

SolarEdge Home Hub Inverter LRA Application Note – North America

Revision history

Version 1.0, December 2023: Initial release

Overview

Compressor-based heavy loads such as HVACs require a high in-rush current when they first start up. This is called the Locked Rotor Amperage (LRA). In order to start compressor-based heavy loads during a grid power outage, the SolarEdge system must be capable of supporting the appropriate load.

SolarEdge Home Hub inverters have backup capabilities which ensure that they are able to support HVAC and other heavy loads during a power outage, provided they are coupled with the correct number of SolarEdge Home batteries.

This document specifies the Locked Rotor Amperage (LRA) values for appliances like HVACs and heat-pumps. The LRA values indicate the startup current required to be supplied by an inverter model together with an appropriate SolarEdge Home Battery.

SolarEdge Home LRA solution

The SolarEdge Home LRA solution is designed to provide backup¹ power to start up heavy loads up to 106A LRA rating². A 106A LRA rating can be achieved by a SolarEdge Home Hub inverter that supplies up to 11.4kW during an outage. This inverter power output is sufficient to supply HVAC systems up to 3.5 tons which are common in North American households.

Supported appliance LRA ratings

The following inverter models are capable of supplying 11.4kW peak power in backup mode:

- SExxxxxH-USMNUxxxx all models²
- SExxxxxH-USMNFxxxx all models²
- SE7600H-USMNBxxxx
- SE7600H-USMNGxxxx
- SE10000H-USMNBxxxx
- SE11400H-USSNxxxxx

All these inverters can supply a load rated up to 96A (LRA) with a minimum of one connected SolarEdge Home battery (BAT-10K1P) and up to 106A (LRA) with a minimum of two connected SolarEdge Home batteries (BAT-10K1P).

¹ Backup applications are subject to local regulations and require connection with SolarEdge Home Hub Inverters, SolarEdge Home Batteries, and the SolarEdge Home Backup Interface.

² For models SE7600H-US and below the rated AC stand-alone power must be configurable to 11400W.

The LRA ratings of HVAC compressors that SolarEdge inverters can accommodate in off-grid mode is based on following assumptions:

- The listed LRA ratings are supported without a Soft-Start module. Adding a Soft-Start module increases the supported LRA ratings.
- At start-up, the compressor is the only load powered by the inverter. Shedding of additional loads is achievable using the SolarEdge Home Load Controller (SEM-DCS-N08), the SolarEdge Home Smart Switch (SEM-SWT-N16), or the SolarEdge Smart Socket (SEM-SKT-B13).
- An inverter that is coupled to a suitable number of SolarEdge Home Batteries allows system start up without any PV production. When there is adequate PV production, it is possible to reach the maximum LRA value performance of **106A** using only one SolarEdge Home Battery.
- The HVAC compressor hasn't operated for at least 15 minutes before start-up.
- The values are based on limited tests on specific make and models of HVAC units available in the market.
- The LRA rating of an HVAC compressor may differ from the value on its label due to the age and condition of the compressor.

Relevant HVAC tonnage and LRA ratings³

Nominal Capacity		Compressor LRA (A)
Tons	BTU/hr	
5	60K	130 to 155
4	48K	100 to 130
3.5	42K	90 to 110
3	36K	70 to 85
2	24K	50 to 63
1.5	18K	44 to 48

³ Analyzed from data sheets of market-leading brands.