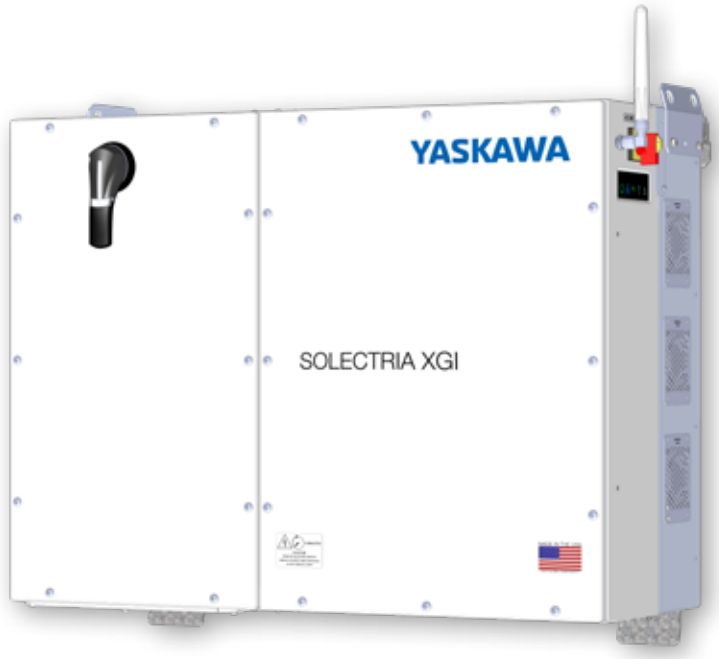
YASKAWA

SOLECTRIA XGI™ 1500

Premium 3-Phase Transformerless Utility-Scale Inverters



Features

- Made in the USA with global components
- Buy American Act (BAA) compliant
- Four models: 125kW/125kVA, 125kW/150kVA, 150kW/166kVA, 166kW/166kVA
- 99.0% peak efficiency
- Flexible solution for distributed and centralized system architecture
- Advanced grid-support functionality Rule 21/UL1741SA
- Robust, dependable and built to last
- Lowest O&M and installation costs
- Access all inverters on site via WiFi from one location
- Remote diagnostics and firmware upgrades
- SunSpec Modbus Certified

Options

- String combiners for distributed and centralized systems
- Web-based monitoring
- Extended warranty

MADE IN THE USA

With U.S. and Global Components

Yaskawa Solectria Solar's XGI 1500 utility-scale string inverters are designed for high reliability and built of the highest quality components that were selected, tested and proven to last beyond their warranty. The XGI 1500 inverters provide advanced grid-support functionality and meet the latest IEEE 1547 and UL 1741 standards for safety. The XGI 1500 inverters are the most powerful 1500VDC string inverters in the PV market and have been engineered for both distributed and centralized system architecture. Designed and engineered in Lawrence, MA, the new SOLECTRIA XGI inverters are assembled and tested at Yaskawa America's facilities in Buffalo Grove, IL. The XGI 1500 inverters are Made in the USA with global components and are compliant with the Buy American Act.

SOLECTRIA SOLAR

SOLECTRIA XGI 1500

Specifications

	XGI 1500-125/125	XGI 1500-125/150	XGI 1500-150/166	XGI 1500-166/166
DC Input				
Absolute Maximum Input Voltage	1500 VDC	1500 VDC	1500 VDC	1500 VDC
Maximum Power Input Voltage Range (MPPT)	860-1250 VDC	860-1250 VDC	860-1250 VDC	860-1250 VDC
Operating Voltage Range (MPPT)	860-1450 VDC	860-1450 VDC	860-1450 VDC	860-1450 VDC
Number of MPP Trackers	1 MPPT	1 MPPT	1 MPPT	1 MPPT
Maximum Operating Input Current	148.3 A	148.3 A	178.0 A	197.7 A
Maximum Operating PV Power	128 kW	128 kW	153 kW	170 kW
Maximum DC/AC Ratio | Max Rated PV Power	2.0 | 250 kW	2.0 | 250 kW	1.66 | 250 kW	1.5 | 250 kW
Max Rated PV Short-Circuit Current (∑Isc x 1.25)	320 A	320 A	320 A	320 A
AC Output				
Nominal Output Voltage	600 VAC, 3-Ph	600 VAC, 3-Ph	600 VAC, 3-Ph	600 VAC, 3-Ph
AC Voltage Range	-12% to +10%	-12% to +10%	-12% to +10%	-12% to +10%
Continuous Real Output Power	125 kW	125 kW	150 kW	166 kW
Continuous Apparent Output Power	125 kVA	150 kVA	166 kVA	166 kVA
Maximum Output Current	120 A	144 A	160 A	160 A
Nominal Output Frequency	60 Hz	60 Hz	60 Hz	60 Hz
Power Factor (Unity default)	+/- 0.85 Adjustable	+/- 0.85 Adjustable	+/- 0.85 Adjustable	+/- 0.85 Adjustable
Total Harmonic Distortion (THD) @ Rated Load	<3%	<3%	<3%	<3%
Grid Connection Type	3-Ph + N/GND	3-Ph + N/GND	3-Ph + N/GND	3-Ph + N/GND
Fault Current Contribution (1 cycle RMS)	144 A	173 A	192 A	192 A
Efficiency				
Peak Efficiency	98.9%	98.9%	99.0%	99.0%
CEC Average Efficiency	98.5%	98.5%	98.5%	98.5%
Tare Loss	<1 W	<1 W	<1 W	<1 W
Temperature				
Ambient Temperature Range	-40°F to 140°F (-40C to 60C)		-40°F to 140°F (-40C to 60C)	
De-Rating Temperature	122°F (50C)		113°F (45C)	
Storage Temperature Range	-40°F to 167°F (-40C to 75C)		-40°F to 167°F (-40C to 75C)	
Relative Humidity (non-condensing)	0 - 95%		0 - 95%	
Operating Altitude	9,840 ft (3 km)		9,840 ft (3 km)	
Communications				
Advanced Graphical User Interface	WiFi			
Communication Interface	Ethernet			
Third-Party Monitoring Protocol	SunSpec Modbus TCP/IP			
Web-Based Monitoring	Optional			
Firmware Updates	Remote and Local			
Testing & Certifications				
Safety Listings & Certifications	UL 1741, IEEE 1547, UL 1998			
Advanced Grid Support Functionality	Rule 21, UL 1741SA			
Testing Agency	ETL			
FCC Compliance	FCC Part 15, Class A			
Warranty				
Standard and Options	5 Years Standard; Option for 10 Years			
Enclosure				
Acoustic Noise Rating	56 dBA @ 3 m			
DC Disconnect	Integrated 2-Pole 250 A DC Disconnect			
Mounting Angle	Vertical only			
Dimensions	Height: 29.5 in. (750 mm) | Width: 39.4 in. (1000 mm) | Depth: 15.1 in. (380 mm)			Specifications subject to change.
Weight	270 lbs (122 kg)			
Enclosure Rating and Finish	Type 4X, Polyester Powder-Coated Aluminum			

SOLECTRIA SOLAR

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

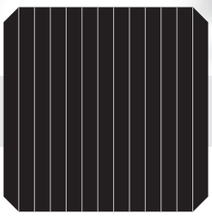
1-978-683-9700
Email: inverters@solectria.com

Document FL.XGI1500.01
9/30/2019

YASKAWA

LG NeON® 2

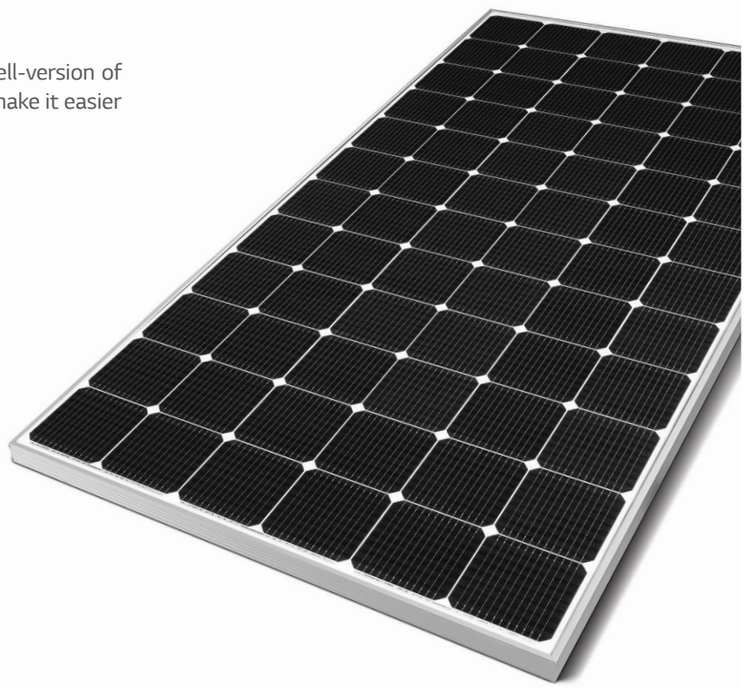
LG400N2W-A5 | LG395N2W-A5 | LG390N2W-A5



72

400W | 395W | 390W

The LG NeON® 2 is LG's best selling solar module. Especially 72cell-version of the NeON® 2 is suited for commercial or utility applications, that make it easier to manage space with maximizing the power of a unit.



Feature

Enhanced Performance Warranty

LG NeON® 2 has an enhanced performance warranty. After 25 years, LG NeON® 2 is guaranteed at least 84.8% of initial performance.

High Power Output

LG NeON® 2 has been designed to significantly enhance its output efficiency making it efficient even in limited space.

Improved Product Warranty

As well as the enhanced performance warranty, LG has extended the product warranty of the LG NeON® 2 for an additional 2 years.

BOS (Balance Of System) Saving

LG NeON® 2 can reduce the total number of strings due to its high module efficiency resulting in a more cost effective and efficient solar power system.

Better Performance on a Sunny Day

LG NeON® 2 now performs better on a sunny days thanks to its improved temperature coefficient.

Near Zero LID (Light Induced Degradation)

The n-type cells used in LG NeON® 2 have almost no boron, which may cause the initial performance degradation, leading to less LID.

About LG Electronics

LG Electronics is a global big player, committed to expanding its operations with the solar market. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first MonoX® series to the market, which is now available in 32 countries. The NeON® (previous. MonoX® NeON), NeON®2, NeON®2 BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG Solar's lead, innovation and commitment to the industry.

LG NeON® 2

LG400N2W-A5 | LG395N2W-A5 | LG390N2W-A5

Mechanical Properties

Cells	6 x 12
Cell Vendor	LG
Cell Type	Monocrystalline / N-type
Cell Dimensions	161.7 x 161.7 mm / 6 inches
# of Busbar	12 (Multi Wire Busbar)
Dimensions (L x W x H)	2,024 x 1,024 x 40 mm
	79.69 x 40.31 x 1.57 in
Front Load	5,400 Pa / 113 psf
Rear Load	4,300 Pa / 90 psf
Weight	21.7 kg / 47.84 lb
Connector Type	MC4 (MC)
Junction Box	IP68 with 3 Bypass Diodes
Cables	1,200 mm x 2 ea / 47.24 in x 2 ea
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminium

Certifications and Warranty

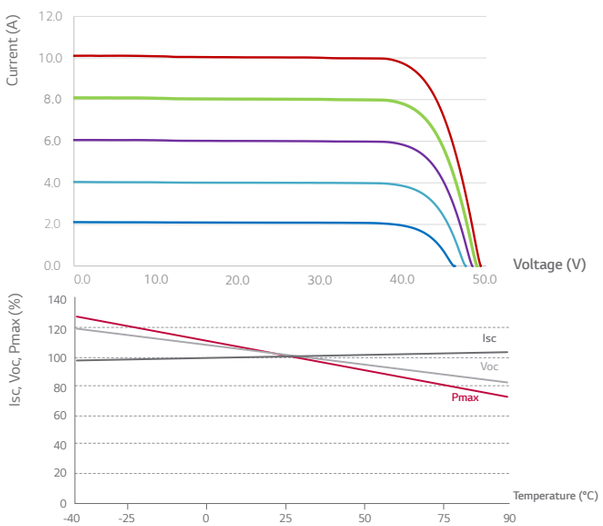
Certifications	IEC 61215, IEC 61730-1/-2
	UL 1703
	IEC 61701 (Salt mist corrosion test)
	IEC 62716 (Ammonia corrosion test)
	ISO 9001
Module Fire Performance	Type 1 (UL 1703)
Fire Rating	Class C (ULC/ORD C 1703, IEC 61730)
Product Warranty	12 Years
Output Warranty of Pmax	Linear Warranty*

* 1) 1st year : 98%, 2) after 1st year : 0.55%p annual degradation, 3) 84.8% for 25 years

Temperature Characteristics

NOCT	[°C]	45 ± 3
Pmax	[%/°C]	-0.36
Voc	[%/°C]	-0.26
Isc	[%/°C]	0.02

Characteristic Curves



Electrical Properties (STC*)

Model		LG400N2W-A5	LG395N2W-A5	LG390N2W-A5
Maximum Power (Pmax)	[W]	400	395	390
MPP Voltage (Vmpp)	[V]	40.6	40.2	39.8
MPP Current (Impp)	[A]	9.86	9.83	9.81
Open Circuit Voltage (Voc)	[V]	49.3	49.2	49.1
Short Circuit Current (Isc)	[A]	10.47	10.43	10.39
Module Efficiency	[%]	19.3	19.1	18.8
Operating Temperature	[°C]	-40 ~ +90		
Maximum System Voltage	[V]	1000 (IEC) / 1500 (UL)		
Maximum Series Fuse Rating	[A]	20		
Power Tolerance	[%]	0 ~ +3		

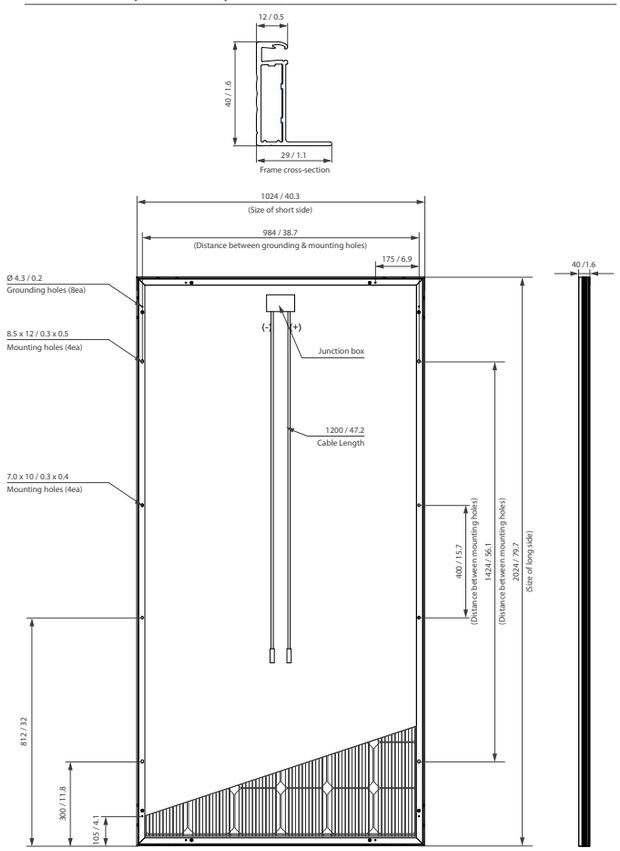
* STC (Standard Test Condition): Irradiance 1000 W/m², cell temperature 25 °C, AM 1.5
The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.
The Typical change in module efficiency at 200 W/m² in relation to 1000 W/m² is -2.0%.

Electrical Properties (NOCT*)

Model		LG400N2W-A5	LG395N2W-A5	LG390N2W-A5
Maximum Power (Pmax)	[W]	296	293	289
MPP Voltage (Vmpp)	[V]	37.6	37.2	36.9
MPP Current (Impp)	[A]	7.88	7.86	7.84
Open Circuit Voltage (Voc)	[V]	46.1	46.0	45.9
Short Circuit Current (Isc)	[A]	8.41	8.38	8.35

* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m², ambient temperature 20 °C, wind speed 1 m/s

Dimensions (mm / inch)



* The distance between the center of the mounting/grounding holes.

LG Life's Good

LG Electronics Inc.
Solar Business Division
LG Twin Towers, 128 Yeoui-daero, Yeongdeungpo-gu, Seoul
07336, Korea

www.lg-solar.com

Product specifications are subject to change without notice.
DS-N5-72-W-G-F-EN-70525

January 16, 2019

RE: Voltage and Frequency Setpoints for XGI 1500-125/125-UL, XGI 1500-125/150-UL, XGI 1500-150/166-UL and XGI 1500-166/166-UL

To Whom It May Concern:

Solectria XGI 1500-125/125-UL, XGI 1500-125/150-UL, XGI 1500-150/166-UL and XGI 1500-166/166-UL utility interactive inverters will cease power production in the event of abnormal grid conditions. These voltage and frequency setpoints adhere to IEEE1547a-2014, which has the default setpoints and range of adjustability specified below:

Voltage Range (p.u.)	Default Clearing Time (s)	Clearing Time: adjustable up to and including (s)
V < 0.45	0.16	0.16
0.45 <= V < 0.60	1	11
0.60 <= V < 0.88	2	21
1.1 < V < 1.2	1	13
V >= 1.2	0.16	0.16

Response to Abnormal AC Voltage

	Default Settings		Ranges of Adjustability	
Protective Function	Frequency (Hz)	Clearing Time (s)	Frequency (Hz)	Clearing Time: adjustable up to and including (s)
81U-1	f < 57.0	0.16	56 – 60	10
81U-2	f < 59.5	2	56 – 60	300
81O-1	f > 60.5	2	60 – 64	300
81O-2	f > 62	0.16	60 – 64	10

Response to Abnormal Frequency

At the request of the utility the adjustable settings specified can be changed through a password-protected menu on the user interface. Upon grid disturbances the inverter will wait 5 minutes after the grid voltage and frequency return to nominal values before attempting to reconnect. Please refer to the XGI 1500 Installation and Operations Manual for additional information.

Sincerely,

Emily Hwang | Applications Engineering Manager
+1 978.638.9700| emily.hwang@solectria.com

SOLECTRIA SOLAR

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

1-978-683-9700
Email: inverters@solectria.com

June 25, 2018

XGI 1500 – National Grid Anti-Islanding Information

Identify the manufacturer:	Yaskawa – Solectria Solar
Identify the model:	XGI 1500-166, XGI 1500-125
Contact information for manufacturer contact:	Eric Every Product Manager Solectria Renewables, LLC 978-683-9700 x137 eric.every@solectria.com
Identify if the inverter is 3-phase or 1-phase:	3 Phase
Provide brief description of island detection method proposed:	Perturbation is applied by injecting a small amount of reactive power (or phase angle) into its output current during every cycle. The magnitude of the perturbation increases if the inverter detects an island condition.
Does the inverter employ active or passive islanding detection? Provide documentation confirming that the islanding detection is "turned on" in the proposed inverter:	Active. The anti-islanding detection algorithm is hardcoded into the inverter operating firmware and cannot be disabled or "turned off" by the user.
For active islanding detection, various methods are available in the market. Identify the type of detection proposed. Is the method based on Sandia Frequency Shift, Sandia Voltage Shift, Sandia Impedance Detection, or Other? If Other, specify:	The active islanding detection algorithm is based on the Sandia Frequency Shift Detection methodology.
Does the active islanding detection utilize positive feedback?	Yes
If utilizing positive feedback, does the island detection employ a uni-directional or bi-directional perturbance?	Bi-directional
Does the inverter use an isolation transformer?	No
If yes, what is the low voltage phase to neutral voltage?	N/A
How is the AC output voltage limited? Specifically, how do the inverter controls limit the AC output voltage when generation exceeds available load?	The inverter detects the AC voltage and converts available DC power to AC when the AC voltage is in normal range. Inverters do not limit the AC output voltage. Instead, if the AC voltage is higher than threshold, inverters stop operation (cease to energize) according to IEEE1547 standards.

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

1-978-683-9700
Email: inverters@solectria.com

August 28, 2019

Response to NGRID: Supporting Documentation for Interconnection Study Application for Inverter-based DER System, Version 3.0

Section 1

Table 1: Islanding Detection Information

Item #	National Grid Requested Information	YSS Response
1	Identify the inverter manufacturer	Solectria Renewables, LLC (Yaskawa Solectria Solar)
2	Identify the inverter model	XGI 1500-125/125, XGI 1500-125/150, XGI 1500-150/166 and XGI 1500-166/166
3	Identify inverter listing (UL1741, UL1741 SA, Non-listed)	UL 1741 and UL 1741SA
4	Contact information for the inverter manufacturer (Name, email address, mailing address and phone number)	Emily Hwang Applications Engineering Manager Yaskawa Solectria Solar 978-683-9700 Emily.Hwang@solectria.com
5	Identify if the inverter is 3-phase or 1-phase.	3-phase
6	Provide a brief description of island detection method proposed. The description shall be sufficient to determine whether the inverter employs positive feedback on one or more grid parameters, and what parameter(s) the positive feedback is applied to.	Perturbation is applied by injecting a small amount of reactive power (or phase angle) into its output current during every cycle. The magnitude of the perturbation increases if the inverter detects an island condition.
7	Does the inverter employ active or passive islanding detection? Provide documentation confirming that the islanding detection is "turned on" in the proposed inverter.	Active. The anti-islanding detection algorithm is hardcoded into the inverter operating firmware and cannot be disabled or “turned off” by the user.
8	For active islanding detection, various methods are available in the market. Identify the type of detection proposed. Is the method based on Sandia Frequency Shift, Sandia Voltage Shift, Impedance Detection with Positive Feedback, or Other? If Other, specify.	The active islanding detection algorithm is based on the Sandia Frequency Shift Detection methodology
9	Does the active islanding detection utilize positive feedback?	Yes

10	If utilizing positive feedback, is the positive feedback response bi-directional, or unidirectional? In other words, is the perturbation in the same direction as the deviation from nominal?	Bi-directional
11a	If the islanding detection is the same to meet both UL1741 and UL1741 SA, state here. Otherwise, please describe how the islanding detection changed from when the inverter was listed to UL1741 to when it was listed to UL1741 SA. Alternatively, two separate letters may be provided for each firmware version.	The islanding method is the same
11b	Identify all functions verified by UL1741 SA as compatible with unintentional islanding compliance.	All functions will be tested and efficacy of the anti-islanding protection will be verified
11c	Identify all functions *that are not* verified by UL1741 SA as compatible with unintentional islanding compliance.	N/A
11d	For each function verified in item 11b above, identify any parameters that adversely affect islanding detection and identify the worst case tests used in UL1741 SA.	No features will adversely affect islanding detection
11e	Attach a PDF of the UL1741/UL1741 SA test results file with the filename: Manufacturer_Model_UL1741_SA_Test_Results_Date.PDF	Refer to YSS UL listing letters (UL 1741SA will be provided once available)
11f	Indicate the filename/compressed folder name for inverter models provided as Manufacturer_Model_UL1741_SA_Inverter_Model. *Note: If inverter models and validation data are not provided per the requirements in Section 3, the Customer will be required to operate in Specified PF mode per ESB756, with Q(V), Volt/VAR functions OFF, and Frequency-Watt Functions OFF, and normal ramp rate.*	N/A
12	Is there a self-protective overvoltage setting at 1.4pu voltage per ESB756 or lower, set to 1ms or less *total clearing time* activated in the inverter? If not, is there another means to meet the requirements in ESB 756 B, C, or D section 10.3? Indicate the settings and total clearing time here.	These models currently have protection at 1.2pu and the clearing time is 160ms
13	Identify the inverter firmware version that incorporates the above features.	3.0

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

1-978-683-9700
Email: inverters@solectria.com

Section 2

Table 2: Advanced Inverter Functionality

Function	Inverter is Capable of this function (Capable/Not Capable)	Function is tested as compatible with Islanding detection (Yes/No)	Site Proposal: This Inverter function is proposed to be set to: (enabled/ disabled)	Site Proposal: Specific Settings (or N/A if not used)	Function Response Time (include units) [1]	Notes: *For all functions: provide curves where required. Excel is preferred.
Constant Power Factor Mode	Capable	Yes	Enabled	PF = 1	N/A	
Voltage - Reactive Power Mode Also known as "Q(V)," "Volt/VAR with VAR priority," "Volt-VAR"	Capable	Yes	SHALL BE DISABLED PER NATIONAL GRID ESB756	Disabled	N/A	
Active Power - Reactive Power mode (Also known as "Watt-VAR" mode)	Capable	Yes	SHALL BE DISABLED PER NATIONAL GRID ESB756	Disabled	N/A	
Constant Reactive Power Mode (Also known as "Fixed VAR")	Capable	Yes	SHALL BE DISABLED PER NATIONAL GRID ESB756	Disabled	N/A	

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

1-978-683-9700
Email: inverters@solectria.com

Voltage - Active Power Mode (Also known as "Volt-Watt" Mode)	Capable	Yes	SHALL BE DISABLED PER NATIONAL GRID ESB756	Disabled	N/A	
Frequency-Watt (also known as 'power as a function of frequency,' or "frequency droop")	Capable	Yes	SHALL BE DISABLED PER NATIONAL GRID ESB756	Disabled	N/A	
Ramp Rate	Capable	Yes	Enabled	2% max current / s	N/A	

Section 3

Inverter Model and Validation Data Requirements are filed with National Grid directly.

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

1-978-683-9700
Email: inverters@solectria.com

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Applicant:	Solectria Renewables LLC 360 Merrimack Street	**Manufacturer:**	Yaskawa America Inc
Address:	Bldg 9, Floor 2 LAWRENCE, MA 01843	**Address:**	1067 Johnson Drive Buffalo Grove, IL 60089
Country:	USA	**Country:**	USA
Contact:	Wei Zhou (primary) Jihua Ma (alternate)	**Contact:**	Arthur Folta (primary) Joe Kleczkowski(alternate)
Phone:	(978) 683-9700	**Phone:**	847-887-7555 (primary)
FAX:	(978) 683-9702	**FAX:**	414-856-2501
Email:	wei.zhou@solectria.com jihua.ma@solectria.com	**Email:**	arthur_folta@yaskawa.com joe_kleczkowski@yaskawa.com

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Cortland NY 13045

Control Number: *5010838* **Authorized by:** for Dean Davidson, Certification Manager

This document supersedes all previous Authorizations to Mark for the noted Report Number.

Intertek Testing Services NA Inc.
545 East Algonquin Road, Arlington Heights, IL 60005
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

Standard(s):	Inverters, Converters, Controllers And Interconnection System Equipment For Use With Distributed Energy Resources [UL 1741:2010 Ed.2+R:15Feb2018]
Product:	Grid interactive PV inverter
Brand Name:	Yaskawa Solectria Solar
Models:	XGI 1500-125/125, XGI 1500-125/150, XGI 1500-150/166, XGI 1500-166/166