





**Certificate:** 80082109  
**Project:** 80082109

**Master Contract:** 301721  
**Date Issued:** 2021-10-11

**Electrical Ratings:**

Battery Module Model	Normal Voltage Vdc	Normal Capacity Ah/kWh	Battery Module Configuration	Enclosure IP Rating
ZR-PBX1	51.2	100Ah/5.12kWh	16P1S	IP20

**Manufacturer's Specified Charging Parameters for Battery Module:**

Battery Module Model	Temperature Range, °C	Normal Charging Voltage, Vdc	Normal Charging Current, A	Maximum Charging Voltage, Vdc	Maximum Charging Current, A
ZR-PBX1	0-50	56.8	20	57	20 (0~15 °C); 100 (15~50 °C)

**Manufacturer's Specified Discharging Parameters for Battery Module:**

Battery Module Model	Temperature Range, °C	Normal Discharging Current, A	End-of-discharge voltage, Vdc	Maximum Discharging Current, A
ZR-PBX1	-15-50	20	46.88	20 (-15~15 °C); 100 (15~50 °C)

**APPLICABLE REQUIREMENTS**

ANSI/CAN/UL-1973:2018, Second Edition - Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications.

**Conditions of Acceptability:**

1. The battery module Model: ZR-PBX1 combined with tool board/box Model: ZR-MC100-200E, regarded as EUT, was evaluated according to ANSI/CAN/UL-1973:2018, Second Edition, all applicable tests were conducted on the EUT.
2. The tool board/box model: ZR-MC100-200E, which was evaluated with Power Base Pro LV Series in report 80066883, The tool board/box is only used for test purpose, and battery module ZR-PBX1 will be used with inverter or other end products. Additional evaluation shall be necessary.
3. The battery module including its battery management system has been tested according to the functional-safety requirements of ANSI/CAN/UL-1973:2018, Second Edition. Solid state circuits and software controls relied upon as the primary safety protection, have been evaluated to the Standard for Safety: Automatic Electrical Controls – Part 1, CSA/UL 60730-1. Any change to the software and electronic controls of the BMS may require additional testing.
4. The enclosure was evaluated only to establish an IP rating of IP20 with the Standard for Degrees of Protection Provided by Enclosure (IP Code) IEC 60529.
5. Product is evaluated for indoor use and shall avoid being used in moisture environment, and not being used near marine environments.

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6. Further evaluation for Resistance of Moisture and/or Salt Fog shall be required for the battery module intended to be used in the end product where moisture and/or salt fog condition were applied.
7. Manual disconnect device shall be required during the installation of the end products.
8. Corrosion due to electrochemical action is to be determined for conductive parts in contact with terminals when subjecting to the installation of the end products.
9. Equipment Application Location: Stationary
10. Access Location: Operator Accessible.
11. The installation was not evaluated. The battery system shall be installed in accordance with NFPA 70 or other applicable installation code.
12. Dielectric Voltage Withstand Test was performed with the test potential of 1000Vac/1414Vdc, a higher test potential shall be considered in the end product if higher overvoltage category specified.
13. Overvoltage Category(OVC): 2
14. Pollution Degree(PD): 2
15. Altitude for Operation: Up to 2000 m.

### **MARKINGS**

The manufacturer is required to apply the following markings:

- Products shall be marked with the markings specified by the particular product standard.
- Products certified for Canada shall have all Caution and Warning markings in both English and French.

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having Jurisdiction. It is the responsibility of the manufacturer to provide and apply these additional markings, where applicable, in accordance with the requirements of those authorities.

The products listed are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and U.S. Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only.

The markings shall be legibly and permanently marked with:

- a) The products listed are eligible to bear the CSA Mark shown with adjacent indicator 'US' for US only



- b) Batteries shall be marked with the manufacturer's name, trade name, trademark, CSA master contract number "301721" or other descriptive marking which may identify the organization responsible for the product.
- c) Part number or Model number; as specified in product section above.
- d) Electrical ratings in volts dc and capacity in Ampere-hours or Watt-hours and chemistry; as specified in product section above.
- e) The electric energy storage system terminals shall be marked to indicate whether they are positive (+) or negative (-).
- f) Battery Module shall be marked with the maximum short circuit current and duration (at maximum short circuit current) at the system output terminals (No less than 2670A/18ms).



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- g) Electric energy storage systems shall also be marked with the date of manufacture, which may be in the form of a code that does not repeat within 20 years.
- h) Systems shall be marked with a cautionary marking indicating to read all instructions before installation, operation and maintenance of the system. This marking may be in the form of the symbol(s) for example: the Standard for Graphical Symbols for Use on Equipment – Index and Synopsis, ISO 7000, “caution” Symbol No. 434 (exclamation point inside triangle) followed by the “read instruction manual” Symbol No. 790 (open book). If using symbols, their meaning shall be explained in the instruction manual.



## *Supplement to Certificate of Compliance*

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*The products listed, including the latest revision described below,  
are eligible to be marked in accordance with the referenced Certificate.*

### **Product Certification History**

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<b>Project</b>	<b>Date</b>	<b>Description</b>
80082109	2021-10-11	Original Certification for Battery Pack System for use in Stationary Electrical Energy Storage Application, Lithium-ion battery module, Model ZR-PBX1, Rated 51.2Vdc, 100Ah, 5.12KWh by ANSI/CAN/UL-1973:2018, Second Edition.