942 Corridor Park Boulevard
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www.f47testing.com

SEMI F47-0706 Compliance Certificate
EPRI PQ Star[sm] Test Program

Certification Date: April 04th, 2007

PQ Star Reference Number:
SEMIF47.144

Manufacturer: *PULS*

Product: Dimension 24Vdc Power Supply

Model Number: QS20.241

Serial Number (Unit Tested): 3722151

See Attachment A for Detailed Test Results

Test Configuration:
See Attachment B for details.

Test Date: 4/2/07

Test Location:
EPRI
942 Corridor Park Blvd
Knoxville, TN 37932

Electrical Environment:
120/208Vac Single Phase, 50/60 Hz
(See Attachment A for details.)

This letter and subsequent documentation certifies that the Puls Dimension QS20.241 power supply detailed in this document, in its original configuration has been voltage sag tested per the **SEMI F47-0706** test protocol and was found to comply at 100% load, at 50/60Hz at 120/208Vac. This certification remains valid to the models tested only and as long as no component substitutions are made. Compliance will be subject to reevaluation three-years from date of this certification.

Certified by,

Scott D. Bunton
Senior Technician, Power Quality & Energy Utilization

PULS QS20.241 Power Supply

EPRI ELECTRIC POWER RESEARCH INSTITUTE

PQ SEMI F47

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Attachment A – SEMI F47 Test Results

Testing was performed at EPRI's Power Quality Laboratory in Knoxville, TN. To ensure maximum accuracy of the test, a variable voltage source was used to set the voltage to exactly 120/208Vac. This was verified at the power supply with a qualified meter. During the voltage sag test, the power supply was connected to a variable resistive load bank and loaded to 100% of its load. Table A-1 shows the power supplies rated full load conditions, and the actual load it was tested at.

Table A-2 lists all points tested per SEMI F47-0706. Figure A-1 shows the power supplies ride-through curve at 120Vac. Figure A-2 shows the power supplies ride-through curve at 208Vac. The specific SEMI F47 test points are highlighted for both 50 and 60 Hz. The power supply was tested at points below the curve to fully characterize the components. During the testing of SEMI F47 test points (1s at 80%, 0.5s at 70%, and at 50%) the output voltage of the power supply did not deviate. The power supply passed at 50 and 60 Hz, loaded to 100% of resistive load.

Table A-1 Power Supplies Ratings

Evaluated at 120/208Vac							
Manufacture	Power Supply	Vdc	I	R	W	Actual load	Result
PULS	QS20.241	24	20	1.2Ohm	480	100%	Passed

Table A-2. PULS QS20.241 Test Results

Duration				Percent of Nominal					
Seconds	60Hz Cycles	Seconds	50Hz Cycles	120Vac 60Hz	120Vac 50Hz	208Vac 60Hz	208Vac 50Hz	SEMI F47	Results
1	60	1	50	50%	45%	25%	25%	80%	Passed
0.5	30	0.5	25	45%	45%	25%	25%	80%	Passed
0.5	30	0.5	25	45%	45%	25%	25%	70%	Passed
0.25	15	0.25	12.5	45%	40%	25%	25%	70%	Passed
0.2	12	0.2	10	40%	40%	25%	25%	70%	Passed
0.2	12	0.2	10	40%	40%	25%	25%	50%	Passed
0.17	10	0.17	8.5	40%	40%	20%	20%	50%	Passed
0.08	5	0.08	4	40%	35%	20%	20%	50%	Passed
0.07	4	0.07	3.5	35%	35%	20%	20%	50%	Passed
0.05	3	0.05	2.5	30%	40%	15%	15%	50%	Passed
0.03	2	0.03	1.5	20%	15%	0%	0%	50%	Passed
0.02	1	0.02	1	0%	0%	0%	0%	50%	Passed

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Figure A-1. PULS QS20.241 SEMI F47 Ride-Through Curve at 120Vac, 50 Hz and 60 Hz

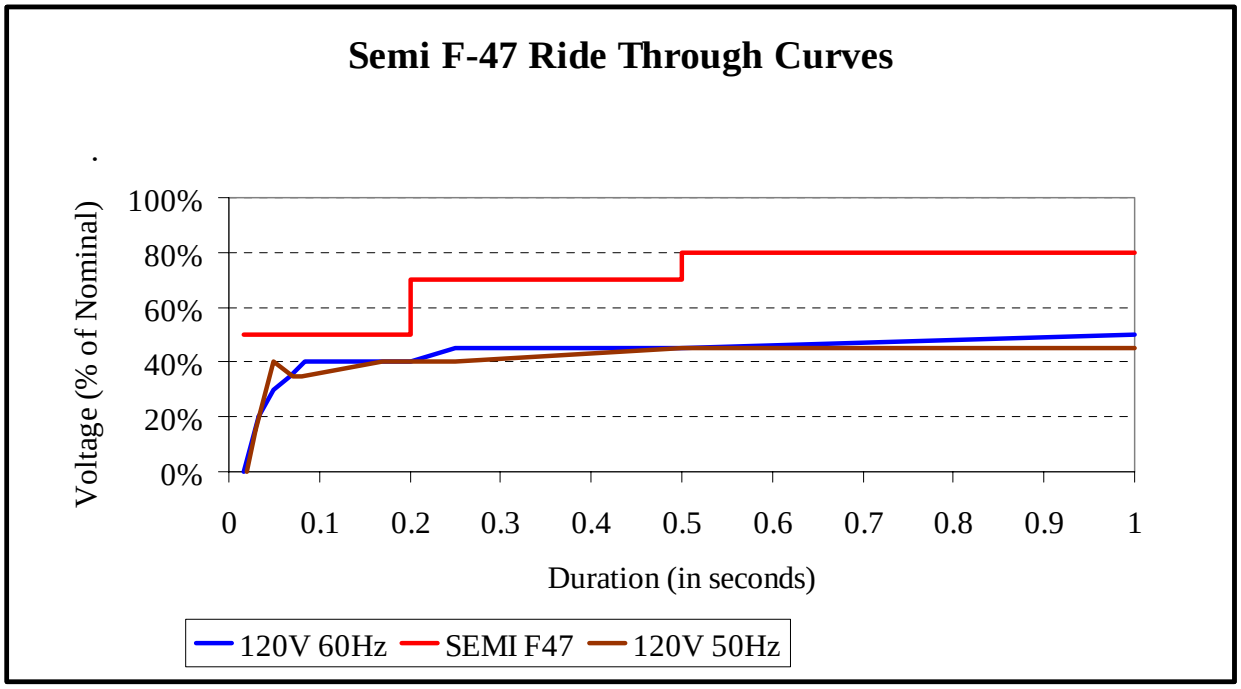
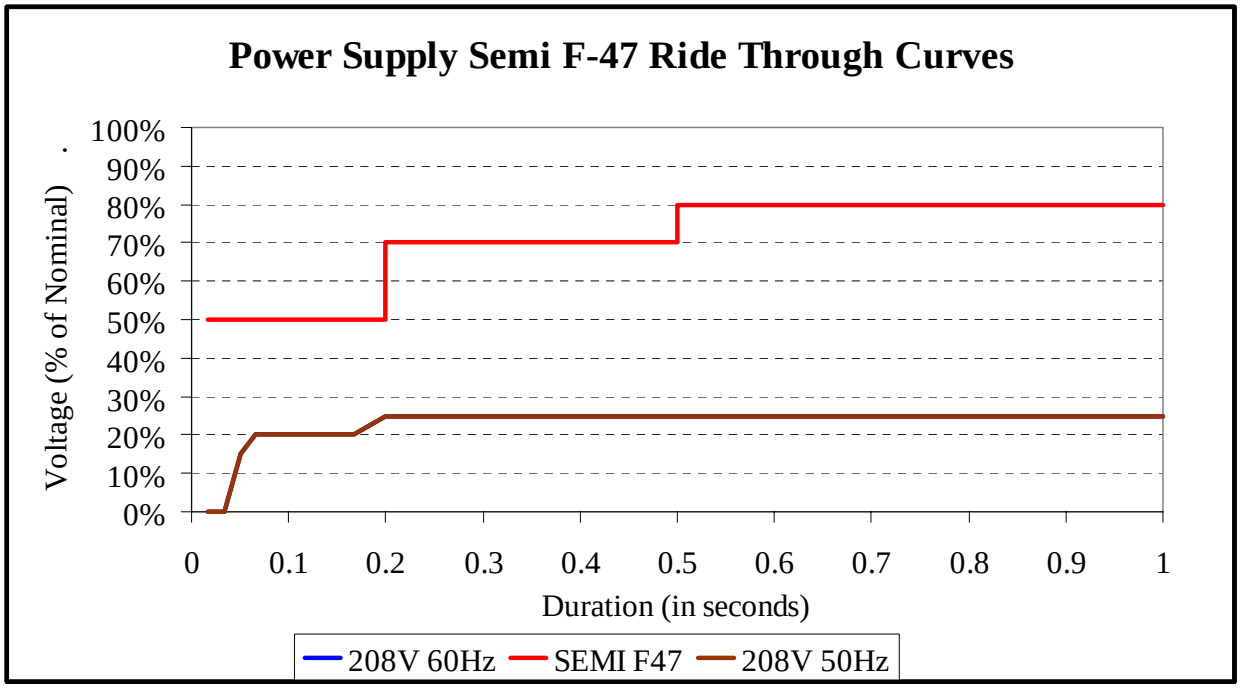


Figure A-2. PULS QS20.241 SEMI F47 Ride-Through Curve at 208Vac, 50Hz and 60 Hz



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Electrical Environment

Steady state measurements were taken prior to testing. Table A-3 lists measurements taken to characterize the electrical environment of the power supply during SEMI F47 compliance testing, at 50/60 Hz.

Table A-3. Steady State Measurements for PULS QS20.241

Measurement Parameters	Test Process State 120V/60Hz	Test Process State 120V/50 Hz	Test Process State 208V/60Hz	Test Process State 208V/50Hz
Rated Voltage P-P	100-240	100-240	100-240	100-240
Voltage (Va-b)	120.4	120.6	209	209
Current (Ia)	4.12	4.11	2.42	2.43
Power (Wa-n)	480	480	470	460
Volt Amps (VA)	500	500	510	510
Vthd (Phase A) %	2.6	3.5	3.2	3.4
Ithd (Phase A) %	19.8	21.2	33	33.3
I1	4.04	4.02	2.29	2.29
I3	0.79	0.83	0.78	0.79
I5	0.16	0.15	0.08	0.08
Power Factor	0.97	0.96	0.92	0.91
Crest Factors	1.6	1.61	1.82	1.83
Hertz	60	50	60	50

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Attachment B - Test Configuration

Test Configuration

The voltage sag generator was placed in series with the main power feed as shown in Figure B-1. The Main power feed for this test was an amplifier that was adjustable for voltage and frequency. This allowed a precise setting of 120/208Vac and 50/60 Hz. A photo of the setup is shown in Figure B-2.

Figure B-1 – Test Configuration and Setup

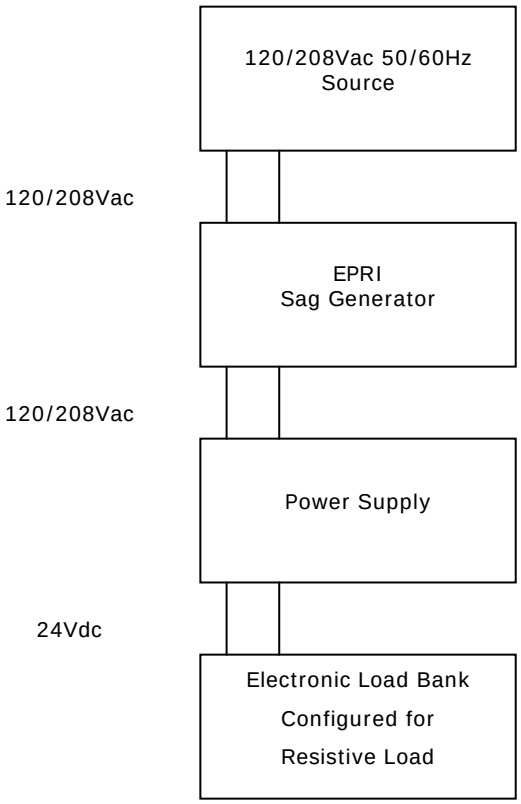

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Figure B-2 - Photo of Test Setup