

IFC Mounting Requirements for IQ Battery Systems

Overview

The International Fire Code (IFC) and International Residential Code (IRC) provide guidance on the mounting of stationary energy storage systems (ESS). These standards have been adopted by many jurisdictions in the United States. IFC has been adopted in approximately 75% of US states and the NFPA 1 – Fire Code has been adopted in 25% of states. There are requirements in the [2021 IFC](#) Section 1207, [2018 IFC](#) Section 1206, that are commonly referenced by AHJs with respect to energy storage systems (ESS). A link to the states that have adopted a version of the IFC and IRC can be found [here](#), but the version is not listed. As of July 1, 2021, the updated California Residential Code (CRC) for installation of ESS in single family homes and duplexes match the requirements in the California Fire Code (CFC) as California adopted the 2021 IFC and IRC.

The IFC, IRC, and California CRC and CFC require all ESS to be listed to UL 9540. Enphase IQ Batteries are listed to UL 9540. In the IRC, IFC, NFPA 855, and UL 9540, the separation between ESS when installed is defined to be at least 3 feet (914 mm). IFC and CRC also provide guidance that an ESS must be installed at least 3 ft from doors and windows directly entering the dwelling unit. Equipment evaluated to UL 9540A with a report written by an Nationally Recognized Testing Laboratory (NRTL) shall be permitted (optionally allowed by code officials) to be installed with a separation distance less than 3 ft based on the UL 9540A test results.

The Enphase IQ Batteries 3, 3T, and 10 have been tested per UL 9540A by an NRTL and should be exempted from the requirements of as they meet the exceptions provided for large-scale fire testing and fault condition testing. The UL 9540A testing shows that the manufacturers installation and spacing recommendations included in these products' Quick Installation Guides (QIG) are adequate and allow a separation distance less than 3 ft.

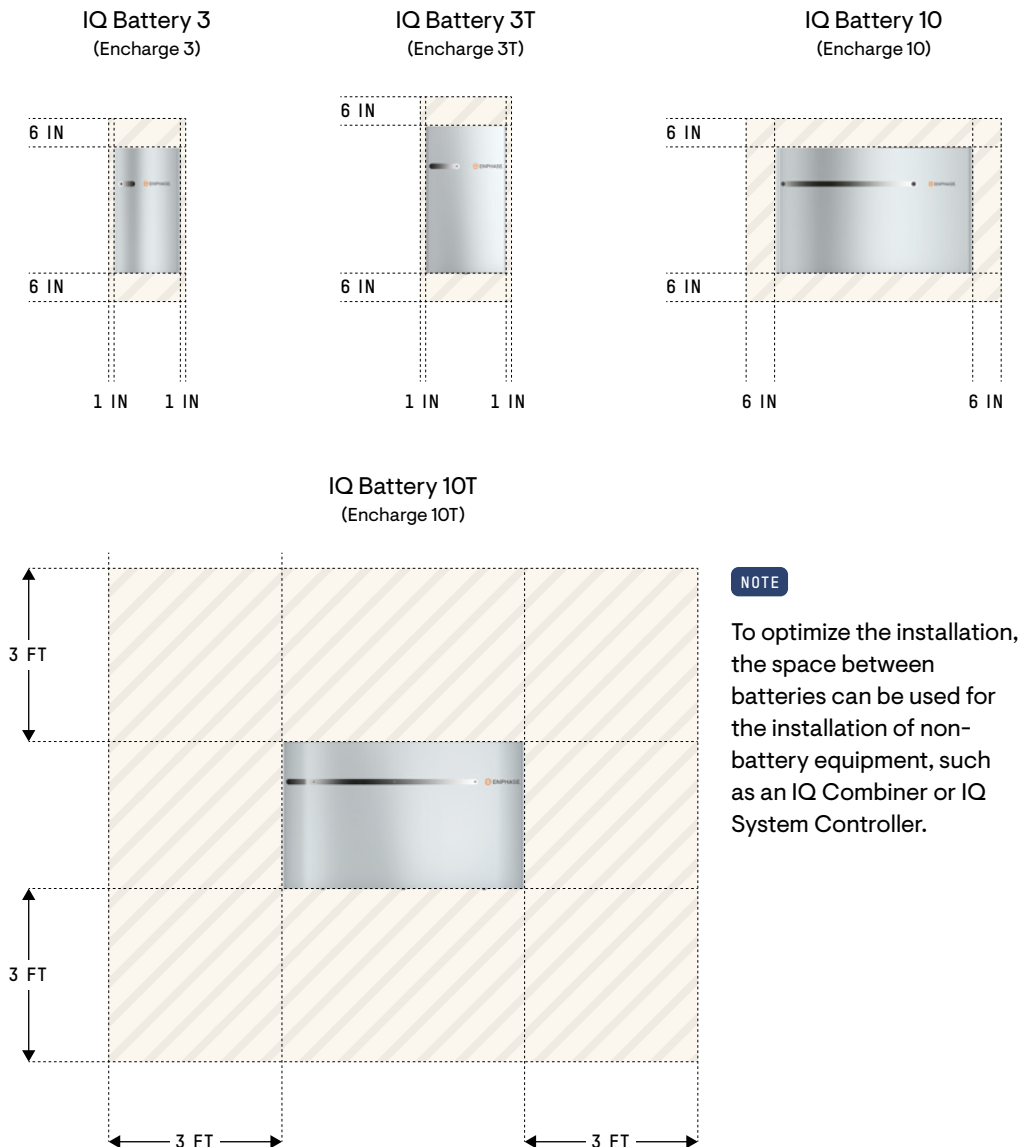
The IQ Battery 3 (Encharge 3) and IQ Battery 10 (Encharge 10) and IQ Battery 3T (Encharge 3T) have been tested according to UL9540A test requirements and manufacturer installation guide. The testing confirmed that thermal runaway “did not propagate from module to module in the unit.” The testing also showed that “Additional thermal runaway behavior or re-ignitions were not observed.”

The Enphase IQ Batteries 10T shall be installed per UL 9540, IFC, and IRC requirements (e.g., 3 ft separation distance) until the UL 9540A tests, evaluations, and reports for this product are completed and released by an NRTL.

The IQ Battery 3 (Encharge 3), IQ Battery 10 (Encharge 10) and IQ Battery 3T (Encharge 3T) testing were conducted at the manufacturers recommended mounting distances with a minimum of 6" between vertically stacked units, 1" horizontally between battery IQ Battery 3/3T units, and 6" clearance on the sides for IQ Battery 10. The [IQ Battery datasheets](#) detail that they have been certified to UL9540A.

Spacing requirements between batteries

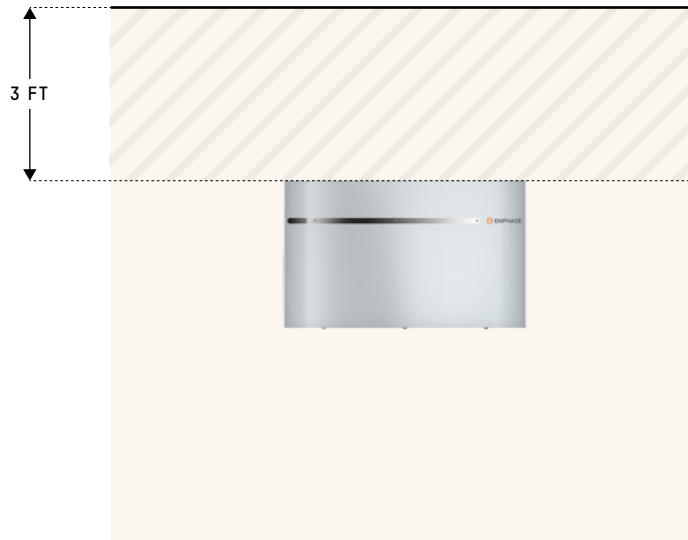
The following diagrams illustrate the minimum amount of space required between each IQ Battery. The minimum space for non-battery Enphase equipment is 6" around all sides.



IQ Battery 10T ceiling and floor spacing requirements

Minimum distance from ceiling

The IQ Battery 10T must be installed at least 3 feet from the ceiling.

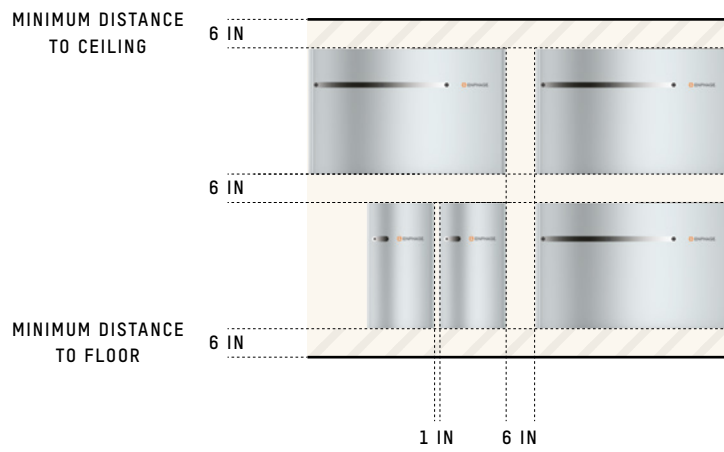


Minimum distance from floor

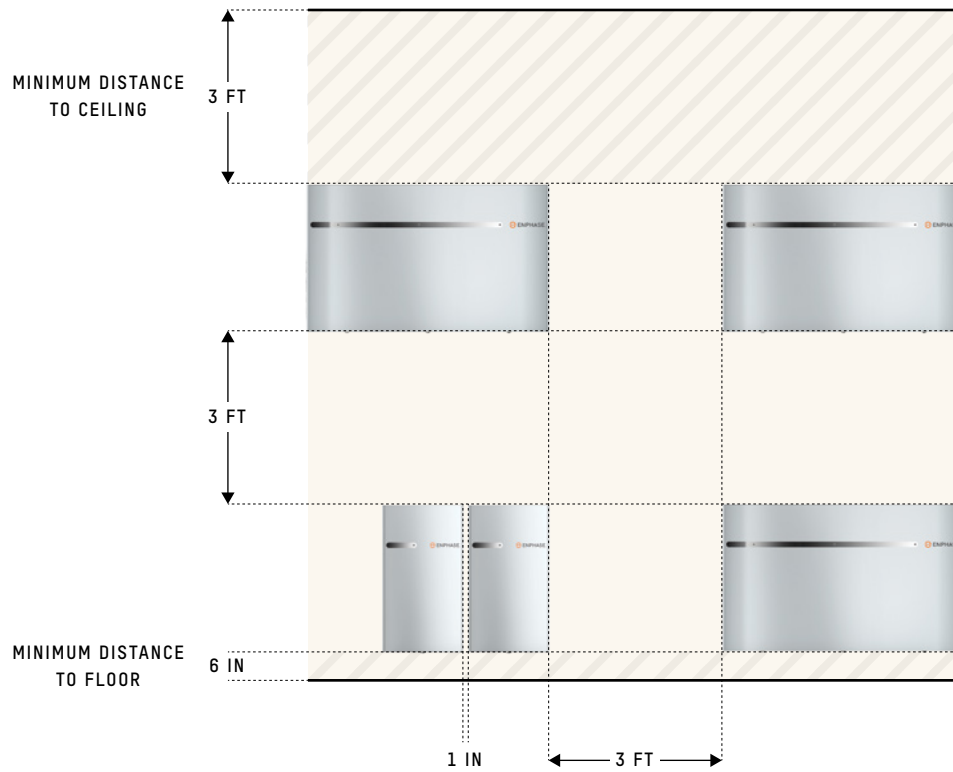
The IQ Battery 10T must be installed at least 6 inches from the floor.



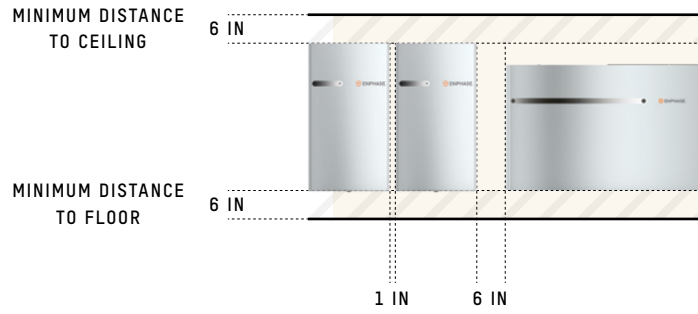
IQ Battery 3 and 10 example installation



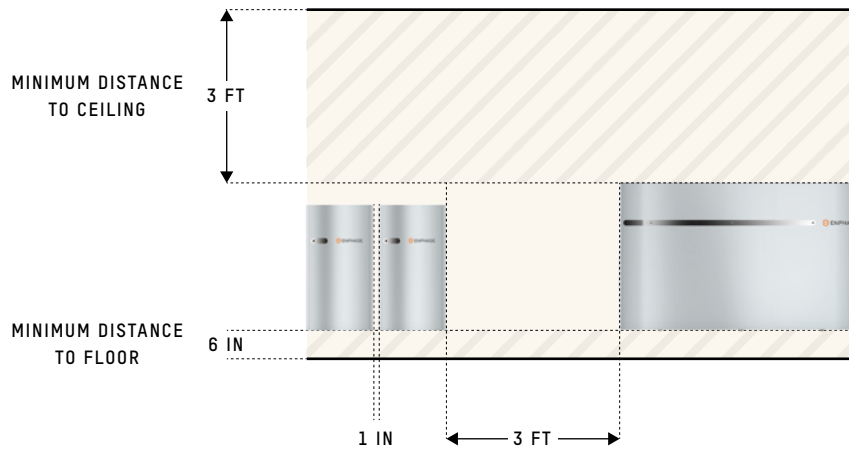
IQ Battery 3T and 10T example installation



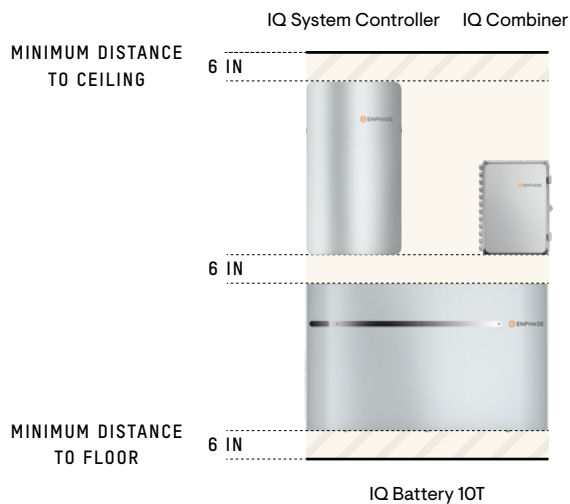
IQ Battery 3T and 10 example installation



IQ Battery 3 and 10T example installation

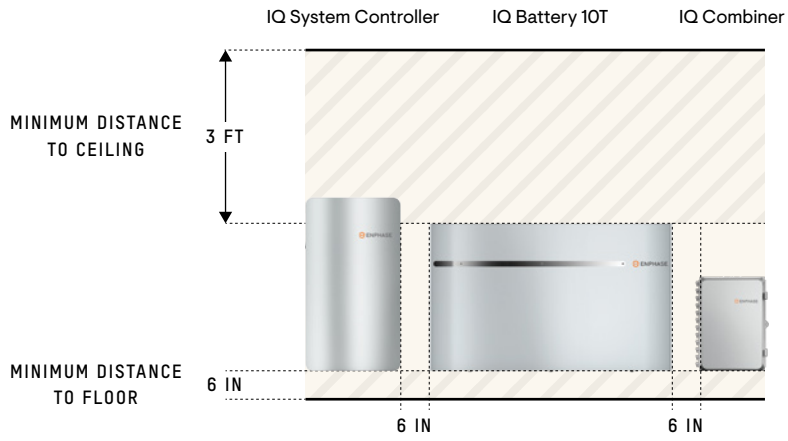


Stacked IQ Battery 10T example installation

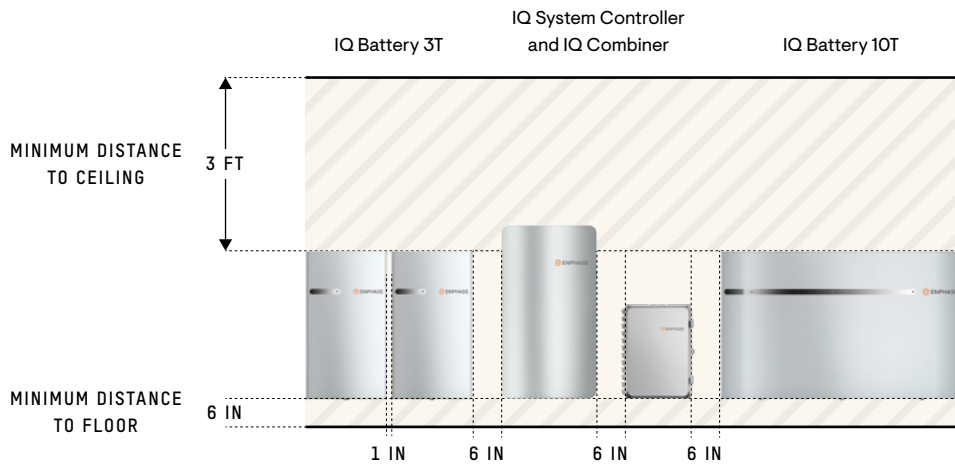


Optimal layouts for IQ Battery 10T installations

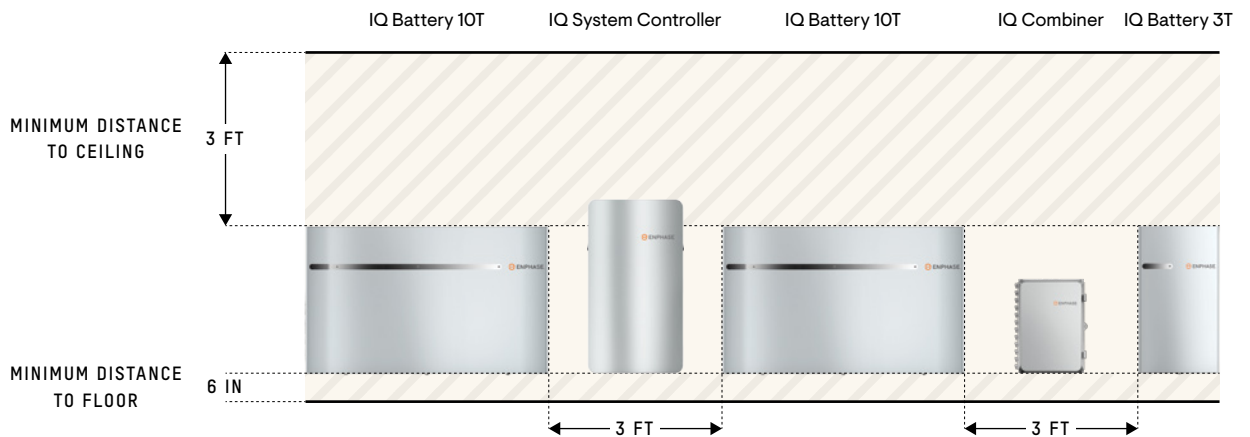
Single IQ Battery 10T



Single IQ Battery 10T with dual IQ Battery 3T



Dual IQ Battery 10T with single IQ Battery 3T



Conclusion

The Enphase IQ Battery 3, 3T, and 10 meet the requirements to be exempted from the IFC mounting restrictions and the manufacturer's recommended mounting requirements should be applied. The mounting requirements for the Enphase batteries are detailed in the [IQ Battery Quick Installation Guide](#) and [IQ Battery 3T/10T Quick Installation Guide](#).

The Enphase IQ Batteries 10T shall be installed per UL 9540, IFC, and IRC requirements (e.g., 3 ft separation distance) until the UL 9540A tests, evaluations, and reports for this product are completed and released by an NRTL. The mounting requirements for the IQ Batteries are detailed in the [IQ Battery 3T/10T Quick Installation Guide](#).

Supporting content

UL 9540 ESS Safety. "Energy Storage Systems and Equipment,"
<https://standardscatalog.ul.com/ProductDetail.aspx?productId=UL9540>

UL 9540A BESS Fire Testing. "ANSI/CAN/UL Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems."
<https://standardscatalog.ul.com/ProductDetail.aspx?productId=UL9540a>
<https://www.ul.com/services/ul-9540a-test-method>

ICC Codes. Residential Code, Fire Code and Building Code, plus many more.
<https://codes.iccsafe.org/codes/i-codes>

NFPA 855 ESS Installation. "Standard for the Installation of Stationary Energy Storage Systems."
<https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855>

IFC 2021 Section 1207 Electrical Energy Storage Systems
https://codes.iccsafe.org/content/IFC2021P1/chapter-12-energy-systems#IFC2021P1_Pt03_Ch12_Sec1207

CFC Section 1206.2.8.3 Stationary Battery Arrays Stationary battery arrays shall be spaced not less than three feet from other stationary battery arrays. This code includes an exception for systems which have been tested by UL9540A to meet the requirements for large-scale fire testing and fault condition testing.

CFC Section 1206.2.8.7.2 Means of Egress Stationary battery storage systems shall be separated from means of egress (doors and some windows) to ensure safe egress under fire conditions. This code includes an exception for systems which have been tested by UL9540A to meet the requirements for large-scale fire testing and fault condition testing.

For further information, contact Enphase support at <https://support.enphase.com>