IEC Immunity Option

Web Browser Based Power Immunity IEC Test Sequences

SmartSource Suite Web Browser Test Option Benefits:

- No special software Windows application software and instruments driver installations needed. *Tests are controlled and ran using a web browser.*
- Test sequences can be controlled using SCPI commands from an ATE test system. *Automated Compliance Testing supported.*
- Measurements such as voltage and current are recorded at each test step and included in test reports. *Documents EUT compliance after test completes.*
- User prompts guide an operator through the entire test procedure. *No intimate IEC Standards knowledge required on the part of the operator, less chance of mistakes.*
- Test Reports are generated after each test. *Makes it easy to meet documentation requirements and augment technical construction files (TCFs) with test reports.*
- Test sequences can be customized by end user if needed to create custom version or special purpose test variations as desired. *Accommodate changing IEC standards as needed.*

Available Features:

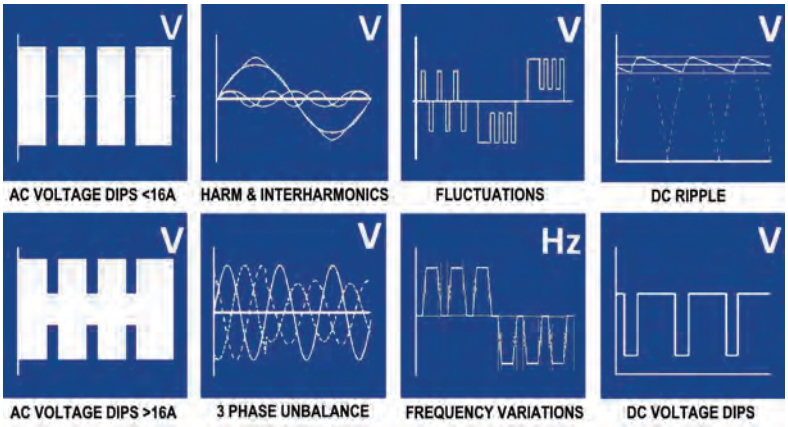
Includes Complete Test Sequences for the following IEC 61000-4 Conducted Immunity Test Standards:

- **IEC 61000-4-11,** Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current less than 16 A per phase. (Includes Korean version)
- **IEC61000-4-13,** Harmonics and inter harmonics including mains signaling at AC power port, low frequency immunity tests (requires C Option on power source)
- **IEC61000-4-14,** Voltage fluctuation immunity test
- **IEC61000-4-17, Ripple on DC input power port** immunity test (AFX, AGX & AZX Series)
- **IEC61000-4-27,** Unbalance, immunity test for equipment with input current not exceeding 16 A per phase
- **IEC61000-4-28,** Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase
- **IEC 61000-4-29,** Voltage dips, short interruptions and voltage variations on DC input power port immunity tests. (Includes Korean versions)
- **IEC61000-4-34,** Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase

International Electrotechnical Commission

IEC Immunity Testing

The EMC Directive is one of the 'New Approach' Directives and applies across all 27 member states of the European Union (EU). The Directive applies to all electronic or electrical products liable to cause or be disturbed by electromagnetic interference (EMI). As a result a large number of manufacturers in the electronics or electrical industries need to ensure that their products are compliant with the requirements of the Directive and be able to demonstrate that this is the case in order to affix the CE Mark.



To verify compliance with these directives, the International Electrotechnical Commission (https://www.iec.ch) has issued a number of harmonized standards that describe test methods, test levels and pass or fail criteria. A number of these test standards cover immunity to commonly found AC line anomalies that are known to occur on the public Low Voltage (LV) network. These conducted immunity standards are numbered IEC 61000-4-nn. These IEC 61000-4 standards are not product specific but rather generic and may be applied to numerous product categories to ensure compliance with CE mark requirements.

There are additional product specific IEC standards that cover individual product types. To determine the IEC 61000-4 tests that apply to a particular product category, refer to the relevant product standard. For example, the IEC EMC product standard that applies to programmable AC power sources is IEC 61326-1, "Electrical equipment for measurement, control and laboratory use – EMC requirements". It calls out which IEC 61000-4 tests must be performed, what product class if applicable and any specific set of test levels and pass/fail criteria. Consult the product specific EMC immunity standard for the product you intend to test. Copies of these standards can be purchased at the IEC web store (http://webstore.iec.ch).

PACIFIC POWER SOURCE®

THE POWER OF EXPERTISE

FREQUENCY CONVERSION | AEROSPACE | MILITARY | RENEWABLE ENERGY | EV CHARGING | PRODUCTION TEST

Standard and Editions Supported

The Pacific Power Source IEC AC Immunity Test option includes pre-defined test sequences for all relevant IEC 61000-4 standards. This option provides a complete solution for IEC AC or DC conducted immunity testing when combined with an AFX, AGX, AZX, LMX, LSX, RGS or GSZ Series AC Power Source. As of the date of publication of this data sheet, all test sequences conform to the latest standard revisions that are in effect. A summary of standard numbers, descriptions, editions and publication dates is provided in the table below.

IEC Standard	Description	Supported Version	Edition	Dated
IEC 61000-4-11	Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	IEC 61000-4-11:2020 RLV	3.0	2020-01-28
IEC 61000-4-13	Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests	IEC 61000-4-13:2002+AMD1:2009 +AMD2:2015 CSV	1.2	2015-12-14
IEC 61000-4-14	Voltage fluctuation immunity test for equipment with input current not exceeding 16 A per phase	IEC 61000-4-14:1999+AMD1:2001 +AMD2:2009 CSV	1.2	2009-08-12
IEC 61000-4-17	Ripple on DC input power port immunity test	IEC 61000-4-17:1999+AMD1:2001 +AMD2:2008 CSV	1.2	2009-01-28
IEC 61000-4-27	Unbalance, immunity test for equipment with input current not exceeding 16 A per phase	IEC 61000-4-27:2000+AMD1:2009 CSV	1.1	2009-04-07
IEC 61000-4-28	Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase	IEC 61000-4-28:1999+AMD1:2001 +AMD2:2009 CSV	1.2	2009-04-07
IEC 61000-4-29	Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests	IEC 61000-4-29:2000	1.0	2000-08-30
IEC 61000-4-34	Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase	IEC 61000-4-34:2005+AMD1:2009 CSV	1.1	2009-11-26

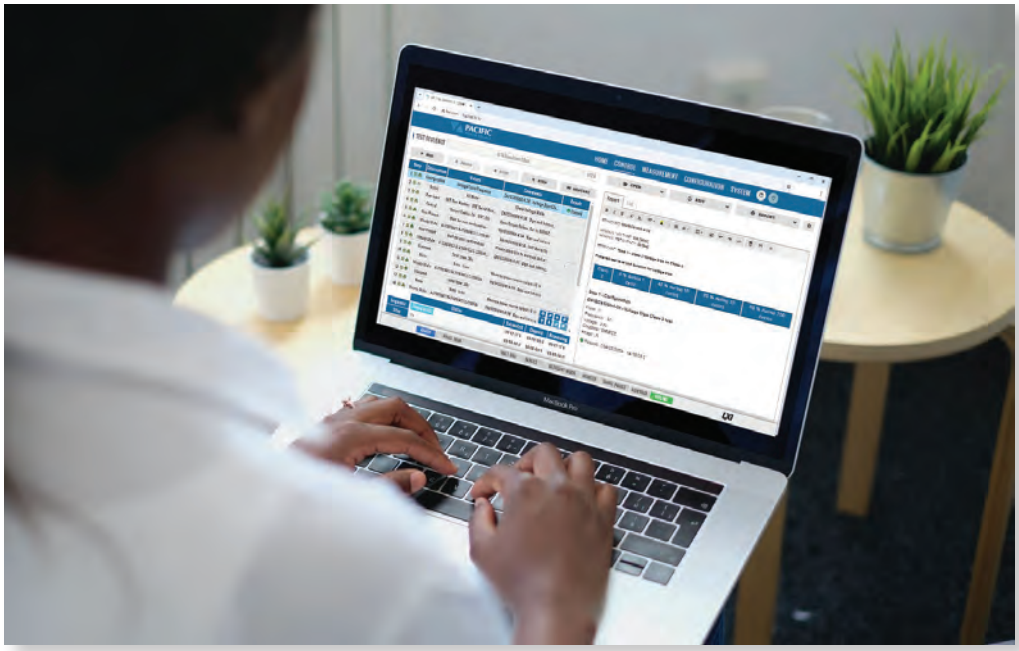
Table 1: Included IEC Standards and Editions

Common Features

All AC source embedded test sequences are accessed using the **SmartSouce Suite** web browser interface, providing a common user interface. The web browser interface means no special software or instrument drivers need to be installed on a Mac or Windows PC. The power source has a built-in web server that serves up control, measurement and data screens to any device, PC, laptop, table or smartphone.

Instead, any device capable of displaying a web page can be used to create, edit, execute and/or report on any test sequence. This includes PC's, Macs, Tablets or smart phones.

All tests sequences are controlled from the browser.



IEC 61000-4-11 Voltage Dips, Interruptions and Variations

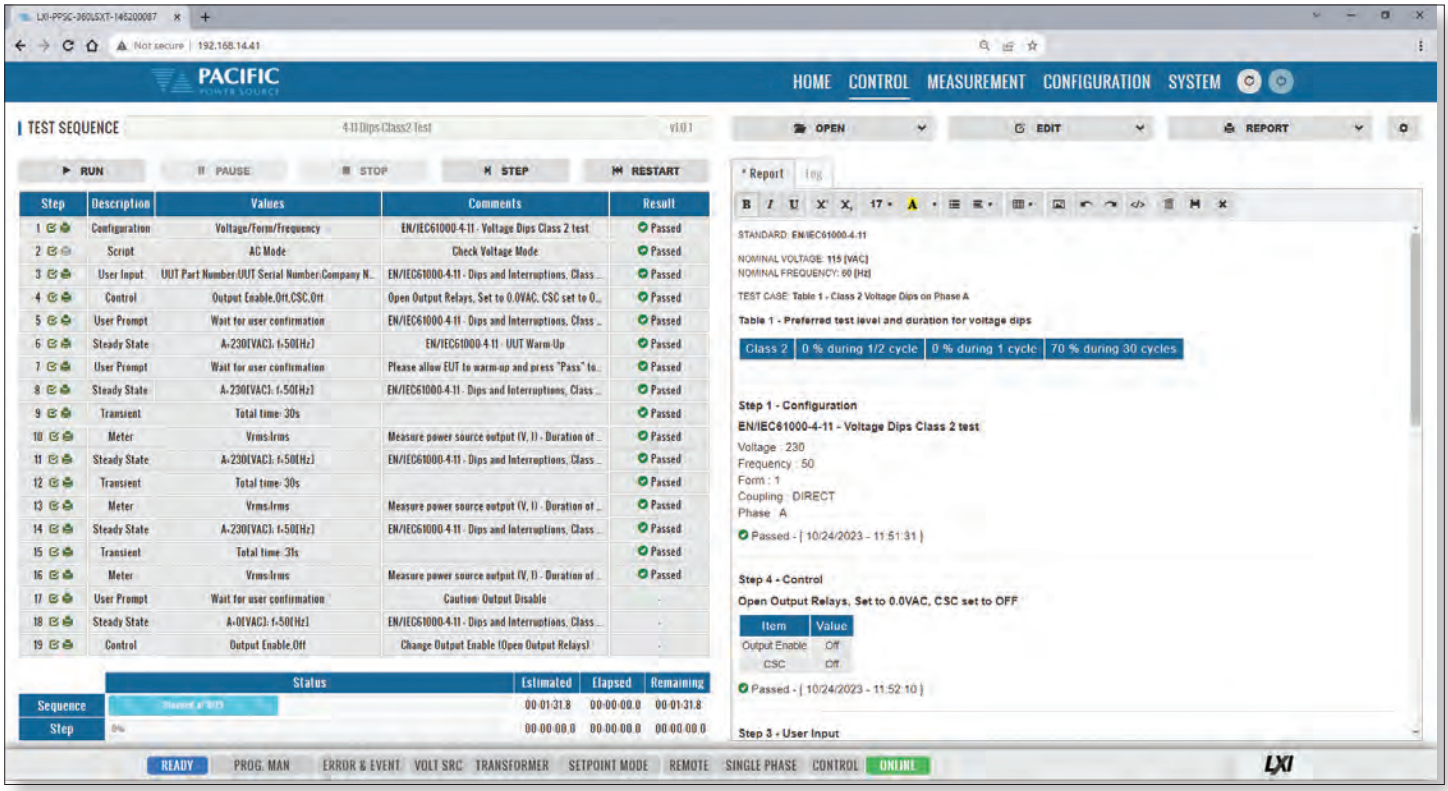


Figure 2: IEC 61000-4-11 Browser Window Test Control Screen

Voltage Dips and Interruptions immunity applies to virtually all electrical products that require the CE mark. This requires testing per IEC 61000-4-11 to determine the ability of the equipment under test to withstand such AC line anomalies. Actual test levels and durations depend on the product class. Products are categorized into four classes, 1, 2, 3 and X, with X being a class defined by individual product committees with the restriction that they cannot be less severe than class 2. Test levels for class 1 and X are not specified in the IEC 61000-4-11 standard itself.

Testing levels for these classes are defined in product specific IEC standards which refer to the generic IEC 61000-4-11 standard for test methods and equipment to be used. The IEC 61000-4-11 test sequences contained in the IEC AC Option package cover all defined classes and nominal voltage and frequency permutations for single, split or three phase products as detailed in Table 2.

Once selected, the corresponding test screen is displayed allowing a test to be started. A typical IEC 61000-4-11 test sequence is shown in Figure 3. Text execution is normally continuous but the user has the option of single stepping through the sequence. A typical IEC 61000-4-11 Phase-to-Phase voltage dip of ½ cycle duration is shown in Figure 4.

The IEC 61000-4-11 Voltage Dips and Variations test sequences are suitable for **pre-compliance testing** of EUTs. For full compliance requirement, refer to the EPTS option on next page.

IEC 61000-4-11 Table	Test	Voltage V_{LN} / V_{LL} (V_{RMS})	Frequency (Hz)	Class / Test Level	Phase Mode
Table 1	Voltage Dips	115 / 208Vac	60 Hz	Class 2	1ø , 3ø
				Class 3	1ø , 3ø
		230 / 400Vac	50Hz	Class 2	1ø , 2ø, 3ø
				Class 3	1ø , 2ø, 3ø
Table 2	Short Interruptions	115 / 208Vac	60 Hz	Class 2	1ø , 3ø
				Class 3	1ø , 3ø
		230 / 400Vac	50Hz	Class 2	1ø , 2ø, 3ø
				Class 3	1ø , 2ø, 3ø
Table 3	Voltage Variations	115 / 208Vac	60 Hz	V = 70%	1ø , 3ø
		230 / 400Vac	50Hz	V = 70%	1ø , 2ø, 3ø

Table 2: IEC 61000-4-11 Test Coverage

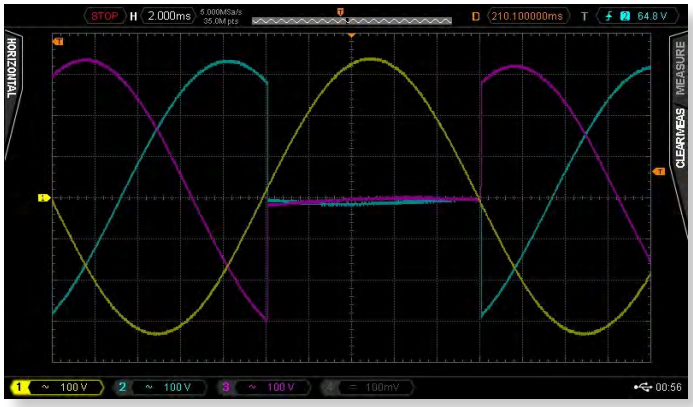


Figure 4: IEC 61000-4-11 1/2 Cycle Phase-to-Phase Voltage Dip

Three Phase EUT Voltage Dip Testing

For three phase EUT testing, the voltage dips and interruptions applied are different between Delta and WYE configurations. Figure 7 shows an example of the output of the AC source during a 70% voltage dip test on a three phase Delta AC product. For three phase delta systems, each phase-to-phase voltage must be dropped and phase shifted to accomplish the required resulting vector voltage drop. This requires three tests to be run (Phase A-B, Phase A-C and Phase B-C).

On three phase Y systems (with Neutral), each individual phase must be dropped but also each combination of phase-to-phase voltage. This requires six tests. All six test sequences are provided in the IEC AC Immunity test option.

Figure 7: IEC 61000-4-11 Phase BC Voltage Dip to 70% of UT

AC Source Requirements – IEC 61000-4-11

Pacific Power's AC sources meet or exceed the IEC 61000-4-11 power source requirements except for rise and fall time. To obtain full compliance testing, the EPTS (Electronic Power Transfer Switch) hardware option is required (Fig 5). This option also supports IEC 61000-4-34 high power AC Dips testing. See Table 3 for details.

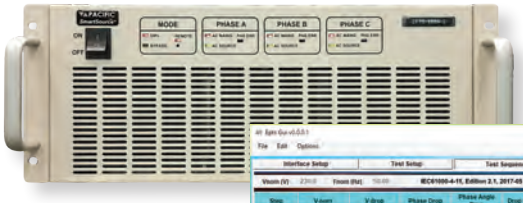


Figure 5: EPTS-75A-3 Option

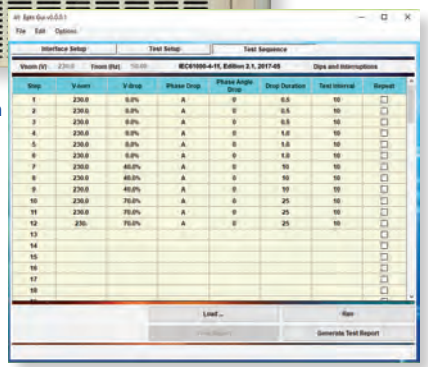


Figure 6: EPTSGui IEC 61000-4-11 Test Sequence

IEC 61000-4-13 Harmonics and Inter Harmonics

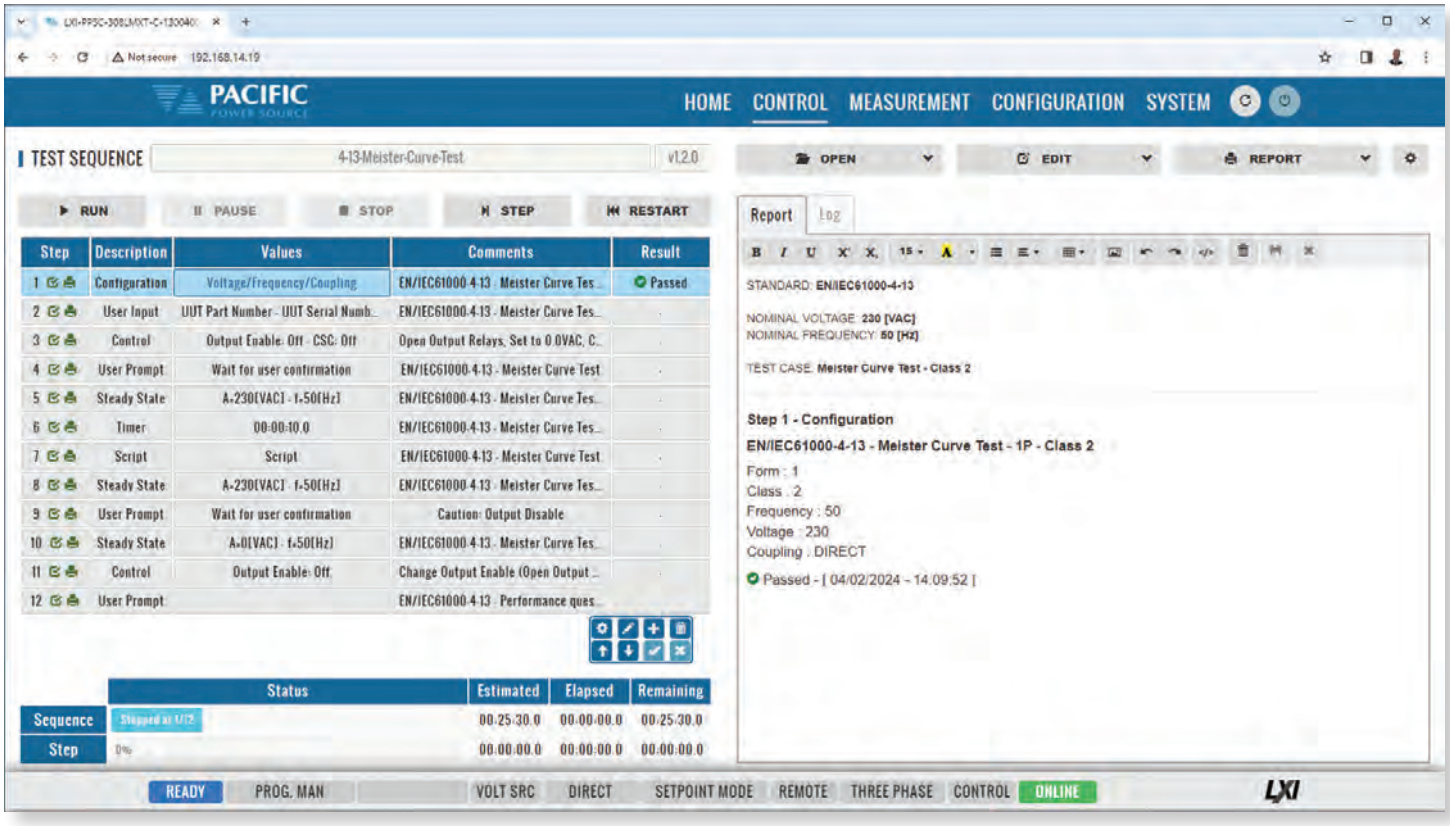


Figure 8: IEC 61000-4-13 Test Execution Control Screen

Option C Inter Harmonics Generator

To perform the inter harmonics tests included in the IEC 61000-4-13 test standard, the C Option inter harmonics generator option is required on the power source.

IEC 61000-4-13 Test Sequences

The objective of the IEC 61000-4-13 standard is to ensure that products are impervious to the effects of signaling frequencies that may be present on the public utility power grid. Signaling over AC power lines is often used to remotely control switch gear or other devices.

The IEC 61000-4-13 test requirements are rather extensive compared to the other IEC 61000-4 tests.

The IEC 61000-4-13 test sequences cover all defined classes and nominal voltage and frequency permutations for single, split or three phase products. Harmonics and Inter Harmonics frequency ranges are swept using pre-scribed frequency step sizes resulting in long test times.

The appropriate IEC 61000-4-13 test sequence can be selected from web browser SmartSource Suite pull down menu based on EUT class.

IEC 61000-4-13 Table	Test	Voltage V_{LN} / V_{LL} (V_{RMS})	Frequency (Hz)	Class/Test Level	Phase Mode
Table 1, 2 & 3	Odd Harmonics	115 / 208Vac	60 Hz	Class 1, 2 & 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 1, 2 & 3	1ø , 2ø, 3ø
Table 4	Inter Harmonics	115 / 208Vac	60 Hz	Class 1, 2 & 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 1, 2 & 3	1ø , 2ø, 3ø
Table 7	Flat Curve	115 / 208Vac	60 Hz	Class 1, 2 & 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 1, 2 & 3	1ø , 2ø, 3ø
Table 8	Over Swing	115 / 208Vac	60 Hz	Class 1, 2 & 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 1, 2 & 3	1ø , 2ø, 3ø
Table 9	Frequency Sweep	115 / 208Vac	60 Hz	Class 1, 2 & 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 1, 2 & 3	1ø , 2ø, 3ø
Table 11	Meister Curve	115 / 208Vac	60 Hz	Class 2	1ø , 3ø
		230 / 400Vac	50 Hz	Class 2	1ø , 2ø, 3ø
		230 / 400Vac	50 Hz	Class 2	1ø , 2ø, 3ø

Table 4: IEC 61000-4-13 Test Coverage

IEC 61000-4-13 Test Reports

Test reports listing the AC stimulus applied to the EUT are generated by the web browser test sequence.

IEC 61000-4-14 Voltage Fluctuations

Figure 11: IEC 61000-4-14 Test Execution Control Screen

IEC 61000-4-14	Test	Voltage V_{LN} / V_{LL} (V_{RMS})	Frequency (Hz)	Class / Test Level	Phase Mode
Table 1	Voltage Fluctuations	115 / 208Vac	60 Hz	Class 2 & 3	1ø ,3ø
		230 / 400Vac	50 Hz	Class 2 & 3	1ø , 2ø, 3ø

Table 6: IEC 61000-4-14 Test Coverage

The IEC 61000-4-14 standard applies a series of repetitive voltage fluctuations. The required IEC 61000-4-14 test sequences are included in the IEC AC Immunity option package and cover all defined classes and nominal voltage and frequency permutations for single, split or three phase products.

The appropriate IEC 61000-4-14 test sequence can be selected from the SmartSouce Suite pull down menu.

A typical IEC 61000-4-14 three phase voltage fluctuation test is shown in Figure 12.

Figure 12: IEC 61000-4-14 Three Phase Voltage Fluctuation Test

IEC 61000-4-17 Ripple on DC

The IEC 61000-417 standard covers only DC powered products. The Pacific Power Source IEC 61000-4-17 option, when used with the AFX Series, covers DC powered products up to 425Vdc. Included test voltages are shown in the table below. Additional DC test levels can be created by copying and editing any of the provided test sequence files. The AFX Series meets all IEC 61000-4-17 Power Source requirements.

Power Group	Nominal Voltage	Ripple Frequency	Ripple Amplitude
DC	24Vdc	50Hz	2%, 5%, 10%, 15%
	24Vdc	100Hz	
	24Vdc	150Hz	
	24Vdc	300Hz	
	48Vdc	50Hz	2%, 5%, 10%, 15%
	48Vdc	100Hz	
	48Vdc	150Hz	
	48Vdc	300Hz	

Table 8: IEC 61000-4-17 Test Coverage

IEC 61000-4-27 Voltage Unbalance

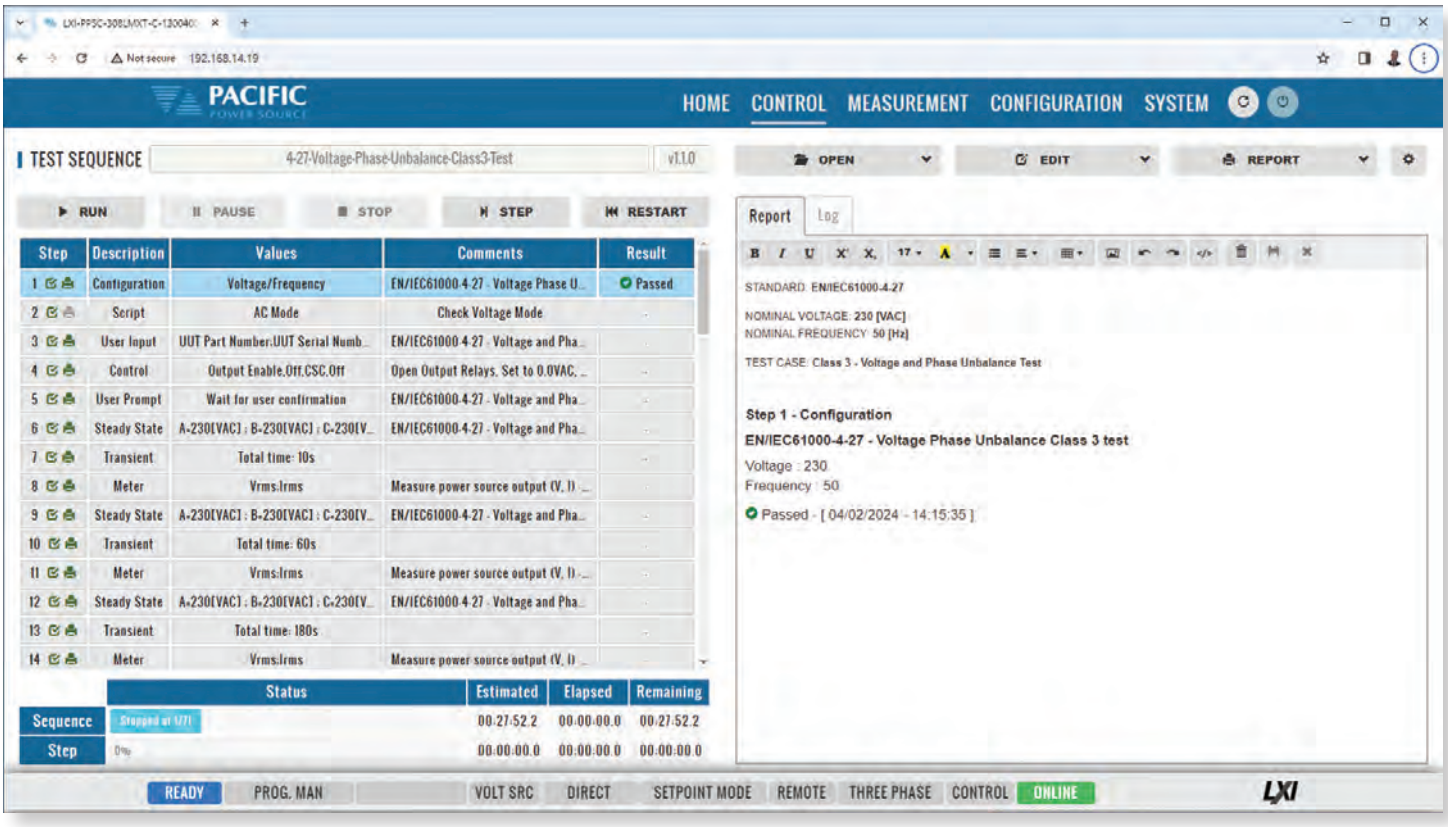


Figure 13: IEC 61000-4-27 Test Execution Control Screen

The IEC 61000-4-27 standard applies only to 50Hz or 60Hz three-phase powered electrical and/or electronic equipment with rated line current up to 16Arms per phase. It establishes a reference for evaluating the immunity of such equipment when subjected to an unbalanced power supply voltage. This test can only be performed using a three phase AC Power Source. An error message will be generated when attempting to execute any of these tests on a AC Power Source in single phase or split phase mode and the test will not start.

The IEC 61000-4-27 test sequences included in the IEC AC Immunity option package covers class 2 and 3 for nominal voltage and frequency permutations and in three phase mode only.

The appropriate IEC 61000-4-27 test sequence can be selected from the UPC Test Manager pull down menu based on nominal voltage, frequency and test level or EUT class.

Once selected, the corresponding test screen is displayed allowing a test to be started. A typical IEC 61000-4-27 test sequence is shown in Figure 13. Text execution is normally continuous but the user has the option of single stepping through the sequence.

A typical IEC 61000-4-27 three phase voltage unbalance test is shown in Figure 14.

IEC 61000-4-27	Test	Voltage V_{LN} / V_{LL} (V_{RMS})	Frequency (Hz)	Class / Test Level	Phase Mode
Table 1	Voltage Unbalance	115 / 208Vac	60 Hz	Class 2 & 3	3ø
		230 / 400Vac	50 Hz	Class 2 & 3	3ø

Table 9: IEC 61000-4-27 Test Coverage

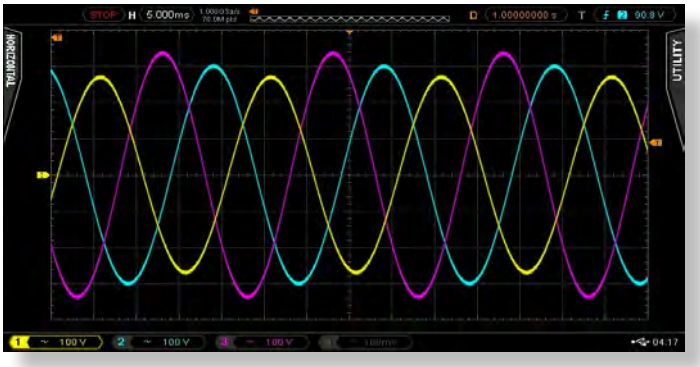


Figure 14: IEC 61000-4-27 Three Phase Voltage Unbalance Test

IEC 61000-4-28 Frequency Variations

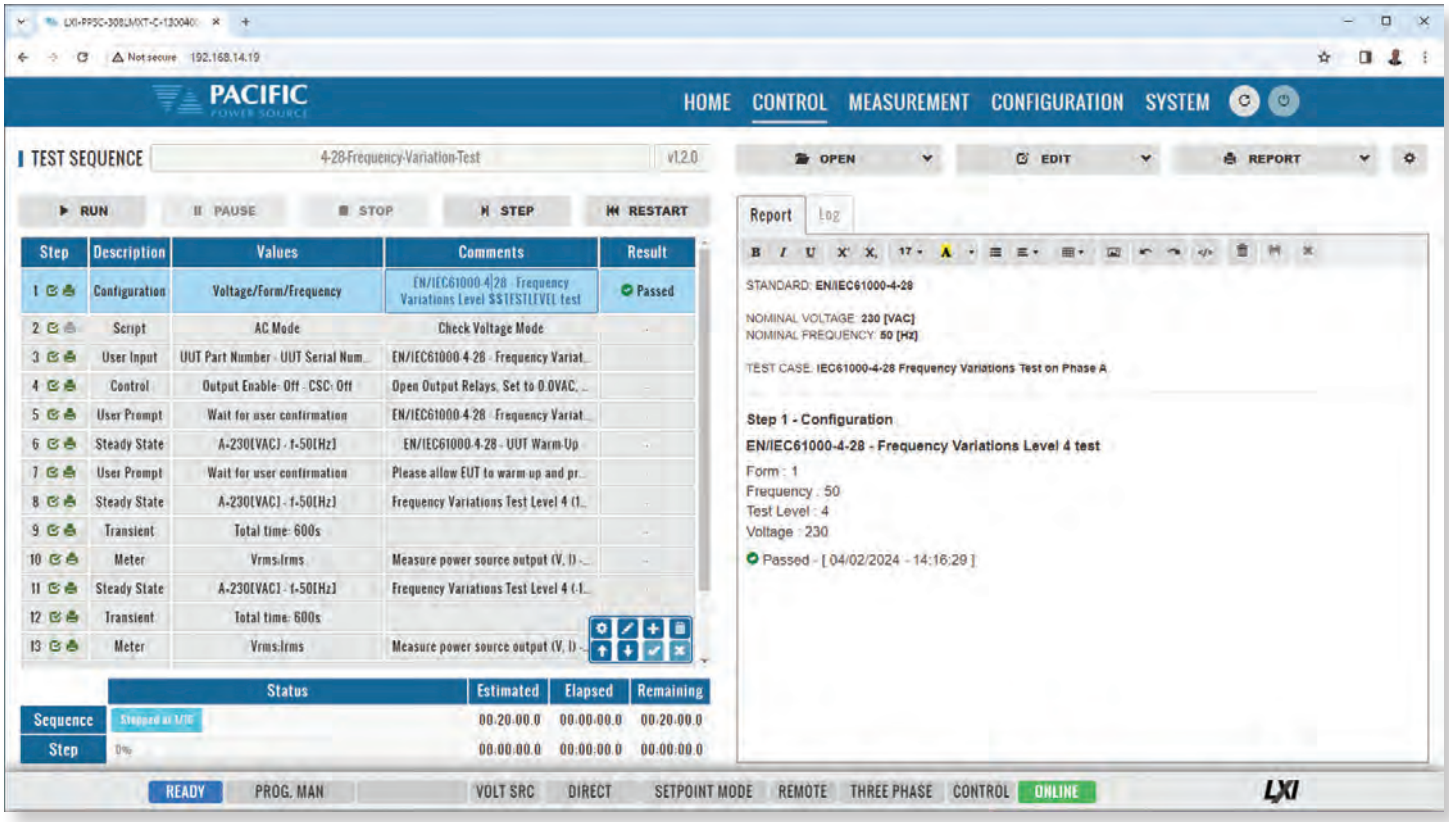


Figure 15: IEC 61000-4-28 Test Execution Control Screen

The IEC 61000-4-28 standard is intended to evaluate the effect of power frequency variations on equipment which may be sensitive to such disturbances. These effects are generally instantaneous. To this end, these tests apply frequency variations using specific frequency slew rates to the EUT.

The IEC 61000-4-28 test sequences included in the IEC AC Immunity option package covers test levels 1, 2, 3 and 4 for nominal voltage and frequency permutations and in single, split or three phase mode. These test levels relate to product Classes 1, 2 and 3 per section 5 of the standard.

The appropriate IEC 61000-4-28 test sequence can be selected from the UPC Test Manager pull down menu based on nominal voltage, frequency, phase mode and test level.

Once selected, the corresponding test screen is displayed allowing a test to be started. A typical IEC 61000-4-28 test sequence is shown in Figure 15. Test execution is normally continuous but the user has the option of single stepping through the sequence.

A typical IEC 61000-4-28 three phase frequency variation test is shown in Figure 16. Since the frequency change is very gradual, it is near impossible to see on a digital scope. A frequency counter is required to measure the actual frequency changes.

IEC 61000-4-27	Test	Voltage V_{LN} / V_{LL} (V_{RMS})	Frequency (Hz)	Class / Test Level	Phase Mode
Table 1	Voltage Unbalance	115 / 208Vac	60 Hz	Class 2, 3 & 8	1ø, 3ø
		230 / 400Vac	50 Hz	Class 2 ,3 & 4	1ø, 3ø

Table 11: IEC 61000-4-28 Test Coverage

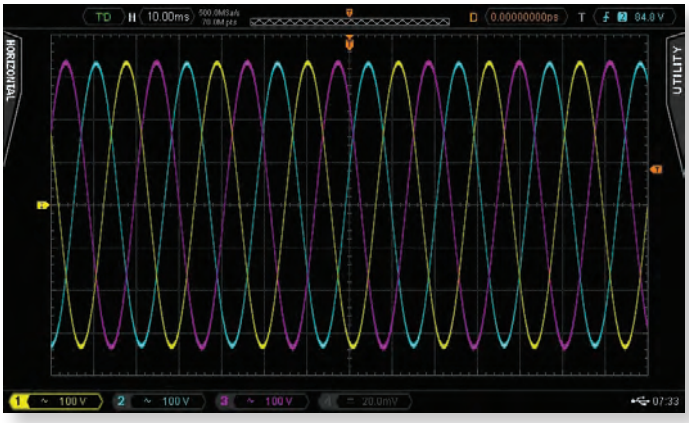


Figure 16: IEC 61000-4-28 Frequency Variation Test

IEC 61000-4-29 DC Dips & Interruptions

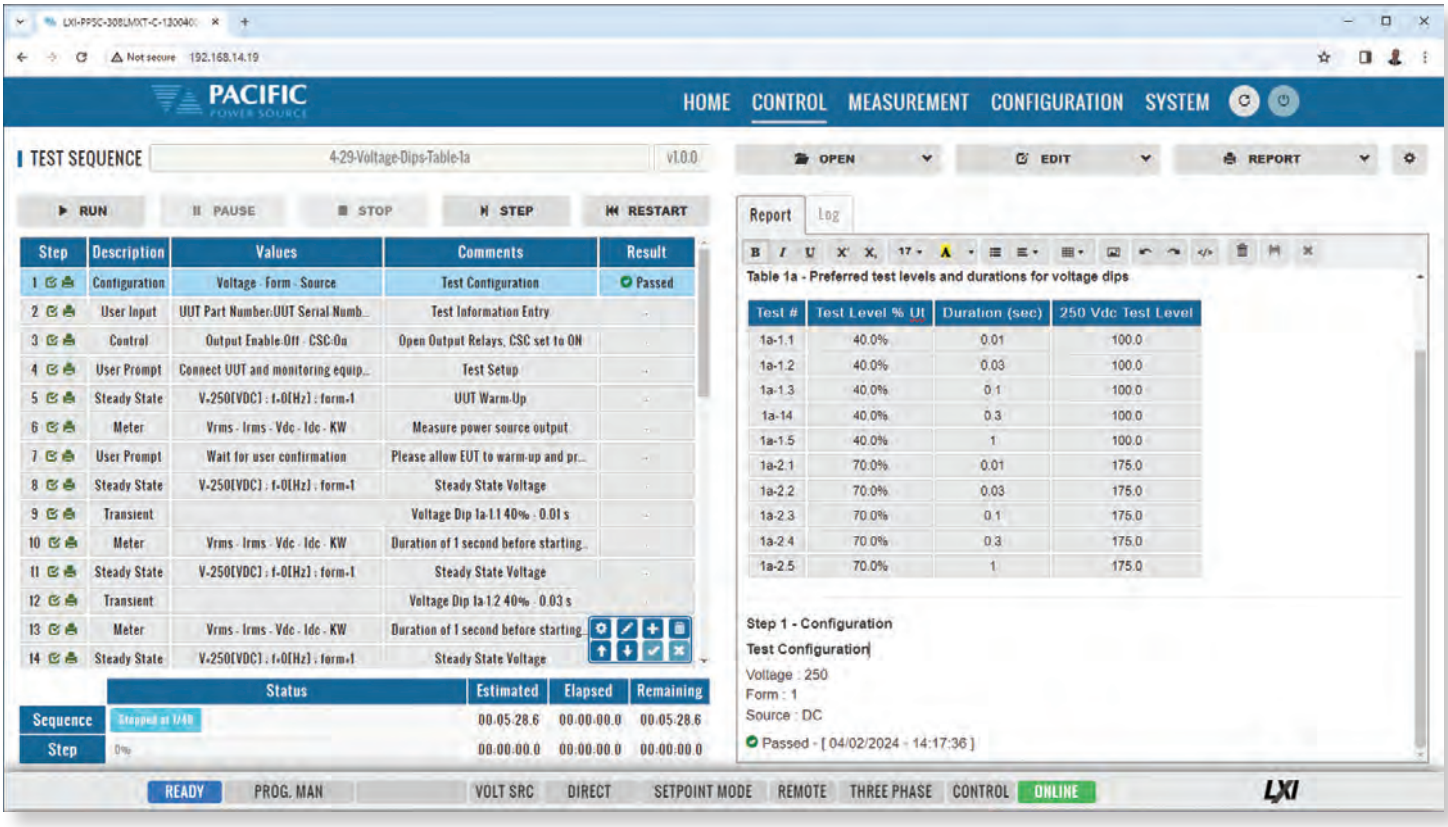


Figure 15: IEC 61000-4-29 Test Execution Control Screen

The IEC 61000-4-29 standard is intended to evaluate the effect of voltage dips and interruptions on equipment which may be sensitive to such disturbances. Note that this is a DC tests and requires the use an AFX Series source.

DC Source Requirements – IEC 61000-4-29

This test requires the use of a power source to produce the required DC voltage output. For full compliance, the EPTS Electronic Power Transfer Switch is required (Refer to IEC61000-4-11 section).

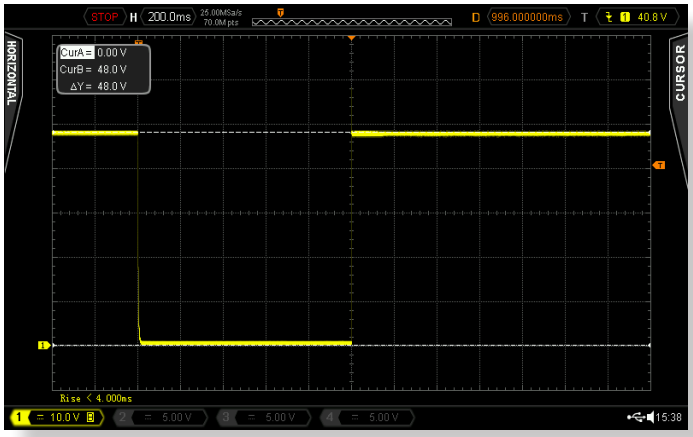


Figure 17: IEC 61000-4-29 DC Voltage Dip Test

IEC 61000-4-34 Voltage Dips, Interruptions and Variations

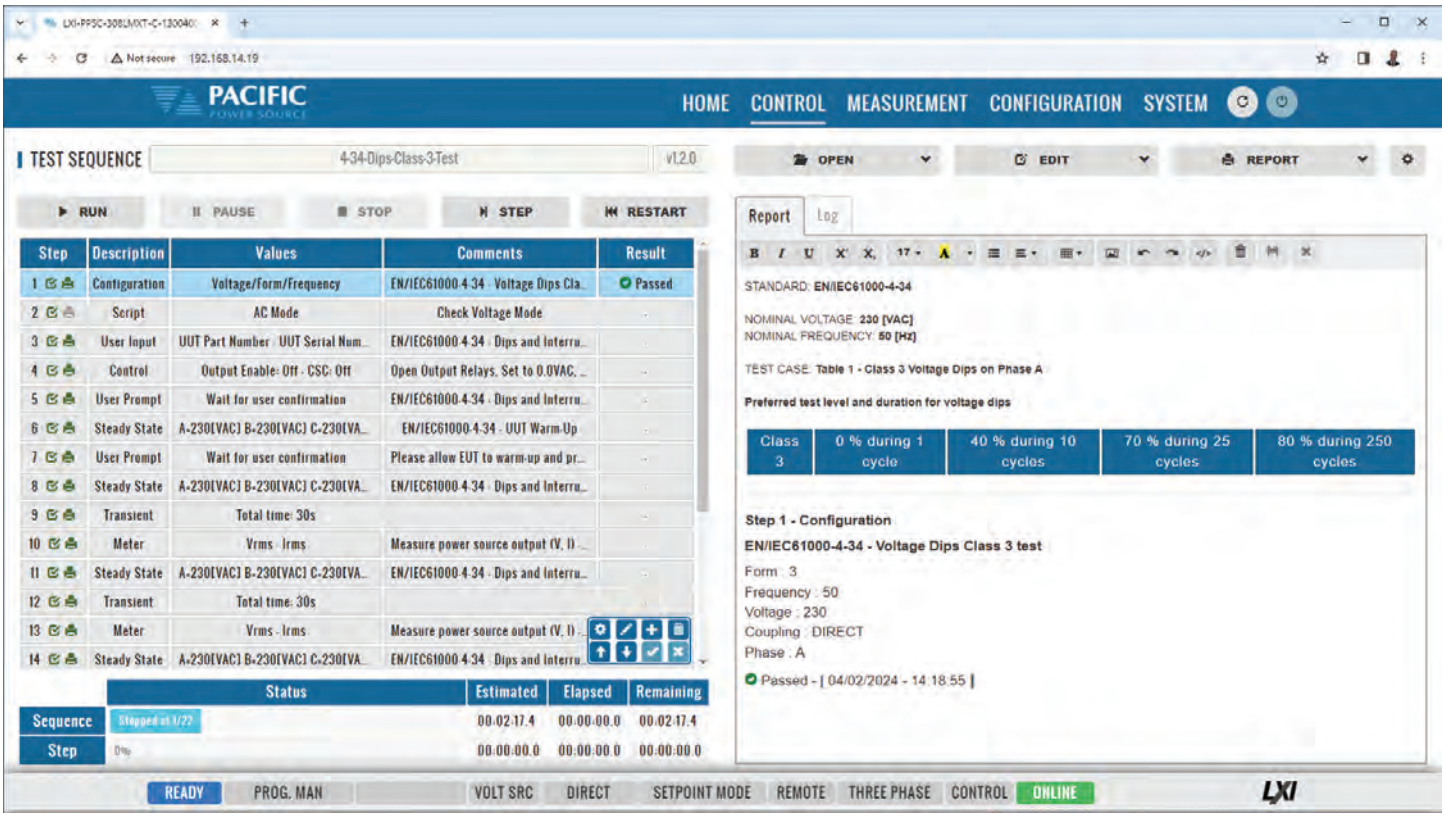


Figure 18: IEC 61000-4-34 Test Execution Control Screen

The IEC61000-4-34 is closely related to the IEC 61000-4-11 standard as both cover Voltage dips, short interruption and voltage variations. The main difference is that the IEC 61000-4-11 standard only covers products requiring no more than 16 Arms per phase while the IEC 61000-4-34 covers products with higher current requirements.

The IEC 61000-4-34 tests covers all defined classes and nominal voltage and frequency permutations for single, split or three phase products. Both Voltage Dips and Voltage Variations are covered.

The appropriate IEC 61000-4-34 test sequence can be selected SmartSource Suite browser pull down menu based on nominal voltage, frequency, phase mode and test level or EUT class.

Once selected, the corresponding test screen is displayed allowing a test to be started. A typical IEC 61000-4-34 test sequence is shown in Figure 18. Text execution is normally continuous but the user has the option of single stepping through the sequence.

A typical IEC 61000-4-34 three phase voltage variation test is shown in Figure 19.

Note: For full compliance with Voltage Rise and Fall time per the standard, refer to the EPTS option information on page 4.

IEC 61000-4-34 Table	Test	Voltage V_{LN} / V_{LL} (V_{RMS})	Frequency (Hz)	Class/Test Level	Phase Mode
Table 1	Voltage Dips	115 / 208Vac	60 Hz	Class 2	1ø , 3ø
				Class 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 2	1ø , 2ø, 3ø
				Class 3	1ø , 2ø, 3ø
Table 2	Short Interruptions	115 / 208Vac	60 Hz	Class 2	1ø , 3ø
				Class 3	1ø , 3ø
		230 / 400Vac	50 Hz	Class 2	1ø , 2ø, 3ø
				Class 3	1ø , 2ø, 3ø
Table 3	Voltage Variations	115 / 208Vac	60 Hz	V = 70%	1ø , 3ø
		230 / 400Vac	50 Hz	V = 70%	1ø , 2ø, 3ø

Table 13: IEC 61000-4-34 Test Coverage

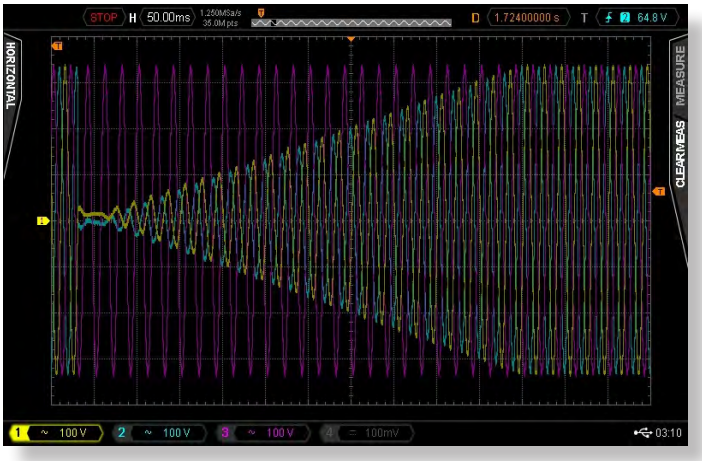
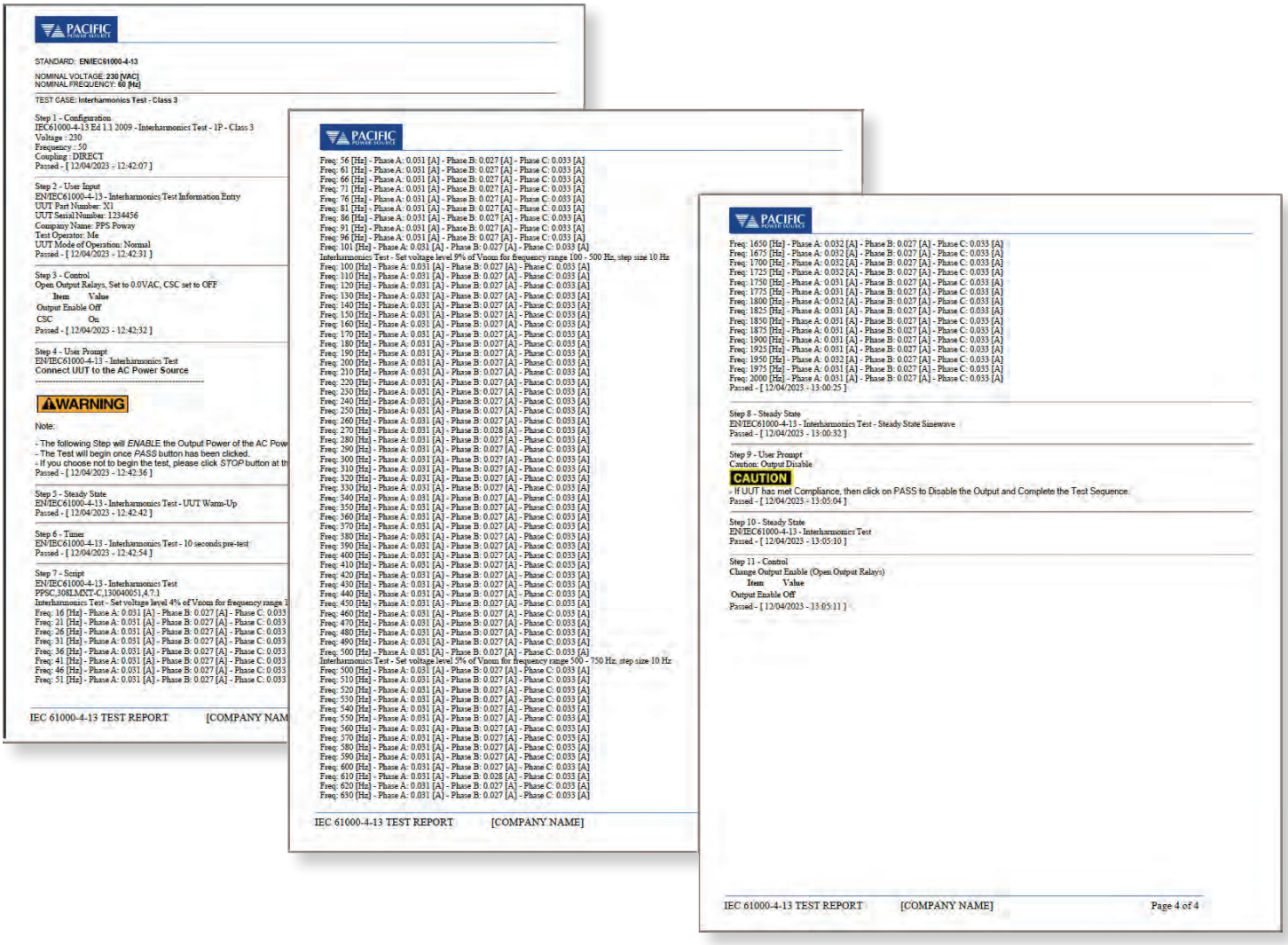


Figure 19: IEC 61000-4-34 Three Phase Voltage Variation Test

Test Reports to Document Product Compliance

All Immunity Test sequences have a built in report generator that produces a document containing the AC or DC voltage disturbances applied to the unit under test as part of the product compliance test.

As sample test report for an IEC 61000-4-13 Harmonics and Interharmonics immunity test is shown here for reference.



PACIFIC

STANDARD: EN/IEC61000-4-13

NOMINAL VOLTAGE: 230 [VAC]
NOMINAL FREQUENCY: 60 [Hz]

TEST CASE: Interharmonics Test - Class 3

Step 1 - Configuration
IEC61000-4-13 Ed 1.1 2009 - Interharmonics Test - 1P - Class 3
Voltage : 230
Frequency : 50
Coupling : DIRECT
Passed - [12/04/2023 - 12:42:07]

Step 2 - User Input
EN/IEC61000-4-13 - Interharmonics Test Information Entry
UUT Part Number: X1
UUT Serial Number: 1234456
Company Name: PPS Poway
Test Operator: Me
UUT Mode of Operation: Normal
Passed - [12/04/2023 - 12:42:31]

Step 3 - Control
Open Output Relays, Set to 0.0VAC, CSC set to OFF
Item Value
Output Enable Off
CSC On
Passed - [12/04/2023 - 12:42:32]

Step 4 - User Prompt
EN/IEC61000-4-13 - Interharmonics Test
Connect UUT to the AC Power Source

WARNING

Note:

- The following Step will ENABLE the Output Power of the AC Pow
- The Test will begin once PASS button has been clicked.
- If you choose not to begin the test, please click STOP button at th
Passed - [12/04/2023 - 12:42:36]

Step 5 - Steady State
EN/IEC61000-4-13 - Interharmonics Test - UUT Warm-Up
Passed - [12/04/2023 - 12:42:42]

Step 6 - Timer
EN/IEC61000-4-13 - Interharmonics Test - 10 seconds pre-test
Passed - [12/04/2023 - 12:42:54]

Step 7 - Script
EN/IEC61000-4-13 - Interharmonics Test
PPSC,30KLMXT-C,13004065,4.7.1
Interharmonics Test - Set voltage level 4% of Vnom for frequency range 1
Freq: 16 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 21 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 26 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 31 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 36 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 41 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 46 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033
Freq: 51 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033

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Freq: 56 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 61 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 66 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 71 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 76 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 81 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 86 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 91 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 96 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 101 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Interharmonics Test - Set voltage level 9% of Vnom for frequency range 100 - 500 Hz, step size 10 Hz
Freq: 100 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 110 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 120 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 130 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 140 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 150 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 160 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 170 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 180 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 190 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 200 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 210 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 220 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 230 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 240 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 250 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 260 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 270 [Hz] - Phase A: 0.031 [A] - Phase B: 0.028 [A] - Phase C: 0.033 [A]
Freq: 280 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 290 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 300 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 310 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 320 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 330 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 340 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 350 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 360 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 370 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 380 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 390 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 400 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 410 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 420 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 430 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 440 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 450 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 460 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 470 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 480 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 490 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 500 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Interharmonics Test - Set voltage level 5% of Vnom for frequency range 500 - 750 Hz, step size 10 Hz
Freq: 500 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 510 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 520 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 530 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 540 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 550 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 560 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 570 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 580 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 590 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 600 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 610 [Hz] - Phase A: 0.031 [A] - Phase B: 0.028 [A] - Phase C: 0.033 [A]
Freq: 620 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 630 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]

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Freq: 1650 [Hz] - Phase A: 0.032 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1675 [Hz] - Phase A: 0.032 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1700 [Hz] - Phase A: 0.032 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1725 [Hz] - Phase A: 0.032 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1750 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1775 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1800 [Hz] - Phase A: 0.032 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1825 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1850 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1875 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1900 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1925 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1950 [Hz] - Phase A: 0.032 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 1975 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Freq: 2000 [Hz] - Phase A: 0.031 [A] - Phase B: 0.027 [A] - Phase C: 0.033 [A]
Passed - [12/04/2023 - 13:00:25]

Step 8 - Steady State
EN/IEC61000-4-13 - Interharmonics Test - Steady State Sinewave
Passed - [12/04/2023 - 13:00:32]

Step 9 - User Prompt
Caution: Output Disable

CAUTION

- If UUT has met Compliance, then click on PASS to Disable the Output and Complete the Test Sequence.
Passed - [12/04/2023 - 13:05:04]

Step 10 - Steady State
EN/IEC61000-4-13 - Interharmonics Test
Passed - [12/04/2023 - 13:05:10]

Step 11 - Control
Change Output Enable (Open Output Relays)
Item Value
Output Enable Off
Passed - [12/04/2023 - 13:05:11]

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Requirements

Web Browser based test sequences run on the power source controller and are operated through a web browser via the standard LAN or USB interface of the power source. Execution, Single Step, Control and Editing of test steps is supported as is printing test reports via common web browser functions.

Delivered test sequence compressed files can be loaded to the power source's memory. Once loaded, they are accessible using most web browsers - Chroma, Edge, Firefox, etc.

Ordering Information

Required options needed to support the following tests:

Test Standard	Test Sequence Part Number	Notes
IEC-4xx Bundle	149323	Includes all 4-xx Test Sequences
EN-IEC61000-4-11	149300	
EN-IEC61000-4-13	149301	
EN-IEC61000-4-14	149302	
EN-IEC61000-4-17*	149303	
EN-IEC61000-4-27	149304	
EN-IEC61000-4-28	149305	
EN-IEC61000-4-29*	149306	
EN-IEC61000-4-34	149307	
C Option	Interharmonic Generator Option to support IEC 61000-4-13 testing on AFX, AGX, AZX, LMX, LSX Models. Standard on GSZ and RGS Models.	Interharmonic generator is built into power source. Must be specified at time of power source order on AFX, AGX, AZX, LMX and LSX Models. This option is included on RGS and GSZ Grid Simulators. Note: Sequence marked (*) are DC and will not work on LMX & LSX Series.

Order Example

IEC-4xx Immunity Browser Based Test Sequences

- 149323 IEC 4xx Bundle

Delivery Items

- Test Sequence Software License Certificate
- User Documentation in PDF format

Test Coverage By Source Model Series

IEC 61000-4 Test	Modes	AFX / AGX / AZX	RGS / GSZ	LMX	LSX	ECTS2
IEC 61000-4-11	AC	👍	👍	👍	👍	👍
IEC 61000-4-13	AC	Opt C Required	👍	Opt C Required	Opt C Required	Opt C Required
IEC 61000-4-14	AC	👍	👍	👍	👍	👍
IEC 61000-4-17	AC + DC	👍	👍			👍
IEC 61000-4-27	AC	👍	👍	👍	👍	👍
IEC 61000-4-28	AC	👍	👍	👍	👍	👍
IEC 61000-4-29	DC	👍	👍			👍
IEC 61000-4-34	AC	👍	👍	👍	👍	👍

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