

Declaration of Conformity for Radian Series Inverter/Chargers

Purpose

The intent of this document is to specify that the OutBack models listed below conform to the following standards for grid-interactive inverter/chargers intended for use in the United States and Canada.

This document supersedes any previous declarations for these OutBack models.

Scope

OutBack models covered by this Declaration of Conformity include the following.

- GS8048A
- GS4048A



IMPORTANT:

This Declaration of Conformity covers only the models listed above. This Declaration does not cover any other models.

Listings

This product carries a listing report by ETL. It is listed to the following standards:

- UL 1741 — Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources (2nd Edition, 1/28/2010 with supplement SA)
- CSA C22.2 — General Use Power Supplies, No. 107.1-01 Issue: 2001/09/01 Ed:3 (R2006)

Certifications

This product has been certified by ETL to meet the following standards:

- UL 1778 — Uninterruptible Power Systems, Annex FF (normative): Backfeed Protection Test
- IEC 62109-1:2010 — Safety of Power Converters for use in Photovoltaic Systems

Directives

- RoHS: Directive 2011/65/EU — “The restriction of the use of certain substances in electrical and electronic equipment”

Compliance

- FCC Part 15.109(G): 2012 Class B
- Hawaiian Electric Companies (HECO) Rule 14H SRD
- California Rule 21 SRD
- IEEE 1547 — Standard for Interconnecting Distributed Resources with Electric Power Systems (July 2003)
- IEEE 1547.1 — Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems (July 2005)

Inverters intended for grid-interactive use in the United States and Canada must comply with the established standards of UL 1741 and IEEE 1547 and 1547.1. These standards provide regulation for acceptable output voltage ranges, output frequency, total harmonic distortion (THD), and anti-islanding performance when the inverter is exporting power to a utility source.

Radian models are tested using the procedures listed in IEEE 1547.1 to the standards listed in both UL 1741 and IEEE 1547. The following specifications have been validated through compliance testing and refer to exporting power to a simulated utility source of less than 1% voltage total harmonic distortion (THD).



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- The output of the inverter exceeds the minimum power factor of 0.85 with a typical power factor of 0.96 or better.
- Individual harmonics do not exceed the limits specified in Table 3 of IEEE 1547 Section 4.3.3. The THD of the root mean square (RMS) current is less than 5%.
- The inverter ceases to export power to the simulated utility source under islanding conditions specified in IEEE 1547 Section 4.4.1.
- The inverter also ceases to export power to the simulated utility source after the output voltage or frequency of the simulated utility source are adjusted to each of the conditions specified in IEEE 1547 Section 4.2.3 Table 1 and Section 4.2.4 Table 2 within the times specified in those tables. All GS8048A and GS4048A inverters are tested to comply with the table below.

Interconnection Response Times to Abnormal Voltages or Frequencies

Voltage Range (AC Volts)	Frequency (Hz)	Seconds Allowed	Cycles Allowed
$V < 60.0$	60.0	0.16	9.6
$60.0 \leq V < 105.6$	60.0	2.0	120.0
$105.6 \leq V \leq 132.0$	60.0	no cessation	no cessation
$132.0 < V < 144.0$	60.0	1.0	60.0
$V \geq 144.0$	60.0	0.16	9.6
120.0	< 59.3	0.16	9.6
120.0	> 60.5	0.16	9.6

FCC Information to the User

This equipment has been tested and found to comply with the limits for a Class B digital device when powered by a DC source, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Manufacturer's Stated Accuracy

OutBack states the following accuracies according to the requirements of UL1741 SA.

Manufacturer's Stated Accuracy

Description	GS8048A	GS4048A
Manufacturer's stated AC voltage accuracy (Vac)	6 Vac	6 Vac
Manufacturer's stated DC voltage accuracy (Vdc)	0.8 Vdc	0.8 Vdc
Manufacturer's stated AC current accuracy (Aac)	1.5 Aac	1.5 Aac
Manufacturer's stated frequency measurement accuracy (Hz or %Hz)	0.03 Hz	0.03 Hz
Manufacturer's stated output power accuracy (W or %W)	5%	5%
Manufacturer's stated reactive power accuracy (% or VAR)	31.2%	31.2%
Manufacturer's stated power factor accuracy	0.05	0.05
Manufacturer's stated time accuracy (sec)	0.033 sec	0.033 sec

Grid Support Function Parameters

OutBack used the following parameters during the testing of the grid support functions according to UL1741 SA. The parameters that have N/A as their value are not applicable.

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Normal Ramp Parameters

Description	GS8048A	GS4048A
Output current rating (Aac)	30 Aac	15 Aac
Minimum normal ramp-up rate (%I _{rated} / sec)	0.1 %/sec	0.1 %/sec
Maximum normal ramp-up rate (%I _{rated} / sec)	4.17 %/sec	4.17 %/sec
Output current range of function (%I _{rated})	0%, 100%	0%, 100%
Ramp rate accuracy (%I _{rated} / sec) ¹	N/A	N/A

Soft-Start Ramp Parameters

Description	GS8048A	GS4048A
Output Current Rating (Aac)	30 Aac	15 Aac
Minimum soft start ramp-up rate (%I _{rated} / sec)	0.1 %/sec	0.1 %/sec
Maximum soft start ramp-up rate (%I _{rated} / sec)	4.17 %/sec	4.17 %/sec
Output current range of function (%I _{rated})	0%, 100%	0%, 100%
Ramp Rate Accuracy (%I _{rated} / sec) ¹	N/A	N/A

Specified Power Factor Parameters

Description	GS8048A	GS4048A
Apparent power rating (VA)	7200 VA	3600 VA
Output power rating (W)	7200 W	3600 W
DC Input voltage range with SPF enabled (Vdc)	44 to 68 Vdc	44 to 68
Nominal AC voltage (Vac)	240 Vac	240 Vac
AC voltage range with SPF enabled (Vac)	196 to 280 Vac	196 to 280 Vac
Manufacturer's stated AC voltage accuracy (Vac)	6 Vac	6 Vac
Manufacturer's stated DC voltage accuracy (Vdc)	0.8 Vdc	0.8 Vdc
Active power range of function (W)	1440, 7200 W	720, 3600 W
Manufacturer's stated Power Factor accuracy	0.05	0.05
Power factor settling time (sec)	25 sec	25 sec
Minimum Inductive (underexcited) Power Factor	-0.80	-0.80
Minimum Capacitive (overexcited) Power Factor	0.80	0.80

Volt-Watt Parameters

Description	GS8048A	GS4048A
Output power rating (W)	7200 W	3600
AC voltage range with function enabled (Vac)	246, 264 Vac	246, 264
Nominal AC voltage (Vac)	240 Vac	240 Vac
Manufacturer's stated AC voltage accuracy (Vac)	6 Vac	6 Vac
Manufacturer's stated output power accuracy (%W)	5%	5%
Manufacturer's stated time accuracy (sec)	0.033 sec	0.033 sec
Settling time (sec)	4 sec	4 sec
Adjustment range of the start of active power reduction (Vac)	246, 264 Vac	246, 264 Vac
Adjustment range of the stop of the curtailment function (Vac)	250, 264 Vac	250, 264 Vac
Maximum slope of active power reduction (%P _{rated} / V)	100 %/V	100 %/V
Minimum slope of active power reduction (%P _{rated} / V)	3 %/V	3 %/V
Adjustment range of delay before return to normal operation (sec)	0, 1800 sec	0, 1800 sec
Adjustment range of the rate of return to normal operation (%P _{rated} /sec) ²	N/A	N/A
Use of hysteresis	No hysteresis	No hysteresis
Slope of the active power response to changes in voltage	100%, 3%	100%, 3%
Active power rate of return to normal operation ²	N/A	N/A

¹ Normal ramp and soft-start ramp rate accuracies are not applicable, as the SRD requirements specify a maximum value instead of an average value.

² Due to the SRD requirement to have no hysteresis curve, the rate of return to normal operation was not required to be tested.

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Frequency-Watt Parameters

Description	GS8048A	GS4048A
Output power rating (W)	7200 W	3600 W
AC frequency range with function enabled (Hz)	54.5, 65.5 Hz	54.5, 65.5 Hz
Manufacturer's stated frequency measurement accuracy (Hz)	0.03 Hz	0.03 Hz
Manufacturer's state power accuracy (%W)	5%	5%
Settling Time (sec)	4 sec	4 sec
Adjustment range of the start of frequency droop (Hz)	59.0, 61.0 Hz	59.0, 61.0 Hz
Maximum slope of frequency droop (%P _{rated} / Hz)	83% / Hz	83% / Hz
Minimum slope of frequency droop (%P _{rated} / Hz)	24% / Hz	24% / Hz
Slope of active power response to change in frequency (%)	83%, 24%	83%, 24%

Volt/VAr Parameters

Description	GS8048A	GS4048A
Apparent power rating (VA)	7200 VA	3600 VA
Output power rating (W)	7200 W	3600 W
EUT Input voltage range with Q(V) function enabled (Vdc)	44 to 68 Vdc	44 to 68 Vdc
Nominal AC EPS voltage (V)	240 Vac	240 Vac
AC EPS voltage range with function enabled (Vac)	196 to 280 Vac	196 to 280 Vac
Reactive Power Accuracy (%)	31.2%	31.2%
Maximum Ramp Rate (VAr/sec)	1000 VAr/sec	1000 VAr/sec
Max rated reactive Power (capacitive, overexcited) (VAr)	4320 VAr	2160 VAr
Max rated reactive Power (inductive, underexcited) (VAr)	-4320 VAr	-2160 VAr
Maximum slope (VAr/V)	1080 VAr/V	1080 VAr/V
Deadband Range (Vac)	0, 48 Vac	0, 48 Vac
Settling Time (sec)	12 sec	12 sec

I hereby certify that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable requirements.

Steve Karaffa
 Senior Vice President, Energy and Industrial
 OutBack Power Technologies
 Date: August 18, 2017

Contact Information

Address: Corporate Headquarters
 17825 – 59th Avenue N.E.
 Suite B
 Arlington, WA 98223 USA

European Office
 Hansastrasse 8
 D-91126
 Schwabach, Germany

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