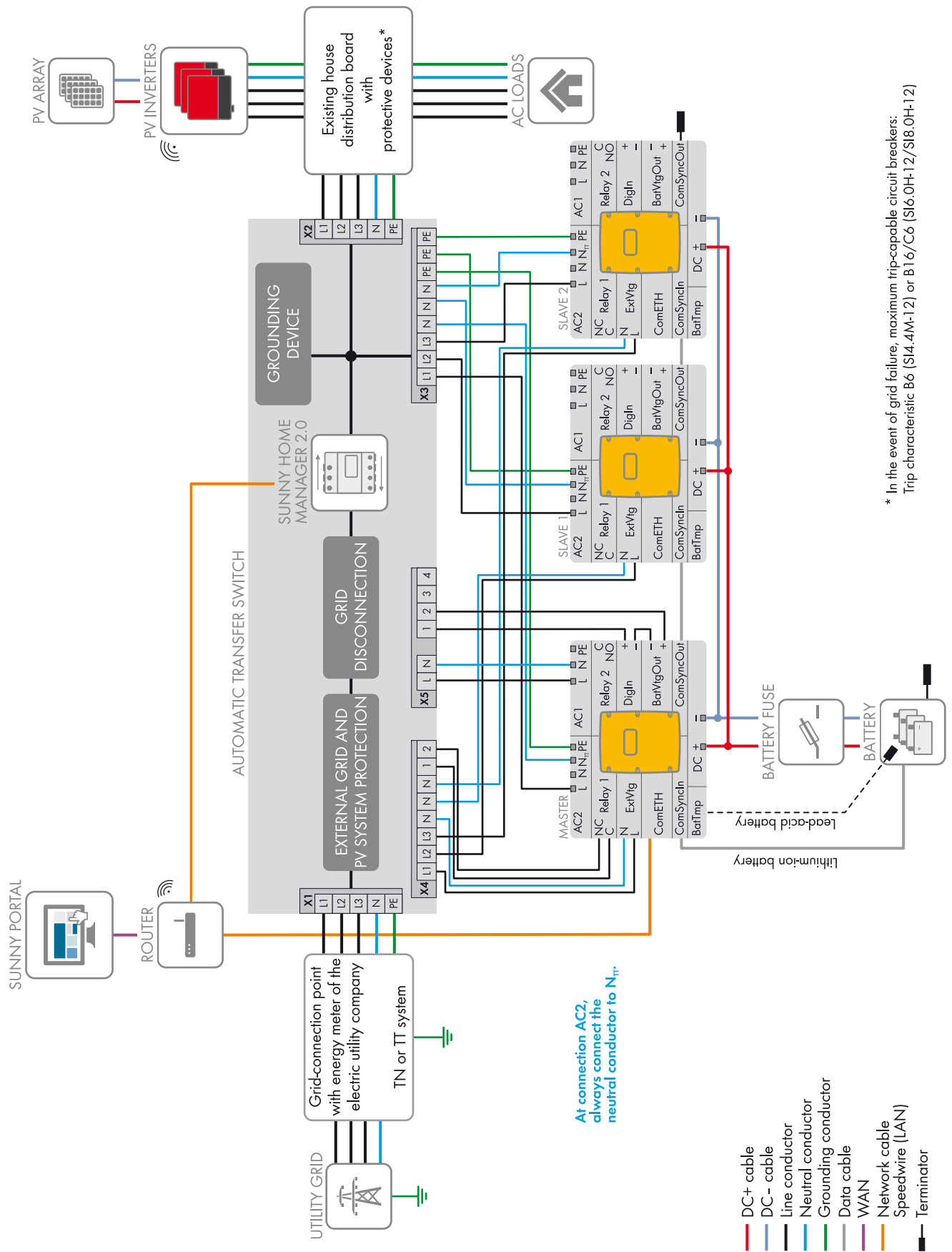


Figure 6: Circuitry overview of a three-phase battery-backup system in Great Britain/Northern Ireland

6 Extended Configuration of the Sunny Island

Requirement:

- The extended configuration must be performed within the first ten operating hours of the Sunny Island, otherwise an SMA Grid Guard code is required in order to change grid-relevant parameters (application form for the SMA Grid Guard code available at www.SMA-Solar.com).

Procedure:

1. Activate the user interface of the inverter (see the inverter operating manual).
2. Log in as "Installer".
3. Ensure that the parameter **Country standard set** is set to **AS4777.3** (for basic configuration of the Sunny Island, see either system description "SMA Flexible Storage System" or "SMA Flexible Storage System with Battery-Backup Function" of the Sunny Island).
4. Set the parameter **Voltage monitoring upper minimum threshold** to 172.5 V.

7 Changing the Configuration of the PV Inverters

In battery-backup systems, the active power of the PV inverters should be controllable depending on the frequency (see the Planning Guidelines "SMA Flexible Storage System with Battery-Backup Function"). If your grid operator prohibits the reduction of active power feed-in in case of overfrequency, you can also use the PV inverters without changing the configuration. SMA Solar Technology AG recommends activating the frequency-dependent control of the PV inverters.

Requirements:

- The PV inverters are part of a battery-backup system and the automatic transfer switch can disconnect the PV inverters from the utility grid.
- The grid operator must be informed of the configuration change and have no objections to it.
- You must be authorized to change Grid Guard parameters. You can find the application form at www.SMA-Solar.com in the download area of the relevant PV inverter.
- The firmware version of the PV inverters must support the frequency-dependent control of active power (for "PV inverters", see the Planning Guidelines "SMA Flexible Storage System with Battery-Backup Function" at www.SMA-Solar.com).

Procedure:

1. With existing PV systems, make sure that the firmware of the installed PV inverters supports frequency-dependent active power reduction (see the Planning Guidelines "SMA Flexible Storage System with Battery-Backup Function" at www.SMA-Solar.com).
2. Set the following parameters of the PV inverters to the specified value (see the documentation of the communication product).

| Parameter | Value |
|---|--------------------|
| P-WCfHzMod Operating mode of active power reduction in case of overfrequency P(f) * | On or WCfHz |
| P-WGra Active power gradient, linear instantaneous power gradient configuration * | 40 |
| P-HzStr Difference between starting frequency and grid frequency, linear instantaneous power gradient configuration * | 0.2 |
| P-HzStop Difference between reset frequency and grid frequency, linear instantaneous power gradient configuration * | 0.2 |
| P-HzStopWGra Active power gradient after reset frequency, linear instantaneous power gradient configuration * | 10 |

* Menu **Equipment & device control system**

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