PCS Certificate of Compliance

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Project #Y0623
Report #LIT19250623

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Subject: PCS BBoC and FCoC testing for the Enphase Battery Energy storage system with IQ Battery 10C

Dear Mr. Baligar

This test report represents the results of our evaluation/testing of the PV + Battery Energy Storage System to the requirements contained in following standards:

UL3141 Issue 2 Outline of Investigation for Power Control Systems (PCS) Dated Oct 9th, 2024
UL1741 3rd Ed CRD for Power Control Systems (PCS), Dated April 8, 2023
UL1741 2nd Ed CRD for Power Control Systems (PCS), Dated March 8, 2019

Compliance includes management, control, and limitation of power exchange between PV, Energy Storage Systems with a Point of Connection (PoC), which is typically the point of back feed on a Main (or) Sub-panel.

The PCS evaluation was conducted on a representative 4th Generation Enphase Energy System and the certification applies to the following configurations which were part of the tested system in the PCS modes defined below.

PCS Modes[1]	PV Model[2] / ESS Model[2]	Max PV Ratings	Max Uncontrolled PV Rating[3]	Max ESS Ratings	Max PV+ESS Rating	Additional Devices needed for PCS functionality	Measured Average/ Maximum OLRT	Average Settling Time
BBoC with PV, Battery Power Limiting	IQ8 / IQ Battery 10C	80A/ 19.20kVA	64A/ 15.32kVA	118A/ 28.32kVA	198A/ 47.52kVA	IQ Combiner 6C/ CTs /Meter Collar	12.12s / 16.25s	12.33s
FCoC with PV, Battery Power Limiting							3.86s / 7.20s	3.68s

[1]Tested with PCS eSW 1.4.0
[2]Please see System configuration table further for exact variations of SKU model numbers.
[3]If uncontrolled PV is present in the system, the nameplate of this uncontrolled PV may not exceed standard design guidance outlined in NEC e.g., NEC 2020 705.12(B)

Feeder Overload Control (FCoC) Protection with PV and Battery Power Limiting:
This is a PCS mode where the system was evaluated for its ability to control per-phase currents from the PV, ESS by monitoring the current output to the main panel using the integrated CTs in the Combiner 6C. The testing verified that when PV power or system load levels were subjected to step changes the total backfeed current did not exceed the limit set beyond the response time mentioned in the table. Max backfeed current limit is 100A per phase. If an uncontrolled PV component is present, its nameplate may not exceed standard NEC guidance without PCS e.g., under NEC 2020 under 705.12(B)(3), the 120% rule must be followed.

Busbar Overload Control (BBoC) Protection with PV and Battery Power Limiting:
This is a PCS mode where the system was evaluated for its ability to control per-phase currents from the PV, ESS by monitoring the sum of current output to the main panel using the integrated CTs in the Combiner 6C and Grid Import Currents to keep the busbar within safe limits.

The testing verified that when the system loads exceeded the busbar limit set, the PV and Battery power were curtailed down to zero, so the original upstream protection mechanism (typically a service breaker) protects the busbar in case of an overload. If an uncontrolled PV component is present, its nameplate may not exceed standard NEC guidance without PCS e.g., under NEC 2020 under 705.12(B)(3), the 120% rule must be followed.

The table below describes the System configuration and SKUs associated with tested PCS mode(s)

System Component	Product SKUs	Equipment required in PCS mode?	
		BBoC with PV & Battery	FCoC with PV & Battery
Enphase PV[1]	IQ8H-240-72-2-US, IQ8-60-2-US, IQ8PLUS-72-2-US, IQ8M-72-2-US, IQ8A-72-2-US, IQ8-60-M-US, IQ8PLUS-72-M-US, IQ8M-72-M-US, IQ8A-72-M-US, IQ8H-240-72-M-US, IQ8MC-72-M-US, IQ8AC-72-M-US, IQ8HC-72-M-US, IQ8X-80-M-US , IQ8HC-72-M-DOM-US, IQ8X-80-M-DOM-US	Required	Required
Enphase Battery	Enphase IQ Battery 10C (Encharge battery 4th generation): IQBATTERY-10C-1P-NA, IQBATTERY-10CS-1P-NA, B05-C01-US00-1-3-RMA rated at 120/240Vac	Required	Required
Enphase IQ Combiner 6C	X-IQ-AM1-240-6C	Required	Required
CTs	For consumption monitoring: At least 2 units of CT-200-SPLIT or CT-200-CLAMP or At least 1 unit of Meter Collar PV and battery monitoring CTs are integrated into the IQ Combiner 6C	Required[1]	Optional
Meter Collar	For Monitoring consumption: At least 1 unit of MC-200-011-V01	Required[1]	Optional

[1]Either Meter Collar (OR) Consumption CTs placed at the Point of Common Coupling (PCC) is required for operation in this mode. Both are not required

This PCS supports:

- Up to 3 circuit inputs, one PV aggregate breaker input and two ESS, each with up to 4 daisy-chained IQ Battery 10C units.
- Each ESS circuits' charge/discharge current with IQ Battery 10C can be limited from 64 Amps to 8 Amps continuous.

1. PV inverter breakers on the combiner box must be properly sized.
    a. The maximum breaker size for each PV inverter branch in the combiner PV Bus is 20A.
    b. The maximum breaker size for PV aggregate breaker circuit in the combiner is 100A.

2. Battery inverter breakers on the combiner box must be properly sized.
    a. The maximum breaker size for a single IQ Battery 10C-based branch in a combiner box is 40A.
    b. The maximum breaker size for each battery branch in the combiner is 80A per circuit.

3. Please refer to the equipment installation instructions for system configuration details.

If there are any questions regarding the results contained in this report, please contact me or any Bureau Veritas CPS customer service representative.

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Sincerely,

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Reviewed by,

Radhe. Patel

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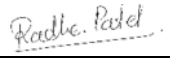
Revision History:

Date/ Project No.	Project Engineer / Reviewer	Description
9/16/2025 Y0623	Dishant Patel  Radhe Patel 	Added uncontrolled PV ratings in Page 1 Table, and PCS Mode definitions.

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