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RESEARCH REPORT NO.: 930527

Approval Date: September 18, 2016
Expires: September 18, 2017

Enphase Energy, Inc.
1420 N. McDowell Blvd.
Petaluma, CA 94954
Attn: Peter Tarver

GENERAL APPROVAL - Micro-inverter, model C250 series - manufactured by Enphase Energy, Inc. for Commercial Installation, installed as a part of a Photovoltaic (PV) system.

CONDITIONS OF APPROVAL

The installation of the PV Micro-inverters are approved when the following conditions are met:

- Only the following model designations are approved under this research report:

Model Number*	Power	Input (DC)		Output (AC)
		MPPT Range	Max DC Current	60HZ, 0.95pf
C250-72-2LN-SX*	240 W	27 - 48 VDC	15 Amp	220-248 VAC, 1.0 Amp

- * C250: Base model number
- 72: Compatible with 72 cell modules
- 2LN: Injects current into the grid (Line-to-Neutral)
- SX: X= 2, 3, 4, 5. Connector style: 2= MC4; 3 = Tyco; 4 = SMK; 5=Amphenol H4
- ZC Built in ZEP racking system bracket
- NA North American content
- US US content

- Upon installation, the following durable marking on a contrasting color background shall be placed on a tag at the load center or at the end of each PV circuit run(s):

“The installation of this PV Micro-inverter shall comply with City of Los Angeles Research Report (RR) number 930527. Not valid if the RR is expired. For a copy of RR visit www.LADBS.org or call 323-224-2168.”

- The Micro-inverters shall be plainly and permanently marked on a contrasting color background where readily visible with the following:

- a. Manufacturer’s Name,
- b. Model designation,
- c. Serial Number,
- d. Complete input and output direct current (DC) and alternating current (AC) electrical ratings in Volts, Amperes/Watts,
- e. “Maximum branch circuit protection: 20A”,
- f. Operating ambient temperatures “-40 °C to 65 °C”,
- g. Current CSA listing required markings or labels.

4. If the listing of this PV Micro-inverter, under CSA Certificate number 2759640 is no longer current, the approval of this Research Report may be suspended or cancelled subject to Test Lab’s evaluation.
5. Micro-inverters shall be supplied from a dedicated 20 Ampere AC branch circuit without GFCI or AFCI protection.
6. The Micro-inverter shall be installed and maintained by “Qualified Person” as defined in the Los Angeles Electrical Code and in strict compliance with manufacturer’s instructions.

7. The maximum number of Micro-inverters in a 20 Amp circuits shall not exceed the following:

Model Number*	Inverter Power Rating	Inverter Output Voltage Rating	Max Number of Micro-inverters	
			Single Phase Circuit	Three Phase Circuit
C250-72-2LN-SX*	240 W	220-248 VAC	Not allowed**	48

* See Item #1 for model designation details

** Refer to manufacture’s installation instructions.

8. The hardware used to mount the Micro-inverter to the racking system shall be of a corrosion resistant type.
9. The power source to the engage cable shall be de-energized prior to servicing.
10. The available symmetrical line to ground fault current at the Micro-inverters shall not exceed 2,839 amperes.
11. The PV racking system shall be provided with grounding means (ie. ground lug) for termination of the equipment grounding conductor that is independent from the Micro-inverter. The WEEB connector shall not be relied upon as an approved equipment bonding jumper or equipment grounding conductor.
12. The inverter’s mounting screws shall not be used as a bonding jumper or as a part of the equipment grounding path between the Micro-inverter and the PV racking system.
13. Only a UL or CSA Listed, Micro-inverter Engage cable shall be used for the AC output circuit with the following markings:
 - a. Type TC-ER,
 - b. THWN-2,
 - c. 4C or 5C,
 - d. 12AWG,
 - e. 90°C Dry / 90°C Wet,
 - f. 600V,
 - g. Sun Res.

14. The installation of the Micro-inverters shall comply with applicable provisions of the Los Angeles City Codes (Building, Electrical, and Fire Codes).
15. The manufacturer shall supply either hard copies of, or downloadable web links for Installation Instructions, Operation Manual, Quick Install Guide, and a copy of this approval letter to the installer.
16. The Micro-inverter shall be installed according to the provisions of this approval and the manufacture installation instructions. When the manufacturer installation instructions conflict with this approval letter, the conditions specified in this approval letter shall prevail.
17. The installation of this Micro-inverter is not approved for Hazardous (Classified) locations as defined in 2014 Los Angeles Electrical Code.
18. Except as permitted under this research report, the installed Micro-inverters and the Engage cables, when replaced, shall be of the identical original manufacturer's part that was approved by the Los Angeles City Electrical Testing Laboratory.
19. If a Micro-inverter is no longer in service, it shall be disconnected and removed in accordance with the manufacturer's installation instructions.
20. An electrical permit shall be obtained prior to installation or relocation of a photovoltaic system in the City of Los Angeles.

DISCUSSION:

The product covered under this Research Report is an AC grounded single phase, non-linear, 248 volts, utility-interactive, Enphase Micro-inverter model C250-72-2LN-SX for use with Photovoltaic (PV) modules not exceeding 60VDC output.

The Positive and Negative input DC conductors of the inverter are not grounded, and they are electrically isolated from AC output conductors. The Micro-inverter's enclosure is bonded to the equipment grounding conductor of the Engage cable. The inverter's output AC neutral conductor is not bonded to its metal enclosure.

This Micro-inverter is intended to connect to a single PV module using individual single pin connectors. These single phase inverters are to be only installed in a three phase configuration with the appropriate cable harness.

The inverter metal inclosure is connected to the AC ground through the approved cable connector and the equipment grounding conductor within the AC cable.

These Micro-inverters consist of an aluminum metal enclosure, built-in ground fault protection in accordance with 2014 Los Angeles Electrical Code (Sec 690.35), positive and negative DC cables and connectors, an AC cable and connector. The wire harness or exposed cable output circuit rated 240V, 30A, or less, are not required to be provided with AFCI protection.

The Engage cable consists of five #12AWG conductors that are three line conductors, a neutral conductor, an equipment ground conductor, and a male connector. The connector is also keyed to prevent installation of other Enphase microinverters on the higher voltage systems associated with Model C250. The electrical contacts are male, but the mechanical portions of the connector have male and female design features. The cable connectors are polarized nonstandard configuration, locking type with a grounding member, where all live parts are guarded against inadvertent contact by a person. The connectors are rated for interrupting full load current without hazard to the operator and are listed or identified for its use. The grounding member of the connector contact is designed to be the first to make and the last to break contact with the mating connector.

The PV modules, racking system, and associated hardware are not part of this approval. The efficiency and operation of the Micro-inverter were evaluated by CSA under Certificate number 2759640.

When this system is installed in accordance with the provisions of this General Approval, it should meet the minimum safety standards of the Los Angeles City Electrical Code.

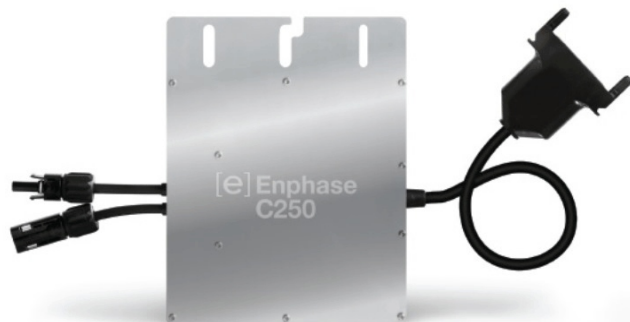
For this General Approval to be valid on any installation in the City of Los Angeles, an engineer or inspector of the Department of Building and Safety must make a determination that all conditions of the General Approval required to provide equivalency have been met.

This General Approval is in accordance with Section 93.0303 of the Electrical Code pertaining to "New Materials and Methods of Construction" and does not waive the requirements of the City of Los Angeles Building Code. This General Approval is neither a product endorsement nor a certification of accuracy or function of the approved item.

PICTURE:

Enphase® C250

APPROVED BY:



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