

SAFE ELECTRIFICATION CHECK LIST

ENERGY STORAGE SYSTEM

INTRODUCTION

The safe electrification check lists initiated by the Forum for European Electrical Safety (FEEDS, www.feedsnet.org) aim to provide the installer and the user with essential information regarding the electrical safety of the installation.



DESCRIPTION

An energy storage system, often abbreviated as ESS, is a device or group of devices assembled together, capable of storing energy in order to supply electrical energy at a later time. Batteries are the most common type of new ESS installation that enable energy from renewables, like solar, to be stored and then released when the power is needed most. Battery storage systems will play an increasingly pivotal role, including into a domestic environment, between green energy supplies and responding to electricity demands.

← BEFORE INSTALLATION

🏠 CLIENT

- Make sure to ask for a qualified and, where relevant, certified installer.
- Check the existence of an electrical inspection report. The report can assess the safety, the readiness to accept new equipment. If no report is available, or if the existing report doesn't give the useful information, it is recommended to ask one if the electrical installation has more than 5 years.
- Check with the installer the place where batteries are likely to be installed: a clear space, ventilation, distances regarding heat sources are key elements.
- Check if and which subsidies are available, and if electrical upgrades are covered.

🔧 INSTALLER

- If client has a photovoltaic system, propose implementation of smart control of loads via an energy management system (In this case the battery will be better optimized, and perform fewer cycles, thus extending its lifespan).
- Control earthing system.
- Plan cables paths and ensure all cables have the appropriate cross-section (See annex) and that all necessary electrical protection devices will be installed.

↓ DURING INSTALLATION

🔧 INSTALLER

- Follow the recommendations given by the manufacturer, they can differ from one to another.
- Follow the relevant standards and legal requirements for installation available at national level.
- Use the cables size and specification in accordance with relevant standards (see annex) and legislation.
- Pay particular attention to:
 - mechanical protection of the terminals
 - protection against overcurrent for:
 - the battery cable
 - the cable powering the regulator
 - the DC cable
 - the cables (converter) inverter DC/AC
 - the cable of the termination DC box
 - emergency battery cut-off for:
 - the battery
 - the DC part of the installation
 - the other DC & AC sources in the battery room
 - sectioning DC and AC sides of the installations
 - identification of DC & AC parts

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AFTER INSTALLATION

CLIENT

- Declare the installation to all relevant counterparties (landlord, condo administrator, the local fire brigade, the insurance company, Distribution System Operator - DSO).
- Keep carefully the documentation provided, related to the equipment and its installation and follow the maintenance plan.

INSTALLER

- Test and control of the new installation, this final check can be performed by a third party and can be mandatory depending on the country.
- Specific attention shall be given to cables, connections, earthing, protection devices.
- Communicate a maintenance plan (including requirements from the manufacturer and/or national regulations).
- Provide the maintenance plan with key information visible on the equipment.
- Supply to the client all information and documents necessary to declare the installation to the relevant counterparties.
- Explain to the customer how the system works, and how to ensure its safety (e.g. that the battery should not be covered or used as a shelf).
- Complete the existing inspection report.

ANNEX: CABLES SECTION

The minimal cable section can be determined using the table below:

Cable section recommendations from the battery to the regulator for 12V (PV panels until 1000W), 24V (PV panels until 2000W) and 48V (PV panels until 4000W) systems

Max current of the PV panel	Max charging current I_{ch}	Battery fuse	Maximum power loss in battery cables	Length 2 x 1.5 m	Length 2 x 2.5 m	Length 2 x 5 m
13.4 V		12 V system				
500 W	37 A	63 A	3 %	6 mm ²	10 mm ²	25 mm ²
700 W	55 A	80 A	3 %	16 mm ²	16 mm ²	35 mm ²
1000 W	70 A	100 A	3 %	25 mm ²	25 mm ²	Not recommended
26.8 V		24 V system				
500 W	18 A	35 A	1 %	6 mm ²	10 mm ²	16 mm ²
1000 W	37 A	63 A	1.5 %	10 mm ²	10 mm ²	25 mm ²
2000 W	70 A	100 A	2 %	25 mm ²	25 mm ²	35 mm ²
53.6 V		48 V system				
1000 W	21 A	35 A	0.5 %	6 mm ²	10 mm ²	16 mm ²
2000 W	42 A	63 A	0.5 %	10 mm ²	16 mm ²	35 mm ²
4000 W	70 A	100 A	1 %	25 mm ²	25 mm ²	35 mm ²