California Instruments

Precision Power Test Product Summary

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- AC & DC Power Sources
- AC Programmable Loads
- Integrated Test Systems
- Power Frequency Changers

AC/DC POWER SOURCES
ISO 9001:2000 CERTIFIED
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2007

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California Instruments Power Products

Applications

Products that operate from any standard AC power (utility or avionics) in today's environment, are likely to encounter variations and disturbances that can play havoc with microprocessor based control systems.

For reasons of safety, or sheer inconvenience, users are no longer tolerant of unpredictable operation of their equipment. It has therefore become essential to thoroughly test new designs, and sometimes every product manufactured, with simulated non-standard power.

Another significant application is the need to operate equipment from an AC power standard not available at the location of the equipment. This can be 400 Hz in a hanger workshop or 60 Hz in Europe.

California Instruments offers some of the most cost effective solutions for AC power applications. Our products are used in thousands of places throughout the world.

Product Lines

These catalog pages contain most of the standard AC Power Sources, Test Systems and Loads available from California Instruments. There are however many special application products that are not listed. If after reviewing these catalog pages, you determine that none of our standard products fit your application, contact California Instruments directly by phone, fax or email. Our applications engineering specialists will be happy to make recommendations regarding your specific application needs.

Choosing the right AC power source or AC load for your application can be a tedious task. California Instruments offers a wide selection of AC power products and test systems with different features and capabilities at various power levels. The following table can be used to select the right AC source for your specific application. Refer to the model series listed in the center column for a description and specifications.

Application Requirements	Model Series	Page	VA Power
Fixed outputs Fixed AC Frequency Changers	P Series iM Series L Series with -M Controller FCS Series or MX Series	4 5 * 8,9	1000 VA to 1250 VA 3 kVA to 15 kVA 833 VA to 18 kVA 18 kVA to 135 kVA
Manual control of variable outputs Variable AC Frequency Changers	P Series and RP Series iM Series L Series with -M Controller FCS Series or MX Series	4 5 * 8,9	800 VA to 2 kVA 3 kVA to 15 kVA 833 VA to 18 kVA 18 kVA to 135 kVA
Simulate voltage and frequency transients with load measurements	i Series and iX Series (AC and DC) Lx and Ls Series (AC only) FCS Series or MX Series	5 6 8,9	3 kVA to 30 kVA 3 kVA to 18 kVA 18 kVA to 135 kVA
Full featured sources with advanced power analysis	iX Series (AC and DC) Lx Series (AC only) MX Series (AC and DC)	5 6 9	3 kVA to 30 kVA 3 kVA to 18 kVA 30 kVA to 135 kVA
IEC Compliance testing	CTS Series MX45-CTS Series	12 13	1250 VA to 30 kVA 45 kVA
AC Motor and Adjustable Frequency Drive Testing	MX Series	9	30 kVA to 135 kVA
Programmable AC Loads	LD Series	11	3 KW to 9 KW
AC Current Sources	CS Series	10	3 kVA to 18 kVA
DC only output	XDS Series KDC Series	15	5 KW to 60 KW 5 KW to 60 KW

**Contact Factory*

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P and RP Series - Frequency Converters

The P Series models are portable, lightweight frequency changers that can be used all over the world to select any combination of standard line voltage and frequency. This equipment is ideally suited to test products for use in other countries or as a source of known, stable AC power anywhere in the world. Domestic US and European outlets are provided on the front panel to facilitate a simple connection of the load.

801P / 1001P / 1251P

The P Series of portable AC power sources offers variable voltage and frequency outputs using digitally encoded rotary knobs. Frequency can be set between 16 Hz and 500 Hz and output voltage is available on two ranges from 0 to 135 V and 0 to 270 V RMS. A user programmable current limit function protects the load from over current conditions. Voltage, and Frequency or Current are displayed on large LCD's. The low cost, small size and reduced weight of the P Series make them suitable as a source of portable 400 Hz avionics power. Available output power levels for the P Series are 800 VA, 1000 VA or 1250 VA.

801RP / 1251RP

The 801RP and 1251RP are functionally equivalent to the P Series but are housed in a rugged 19 inch (483 mm) wide rack mount chassis. Frequency can be set between 16 Hz and 500 Hz and output voltage is available on two ranges from 1 to 135 V and 1 to 270 V RMS. A user programmable current limit function protects the load from over current conditions. Voltage, Frequency, or Current are displayed on large LCDs. For remote control applications, an optional interface supporting both IEEE-488 and RS232C is available.

2001RP

The 2001RP offers 2000 VA output power and is housed in a 5.25" height cabinet. Voltage ranges are 150 and 300 V RMS and the frequency range is 5000 Hz. The 2001RP also offers the option of additional measurements such as true power, peak current, crest factor and power factor. For avionics applications, a higher output current version (-AV option) is available.

2003RP

The 2003RP is a three phase AC Source offering variable voltage and frequency control. Voltage ranges are 135 V and 270 V RMS and the frequency range is 5000 Hz. Measurements are available for all three phases and can be selected from the front panel or over the bus. The 2003RP is a cost effective source of three phase AC power for avionics and defense applications. A standard version and a higher output current version (-AV option) is available.

P and RP Series Windows™ GUI program

Remote Control Operation

An optional remote control interface for all P and RP Series models allows complete control of all AC source functions and provides measurement readback. A Windows™ graphical user interface (GUI) program is included with the interface option. This GUI program supports transient programming through a user defined transient list of up to 100 steps. Available transient functions are voltage step, voltage drop, voltage sweep, voltage surge or sag, frequency step, frequency sweep and frequency surge or sag. Instrument drivers for LabView™ and LabWindows/CVI™ are available. If needed, the front panel can be locked out to prevent operator intervention during automated testing.

See the California Instruments website for detailed information.
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Model	Power	Phases	Voltage ranges	Max RMS Current	Frequency	Size (H x W x D)	Weight
801P	800 VA	1	0-135 / 0-270	6.0 / 3.0	16 - 500 Hz	8.25" x 8.5" x 18.3"	30 lbs.
1001P	1000 VA	1	0-135 / 0-270	7.4 / 3.7	16 - 500 Hz	210 x 216 x 464 mm	13.6 Kg
1251P	1250 VA	1	0-135 / 0-270	9.2 / 4.6	16 - 500 Hz		
801RP	800 VA	1	0-135 / 0-270	6.0 / 3.0	16 - 500 Hz	3.5" x 19" x 22"	34 lbs.
1251RP	1250 VA	1	0-135 / 0-270	9.2 / 4.6	16 - 500 Hz	89 x 483 x 560 mm	15.4 Kg
2001RP	2000 VA	1	0-150 / 0-300	13.3 / 6.7	16 - 5000 Hz	5.25" x 19" x 22"	73 lbs.
2003RP	2000 VA	3	0-135 / 0-270	5.0 / 2.5[2]	16 - 5000 Hz	133 x 483 x 560 mm	33 Kg

Notes: (1) Fixed voltages of 100, 115, 220, 230 or 240 Volt (2) Per Phase

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*i*X Series II, *i* Series II and *i*M Series - AC and DC Power Systems

The *i*X and *i* Series II consist of reduced footprint, high output AC and DC power units that can be combined to provide up to 30 kVA of power in a small amount of space. Offering 5 kVA per unit and a cabinet height of only 7 inches (178 mm, 4U) , the *i* / *i*X Series II represents one of the most compact AC power sources available today.

Controller Options

Configuration options include multiple unit single phase, as well as multiple unit three phase systems, for a power output level of 5 kVA, 10 kVA, 15 kVA or 30kVA. The *i*M Series uses a manual oscillator for applications requiring only basic frequency conversion. For more demanding applications, the *i* Series II uses a programmable version which offers a full set of features including Line Distortion Simulation (LDS), measurement functions and IEEE-488 or RS232C remote control. The *i*X Series II offers a programmable controller with advanced measurements, power analysis and arbitrary waveform generation. Both programmable controllers (*i* and *i*X Series II) offer AC as well as DC output modes. The *i*X Series II also provides combined AC+DC output. The *i*M Series provides AC output only.

Arbitrary Waveforms

The *i*X Series II supports arbitrary waveform generation in addition to standard Sine, Clipped Sine and square wave. A total of 200 user defined waveforms can be stored in the AC Source. Combinations of harmonics may be synthesized to test for voltage harmonic immunity.

Advanced Measurements

The *i*X Series II includes a high resolution, dual-channel power analyzer for each output phase, which provides harmonic analysis and waveform acquisition of the output voltage and current. These built-in comprehensive measurements eliminate the need for additional test equipment in most test setups.

Transient Programming

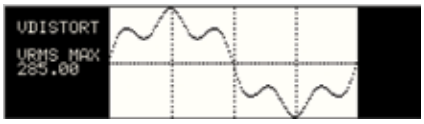
Both *i*X and *i* Series II Power sources offer extensive output transient capabilities to simulate common line disturbances such as drop-outs, sags, surges and dips. Transients can be entered from the front panel and saved for later recall.

Ease Of Use

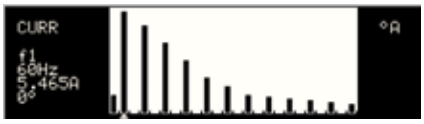
The *i*X and *i* Series II controllers use a large graphical LCD display and keyboard to facilitate easy front panel operation. Intuitive menus and user prompts make front panel control easy. All functions are also fully programmable over the IEEE-488 or RS232C bus using the industry standard SCPI (Standard Commands for Programmable Instruments) programming language.

AC Source Control Software

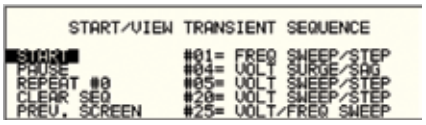
All *i*X and *i* Series II AC/DC power systems include a Windows™ Graphical User Interface (GUI) program. The GUI supports all functions and capabilities of the *i*X and i Series II. Drivers for popular programming environments such as LabView™ and LabWindows/CVI™ are available as well for custom software development.



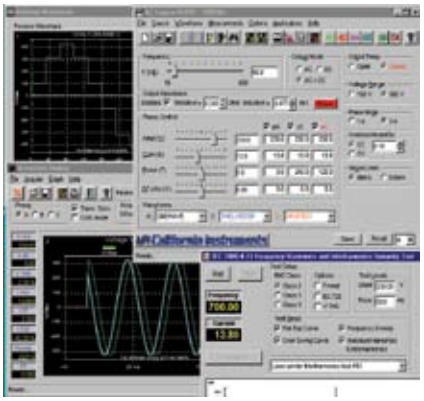
User defined, arbitrary waveform capability with on screen pre-view display.



Advanced measurements including harmonic analysis with graphical and tabular displays.



Programmable output transients with on-screen editing and control.



CIGUI32 Windows™ GUI program for source control, waveform editing and measurement data display.

See the California Instruments website for detailed information. www.california-instruments.com

iX, i and iM Series Model Number Selection Table. (*i*X = Arbitrary, *i* = Programmable, *i*M = Manual controller)

Model[1]	Controller Suffix	Power at 40° C	Phases	Phase mode	Progr, Z_o	Current @ 135 V A rms	Current @ 135 V A peak[2]	Irms/ø 3ø mode	Size (H x W x D)	Weight
3001	*i*, *i*X or *i*M	3000 VA	1		*i*X only	22	110	n/a	7" x 19" x 24"	61 lbs.
5001	*i*, *i*X or *i*M	5000 VA	1		*i*X only	37	110	n/a	178 x 483 x 610 mm	28 Kg
9003	*i*, *i*X or *i*M	9000 VA	1 or 3	option	*i*X only	66	330	22	21" x 19" x 24" 534 x 483 x 610 mm	183 lbs. 84 Kg
10001	*i*, *i*X or *i*M	10000 VA	1			74	220	n/a	14" x 19" x 24" 356 x 483 x 610 mm	122 lbs. 56 Kg
15001	*i*, *i*X or *i*M	15000 VA	1			111	330	n/a	21" x 19" x 24"	183 lbs.
15003	*i*, *i*X or *i*M	15000 VA	1 or 3	option	*i*X only	111	330	37	534 x 483 x 610	84 Kg
30003	*i*, *i*X or *i*M	30000 VA	3			74 / ø	220 / ø	74	42" x 19" x 24" 1068 x 483 x 610 mm	366 lbs. 168 Kg

Notes: (1) All models are factory configured. (2) Repetitive peak current capability.

Line Input Configurations:

Models 3001, 9003: 208-240±10% V L-N, 1ø All other Models: 208-240±10% V L-L, 3ø option -400: 400-480±10% V L-L, 3ø

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Compact *i*/*iX* Series - AC and DC Power Sources

The Compact *i*/*iX* Series consist of compact, high output AC and DC power units that can be combined to provide up to 3000 VA of power in a small amount of space. Offering 750 and 1500 VA single phase units and a 2250 3 phase unit, the Compact *i*/*iX* Series represents one of the most compact AC power sources available today and has many of the same features found in the popular i/iX Series II programmable power sources.

Model		751*i*/*iX*	1501*i*/*iX*	2253*i*/*iX*
Input				
Voltage:		115Vrms +/- 10% 230Vrms +/- 10%	115Vrms +/- 10% 230Vrms +/- 10%	115Vrms - 230Vrms +/- 10%
Frequency:		47 - 63 Hz	47 - 63 Hz	47 - 63 Hz
Current:		<8.5 Arms @ 115 V <4.4 Arms @ 230 V	<17 Arms @ 115 V <8.8 Arms @ 230 V	<20 Arms @ 115 V <15 Arms @ 230 V
PF:		0.97 (typical @ full load)	0.97 (typical @ full load)	0.98 (typical @ full load)
Efficiency:		80%	80%	77%
AC Output				
Voltage:	High Range: Low Range:	0 - 300Vrms 0 - 150Vrms	0 - 300Vrms 0 - 150Vrms	0 - 300Vrms 0 - 150Vrms
Max. Current:	High Range: Low Range:	3.25Arms 6.5Arms	6.5Arms 13Arms	3.25Arms (per phase) 6.5Arms (per phase)
Peak Current:	High Range: Low Range:	20 A Peak 10 A Peak	40 A Peak 20 A Peak	20 A Peak 10 A Peak
AC Power:		750VA	1500VA	750VA (per phs)
Distortion:		< 1% THD	< 1% THD	< 1% THD
DC Output				
Voltage:	High Range: Low Range:	0 - 400Vdc 0 - 200Vdc	0 - 400Vdc 0 - 200Vdc	0 - 400Vdc 0 - 200Vdc
Max. Current:	High Range: Low Range:	1.67Adc @ 300V 1.67Adc @ 150V	1.67Adc @ 300V 3.33Adc @ 150V	1.67Adc @ 300V (per phase) 3.33Adc @ 150V (per phase)
High Range:		500W	1000W	500W (per output)
Low Range:		250W	250W	250W (per output)
Frequency				
Range:		16 – 1000Hz	16 – 1000Hz	16 – 1000Hz
Resolution:		0.01 Hz (16 – 81.91 Hz), 0.1 Hz (– 82.0 – 819.1 Hz) 1 Hz (820– 1000 Hz)	0.01 Hz (16 – 81.91 Hz), 0.1 Hz (– 82.0 – 819.1 Hz) 1 Hz (820–1000 Hz)	0.01 Hz (16 – 81.91 Hz), 0.1 Hz (– 82.0 – 819.1 Hz) 1 Hz (819 Hz)
Accuracy:		0.025%	0.025%	0.025%
Measurements				
Voltage/Current Accuracy:		0.1% FS	0.1% FS	0.1% FS
Current Accuracy:		0.5% FS	0.5% FS	0.5% FS
Mechanical Specifications				
Dimensions		H: 3.5" (89mm), W: 19" (483mm), D: 23" (584mm)	H: 3.5" (89mm), W: 19" (483mm), D: 23" (584mm)	H: 5.25" (133mm), W: 19" (483mm), D: 23" (584mm)
Weight:		55 lbs (25kg)	66 lbs (30kg)	58 lbs (26kg)
Operating Temperature:		0-40°C	0-40°C	0-40°C
Interfaces				
USB:		Standard	Standard	Standard
GPIB:		Option (*i*) Std (*iX*)	Option (*i*) Std (*iX*)	Option (*i*) Std (*iX*)
LAN:		Option (*iX*)	Option (*iX*)	Option (*iX*)
RS232:		N/A	N/A	Standard

Combination AC and DC Power Source and Power Analyzer
Replace multiple instruments with a single multifunction unit

Single & Three Phase Operation
Maximum output of 750VA per phase

750 VA to 2250 VA of Output Power
Cost effective power source

Arbitrary Waveform Generation
User defined voltage waveform and distortion programming

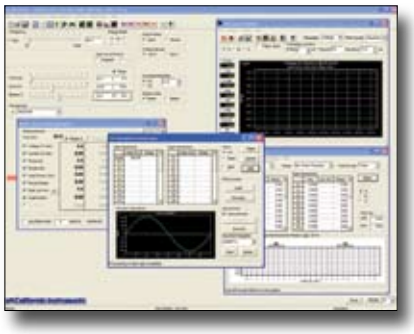
Built-in Digital Power Analyzer
Analyze frequency and time domain of both voltage & current

Rackmountable
Space-saving rackmount chassis

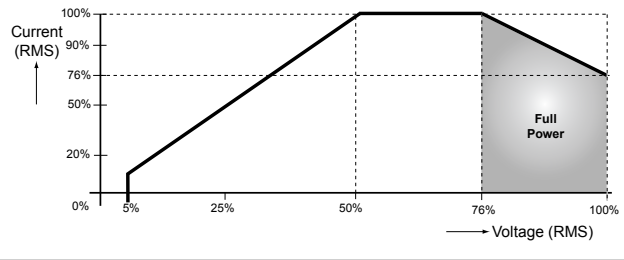
Scope Capture Capability
Built in voltage and current waveform acquisition capability

Powerful Programing Software
Powerful, yet easy to use, instrument control software included
(Avionics test software also available)

Constant Power Mode
Provides increased current at reduced voltage to maximize efficiency



Constant Power Chart



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Lx / Ls Series - Precision AC Power Sources

The Lx and Ls Series Precision AC Power Sources consist of a range of models offering output power levels between 3 kVA and 18 kVA. Using the latest power electronics technology, these units provide compact, precise AC power outputs in single or three phase configurations. The Ls Series provides all common AC source functions for control and measurements. Optional features like arbitrary waveform generation and harmonics measurements can be added. The Lx Series includes these advanced features standard. Both products are particularly suited for applications requiring frequencies up to 5 kHz (-HF option required).

The Lx Series also provides bus compatability with the Agilent 6834B power source.

Exclusive Features

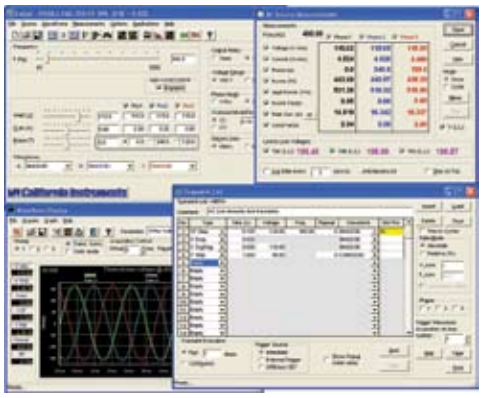
- Drive non-linear loads without derating.
  Full output VA with 0 to 1 power factor
- Support both single and three phase output requirements
  Phase Mode (option on Ls, standard on Lx) allows switching between 1 and 3 phase output configuration without re-wiring.
- Constant power mode
  3 kVA and 4.5 kVA models provide higher currents at reduced voltages for a current power output.
- High Efficiency
  Efficiency 75% typical or better. Generates less heat and consumes less power.

Remote Control

All Ls Series AC sources include RS232 remote control. Both RS232 and GPIB are standard on the Lx Series. A Windows™ Graphical User Interface (GUI) program is included as well. The following tasks can easily be performed with this program using the IEEE-488 or RS232 interface:

- Control all output parameters such as voltage, current limit, phase and frequency.
- Compile lists of transient programs on disk for quick recall and execution.
- Measure and record output parameters such as volt rms, current, real power, and power factor.
- Run RTCA/DO160 (requires option -160) or MIL-STD 704 tests (requires option -704)
- Monitor remote control commands over the bus using the built in command viewer window to quickly learn how to program the Ls/Lx Series yourself.

Drivers for popular programming environments such as LabView™ or LabWindows/CVI™ are available.



Lx / Ls Series Windows™ control program

L Series AC Power Amplifier Selection Table:

Model	Output Power at 35° C[1]	Phase[2]	Volt/Current @ FS Low V rng Vrange	Arms[3]	A peak[4]	Amps/phase 3 phase	Size (H x W x D)	Net Weight
3000Ls	3000 VA	1 or 3	135/270	22.2	133	7.4		
3000Lx	3000 VA	1 and 3	150/300	20	115	6.6		
4500Ls	4500 VA	1 or 3	135/270	33.3	133	11.1	10.5" x 19" x 23"	193 lbs.
4500Lx	4500 VA	1 and 3	150/300	30	115	10	267 x 483 x 584 mm	87.7 Kg
6000Ls	6000 VA	1 or 3	135/270	44.4	133	14.8		
6000Lx	5770 VA	1 and 3	150/300	38.4	115	12.8		
9000Ls	9000 VA	1 or 3	135/270	66.6	266	22.2		
9000Lx	9000 VA	1 and 3	150/300	60	230	20	21" x 19" x 23"	386 lbs.
12000Ls	12000 VA	1 or 3	135/270	88.8	266	29.6	533 x 483 x 584 mm	175 Kg
12000Lx	11540 VA	1 and 3	150/300	76.8	230	25.6		
13500Ls	13500 VA	1 or 3	135/270	100	400	33.3		
13500Lx	13510 VA	1 and 3	150/300	90	345	30	31.5" x 19" x 23"	579 lbs.
18000Ls	18000 VA	1 or 3	135/270	133.2	400	44.4	800 x 483 x 584 mm	263 Kg
18000Lx	17310 VA	1 and 3	150/300	115.2	345	38.4		

Notes:
(1) Derate power by 10% for operation at 50° C ambient or when using the -400 option.
(2) Ls models factory configured -1 or -3 phase unless the "MODE" option is specified.
(3) Max. RMS current at max. voltage on Low V range in 1 phase mode.
(4) Repetitive peak current capability on Low V range in 1 phase mode.

AC Mains Input

Voltage: Models
-208 187V to 252V 3ø L-L
-400 342V to 456V 3ø L-L
(-400 option, not available on 6000Lx/Ls, 12000Lx/Ls or 18000Lx/Ls)
Models 3000Lx/Ls may also be operated from single phase 187 - 252 V input.
Frequency: 47 Hz to 440 Hz

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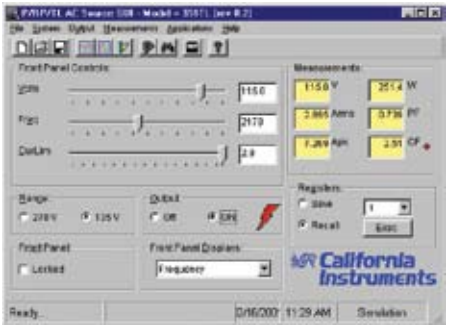
TL Series - High Bandwidth Linear AC Power Sources

Exclusive Features

- 45 Hz to 8000 Hz (Contact factory for requirements above 8 KHz)
- Dual voltage ranges
- Easy to Use
- Programmable
- Standard Current measurement
- Rack Mount
- Optional measurements for Peak Current, Voltage, Real Power, Apparent Power, Power Factor and Crest Factor (with option -OP1)
- Rear panel Connections. (Front panel connections optional.)
- Optional IEEE-488 and RS232C interfaces
- CE Mark

The TL Series consists of two models offering 250 VA or 350 VA of AC power at frequencies up to 8000 Hz. Using new linear technology, the TL Series supports full current at 78 % of voltage range and a 0.7 power factor load while maintaining very low noise (-72 dB) and low distortion. This makes the TL Series a good candidate for special applications requiring very clean and / or high frequency AC power.

The TL Series uses a digital controller with easy to use front panel control for setting voltage, frequency and current limit. Voltage and RMS current measurements are standard as well as full protection for over current and over temperature conditions. An option package adds additional measurements such as peak current, power and power factor. The same option includes both RS232C and IEEE-488 remote control and bundles Windows GUI control software.



TL Series Windows™ GUI program

Model	Max. Power	Phases	Voltage ranges	Max RMS Current	Frequency	Size (H x W x D)	Weight
251TL	250 VA	1	0-135 / 0-270	2.1 / 1.1	45 - 8000 Hz	5.25" x 19" x 22"	73 lbs.
351TL	350 VA	1	0-135 / 0-270	2.9 / 1.5	45 - 8000 Hz	133 x 483 x 560 mm	33 Kg

FCS Series - High Power AC Systems

Front Panel Configurable for Single- or Multi-Phase Operation

System characteristics may be reconfigured to meet changing test needs

Voltage and Frequency Programmable Over IEEE-488 Bus

Standard world power & avionics test parameters computer programmable

Full Power Line Disturbance Simulation Available

Test for dropouts, transients andother power quality parameters

Drives Non-Linear Loads and High Peak In-Rush Current Input Stages

Full output power at 0 to 1 power factor, peak current up to 375 A at 18 kVA

The FCS Series provides single or three phase high power, used primarily for facility wide distribution or product test applications. Systems can be configured from 18 kVA up to 72 kVA. FCS systems are made up of compact, low center of gravity cabinets that can be moved around easily to different locations. Using a highly efficient pulse width modulation DC/DC converter design, the FCS series delivers clean, stable power at a high efficiency rate in a compact package.

Both manual oscillators or programmable controllers are available for the FCS Series of AC amplifiers. Programmable controllers offer Line Distortion Simulation (LDS) and transients for product test applications. Options for MIL-STD704D and RTCA-DO160 tests are available for avionics applications requiring these high levels of output power.

Model	Output Power	Phase	Current @ 135V A rms	A peak	Arms / ø	Size (H xW x D)
FCS-18[1]	18 kVA	1 or 3	133	375	44.4	45"x30"x36" 1140x760x920 mm
FCS-36	36 kVA	1 or 3	266	750	88.8	45"x60"x36" 1140x1520x920 mm
FCS-54	54 kVA	1 or 3	400	1125	133	45"x90"x36" 1140x2280x920 mm
FCS-72	72 kVA	1 or 3	533	1500	178	45"x120"x36" 1140x3040x920 mm

Note: For lower power, refer to iX and Lx/Ls Series section. For higher power see MX Series

See the California Instruments website for detailed information. www.california-instruments.com

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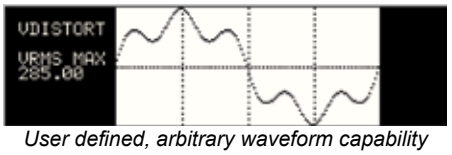
MX Series - High Power AC and DC Power Systems

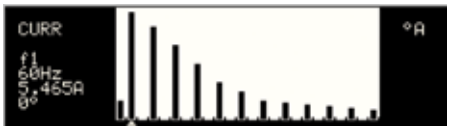
Single MX-30 or MX-45 cabinet configurations can be ordered with either single phase output, three phase output or both (MODE). Multi-cabinet configurations provide three phase output mode only.

The -3Pi models are fully programmable over the IEEE-488 or RS232C bus using the industry standard SCPI (Standard Commands for Programmable Instruments) programming language and a fully functional Windows™ Graphical User Interface (GUI) program is provided for control using a PC.

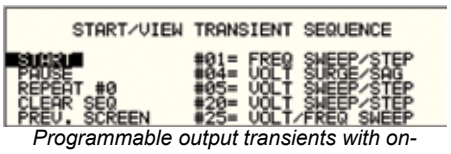
To increase versatility, all MX Series models provide a constant power mode (See chart) between 80 and 100% of voltage range. This provides additional current for the EUT at the commonly used operating points.



User defined, arbitrary waveform capability with on screen pre-view display.



Advanced measurements including harmonic analysis with graphical and tabular displays.

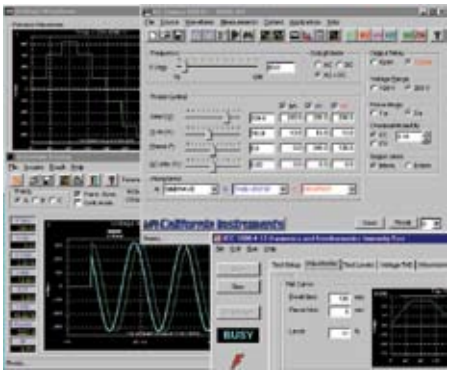


Programmable output transients with on-screen editing and control.

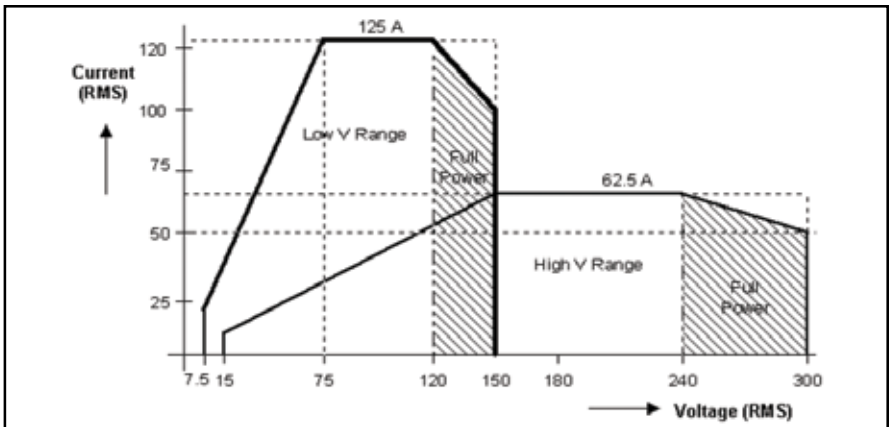
The MX Series provides single or three phase high power for both AC and DC test applications. Base models provide all standard control and measurement functions while -3Pi models have a more sophisticated controller with advanced capabilities such as arbitrary waveform generation, harmonic analysis and programmable output impedance. An intuitive menu driven user interface makes operation of the MX Series easy for novice and experienced users alike.

Using the latest advances in high power switching technology, the MX Series uses an advanced PWM modulation technique to provide low distortion, precisely regulated AC and DC output at power levels up to 135 KVA. The direct coupled output stage of the MX Series supports AC, DC and AC+DC output modes and programmable output impedance.

Available voltage ranges are 150 and 300 VRMS L-N for applications requiring up to 519 V L-L in three phase mode. An additional 400 V L-N voltage range is available as an option (-HV).



MXGui Windows software included with - 3Pi models.



Constant power mode chart for MX45-3Pi in 3 phase mode.

Model	Output Power	Phase Modes	Current @ 120V A rms	A peak	Arms / 1ø	Size (H xW x D)
MX-15	15kVA	1	125	300	125	31.75"x24"x28" 806x610x711 mm
MX-30-1	30 kVA	1	250	900	250	45"x30"x36" 1140x760x920 mm
MX-30-3	30 kVA	3	83.3	300	n/a	45"x30"x36" 1140x760x920 mm
MX-45-1	45 kVA	1	375	900	375	45"x30"x36" 1140x760x920 mm
MX-45-3	45 kVA	3	125	300	n/a	45"x30"x36" 1140x760x920 mm
MX-90-3	90 kVA	3	250	600	n/a	45"x60"x36" 1140x1520x920 mm
MX-135-3	135 kVA	3	375	900	n/a	45"x90"x36" 1140x2280x920 mm
MX-30-3Pi	30 kVA	1 and 3	83.3	300	250	45"x90"x36" 1140x2280x920 mm
MX-45-3Pi	45 kVA	1 and 3	125	300	375	45"x30"x36" 1140x760x920 mm
MX-90-3Pi	90 kVA	3	250	600	n/a	45"x60"x36" 1140x1520x920 mm
MX-135-3Pi	135 kVA	3	375	900	n/a	45"x90"x36" 1140x2280x920 mm

Note: For power levels below 15KVA/phase refer to the FCS Series or iX Series sections

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CS - Current Source

Introduction

The CS Series represents an advanced AC current source that addresses increasing demands on manufacturers to test products using real-world current profiles. By combining true current trans-conductance amplifiers with an advanced digital controller and harmonic power analyzer, CS Series current sources are capable of performing tests that would traditionally have been difficult to accomplish.

The CS Series is completely microprocessor controlled and can be operated from a simple front panel keypad. An analog knob located next to the backlit alphanumeric LCD display allows output current or frequency to be slewed up or down dynamically.

With precise current programming and regulation, high output current, multi-phase mode and built-in power analyzer measurement capabilities, CS Series AC current sources address many AC current test applications. Additional features, like arbitrary waveform generation and transient generation make the CS Series the ideal source for demanding production test requirements.

All CS Series AC Sources are equipped with IEEE-488 (GPIB), USB and RS232C remote control interfaces and support SCPI command language programming. An Ethernet interface is optional (-LAN Option).

Applications

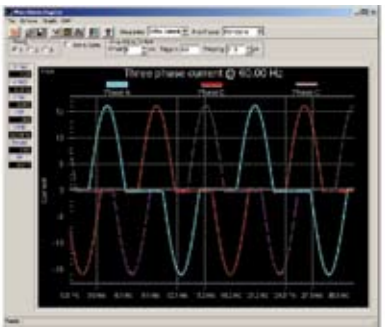
AC Current Sources are useful in a variety of applications. Precise evaluation of circuit breakers, overload relays, bi-metal temperature sensors or heating elements is easily done. Another common application is non-destructive testing of fuses. The arbitrary waveform capability of the CS makes it possible to test these devices under real-world circumstances with harmonically rich current waveforms. Protection devices that are specified to withstand specific current levels for certain durations can be tested easily with the CS current source by programming specific current levels, frequencies and durations using the transient programming system. Available transient modes are fixed, step, pulse and list.

Other typical applications include:

- Life testing and continuity checking of harnesses and connectors.
- Electro-plating at frequencies other than 50 or 60 Hz.
- Calibration of current clamps, watt-hour meters, current probes
- Transformer and inductor testing.

- **Precision Current Source**
  Ideally suited for current protection device testing
- **Single and Three Phase Mode**
  Increased current output for single phase EUTs
- **3kVA to 18kVA Power Levels**
  Match power source and cost to application requirements
- **Arbitrary Waveform Generator**
  Test products using real world current profiles including harmonic currents
- **Built-In Power Analyzer**
  Performs voltage and current harmonic analysis and waveform acquisition
- **Standard IEEE-448, USB and RS232C**
  Remote control interface for ATE system integration and free Windows GUI included

Windows GUI Main Screen



Waveform Display, User Defined Current Waveform, Three Phase

CS Series Model Numbers

Model	Output Power	Phase Output	Current 1Phase	Current 3Phase	Input Voltage[1]
3000CS	3 kVA	1/3	44.44 A	14.81	208-230V
4500CS	4.5 kVA	1/3	44.44 A	14.81	208-230V
4500CS-400	4.5 kVA	1/3	44.44 A	14.81	400V
9000CS/2	9 kVA	1/3	88.88 A	29.62	208-230V
9000CS/2-400	9 kVA	1/3	88.88 A	29.62	400V
13500CS/3	13.5 kVA	1/3	133.33 A	44.44	208-230V
13500CS/3-400	13.5 kVA	1/3	133.33 A	44.44	400V
18000CS/4	18 kVA	1/3	177.77 A	59.24	208-230V
18000CS/4-400	18 kVA	1/3	177.77 A	59.24	400V

Note (1): All input voltage specifications are for Line-to-Line three phase, delta or wye. Model 3000CS (208 V input) can be operated on 230 V L-N single-phase.

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EC1000S - Programmable AC/DC Power Sources

750 VA - 1 KVA
115 V / 230 V input

Bench-top Portability
Compact, light , and portable

Large LCD Screen
Large 5.7 LCD makes it easy to view settings and measurement values on a single screen

Measurement Capabilities
Measures voltage, current, electrical power, frequency, power factor, CF, and harmonic current

Powerful Measurement Features
Measurement value logging, sequence editing, and creation of arbitrary waveform using the control software

Current Limiter
Up to 4X peak output current, voltage, frequency limiter setting

Quick Connect
USB interface makes connections simple

Sequencing
Program output patterns for powerful flexibility

Portable Flexibility

The EC1000S not only supplies AC and DC power, it also allows free programming of outputs such as instantaneous interruption, voltage sweep, and voltage variation patterns. The EC1000S has essential functions for power tests, including a variety of output measurements and measurements related to the load power supply input. In addition, while the EC1000S can output as much as 1kVA @ 200V, it's desktop size makes it an extremely convenient, yet powerful choice for AC and DC applications.

Measurements

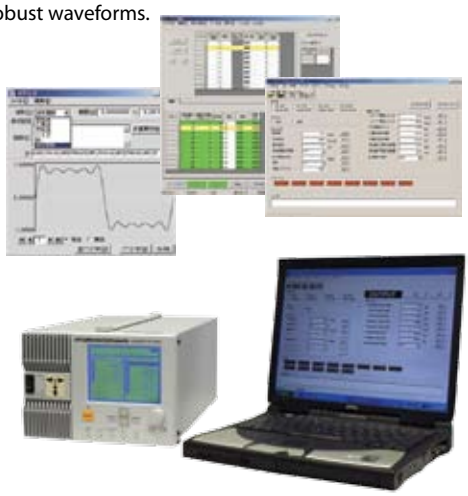
Powerful features for measuring frequencies, load power factors, crest factors (CF) and even harmonic currents, in addition to the voltage and current. Settings and measurements are simultaneously displayed on the large 5.7 LCD.

Test Applications

Program output variation patterns used to test the power supplies of devices and parts. Simultaneous sweeping of frequency and voltage and arbitrary waveforms are supported.

Instrument Control Software

Sophisticated software tools with a logging function for importing/saving measurement value data, facilitating creation of reports, data analysis, and other operations. Includes a sequence function to edit, execute, save and operate a series of output variation patterns. Includes an arbitrary waveform creation function to easily create robust waveforms.



LD Series - Programmable AC Loads

The 3091LD is designed to provide precisely controlled, non-linear loads for testing AC power generation equipment such as UPS's and AC sources. In addition, any active or passive current carrying devices such as switches, circuit breakers, fuses, connectors and power semiconductors can be tested. The 3091LD AC Load can simulate high crest factor and variable power factor load conditions. This provides an effective method of testing AC products against real-world conditions and can significantly increase product reliability.

Front Panel Control

The AC load can be operated from an easy to use, menu driven front panel. Product tests can be performed quickly in an R&D setting by punching up specific load conditions on the front panel and reading the measurement screen of the 3091LD. This fast interactive front panel control mode can be used during a product's early development cycle to isolate potential performance problems, before the product leaves the engineering lab.

Automated Test

The 3091LD can be deployed in ATE test stations using either IEEE-488 or RS232C remote control. The industry standard SCPI (Standard Commands for Programmable Instrumentation) protocol is used and instrument drivers are available to ease test software development. The built-in metering functions include standard measurements, harmonics analysis and waveform capture. This breadth of measurement functions eliminates the need for additional test equipment such as meters, power analyzers and oscilloscopes.

This, and the reduced size of the 3091LD compared to passive load banks, represents a savings in both cost and rack space.

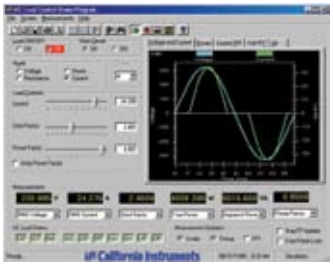
Power Levels

Each 3091LD is capable of dissipating 3000 W of single phase AC power. For higher power or three phase applications, a 3091LD master unit can be combined with one or more auxiliary units. The master 3091LD unit provides the required consolidated measurements so the test system controller - or the operator - need only interface to the master unit, regardless of the specific configuration. Single, split or three phase configurations can be software configured from the master 3091LD for maximum versatility.

Operating Modes

The following AC Load modes are available:

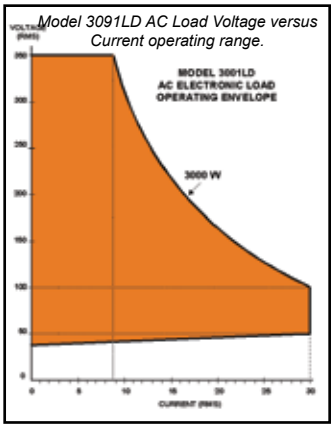
- Constant Current
- Constant Power
- Constant Resistance
- Constant Voltage
- Short Circuit



Windows Graphical User Interface Included.

Note: Higher power and/or three phase AC load systems can be created by combining one master 3091LD with one or more 3091 auxiliary units.

Line Input Configurations:
Standard: 115 ± 10 % V L-N.
Option -230: 230 ± 10 % V L-N



Model 3091LD AC Load Voltage versus Current operating range.

AC Load Selection Table:

Model	Description	Power	Size (H x W x D)	Weight
3091LD	Programmable AC Load Master	3000 W	8.75"x19"x25" (222x483x635)	70 lbs. (32 Kg)
3091	Programmable AC Load Aux. Unit	3000 W	8.75"x19"x25" (222x483x635)	70 lbs. (32 Kg)

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CTS - Compliance Test Systems

Introduction

The CTS Series is a complete, turn-key compliance test system for EN 61000-3-2 / IEC 1000-3-2 (Harmonics), EN 61000-3-3 / IEC 1000-3-3 (Flicker) and various EN 61000-4 / IEC 1000-4 AC immunity tests. Consisting of an AC power source, a signal interface unit (PACS) and a PC based data acquisition system, the CTS provides a complete turn-key solution for IEC testing. The Windows™ based CTS software performs all required IEC tests and generates detailed test reports. Comprehensive data files are stored on disk to allow post test analysis.

The CTS system implements all IEC standards including the new **Amendment 14** and provides a software only upgrade path for future standard changes.

A European style AC outlet is provided on the front panel for easy connection of single phase loads. Three phase loads are connected using rear terminal blocks.

Covered EN61000 Standards

The following tests can be performed using an iX Series based CTS system:

EN 61000-3-2	Harmonics
EN 61000-3-3	Flicker
EN 61000-4-11	Voltage Dips and Interruptions
EN 61000-4-13	Harmonics and Inter-harmonics (requires option -413)
EN 6100-4-17	DC Ripple
EN 61000-4-14	Voltage Fluctuations
EN 61000-4-28	Frequency Variations
EN 61000-4-29	DC Dips and Interruptions

EN 61000-3-2 Harmonics

Full compliance testing for current harmonics emissions of class A, B, C and D products is supported. Support for both the 1998 and 2001 version (Amendment 14) of the Harmonics standard is built-in for full compliance with both harmonics standards.

EN 61000-3-3 Flicker

Flicker results are displayed in real-time during the entire test. No need to wait until the entire test is completed to know if the EUT passed or failed. Both programmable and lumped reference impedance methods are available for flicker testing.

EN 61000-4-11 Voltage Dips

Pre-compliance Voltage Dips and Interruptions are available on most CTS systems. For full compliance solutions, the Electronic Output Switch (option -EOS1 or -EOS3) may be added to iX based CTS systems.

EN 61000-4-13 Interharmonics

Testing to the EN 61000-4-13 Interharmonics standard is supported on all iX Series based CTS systems by adding the -413 option.

Other EN 61000-4 Immunity Tests

Additional immunity test standards are supported on all iX based CTS Systems.

Configurations

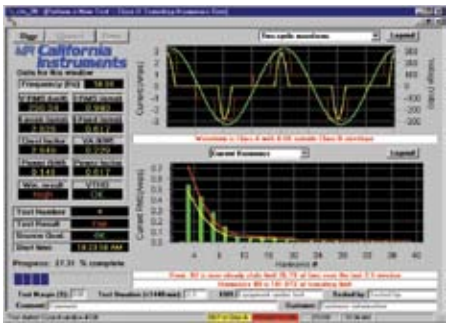
The CTS system is available in both single phase and three phase configurations. Single phase configurations range in power from 1250 VA to 5000 VA.

Three phase configurations offer 30 k VA or 37 A per phase at 230 V. Single phase 5001iX-CTS systems can be upgraded to three phase systems if needed.

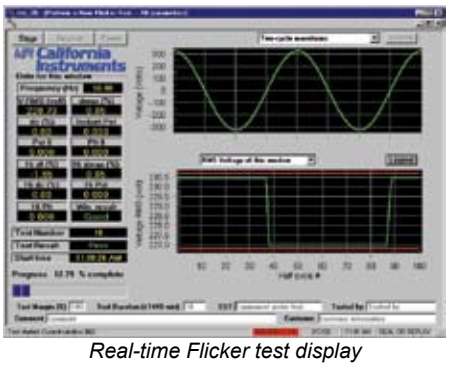
Measurement only CTS system versions (100-CTS and 300-CTS) can be added to an existing California Instruments power source.

CENELEC - Amendment 14

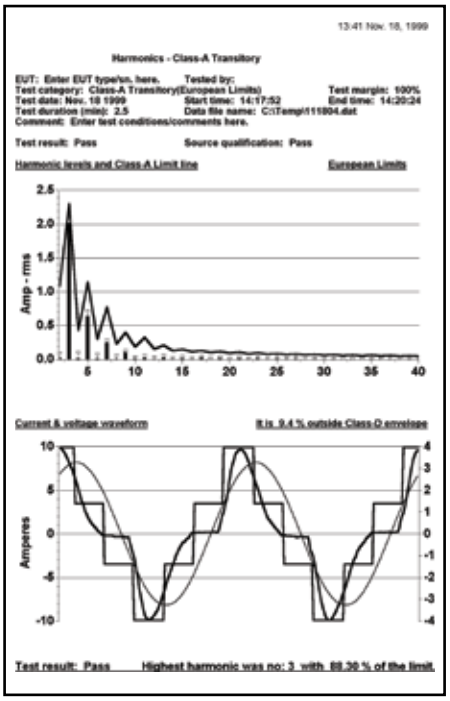
The CTS, with its flexible architecture, allows the user to select measurements to be made per the recently harmonized amendment.



Current Harmonics test display



Real-time Flicker test display



Detailed Test Reports and Data

CTS Series Model Numbers

Model	Output Power	Source Model	No of Phases	EN61000-3 Test	EN61000-4 Test	Size (H x W x D)	
100-CTS		n/a	1	√		3.5”x19”x22”	89x483x560 mm
1251RP-CTS	1250 VA	1251RP	1	√		7”x19”x22”	178x483x560 mm
3001iX-CTS	3000 VA	3001iX	1	√	√	10.5”x19”x24”	267x483x610 mm
5001iX-CTS	5000 VA	5001iX	1	√	√	10.5”x19”x24”	267x483x610 mm
300-CTS		n/a	3	√		3.5”x19”x22”	89x483x560 mm
15003iX-CTS	15000 VA	15003iX	3	√	√	24.5”x19”x24”	623x483x610 mm
30003iX-CTS	30000 VA	30003iX	3	√	√	45.5”x19”x24”	1157x483x610 mm

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MXCTS - High Power Compliance Test Systems

Introduction

The MX45-CTS Series is a complete, turn-key compliance test system for EN 61000-3-12 / IEC 1000-3-12 (Harmonics), EN 61000-3-11/ IEC 1000-3-11 (Flicker) and various EN 61000-4 / IEC 1000-4 AC immunity tests. Consisting of an AC power source, a signal interface unit (PACS-3-75) and a PC based data acquisition system, the MX45-CTS provides a complete turn-key solution for IEC testing. The Windows™ based MXCTS software performs all required IEC tests and generates detailed test reports. Comprehensive data files are stored on disk to allow post test analysis.

The MXCTS system implements all IEC standards including the new **Amendment 14** and provides a software only upgrade path for future standard changes.

A European style AC outlet is provided on the front panel for easy connection of single phase loads. Three phase loads are connected using rear terminal blocks.

Covered EN61000 Standards

The following tests can be performed using an MX45 based CTS system:

EN 61000-3-12	Harmonics
EN 61000-3-11	Flicker CTSH
EN 61000-3-2	Harmonics (option)
EN 61000-3-3	Flicker (option)
EN 61000-4-13	Harmonics and Inter-harmonics (requires option -413)
EN 6100-4-17	DC Ripple
EN 61000-4-14	Voltage Fluctuations
EN 61000-4-28	Frequency Variations
EN 61000-4-29	DC Dips and Interruptions

EN 61000-3-12 Harmonics

Full compliance testing for current harmonics emissions products is supported. Support for the 2001 version (Amendment 14) of the Harmonics standard is built-in for full compliance with both harmonics standards.

EN 61000-3-11 Flicker

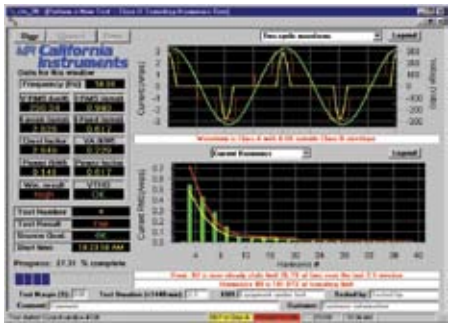
Flicker results are displayed in real-time during the entire test. No need to wait until the entire test is completed to know if the EUT passed or failed. A Ztest reference impedance (OMNI-3-75) is provided for IEC 61000-3-11 flicker testing (-CTSH) and a Zref (OMNI-3-37MX) for IEC 61000-3-3 flicker testing (-CTSL).

Configurations

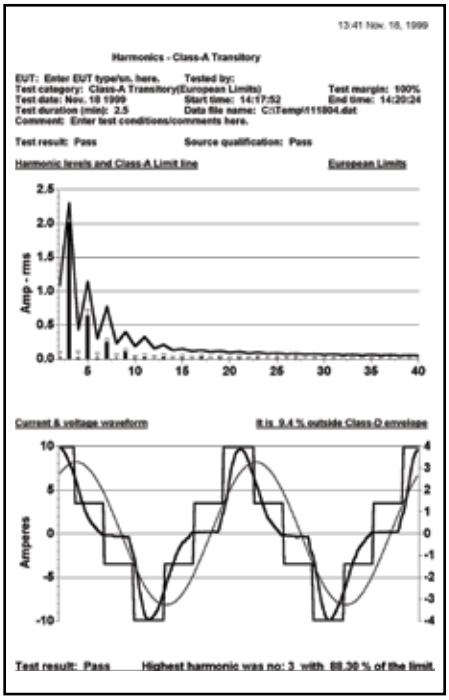
The MX45-CTS system is available with flicker reference impedance for either IEC61000-3-11 (-CTSH) or IEC 61000-3-3 (-CTSL). A system with both impedances and both high and low power software is available as well (-CTSHL). It is strongly recommended that California Instruments supply the required PC with the test system. (Option CIC-PC)

CENELEC - Amendment 14

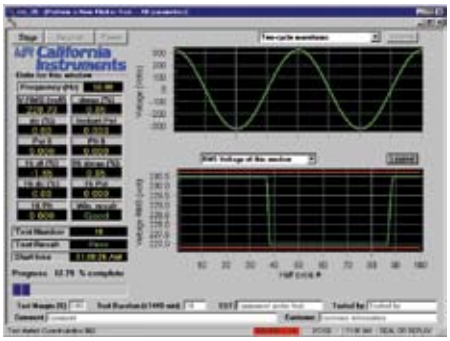
The MX45-CTS, with its flexible architecture, allows the user to select measurements to be made per the recently harmonized amendment.



Current Harmonics test display



Detailed Test Reports and Data



Real-time Flicker test display

See the California Instruments website for detailed information. www.california-instruments.com

MX45-CTS Series Model Numbers

Model	Description	Flicker Impedance	Software
MX45-CTSH	IEC 61000-3-11/12 harmonics and flicker test system	OMNI-3-75	CTSMXH
MX45-CTSL	IEC 61000-3-2/3 harmonics and flicker test system	OMNI-3-37MX	CTSMXL
MX45-CTSHL	Combination harmonics and flicker test system	OMNI-3-37MX OMNI-3-75	CTSMXL CTSMXH

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ARGANTIX - Compact, Programmable DC Power Supplies

California Instruments offers a range of programmable DC Power supplies for a wide range of applications under the Argantix brand name. Power levels range from 5 KW to 15 KW per unit with the possibility to parallel up to 5 units for higher power needs. Output voltage ranges are from 30VDC to 600VDC. To match capabilities with your needs, two different controllers are offered, a basic controller (XDS) with all the commonly used features for setting voltage, current limit and measurements or a more sophisticated controller (KDC) with advanced functions like transient programming, built-in test routines and digitization of the output voltage and current. Both controllers come standard with RS232 and optional GPIB remote control interfaces. Driver and Windows software is available as well. Visit the Argantix web site at www.argantix.com for product details and pricing.

XDS Series - Economical

- **Simple analog style controls for easy operation and measurements.**
- **Standard remote control interface (RS232)**
- **Analog voltage programming (0-10V)**
- **Modular power levels to grow with your needs.**
- **Paralleling mode of multiple units.**

KDC Series - Advanced

- **Advanced controller with built in transient programming.**
- **Menu driven user-interface**
- **User selectable operating modes (CC, CV, CP)**
- **Digitized waveform measurements.**
- **Paralleling mode of multiple units.**

Models

Models:	XDS and KDC
Voltage ranges:	0 to full scale, See table
Current ranges:	0 to full scale, See table
Power output:	5, 10, 15 KW
No DC Outputs:	1
Input Voltage:	208, 400, 480 VAC L-L, 3 Phase Delta.
Measurements:	Volt DC, Current DC, Power DC, Peak Current
Remote control:	RS232C std, GPIB optional
Analog options:	RPV (XDS), PRV, RPC (KDC)
Protection:	Over current, short-circuit, over temp, over voltage.
Dimensions:	H: 5.25" / 133.35 mm W: 19" / 482.6 mm D: 24.74" / 628.4 mm
Weight:	5KW: 56 lbs. 25.4 Kg 10KW: 70 lbs 32 Kg 15KW: 84 lbs. 38.1 Kg

Model	Volt DC	Current (A) 5KW	10KW	15KW
XDS/KDC	30	167	333	500
XDS/KDC	40	125	250	375
XDS/KDC	50	100	200	300
XDS/KDC	80	62.5	125	187
XDS/KDC	100	50	100	150
XDS/KDC	150	33.3	66.7	100
XDS/KDC	300	16.7	33.3	50
XDS/KDC	400	12.5	25	37.5
XDS/KDC	600	8.3	16.7	25

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System Configurations and Options

In addition to the products listed in this catalog, California Instruments offers both standard and custom cabinet systems as well as custom products for special applications.

Many of our higher power solutions involve several products connected in parallel to achieve the required power. Also, some custom configurations feature additional chassis for more sophisticated control, precision power impedance matching, or electronic drop-out switching. It is often easier to configure a total solution in a cabinet that includes the control and power wiring. Cabinet systems are usually shipped as fully assembled, wired, and tested solutions.

For product compliance test applications, it is often more convenient to connect directly to the appropriate power outlet. A variety of options include all standard international outlets for single and three phase operation.

For further information concerning cabinet systems, please contact your local representative, or our applications engineering department at the factory.

Industrial Grade Cabinets

Completely configured and pre-wired AC test systems.

Heavy Duty Rack Slides

All system units are mounted using rack slides for easy access and removal

Common Input Circuit Breaker

Suitably rated input circuit breaker provides system level protection and single shut-off.

Rear Connections

Clearly labeled AC input and output terminal blocks are provided at the bottom rear of each cabinet for easy access.

Anti-tilt Pontoon Base

Wide base prevents accidental tipping, even if all units are pulled out on rack slides.

Easy Mobility

Heavy duty ball-bearing casters allow cabinets to be moved around easily.

Faster Setup

California Instruments cabinet systems are carefully designed and manufactured to provide maximum system performance and reduce installation cost. The various elements that make up an integrated high power AC test system are carefully assembled in a high quality 19 inch cabinet. All input and output wiring is properly sized and routed for optimal performance and safety. Configuration problems or wiring mistakes are eliminated when ordering a cabinet based multi-box power system like the 15003iX or a three phase compliance test system like the 30003iX-CTS. This translates into faster setup time and reduced installation hassles upon receipt of your power system.

Rack Slides

AC power sources can be rather heavy when compared to typical 19 inch test instruments. This makes it more difficult to mount them in a cabinet unless they are properly supported. CI cabinet systems use heavy duty rack slides that can easily handle the weight of the AC source. The use of rack slides over angle brackets allows each unit to be installed and removed easily should there ever be a need to remove or replace an individual unit. Adjustments can be made by simply pulling a unit forward on its slides.

Stops prevent any unit from being pulled too far forward. Wiring to the power sources is done with adequate service loops to allow units to remain connected as they are pulled to a forward position.

See the California Instruments website for detailed information. www.california-instruments.com

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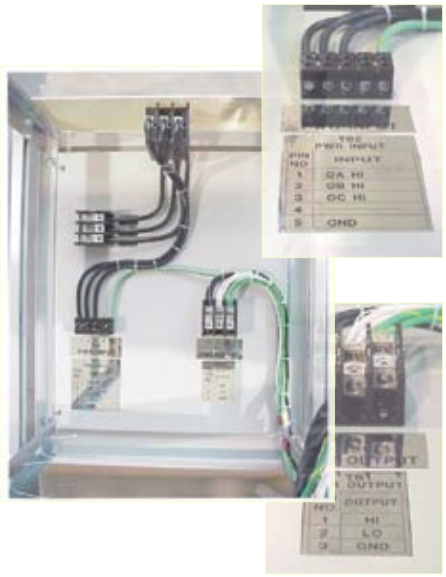
System Configurations and Options



Wiring

Connections for AC input and output are provided at the rear bottom of each cabinet system. All wiring is carefully routed and tied down for optimal safety and ease of maintenance. A suitably sized input terminal compression block allows quick connection of the required 3 phase WYE or Delta input power and protective earth ground. Input power is then routed to a three pole circuit breaker that can be operated from the front of the cabinet. This circuit breaker is typically located on a panel at the bottom of the cabinet. From there, input power is distributed to all components of the power system.

Each AC power source has an individual circuit breaker for added protection. The master breaker may be used to quickly shut down the entire cabinet system.

Connection of the EUT can be accomplished through an output terminal compression block, also located at the rear bottom of the cabinet.

Inputs and outputs are clearly marked as such to minimize connection errors. Finally, strain reliefs are provided for both input and output wiring.

Cooling

To ensure long-term durability, careful attention is paid to proper airflow in the cabinet. Sufficient clearance is provided on the sides and at the back of the power sources to allow air to flow. A rear panel screen protects the user from accidental access to the inside of the cabinet while at the same time allowing sufficient ventilation.

The side panels of the cabinet are louvered to ensure adequate air intake capacity.

Mechanical Construction

California Instruments cabinets are designed for heavy duty use. They are constructed of tubular steel with all sections welded on all sides. Both side panels and the rear screen can be removed for easy access.

Since the weight of each individual AC power source can be as high as 180 lbs., a solid pontoon base is used to avoid tip-over. This is especially important in view of the fact that the power sources are mounted on rack slides and their weight shifts forward when pulled out from the front. The wide heavy base prevents the cabinet from toppling over, thus avoiding potential accidents.

At the same time, smooth rolling casters on all four corners allow the cabinet system to be moved around easily as needed. This means the cabinet system can easily be deployed in different locations on the same floor

Dimensions

Cabinet systems are available in different heights to accommodate various power systems. Standard available rack heights are shown below. For special requirements, contact the factory.

Model	Height Outside	Height Inside	Depth w/o base	Depth w base	Width
C1	28.6” 726 mm	17.6” 447 mm	28.75” 730 mm	37” 940 mm	24.75” 629 mm
C4	54.8” 1392 mm	43.8” 1113 mm	28.75” 730 mm	37” 940 mm	24.75” 629 mm
C5	63.6” 1615 mm	52.6” 1336 mm	28.75” 730 mm	37” 940 mm	24.75” 629 mm
C6	72.3” 1836 mm	61.3” 1557 mm	28.75” 730 mm	37” 940 mm	24.75” 629 mm
C7	54.8” 1392 mm	43.8” 1113 mm	28.75” 730 mm	37” 940 mm	49.50” 1257 mm

Packaging

All cabinets are packaged in custom wooden crates to prevent shipping damage. These crates are reusable and can be retained should the cabinet system ever have to be shipped elsewhere. On request, US domestic deliveries can be made by air-ride van, in which case the crate is not provided. For international shipments, the crate is mandatory. These crates are treated in accordance with prevailing regulations for import to various countries.

Ordering Information

Cabinet systems may be ordered by specifying the letter “C” prefix to any AC power source model. For example, a 30003iX-CTS-LR4 compliance test system may be ordered as a cabinet system by ordering model:

C6-30003iX-CTS-LR4

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How to Get Additional Information

This shortform catalog provides an overview of readily available AC power solutions. California Instruments also offers special products to meet unique application requirements. To discuss your application or to obtain detailed technical specifications on any of the products incorporated in this short form catalog, call California Instruments or visit our web site. Detailed technical specifications on most products are available through California Instruments' web site. Copies of product data sheets, application notes and demonstration software can be downloaded from our web site as well.

Terms and Conditions

Domestic: All prices quoted are FOB San Diego, CA. Shipments are made Motor Freight, freight charges collect. The buyer may designate a specific freight carrier at the time of placing an order. Contact factory for a firm quotation. Cabinet systems are either crated or shipped air ride van. All prices and specifications quoted are subject to change without notice. Payment terms are net 30 days from date of invoice on approved credit. Orders should be sent or faxed to:

California Instruments
9689 Towne Centre Drive
San Diego, CA 92121-1964

Phone: **+1 - 858 - 677- 9040**
Fax: **+1 - 858 - 677- 0940**

sales@calinst.com
www.calinst.com

International: All prices quoted are EX WORKS Factory, San Diego, CA, U.S.A. Packaging is suitable for air freight shipment. All cartage, documentation and freight charges are at buyer's expense. Terms are pre-payment or irrevocable Confirmed Letter of Credit. Letters of Credit must be opened in accordance with California Instruments' instructions. Please contact the factory for quotations requiring pro-forma invoices, ocean freight, CIF, C&F, etc. Orders may be sent directly to the factory or placed through your local authorized representative or distributor.

Extended Warranty

All California Instruments AC products come with a 1 year warranty. All Argantix DC products come with a 5 year warranty. California Instruments offers 2-year and 4-year extended warranties on all of our products. Service contracts cannot be purchased separately. Extended Warranties can only be purchased with the original unit purchase and can cover the system for up to 5 years. For more information on extended warranties, call (858) 677-9040 to speak with a sales representative.

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