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Compliance Certificate: IEEE 1668,SEMI F47, and IEC 61000-4-34
EPRI PERQ™ Test Program
Certification Date: March 1st, 2024

Product Description	GA700/800 Series Variable Frequency Drives
Manufacturer	Yaskawa Electric Corporation 2-13-1, Nishimiyaichi, Yukuhashi, Fukuoka, 824-8511, Japan Phone: +81-930-25-2548
Applicable Catalog Codes	GA80X * Y, where * is any rating code 2004 ~ 2415, 4002 ~ 4H12, or 5062 ~ 5472 GA70X * Y, where * is any rating code 2004 ~ 2415 or 4002 ~ 4H12 Notes: • CIPR- prefix is optional for all catalog codes. • "X" denotes one character, A~Z • "Y" denotes multiple alphanumeric characters
Pass Criteria	IEC 61000-4-34:2005/AMD1:2009 and IEC 61000-4-11:2020, Class Three Level Phase-to-Phase Method B voltage sags: Operates normally within limits specified by the manufacturer, requestor or purchaser (Section 9a criteria). Type II phase-to-phase sags done within accordance to Figure C.3. IEEE 1668-2017, Type II voltage sags: Performs as expected or intended and all its relevant parameters are within technical specifications or within allowed tolerance limits during voltage sags (Section 5.3.4.1, (a) criteria). IEEE 1668-2017, Type III voltage sags: The drive outputs vary outside the technical specification/limits, but equipment can automatically recover after the end of a voltage sag without any intervention from the user (Section 5.3.4.1, (b) criteria). The drive did not perform at full rated operation during the voltage sags, but performed a self-recovery operation. SEMI F47-0706-0812RE, Type II voltage sags: Performs at full rated operation during voltage sags (Section 7.8.2, (a) criteria).
Programming requirement	The power loss ride-through selection parameter, L2-01, must be set to 2 to achieve and the undervoltage detection threshold parameter, L2-05, must also lowered to the minimum levels for each voltage class. L2-05 was set to 150V, 300V, and 431V for 200V, 400V, and 600V voltage classes, respectively.
Test Configuration	See Appendix 1 Test Configuration Details

EPRI tested and simulated a subset of 200V, 400V, and 600V GA700/800 series drives to the referenced standards. Based on our thorough testing and analysis, it is highly expected that the entire line will be compliant under similar load, configuration, and test conditions. This letter certifies that the drive models referenced in this certificate comply with the criteria and standards indicated. Certification remains valid, provided that no component substitutions impacting the power structure or software modifications affecting the drive behavior during voltage sags are made.

Certified by,

Aaron R. Winebarger, Engineer I
PERQ™ Compliance Program
Electric Power Research Institute

ELECTRIC POWER RESEARCH INSTITUTE

PERQ
POWER EFFICIENCY RATING & QUALITY

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Appendix 1: Test Configuration Details

Test Conditions	Drive samples No. 1, 3, and 4 were tested on EPRI's large drive test stand at full load in heavy-duty operation. A motor was connected to the output terminals of the drive and coupled to an eddy current brake. Drive Sample No. 2 was tested on EPRI's small drive test stand at full load in heavy-duty operation. Voltage sags were injected with a voltage sag generator compliant with the standards referenced above. The drive was tested with a modified parameter set wherein the power loss ride-through selection parameter, L2-01, was set to 2 and the undervoltage detection threshold parameter, L2-05,was lowered to the minimum levels for each voltage class. L2-05 was set to 150V, 300V, and 431V for 200V, 400V, and 600V voltage classes, respectively.
Catalog Codes Tested	GA70A2169BBA, EPRI Sample No. 1, 2169 GA70U4023ABA, EPRI Sample No. 2, 4023 GA80U4168ABM, EPRI Sample No. 3, 4168 GA80U5099ABM, EPRI Sample No. 4, 5099
Test Date	11/10/2023
Test Location	EPRI Knoxville Lab 942 Corridor Park BLVD Knoxville, TN 37932 (USA)
Nominal Voltages and Frequencies Tested	240 Vac, 3 Phase, 60 Hz 480 Vac, 3 Phase, 60 Hz 600 Vac, 3 Phase, 60 Hz Note: Voltages applied, per drive ratings.
Test Equipment	Voltage source 60A Omniverter Voltage Sag Generator * 200A EPRI Portable Voltage Sag Generator* HBM GEN3iA High Speed Mainframe Data Acquisition System Hioki 3198 Power Quality Analyzer *Selected according to drive rating. The test equipment listed above fully complies with all requirements of IEC 61000-4-11, IEC 61000-4-34, and IEEE 1668-2017.
Standards Referenced	SEMI F47-0706 (2012 publication) IEEE 1668-2017 IEC 61000-4-34:2005/AMD1:2009, IEC 61000-4-11:2020
Test Report	EPRI Yaskawa GA700/800 Drive Series Test Reports IEC61000.4-34.11, IEC61000.4-34.12, IEC61000.4-34.13, IEEE-1668.1, IEEE-1668.2, IEEE-1668.3, SEMI F47.196, SEMI F47.197, SEMI F47.198.
Declaration of Equivalency	Based on the commonality of the drive design and EPRI's testing and analysis, one may associate the Applicable Catalog Codes listed with the specific test results for the select Catalog Codes Tested.