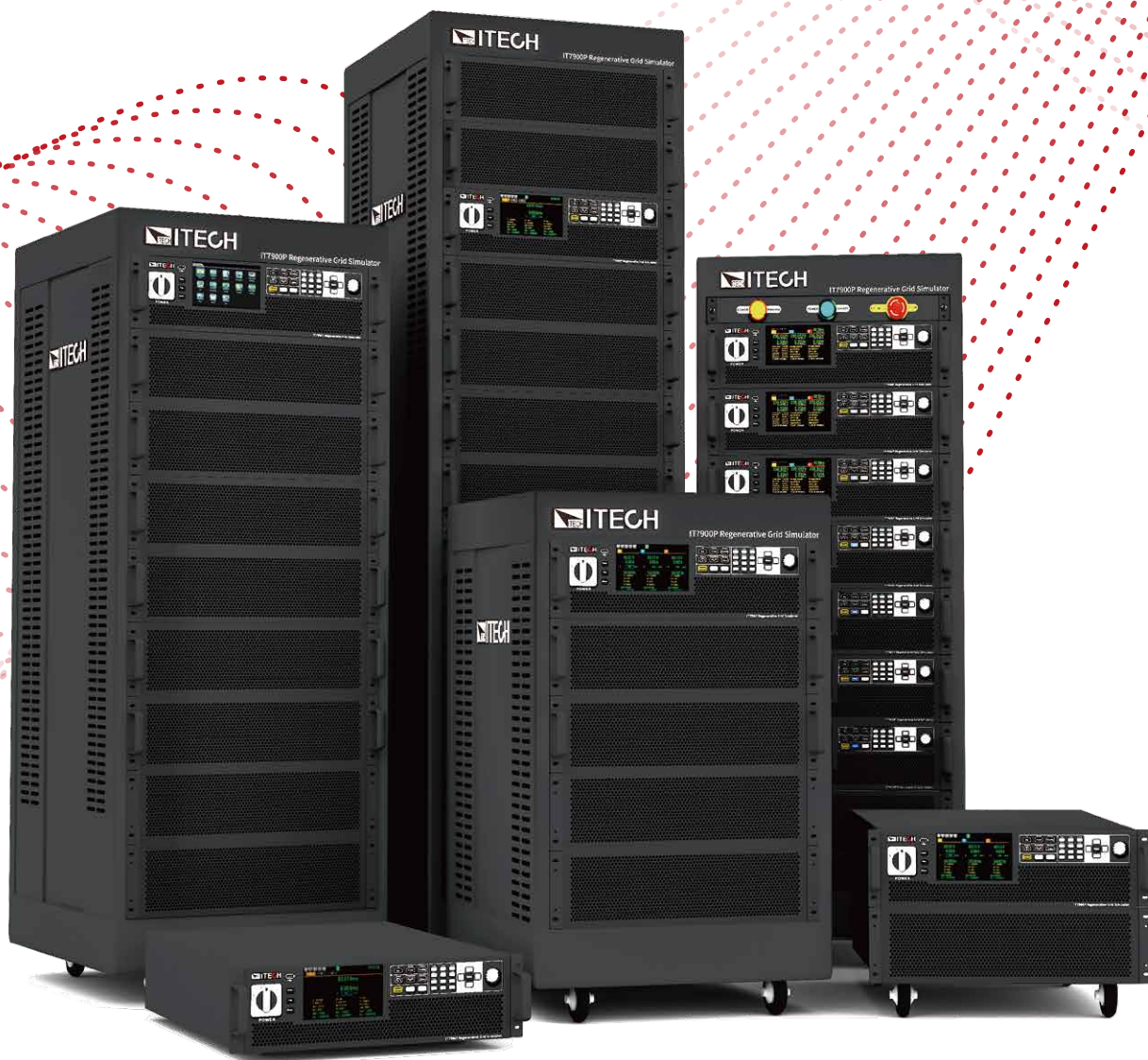


ITECH ELECTRONIC

ITECH EMC Test Solution



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ITECH Test Solution



EMC, electromagnetic compatibility test, refers to the comprehensive assessment of the electromagnetic field interference (EMI) and anti-interference ability (EMS) of electronic products. It is one of the most important indicators of product quality.

The EMC directive is one of the "new approach" directives and applies to all 27 member states of the European Union (EU). This directive applies to all electronic or electrical products that may cause or be affected by electromagnetic interference. In order to verify compliance with these directives, the International Electrotechnical Commission (IEC) publishes a number of harmonized standards that a large number of manufacturers in the electronic or electrical industry need to ensure that their products comply with these testing standards and comply with CE marking requirements.

EMC testing is very complex, and if there is no testing process, it will be detrimental to the product. ITECH's test instruments have built-in IEC test programs. You can directly recall them for testing, which is faster and more accurate. The 5-inch touch screen of ITECH test equipment can clearly display various parameters, allowing you to observe the test more intuitively. ITECH also provides you with the authority to edit different test parameters in regulations, so that you can customize your own test procedures according to your needs, making the operation more flexible. In addition, ITECH's free PC software allows you to directly enter the IEC regulation interface and complete the test remotely, further improving the convenience and efficiency of testing.

We can provide testing solutions for the following EMC regulations

EN/IEC61000-4-11	Voltage dips, short interruptions and voltage variations immunity tests
EN/IEC61000-4-13	Harmonics and interharmonics tests
EN/IEC61000-4-14	Voltage fluctuation immunity test
EN/IEC61000-4-17	Ripple on DC input power port immunity test (stay tuned)
EN/IEC61000-4-28	Variation of power frequency, immunity test
EN/IEC61000-4-29	Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests (stay tuned)
EN/IEC61000-3-2	Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN/IEC61000-3-12	Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase

ITECH Test Solution

Product	Series	Built-in IEC regulatory standard
AC power supply	IT7800/IT7800E	IEC61000-4-11/4-13/4-14/4-17/4-28/4-29/3-2/3-12
Grid simulator	IT7900/IT7900E	IEC61000-4-11/4-13/4-14/4-17/4-28/4-29/3-2/3-12
AC source load system	IT7900P/IT7900EP	IEC61000-4-11/4-13/4-14/4-17/4-28/4-29/3-2/3-12
AC load	IT8200	IEC61000-3-2/3-12

Grid simulator + Regenerative e-load

IT7900P

- 15kVA in 3U
- Power range:5kVA~960 kVA
- Output voltage range:350V

IT7900EP

- 21kVA in 3U
- Power range:21kVA~1MVA+
- Output voltage range:350V

Source load 2 in 1 power system

IT7900P/7900EP integrates 3 instruments. You can use it as a power grid simulator, a programmable AC power supply, or a regenerative AC/DC electronic load.

Regenerative grid simulator

IT7900

- 15kVA in 3U
- Power range:2kVA~960 kVA
- Output voltage range:350V/700V/1050V

IT7900E

- 21kVA in 3U
- Power range:21kVA~1MVA+
- Output voltage range:350V

Four quadrant output

IT7900/IT7900E is not only a full four-quadrant grid simulator, but also a full four-quadrant AC/DC electronic load. It can simulate in all 4 quadrants, combined with efficient energy regeneration, it is suitable for testing grid-connected products, such as frequency changes, voltage transients and anti-islanding tests of grid-connected PV inverters.

High power AC power supply

IT7800

- 15kVA in 3U
- Power range:2kVA~960 kVA
- Output voltage range:350V/700V/10

IT7800E

- 21kVA in 3U
- Power range:21kVA~1MVA+
- Output voltage range:350V

High power density

From 1U/2U/3U stand-alone unit to 15U/27U/37U cabinets, the various models of the IT7800/7800E series can meet the testing ranging from 2k to 231kVA. It is only 1/12 of a conventional AC power supply in size, requiring less space and lower testing costs.

Regenerative AC electronic load

IT8200

- 15kVA in 3U
- Power range:2kVA~960 kVA
- Output voltage range:350V

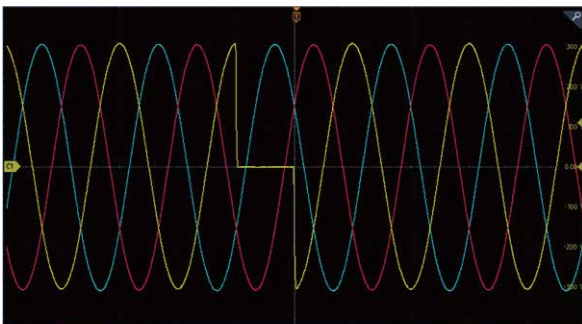
Multiple operation modes

- * AC mode supports CC/CP/CR/CS/CC+CR/CE
- * CE mode can simulate 14 circuit topologies such as single-phase rectifier RLC and parallel RLC.
- * DC mode supports 9 working modes such as CC/CR/CP/CV.

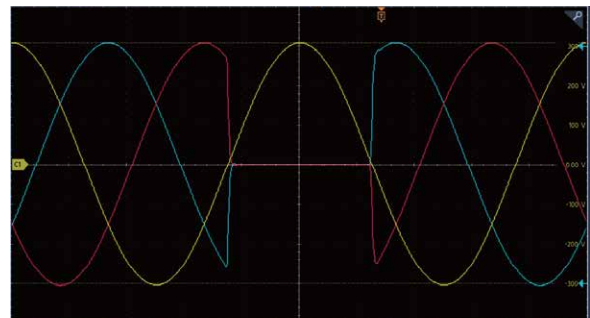


EN/IEC 61000-4-11 Voltage dips, short interruptions and voltage variations immunity tests

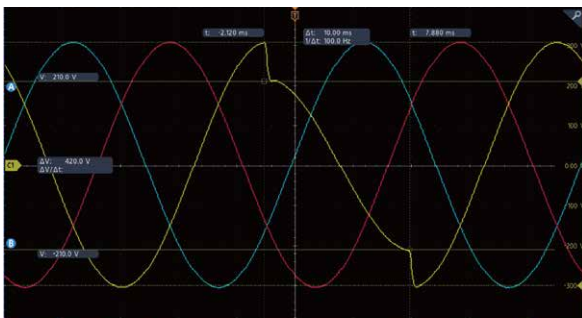
Almost all electrical equipment requiring CE marking should be tested for immunity to voltage dips and interruptions. To ensure that the product can withstand such AC anomalies, you need to test according to the IEC 61000-4-11 standard. ITECH AC power supply has built-in IEC 61000-4-11 test program. You can set or customize different voltage drops and mid-range conditions according to the standard to test the DUT. This approach ensures that the product can operate stably under various conditions and meet the requirements of relevant regulatory standards. **For IT7800/E,IT7900/E,IT7900/EP, the slew rate is up to 2.5V/us at most.*



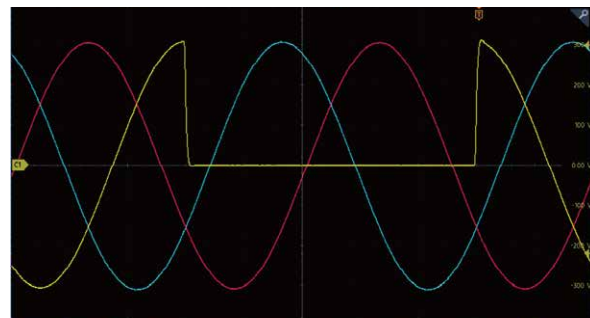
Voltage dip: Phase A 220V output, drops from the starting angle 90° to 0, and maintains 1/2 cycle



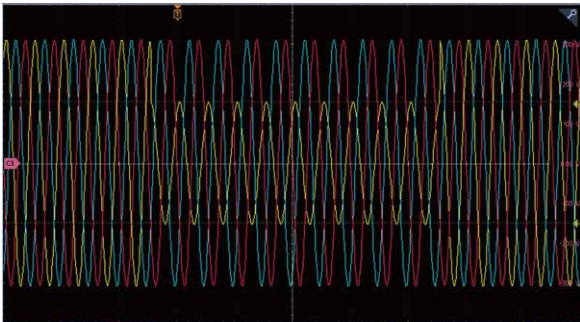
Voltage dip: Phase A 220V output, drops from the starting angle 90° to 70%, maintaining 1/2cycle



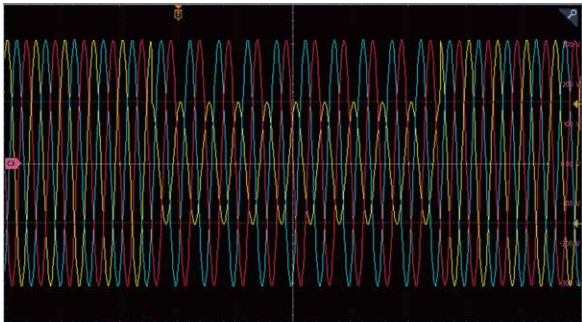
Voltage dip: Phase A 220V output, dropped from 90° from the starting angle, maintained for 1 cycle



Voltage dip: Phase B and C, drop from the starting angle 90° to 0, maintain 1/2 cycle



Short interruption: level=50%, phase=90°, lasting 10cycle

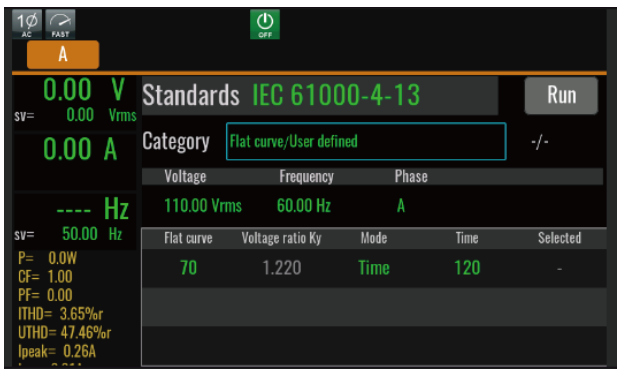
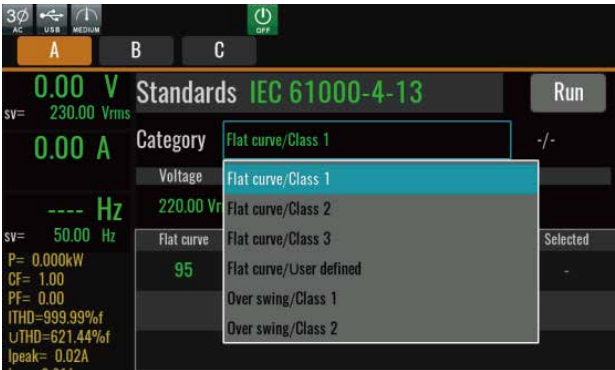


Voltage variation: level70%, 90° angle drop, Td=0, Ts=5cycle, Ti=20cycle

EN/IEC 61000-4-13 interharmonics test

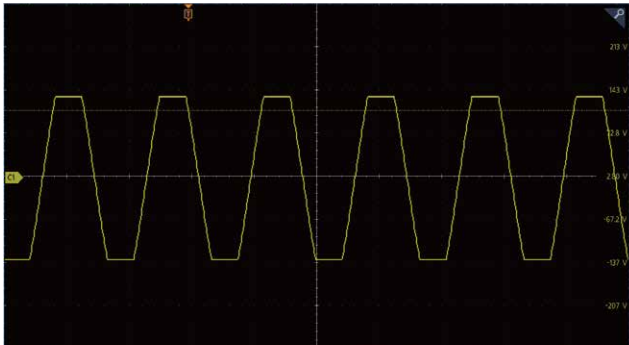
The IEC 61000-4-13 standard is to ensure that products are resistant to signal frequency interference that may be present on public power grids. Sending signals over AC power lines is often used to remotely control switchgear or other devices. ITECH AC power supplies can superimpose harmonics and inter-harmonics on the AC output and fully support IEC 61000-4-13 harmonic and inter-harmonic testing. Its arbitrary wave generation function can easily generate flat-top curve and overshoot curve waveforms to meet various testing needs.

[Flat curve test case]



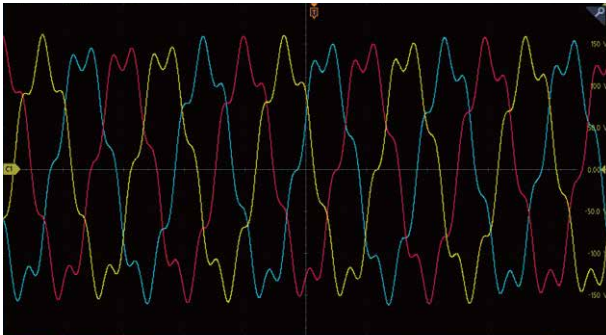
Flat curve/User defined parameter set

[Flat curve test result]



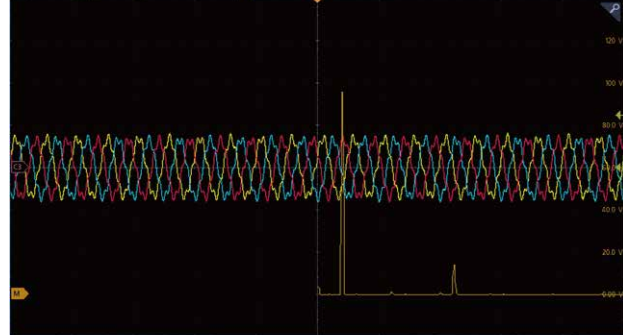
Flat curve/User defined test result

【Three-phase harmonic output-waveform】



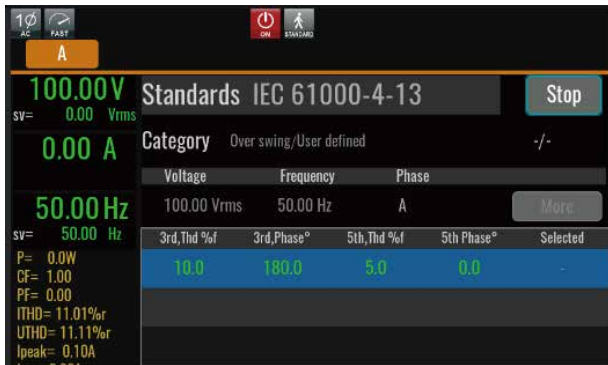
Three-phase harmonic frequency sweep test waveform results

【Three-phase harmonic output-waveform】



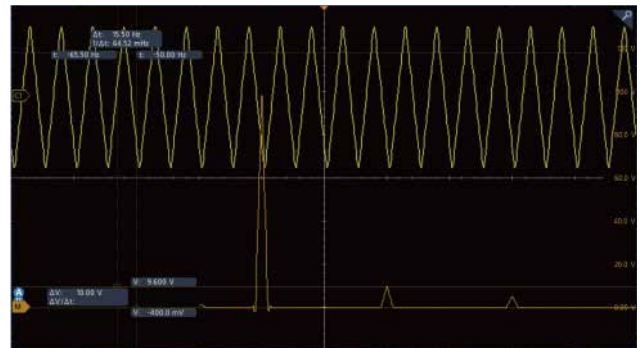
Three-phase harmonic frequency sweep test A-phase spectrum test results

【Over swing test】



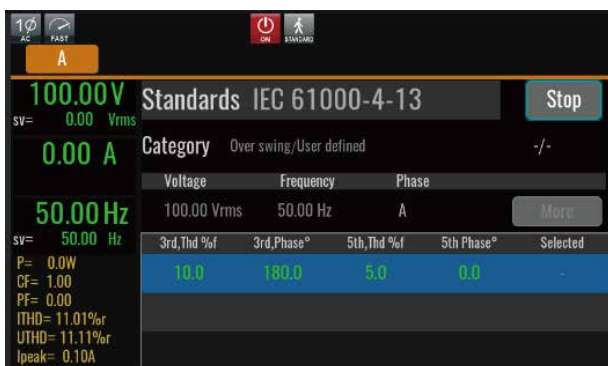
Over swing parameters

【Over swing test result】



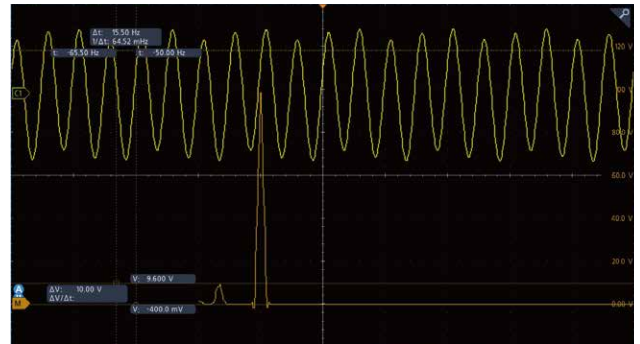
Over swing test result

【Sweep in frequency test】

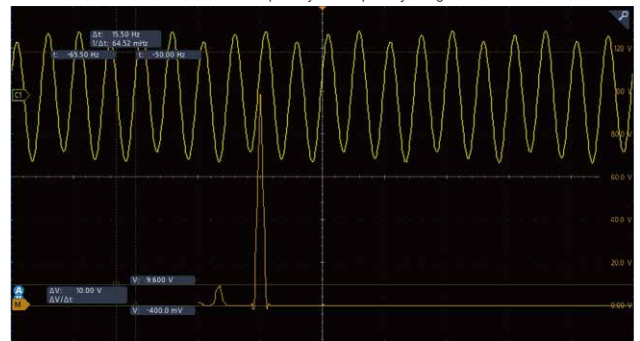


Sweep in frequency parameters

【Sweep in frequencytest result】



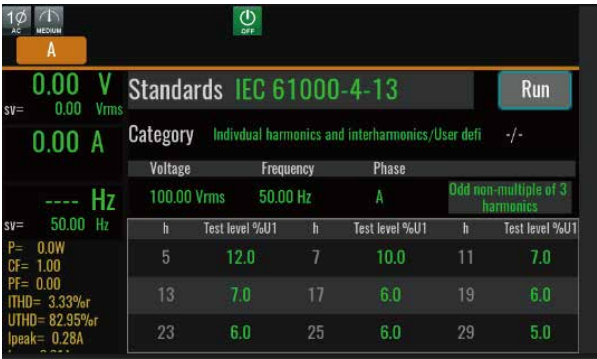
Sweep in frequency-Harmonic waveform and spectrum between a certain frequency in frequency range 1



Sweep in frequency-Harmonic waveform and spectrum between a certain frequency in frequency range 2

[Three-phase harmonic output-waveform]

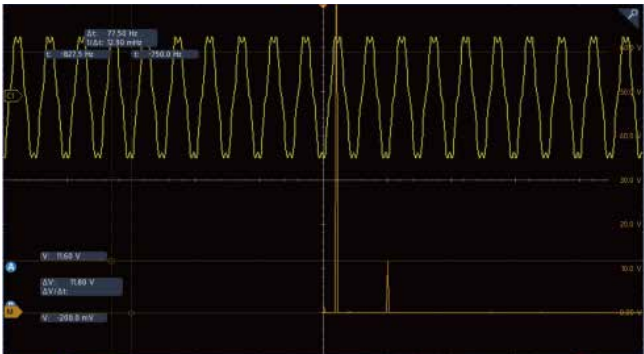
Three-phase harmonic output-waveform



Odd non-multiple of 3 harmonics parameters

[Test result]

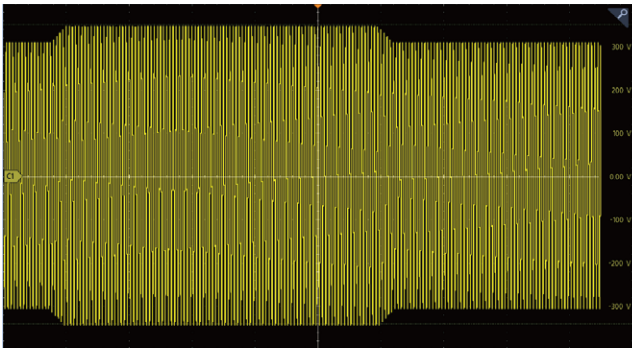
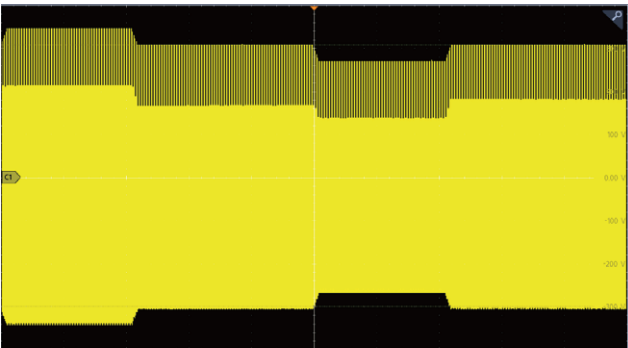
Similarly, we only show the test results at the first moment of parameter setting corresponding to Odd non-multiple of 3 harmonics, as shown below



Odd non-multiple of 3 harmonics test waveforms and spectrum results

EN/IEC 61000-4-14 Voltage fluctuation immunity test

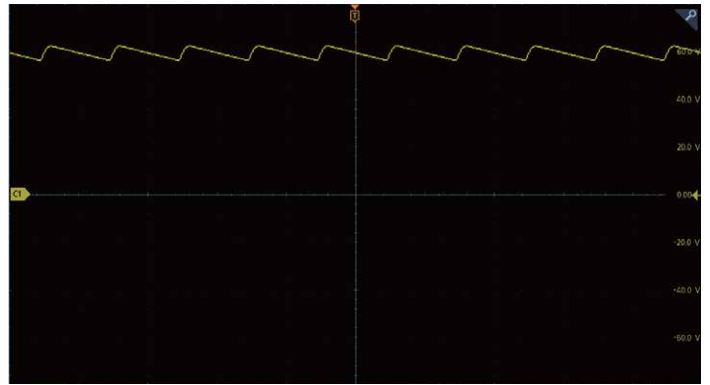
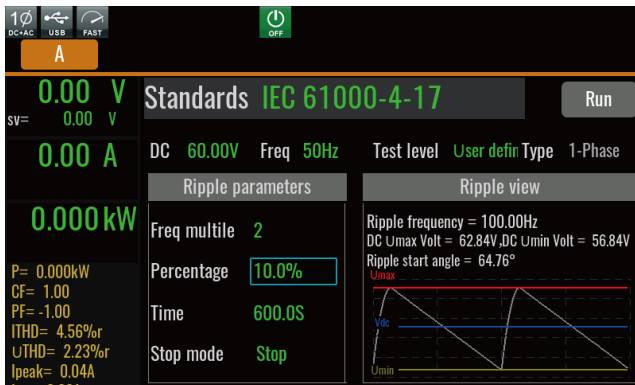
The IEC 61000-4-14 standard applies to a series of repeated voltage fluctuations. ITECH AC power supplies are capable of applying a precise and fixed series of voltage fluctuations to the DUT to complete IEC 61000-4-14 testing. ITECH AC power is preset at Level 3 and Level 2, and you can also modify the test levels as needed.



$\Delta U = \pm 12\%$

EN/IEC 61000-4-17 Ripple on DC input power port immunity test

IEC 61000-4-17 covers DC powered products. ITECH's AC and DC sources are capable of applying DC ripple voltage to these products. You can set the ripple frequency as a multiple of the AC output frequency to simulate a variety of real-world operating conditions. ITECH power supply has preset various parameters, which you can modify according to your needs, making it more flexible and practical.

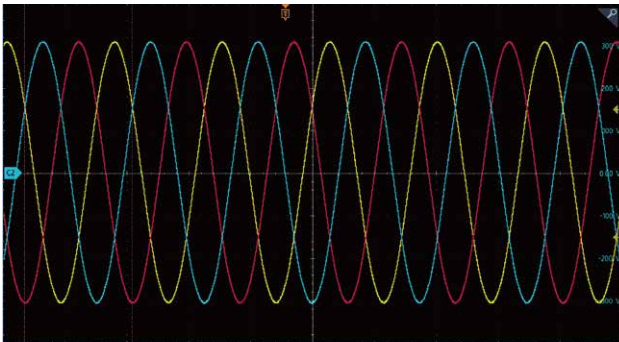
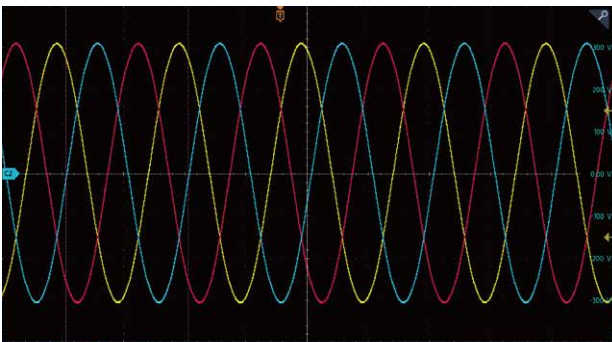


Voltage=60V , frequency=50Hz, Ripple frequency multiplier=2, Ripple peak to peak=10%

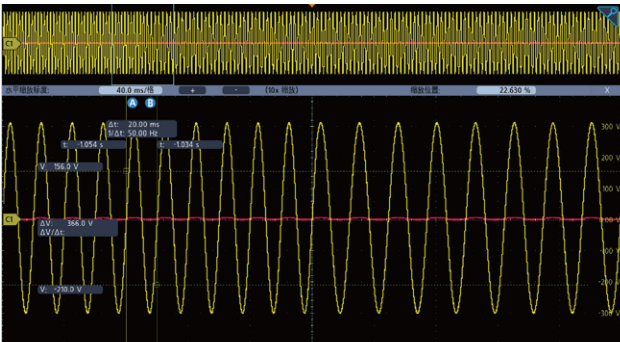
EN/IEC 61000-4-28 Variation of power frequency, immunity test

IEC 61000-4-28 is designed to evaluate the effects of changes in mains frequency on equipment that may be sensitive to interference. When conducting tests, the ITECH AC power supply is capable of applying a series of slowly varying frequency perturbations to the DUT to test whether the EUT is able to maintain stable performance. ITECH AC power supply provides 2, 3, and 4 test levels. You can test according to the needs of different products, edit the level and duration of frequency offset as needed, and develop customized test procedures.

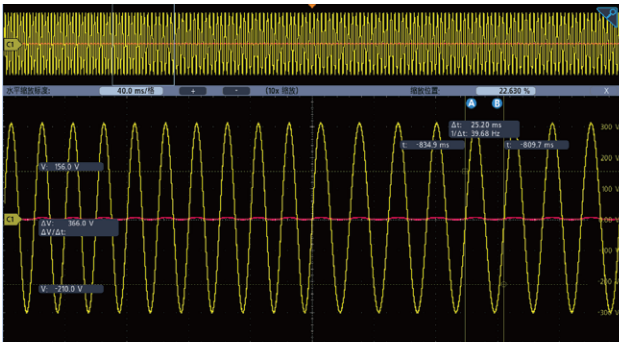




f1=50Hz,Δf/f1=15%。From 50Hz to 57.5Hz



The first AB frequency is 50Hz



After 10 cycles, the frequency is 39.7Hz

EN/IEC 61000-4-29 Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests

IEC 61000-4-29 is designed to evaluate the effects of voltage sags and interruptions on equipment that may be sensitive to such disturbances and is applied to DC powered products. ITECH's AC and DC sources will impose DC voltage drops, interruptions and fluctuations to check whether the DUT can remain stable and meet the test standards.

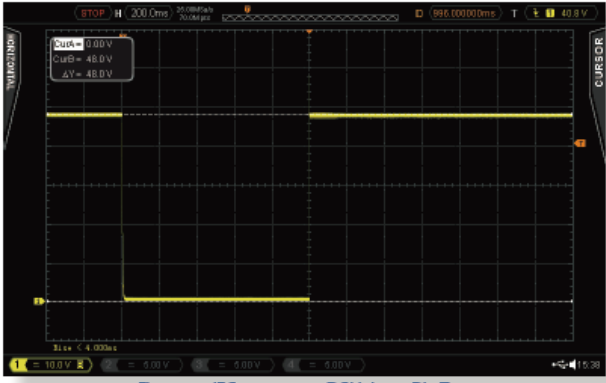
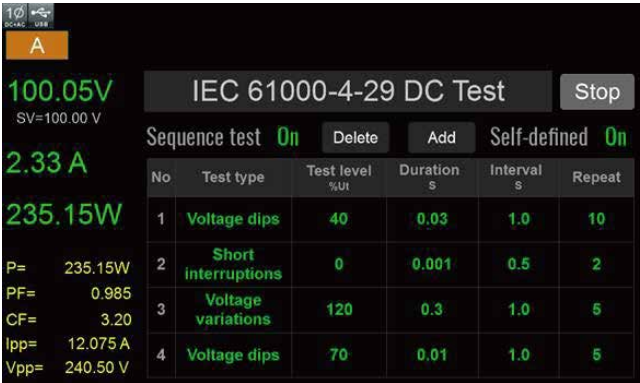


Figure 15: IEC 61000-4-29 DC Voltage Dip Test

EN/IEC61000-3-2 Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

IEC61000-3-2 is intended to specify harmonic current emission limits that 16A equipment should comply with under specified conditions. ITECH's AC power supply and load have this test standard built-in, allowing you to easily select Class A/B/C/D to check whether the harmonic current emission limit of the DUT complies with the standards specified in EN/IEC61000-3-2 .

THD observe				
Total THD observe setting				Enable
U-THD $\geq$	I-THD $\geq$	THC $\geq$	POHC $\geq$	PWHC $\geq$
4.00 %f	1.00 %f	2.00 A	2.50 A	5.00 A
Category	IEC 61000-3-2	Subset	Class A	
Harmonic order h	Max harmonic current I_h/I_{ref}	Harmonic order h	Max harmonic current I_h/I_{ref}	
2	1.08	3	2.30	
4	0.43	5	1.14	
6	0.30	7	0.77	
8-h-40 Even	$0.23 \cdot 8/h$	9	0.40	

EN/IEC61000-3-12 Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤ 75 A per phase

In order to limit the harmonic currents emitted by non-linear loads to the power grid, two international standards on harmonic current limits have been promulgated: IEC61000-3-2 targets equipment <16 A, and IEC61000-3-12 tests objects between 16A and 75A. between. You can check whether the DUT complies with the standard through IEC61000-3-12 built into ITECH's AC power supply and load.

THD observe				
Total THD observe setting				Enable
U-THD $\geq$	I-THD $\geq$	THC $\geq$	POHC $\geq$	PWHC $\geq$
4.00 %f	1.00 %f	2.00 A	2.50 A	5.00 A
Category	IEC 61000-3-12	Type	Non-balance	Rsce 33
Harmonic order h	Max harmonic current I_h/I_{ref}	Harmonic order h	Max harmonic current I_h/I_{ref}	
3	21.6			
7	7.2			
11	3.1			
Parameters	Ratio	Parameters	Ratio	
THC / I_{ref}	23	PWHC / I_{ref}	23	



This information is subject to change without notice. For more information, please contact ITECH.

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