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Programmable AC Source

Model No. **6400 Series**

Programmable AC Source
Model 6400 Series
375~9000VA

KEY FEATURES

- Output distortion less than 0.3%, and peak repetitive current over 2.5 times of the rms current
- High accuracy measurement of RMS voltage, RMS current, true power, frequency, power factor, and current crest factor
- Built-in power factor correction circuit provides input power factor of over 0.98 to meet IEC regulations
- Programmable current limit
- Built-in output isolation relays
- EEPROM storage of user defined voltage & frequency combination for instant recall at anytime
- Optional GPIB, RS-232, Analog Programming interface.
- Over-voltage, under-voltage, over-power, over-current, over-temperature, and short circuit protection
- Temperature controlled fan speed

RS-232 GPIB APG CE PFC

- Self-test at power-on
- User-definable power-on state
- Easy use graphic user interface: softpanel (Option)

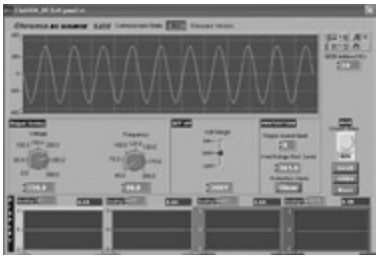
The 6400 series Programmable AC Power Source uses state of the art PWM technology to deliver pure, instrument grade AC power at very low cost never achieved before. The 6400 AC power source offers maximum rated power for any output voltage from 0 to 300VAC, at any frequency from 45 to 1K Hz. It is not only suitable for commercial applications(47-63Hz), but also for avionics, marine, military applications at 400Hz.

All models generate very clean output with typical distortion less than 0.3%! Incorporating power factor correction circuit, the 6400 AC power source yields higher efficiency and delivers more output power than competitive instruments. Furthermore, it is capable of high peak repetitive current needed to drive most electronic products with high crest factor input design.

The 6400 AC power source uses advanced circuit to offer precision and high speed measurement of true RMS voltage, true RMS current, true power, frequency, power factor, and current crest factor.

The 6400 AC power source is very easy to operate from the front panel keypad, or from the remote controller via IEEE-488, RS-232 or APG (Analog Programming) interface. The optional interface is designed as a plug-in card to change the unit in seconds into a computer controlled system power source.

Designed with self diagnostic routine and protected against over-voltage, under-voltage, over-power, over-current, over-temperature and fan fail, the instrument offers quality and reliability for even the most demanding applications in production testing, R&D design characterization, and QA verification.



Softpanel of 6400 Series

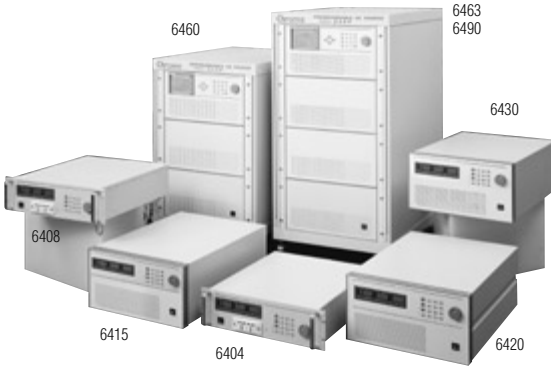
SPECIFICATIONS - 1				
Model	**6404**	**6408**	**6415**	**6420**
Output / Phase	1	1	1	1
Output Ratings				
Power / Phase	375VA	800VA	1500VA	2000VA
Voltage				
Range / Phase	150V/300V/Auto			
Accuracy	0.2% F.S. for freq. ≦ 200Hz, 0.4% F.S. for freq. > 200Hz		0.2% + 0.2% of F.S.	
Resolution	0.1V	0.1V	0.1V	0.1V
Distortion	typical. 0.3% for freq. ≦ 200Hz, 0.8% for freq.>200Hz		0.5% for (45-500Hz), 1% for (> 500-1KHz)	
Line Regulation	0.1%	0.1%	0.1%	0.1%
Load Regulation	0.1%	0.1%	0.1%	0.1%
Temp. Coefficient	0.02% per ℃			
Max. current -rms	2.5A/1.25A	5.33A/2.67A	15A/7.5A	20A/10A
-peak	7A/3.5A ≦100Hz 5.5A/12.75A >100Hz	14.92A/7.47A ≦ 100Hz 7.47A/5.87A >100Hz	45A/22.5A ≦ 100Hz (45-100Hz) 37.5A/18.75A (>100-1KHz)	60A/30A (45-100Hz) 50A/25A (>100-1KHz)
Frequency				
Range	45-500Hz	45-500Hz	45-1000Hz	45-1000Hz
Accuracy	0.1%	0.1%	0.1%	0.1%
Resolution	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Input Ratings				
Voltage Range	90-132V / 180-250V	90-132V (6408-1),180-250V (6408-2)	190-250V, 1Ø	190-250V, 1Ø
Frequency Range	47-63Hz	47-63Hz	47-63Hz	47-63Hz
Current	7.5A max.	12A max.(6408-1), 6A max. (6408-2)	12A max.	15A max.
Power Factor	0.8 typical.	0.98 min.	0.95 min.	0.97 min.
Measurement				
Voltage / Phase				
Range	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V
Accuracy (rms)	0.1% + 0.1% F.S.		0.25% + 0.1% F.S.	
Resolution	0.1V	0.1V	0.1V	0.1V
Current / Phase				
Range (peak	0-2A/2-10A	0-4A/4-20A	0-70A	0-100A
Accuracy (rms)	0.5% + 0.2% F.S.	0.5% + 0.2% F.S.	0.4% + 0.2% F.S.	0.4% + 0.15% F.S.
Resolution	0.01A	0.01A	0.01A	0.01A
Power / Phase				
Range	0-375W	0-800W	0-1500W	0-2000W
Accuracy	0.5% F.S.	0.5% F.S.	1% F.S. (CF<6)	1% F.S. (CF<6)
Resolution	0.1 W	0.1 W	0.1 W for P<1000W, 1W for P>1000W	
Frequency				
Range	45-500Hz	45-500Hz	45-1000Hz	45-1000Hz
Accuracy	0.02%	0.02%	0.02%	0.02%
Resolution	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Others				
Efficiency	75% typical	80% typical	80% typical	80% typical
Protection	UVP, OVP, OCP, OPP, OTP, Short			
Safety & EMC	CE (Include LVD and EMC Requirement)			
Dimension (H x W x D)	133.35 x 482.6 x 471.4 mm / 5.25 x 19 x 18.56 inch		221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	
Weight	18 kg / 39.65 lbs	23 kg / 50.66 lbs	23 kg / 50.66 lbs	27 kg / 59.47 lbs

Programmable AC Source

Model No. 6400 Series

SPECIFICATIONS -2				
Model	**6430**	**6460**	**6463**	**6490**
Output / Phase	1	1 (parallel or series)	1 or 3 selectable	1 or 3 selectable
Output Ratings				
Power / Phase	3000VA	6000VA	2000VA	3000VA
Voltage				
Range / Phase	150V/300V/Auto	150V/300V(parallel), 300V/500V(series)	150V/300V	150V/300V
Accuracy	0.2% + 0.2% of F.S.	0.2% + 0.2% of F.S.	0.2% + 0.2% of F.S.	0.2% + 0.2% of F.S.
Resolution	0.1V	0.1V	0.1V	0.1V
Distortion	0.5% for (45-500Hz), 1% for (> 500-1KHz)	1%	1%	1%
Line Regulation	0.1%	0.1%	0.1%	0.1%
Load Regulation	0.1%	0.2%(series), 0.8% (parallel)	0.2%(3 phases), 0.8% (1 phase)	0.2%(3 phases), 0.8% (1 phase)
Temp. Coefficient	0.02% per ˚C	0.02% per ˚C	0.02% per ˚C	0.02% per ˚C
Max. current -rms / Phase	30A/15A	60A/30A/15A (150V/300V/500V)	20A/10A (150V/300V)	30A/15A (150V/300V)
Peak Current/phase-crest-factor	3(45-100Hz), 2.5(>100-1KHz)	180A/90A/45A (45-100Hz), 150A/75A/38A (>100-1KHz)	60A/30A (45-100Hz), 50A/25A (>100-1KHz)	90A/45A (45-100Hz), 75A/38A (>100-1KHz)
Frequency				
Range	45-1000Hz	45-1000Hz	45-1000Hz	45-1000Hz
Accuracy	0.1%	0.15%	0.15%	0.15%
Resolution	0.1Hz	0.01Hz (45-99.9Hz), 0.1Hz (100-999.9Hz)		
Input Ratings				
Voltage Range	190-250V, 1Ø	190-250V, 3Ø	190-250V, 3Ø	190-250V, 3Ø
Frequency Range	47-63Hz	47-63Hz	47-63Hz	47-63Hz
Current	23A max.	23A max./phase	15A max./phase	23A max./phase
Power Factor	0.98 min.	0.98 min. under full load	0.97 min. under full load	0.98 min. under full load
Measurement				
Voltage / Phase				
Range	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V
Accuracy (rms)	0.25% + 0.1% F.S.	0.25% + 0.1% F.S	0.25% + 0.1% F.S	0.25% + 0.1% F.S
Resolution	0.1V	0.1V	0.1V	0.1V
Current / Phase				
Range (peak)	0-140A	0-280A	0-100A	0-140A
Accuracy (rms)	0.4% + 0.1% F.S.	0.4% + 0.1% F.S.	0.4% + 0.15% F.S.	0.4% + 0.1% F.S.
Resolution	0.01A	0.01A	0.01A	0.01A
Power / Phase				
Range	0-3000W	0-3000W	0-2000W	0-3000W
Accuracy	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)
Resolution	0.1 W for P<1000W, 1W for P>1000W	0.01 W	0.01 W	0.01 W
Frequency				
Range	45-1000Hz	45-1000Hz	45-1000Hz	45-1000Hz
Accuracy	0.02%	0.01%+2 count	0.01%+2 count	0.01%+2 count
Resolution	0.1Hz	0.01Hz	0.01Hz	0.01Hz
Others				
Efficiency	80% typical	80% typical	80% typical	80% typical
Protection	UVP, OVP, OCP, OPP, OTP, Short	OPP, OLP, OTP, FAN Fail		
Safety & EMC	CE (Include LVD and EMC Requirement)			
Dimension (H x W x D)	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	765.94 x 546 x 700 mm / 30.16 x 21.5 x 27.56 inch	990 x 546 x 700 mm / 38.98 x 21.5 x 27.56 inch	990 x 546 x 700 mm / 38.98 x 21.5 x 27.56 inch
Weight	27 kg / 59.47 lbs	107 kg / 235.68 lbs	156 kg / 343.61 lbs	156 kg / 343.61 lbs

6400 Series Programmable AC Source Family



PROGRAMMABLE AC POWER SOURCE
MODEL 61500 SERIES

AC power source 61500 series sets up the new standard for high performance AC power source. It equips with all powerful features such as power line disturbance (PLD) simulation, programmable output impedance, comprehensive measurement functions, wave-shape synthesis and regulation test software. These features make the 61500 series ideal for commercial, power electronics, avionics, military and regulation test applications from bench-top testing to mass production.

Line up from 500VA to 4000VA with one phase output, the 61500 series give users the maximum choices from R/D design verification, quality assurance, to production test.

Using the state-of-the art PWM technology, the 61500 series is capable of delivering up to 6 times of peak current compared to its maximum rated current that makes it ideal for inrush current test.

The AC+DC modes extend the applications not only pure AC voltage but also DC component for testing DC offset in laboratory. Applying the advanced DSP technology, the 61500 series is able to provide precision and transient voltage waveform as well as measurements such as RMS voltage, RMS current, true power, power factor, current crest factor and up to 40 orders of current harmonic components.

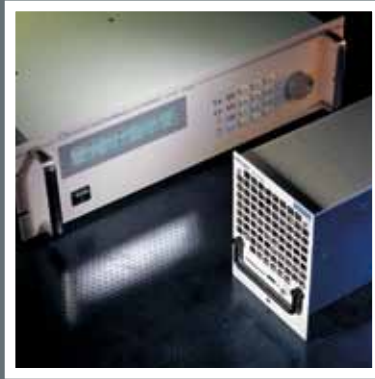
The 61500 series allows users to compose different harmonic components to synthesize their own harmonic distorted wave-shapes. To simulate the natural waveform, the 61500 series also provides an external analog input to amplify the analog signal from arbitrary signal generator. Thus, it is capable of simulating the unique waveform observed in the field.

With the versatile programmable voltage functions and easy-use operation software, the 61500 series enables users to perform the pre-compliance tests against IEC 61000-4-11 and compliance test against IEC 61000-4-13/-4-14/-4-28 immunity test regulations. With low impedance and low voltage harmonic character, model 61505 can be a standard source for 230V/16A IEC 61000-3-2 testing. With programmable output impedance function, 61500 series provide a solution for testing IEC 61000-3-3 regulations by incorporating a flicker meter.

MODEL 61500 SERIES

Key Features:

- Output Rating :
  Power : 500VA (61501), 1000VA (61502)
  1500VA (61503), 2000VA (61504)
  4000VA (61505)
  Voltage range: 0-150V/0-300V/Auto
- Compact size and weight attributable to advance PWM technology
- AC+DC output mode for voltage DC offset simulation
- Programmable slew rate setting for changing voltage and frequency
- Low output impedance for testing IEC 61000-3-2 (61505)
- Programmable output impedance for testing IEC 61000-3-3
- LIST, PULSE, STEP mode function for testing power line disturbance (PLD) simulation capability
- IEC 61000-4-11 voltage dips, short and variation simulation
- Harmonics, inter-harmonics waveform synthesizer for testing IEC 61000-4-13
- Programmable voltage, current limit
- Comprehensive measurement capability, including current harmonics
- High output current crest factor, ideal for inrush current testing
- Turn on, turn off phase angle control
- TTL signal which indicates output transient
- Analog programmable interface
- 3 units combined to 3-phase power output
- Easy-use software for operation and IEC regulation test
- Optional GPIB and RS-232 interface



SPECIFICATIONS

Model	61501	61502	61503	61504	61505
Output Phase	1	1	1	1	1
Output Rating -AC					
Power	500VA	1000VA	1500VA	2000VA	4000VA
Voltage					
Range/Phase	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion*1	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)
Line Regulation	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation*2	0.2%	0.2%	0.2%	0.2%	0.2%
Max. Current					
R.m.s.	4A/2A (150V/300V)	8A/4A (150V/300V)	12A/6A (150V/300V)	16A/8A (150V/300V)	32A/20A (150V/300V)
Peak	24A/12A (150V/300V)	48A/24A (150V/300V)	72A/36A (150V/300V)	96A/48A (150V/300V)	192A/96A (150V/300V)
Frequency					
Range	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Output Rating-DC					
Power	250W	500W	750W	1000W	2000W
Voltage	212V/424V	212V/424V	212V/424V	212V/424V	212V/424V
Current	2A/1A (212V/424V)	4A/2A (212V/424V)	6A/3A (212V/424V)	8A/4A (212V/424V)	16A/8A (212V/424V)
Programmable Output Impedance					
Range	0Ω +200μH ~ 1Ω +1mH				
Harmonics & Inter-harmonics Simulation					
Bandwidth	2400Hz	2400Hz	2400Hz	2400Hz	2400Hz
Input Rating					
Voltage Range	90~250V, 1Ø	90~250V, 1Ø	90~250V, 1Ø	90~250V, 1Ø	190~250V, 3Ø*3
Frequency Range	47~63Hz	47~63Hz	47~63Hz	47~63Hz	47~63Hz
Current (per phase)	10A Max. @ 90V	18A Max. @ 90V	22A Max. @ 90V	28A Max. @ 90V	14A Max. @ 190V
Power Factor*4	0.97 Min.	0.97 Min.	0.98 Min.	0.98 Min.	0.98 Min.
Measurement					
Voltage					
Range	150V/300V	150V/300V	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current					
Range (peak)	24A	48A	72A	96A	192A
Accuracy (r.m.s.)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power					
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.
Resolution	0.1W	0.1W	0.1W	0.1W	0.1W
Harmonics					
Range	2~40 orders	2~40 orders	2~40 orders	2~40 orders	2~40 orders
Others					
Interface	GPIB, RS-232 (Optional)				
Temperature					
Operating	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (include EMC & LVD)				
Dimensions (HxWxD)	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	266.7 x 482.6 x 569.5 mm / 10.5 x 19 x 22.42 inch
Weight	20 kg / 44.05 lbs	20 kg / 44.05 lbs	20 kg / 44.05 lbs	20 kg / 44.05 lbs	41 kg / 90.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Model 61505 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.
Note*4 : Input power factor is tested on input 220V, full load condition.

PROGRAMMABLE AC POWER SOURCE
MODEL 6500 SERIES

The global AC power testing requirements demand more sophisticated AC Power Source that is capable of simulating a wide variety of AC line conditions, harmonic waveforms, accurate power measurements and analysis. 6500 Series Programmable AC Power Source delivers the right solution to simulate all kinds of normal/abnormal input conditions and measure the critical characteristics of the products under test. It can be utilized in R&D design, production test, and QA verification for commercial, industrial, and aerospace electronic products.

6500 Series AC Power Source delivers the maximum rated power for the output voltage up to 300 Vac, and the frequency between 15Hz to 2000Hz. It is suitable for commercial applications (47-63Hz) such as avionics, marine, and military applications at 400Hz or higher frequency ; or for electrical motor, airc onditioner test applications at 20Hz. All models generate very clean sine or square waveforms output with typical distortion less than 0.5%.

6500 Series has built in Direct Digital Synthesis (DDS) Waveform Generator to provide user programmable high precision waveform. For the product tests under AC line distortion conditions, clipped sine wave can be generated with 0% to 43% distortion and amplitude from 0% to 100%. It also can simulate all kinds of power line disturbances such as cycle dropout, transient spike, brown out, phase angle, voltage and frequency ramp up (ramp down), etc. Up to 30 harmonic waveforms are factory-installed, and testing for compliance to AC line harmonic immunity standards can be easily achieved in the field.

The 6500 Series has built in 16-bit precision measurement circuit to offer precision and highspeed measurements for Vrms, Irms, Ipk+, Ipk-, power, frequency, crest factor, power factor, inrush current, VA, and VAR, etc.

The 6500 Series provides easy operation through the front panel keypad, or remote controller via GPIB, RS-232C bus or APG (Analog Programming) interface. Instrument drivers are available to integrate the AC source into the ATE application operations under Labview control.

Designed with self-diagnostic routine and protections against overload, overpower, over temperature, over current and fan fail, the 6500 Series instrument has the qualities and reliability that can suit for the most demanding production line applications.

MODEL 6500 SERIES

Key Features:

- Output Rating :
  Power : 1200VA, 1ø (6512)
  2000VA, 1ø (6520)
  3000VA, 1ø (6530)
  6000VA, 1ø (6560)
  9000VA, 1ø or 3ø (6590)
  Voltage : 0-150V / 0-300V / Auto (6512,6520, 6530)
  0-150V /0-300V(parallel)(6560)
  0-300V / 0-500V (series)(6560)
  0-150V / 0-300V (6590)
- Direct Digital Synthesis (DDS) waveform generation.
- Programmable Sine, Square, or Clipped Sine waveform output
- Programmable voltage, current limit, frequency, phase, and distortion
- Power line disturbances simulation capability
- 30 factory-installed harmonic waveforms in the wavefrom library
- User programmable harmonic waveforms
- User programmable sequential output waveforms for auto-execution
- Powerful measurement of Vrms, Irms, Ipk+, Ipk-, power, frequency, crest factor,power factor, inrush current, VA, VAR, etc.
- Built-in power factor correction circuit provides input power factor over 0.98 to meet the IEC regulations
- Advanced PWM technology delivers high power output in a light and compact rack-mountable package
- Built-in output isolation relays
- User-definable power-on state
- TTL output to any signal output transition for ATE application
- Analog Programming Interface for external amplitude control
- Option GPIB and RS-232 bus interface
- LIST mode, transient power line disturbances simulation, Voltage Dip & Variation,for precompliance test IEC 61000-4-11
- Easy use graphic user interface : softpanel (Option)

SPECIFICATIONS

Model	6512	6520	6530	6560	6590
Output Phase	1	1	1	1 (parallel or series)	1or 3 selectable
Output Ratings					
Power	1200VA	2000VA	3000VA	6000VA	3000VA per phase, 9000VA total
Voltage					
Range/phase	150V / 300V / Auto	150V / 300V / Auto	150V / 300V / Auto	150V / 300V (parallel) 300V / 500V (series)	150V / 300V
Accuracy	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion *1	1% (15~45Hz) 0.5% (> 45~500Hz) 1% (> 500~1kHz) 2% (> 1K~2kHz)	1% (15~45Hz) 0.5% (> 45~500Hz) 1% (> 500~1kHz) 2% (> 1K~2kHz)	1% (15~45Hz) 0.5% (> 45~500Hz) 1% (> 500~1kHz) 2% (> 1K~2kHz)	1% (45~1kHz)	1% (45~1kHz)
Line Regulation	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation *2	0.1%	0.1%	0.1%	0.2% (series), 0.8% (parallel)	0.2%
Temp. Coefficient	0.02% per˚C	0.02% per˚C	0.02% per˚C	0.02% per˚C	0.02% per˚C
Max. Current/Phase					
RMS	12A/6A (150V / 300V)	20A/10A (150V / 300V)	30A/15A (150V / 300V)	60/30/15A (150/300/500V)	30A/15A (150V / 300V) 90A/45A total
peak	36A/18A (15~100Hz) 30A/15A (>100~1KHz) 24A/12A (>1K~2KHz)	60A/30A (15~100Hz) 50A/25A (>100~1KHz) 40A/20A (>1K~2KHz)	90A/45A (15~100Hz) 75A/38A (>100~1KHz) 60A/30A (>1K~2KHz)	180/90/45A (45~100Hz) 150/75/38A (>100~1KHz)	90A/45A (45~100Hz) 75A/38A (>100~1KHz)
Frequency					
Range	15 ~ 2kHz	15 ~ 2kHz	15 ~ 2kHz	45 ~ 1kHz	45 ~ 1kHz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Resolution	0.01Hz (15 ~ -99.9Hz) 0.1Hz (100 ~ 999.9Hz) 0.2Hz (1k ~ 2kHz)	0.01Hz (15 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz) 0.2Hz (1k ~ 2kHz)	0.01Hz (15 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz) 0.2Hz (1k ~ 2kHz)	0.01Hz (45 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz)	0.01Hz (45 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz)
Input Ratings					
Voltage Operating Range	1Ø 200~240V ± 10%V_{LN}			3Ø 200~240V ± 10%V_{LN}	
Frequency Range	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz
Current	10A max.	15A max.	23A max.	23A max./phase	23A max./phase
Power Factor	0.95 min. under full load	0.97 min. under full load	0.98 min. under full load	0.98 min. under full load	0.98 min. under full load
Measurement					
Voltage/Phase					
Range	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V
Accuracy (RMS)	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current/Phase					
Range (peak)	0 ~ 60A	0 ~ 100A	0 ~ 140A	0 ~ 280A	0 ~ 140A
Accuracy (RMS)	0.4% + 0.25%F.S.	0.4% + 0.15%F.S.	0.4% + 0.1%F.S.	0.4% + 0.1%F.S.	0.4% + 0.1%F.S.
Accuracy (peak)	0.4% + 0.5%F.S.	0.4% + 0.3% F.S.	0.4% + 0.2% F.S.	0.4% + 0.2% F.S.	0.4% + 0.2% F.S.
Resolution	0.01A	0.01A	0.01A	0.01A	0.01A
Power/Phase					
Accuracy	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)
Resolution	0.01W	0.01W	0.01W	0.01W	0.01W
Frequency					
Range	15 ~ 2kHz	15 ~ 2kHz	15 ~ 2kHz	45 ~1kHz	45 ~1kHz
Accuracy	0.01% +2 count	0.01% +2 count	0.01% +2 count	0.01% +2 count	0.01% +2 count
Resolution	0.01Hz	0.01Hz	0.01Hz	0.01Hz	0.01Hz
Others					
Efficiency	80% typical	80% typical	80% typical	80% typical	80% typical
Protection	OPP, OLP, OTP, FAN Fail				
Temperature					
Operating	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (Include LVD and EMC Requirement)				
Dimension (H x W x D)	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	765.94 x 546 x 700 mm / 30.16 x 21.5 x 27.56 inch*3	888.5 x 546 x 700 mm / 34.98 x 21.5 x 27.56 inch*3
Weight	26.4 kg / 58.15 lbs	26.4 kg / 58.15 lbs	26.4 kg / 58.15 lbs	107 kg / 235.68 lbs	156 kg / 343.61 lbs

Note*1 : Test under output voltage from half to full range.
Note*2 : Test with sinewave & with remote sense.
Note*3 : For dimension including the wheel set, please add 80mm to overall height.

PROGRAMMABLE AC POWER SOURCE
MODEL 61600 SERIES

Programmable AC Power Source 61600 series delivers pure, instrument grade AC power at very low cost. The 61600 series supplies the output voltage from 0 to 300VAC, and frequency from 15 to 1000Hz. It is suitable for commercial, avionics, and military applications from bench-top testing to mass production.

The 61600 series generates very clean AC output with distortion less than 0.3% at 50/60Hz. With the state-of-the-art PWM technology and power factor correction circuit, the 61600 series yields higher efficiency and delivers more output power. The 61600 series is capable of delivering up to 6 times of peak current compared to its maximum rated current that makes it ideal for inrush current test.

The AC+DC modes extend the applications not only pure AC voltage but also DC component for testing DC offset in laboratory. Users also can use an optional DC noise filter to get low noise and good stability DC voltage for testing. Applying the advanced DSP technology, the 61600 series is able to provide precision and high speed measurements such as RMS voltage, RMS current, true power, frequency, power factor, and current crest factor.

The 61600 series also provides an external analog input to amplify the analog signal from arbitrary signal generator. Thus, it is capable of simulating the unique waveform which observed in the field. Users also can control the amplitude of output voltage by a DC level. It is suitable to integrate AC source 61600 series into users' system.

For convenience sake, the 61600 series offers versatile front panel operations with LCD display and rotary knob. Users may also control the 61600 series AC source remotely via GPIB, RS232 or APG (Analog Programming) interface. Users can find Labview driver in NI's web site for programming.

The power-on self-diagnosis routine along with the full protections against OPP, OCP, OVP and OTP ensure the quality and reliability for the most demanding engineering tests and ATS applications.

MODEL 61600 SERIES

Key Features:

- Output Rating :
  Power : 500VA (61601), 1000VA (61602)
  1500VA (61603), 2000VA (61604)
  4000VA (61605)
  Voltage range : 0~150V/0-300V/Auto
- Frequency : 15Hz~1000Hz
- Compact size and weight attributable to advance PWM technology
- Built-in PFC, provide input power factor over 0.98 (full load)
- AC+DC output mode for voltage DC offset simulation
- Programmable slew rate setting for changing voltage and frequency
- Programmable voltage, current limit
- One-key recall for 9 different voltage and frequency
- Low output impedance for testing IEC 61000-3-2 (61605)
- Comprehensive measurement capability, V, Irms, Ipk, Inrush, P, Q, S, PF, CF of current and etc.
- High output current crest factor, ideal for inrush current testing
- Turn on, turn off phase angle control
- TTL signal which indicates ON/OFF
- 3 units combined to 3-phase power output
- Easy-use software for operation and ON/OFF test
- Optional analog programming interface
- Optional GPIB and RS-232 interface
- Full protection: OP, OC, OV and OT protection

SPECIFICATIONS

Model	61601	61602	61603	61604	61605
Output phase	1	1	1	1	1
Output Rating - AC					
Power/Phase	500VA	1000VA	1500VA	2000VA	4000VA
Voltage					
Range/Phase	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion (*1)	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz
Line Regulation	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation (*2)	0.2%	0.2%	0.2%	0.2%	0.2%
Max. Current/Phase					
r.m.s.	4A/2A (150V/300V)	8A/4A (150V/300V)	12A/6A (150V/300V)	16A/8A (150V/300V)	32A/20A (150V/300V)
peak	24A/12A (150V/300V)	48A/24A (150V/300V)	72A/36A (150V/300V)	96A/48A (150V/300V)	192A/96A (150V/300V)
Frequency					
Range	DC, 15~1kHz	DC, 15~1kHz	DC, 15~1kHz	DC, 15~1kHz	DC, 15~1kHz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Resolution	0.01 Hz	0.01 Hz	0.01 Hz	0.01 Hz	0.01 Hz
Output Rating - DC					
Power	250W	500W	750W	1000W	2000W
Voltage	212V/424V	212V/424V	212V/424V	212V/424V	212V/424V
Current	2A/1A (212V/424V)	4A/2A (212V/424V)	6A/3A (212V/424V)	8A/4A (212V/424V)	16A/8A (212V/424V)
Input Rating					
Voltage Range	90~250V, 1ø	90~250V, 1ø	90~250V, 1ø	90~250V, 1ø	190~250V, 3ø (*3)
Frequency Range	47~63Hz	47~63Hz	47~63Hz	47~63Hz	47~63Hz
Current	10A Max. @ 90V	18A Max. @ 90V	22A Max. @ 90V	28A Max. @ 90V	14A Max. @ 190V
Power Factor (*4)	0.97 Min.	0.97 Min.	0.98 Min.	0.98 Min.	0.98 Min.
Measurement					
Voltage					
Range/Phase	150V/300V	150V/300V	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current					
Range (peak)	24A	48A	72A	96A	192A
Accuracy (r.m.s.)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power					
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S
Resolution	0.1W	0.1W	0.1W	0.1W	0.1W
Temperature					
Operating	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (include EMC & LVD)				
Dimensions (H x W x D)	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch				266.7 x 482.6 x 569.5 mm / 10.5 x 19 x 22.42 inch
Weight	20 kg / 44.05 lbs				41 kg / 90.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.

Note*2 : Load regulation is tested with sinewave and remote sense.

Note*3 : Model 61605 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.

Note*4 : Input power factor is tested on input 220V, full load condition.

Programmable
AC Power Source

MODEL 61700 SERIES

Key Features:

- Power: 1500VA, 3Ø (61701)
  3000VA, 3Ø (61702); 4500VA, 3Ø (61703)
  6000VA, 3Ø (61704); 12000VA, 3Ø (61705)
  Voltage: 0~150V/0~300V
  Frequency: 15~1.2KHz
  Phase angle: 0~360°
- Built-in PFC, provides input power factor over 0.98
- Advanced PWM technology delivers high power density in a compact rack-mountable package
- Built-in output isolation relays
- AC+DC output mode
- Programmable slew rate setting for changing voltage
- Turn on, turn off phase angle control
- User-definable power-on status
- Optional function for power line disturbance (PLD) simulation capability
- Comprehensive measurement capability: V, Irms, Ipk, I inrush, P, PF, CF of current etc.
- Programmable r.m.s. current limit
- Full protection: OP, OC, OV and OT protection
- Optional GPIB and RS-232C interface
- Easy-use software for operation

PROGRAMMABLE AC POWER SOURCE MODEL 61700 SERIES

The Programmable AC source model 61700 series delivers pure, 5-wire, 3-phase AC power. Unlike the traditional 3-phase AC source, it includes low power rating models at very low cost. Users can program voltage and frequency, measure the critical characteristics of the output on its LCD display. It delivers the right solution to simulate all kinds of input condition of UUT to be utilized in R&D and QA. It is also suitable for commercial applications from laboratory testing to mass productions.

The 61700 series AC Source supplies the output voltage from 0 to 300VAC and it can be set individually for each phase. Users also can set the phase angle from 0° to 360°. These kinds of function make the 61700 series can simulate unbalance 3-phase power. Because of the wide output frequency from 15 to 1200Hz, it is suitable for avionics and military application. The AC+DC mode extends the output function to simulate abnormal situation when power line contains DC offset.

The 61700 series uses the state-of-the-art PWM technology and power factor correction circuit. So it is capable to generate very clean AC output with typical distortion less than 0.3%, and it can yield higher efficiency and deliver more output power.

By using advanced DSP technology, the 61700 series offers precision and high speed measurements such as RMS voltage, RMS current, true power, power factor, and current crest factor, etc.

The 61700 series offers an optional function to output transient voltage. The function includes LIST, PULSE, STEP and INTERHARMONICS mode. Users can easily program variant waveform for immunity test. The 61700 series can also be controlled by a powerful and user-friendly softpanel through GPIB or RS-232 interface. Besides that, the softpanel includes a waveform editor that can edit up to 40th order harmonic components. By this way, the 61700 series get the ability to output distorted waveform as users like.

The self-diagnosis routine and protections against over power, over current, over voltage, over temperature and fan fail, the 61700 series ensure the quality and reliability for even the most demanding engineering testing and production line application.

SPECIFICATIONS

Model	61701	61702	61703	61704	61705
AC Output Rating					
Max. Power	1500VA	3000 VA	4500 VA	6000 VA	12000 VA
Per Phase	500VA	1000 VA	1500 VA	2000 VA	4000 VA
Voltage					
Range	150V/ 300V	150V/ 300V	150V/ 300V	150V/ 300V	150V/ 300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion*1	0.3%@50/60Hz 1.5% 15~1.2K Hz	0.3%@50/60Hz 1.5% 15~1.2K Hz	0.3%@50/60Hz 1.5% 15~1.2K Hz	0.3%@50/60Hz 1.5% 15~1.2K Hz	0.3%@50/60Hz 1.5% 15~1.2K Hz
Line Regulation*2	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation	0.2%	0.2%	0.2%	0.2%	0.2%
Temp. Coefficient	0.02% per degree from 25˚C				
Maximum Current (per phase)					
R.m.s.	4A/2A	8A/4A	12A/6A	16A/8A	32A/20A
Peak	24A/12A	48A/24A	72A/36A	96A/48A	192A/96A
Frequency					
Range	DC,15~1.2K Hz	DC,15~1.2K Hz	DC,15~1.2K Hz	DC,15~1.2K Hz	DC,15~1.2K Hz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Phase Angle					
Range	0~360˚				
Resolution	0.3				
Accuracy	< 0.8 50/60Hz	< 0.8 50/60Hz	< 0.8 50/60Hz	< 0.8 50/60Hz	< 0.8 50/60Hz
DC Output Rating (per phase)					
Power	250W	500W	750W	1000W	2000W
Voltage	212V/424V	212V/424V	212V/424V	212V/424V	212V/424V
Current	2A/1A	4A/2A	6A/3A	8A/4A	16A/8A
Input 3-Phase Power (per phase)					
Voltage Range	90~250V	90~250V	190~250V	190~250V	190~250V
Frequency Range	47~63Hz	47~63Hz	47~63Hz	47~63Hz	47~63Hz
Current	9A Max.	16A Max.	10A Max.	14A Max.	28A Max.
Power Factor *3	0.97 Min.	0.98 Min.	0.98 Min.	0.98 Min.	0.98 Min
Measurement					
Voltage (line-neutral)					
Range	150V/300V	150V/300V	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current (per phase)					
Range (peak)	24A	48A	72A	96A	192A
Accuracy (r.m.s.)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Resolution	0.01A	0.01A	0.01A	0.01A	0.01A
Power (per phase)					
Accuracy	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.
Resolution	0.1W	0.1W	0.1W	0.1W	0.1W
Others					
Efficiency *4	68 %	77 %	81 %	82%	82%
Size (WxHxD)	483x399x600mm	483x399x600mm	483x399x600mm	483x399x600mm	546x985x700 mm
Weight	71Kg	71Kg	71Kg	71Kg	163Kg
Protection	UVP, OCP, OPP, OTP, FAN				
Temperature Range					
Operation	0˚C ~40˚C				
Storage	-40˚C ~85˚C				
Humidity	30 %~90 %				
Safety & EMC	CE				

All specifications are subject to change without notice.

Remarks

*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
*2 : Load regulation is tested with sinewave and remote sense.
*3 : Input power factor is tested on input 220V, full load condition.
*4 : Efficiency is tested on input voltage 110V for 61701 and 61702, 220V for 61703, 61704 and 61705.

REGENERATIVE GRID SIMULATOR
MODEL 61800 SERIES

Market demand for Distributed Resource (DR) products such as PV inverters and wind energy systems is steadily growing as the world strives for clean renewable energy sources. This demand has created a need for rigorous regulation testing to standards such IEEE 1547 / IEC 61000-3-15 / IEC 62116 ensuring proper and safe operation of on-grid products. It has become critical to manufacturers to conduct these tests to prove compliance and to relieve product liability concerns. Chroma's new 61800 family of Grid Simulators has been designed to fulfill these test requirements by providing a full 4 quadrant, fully regenerative, grid simulator with advanced features for compliance, safety and product verification testing.

The 61800 regenerative grid simulator allows users to vary relevant parameters in order to simulate real world grid environments and conditions. Supported variations include frequency, phase angle, voltage amplitude, voltage drops in either single or three phase modes. Unbalanced three phase conditions can easily be simulated. And most importantly, the regenerative feature of the 61800 grid simulator provides an effective energy saving method since energy generated by unit under test is fed back to the grid instead of dissipated as heat during operation.

The 61800 grid simulator could also meet test requirements with smart grid and EV related test applications, such as Vehicle to Grid (V2G) and Energy Storage System (ESS) testing. The 61800 is also capable of meeting IEC regulatory standards' (such as IEC 61000-3-2/-3-3/-3-1/-3-12) requirement for AC supply.

The 61800 regenerative grid simulator is not only limited to product development during R&D. Its extensive features are also valuable during design and quality verification as well as throughout various production stages. Using state-of-the-art digital control technology the 61800 can deliver up to 300VAC at output frequencies ranging from 30Hz to 100Hz. The AC+DC feature allows for applications which require a DC offset bias.

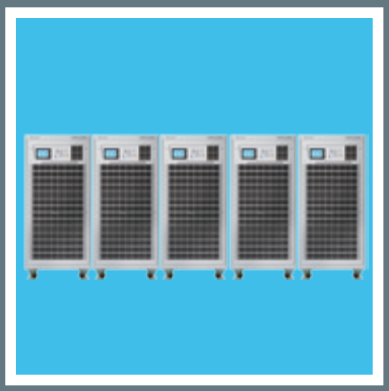
The 61800 series is also able to provide precision measurements such as RMS voltage, RMS current, true power, power factor, current crest factor and many others. By applying advanced DSP technology, the 61800 can easily simulate power line disturbance (PLD) using LIST, PULSE and STEP modes. Additional features such as the waveform synthesis function allows users to program various distorted harmonic waveforms which are required by some regulatory standards. GPIB (IEEE488.2), RS-232, USB and Ethernet interface are available to control the 61800 grid simulator remotely.

MODEL 61800 SERIES

Key Features

- Output power
  61830 : 30kVA ; 61845 : 45kVA ; 61860 : 60kVA
- Output voltage: 0-300V, 400V (option)
- Output frequency: DC, 30Hz-100Hz
- User selectable single phase or three phase output
- Full 4 quadrant, fully regenerative up to 100% of output current rating
- Specifically designed for PV inverter, Smart Grid and EV related test applications
- Programmable slew rate settings for voltage and frequency
- Programmable voltage and current limits
- Turn on, turn off phase angle control
- LIST, PULSE, STEP mode functions for testing Power Line Disturbance (PLD) simulation
- Voltage dips, short interruption and voltage variation simulation
- Harmonics, inter-harmonics waveform synthesizer
- Comprehensive measurement capability, including current harmonics
- Analog programmable interfaces
- Remote interface: GPIB, RS-232, USB and Ethernet
- Parallel output for higher power applications (Three phase only)

60kVA x 5 = 300kVA



SPECIFICATIONS

Model	61830	61845	61860
AC Output Rating			
Output Phase	1 or 3 selectable	1 or 3 selectable	1 or 3 selectable
Max. Power	30kVA	45kVA	60kVA
Per Phase	10kVA	15kVA	20kVA
Voltage			
Range	0~300V_{LN}/0~520V_{LL}	0~300V_{LN}/0~520V_{LL}	0~300V_{LN}/0~520V_{LL}
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V
Distortion *1	< 0.5% @ 50/60Hz < 0.8% @ 30Hz~100Hz	< 0.5% @ 50/60Hz < 0.8% @ 30Hz~100Hz	< 0.5% @ 50/60Hz < 0.8% @ 30Hz~100Hz
Line regulation	0.10%	0.10%	0.10%
Load regulation	0.20%	0.20%	0.20%
Max. Current (1-Phase Mode)			
RMS	150A	225A	300A
Peak	450A	675A	900A
Max. Current (each phase in 3-Phase Mode)			
RMS	50A	75A	100A
Peak	150A	225A	300A
Frequency			
Range	30Hz ~ 100Hz	30Hz ~ 100Hz	30Hz ~ 100Hz
Accuracy	0.01%	0.01%	0.01%
DC Output (1-Phase Mode) *2			
Power	15kW	22.5kW	30kW
Voltage	424V	424V	424V
Current	75A	112.5A	150A
DC Output (3-Phase Mode)			
Power	5kW	7.5kW	10kW
Voltage	424V	424V	424V
Current	25A	37.5A	50A
Harmonics Synthesis Function			
Harmonics range	up to 50 harmonics order @ 50/60Hz fundamental frequency		
Input Rating			
Voltage Operating Range *3	3Ø 200~220V ± 10%V_{LL}, 47~63Hz 3Ø 380~400V ± 10%V_{LL}, 47~63Hz 3Ø 440~480V ± 10%V_{LL}, 47~63Hz	3Ø 200~220V ± 10%V_{LL}, 47~63Hz 3Ø 380~400V ± 10%V_{LL}, 47~63Hz 3Ø 440~480V ± 10%V_{LL}, 47~63Hz	3Ø 200~220V ± 10%V_{LL}, 47~63Hz 3Ø 380~400V ± 10%V_{LL}, 47~63Hz 3Ø 440~480V ± 10%V_{LL}, 47~63Hz
Current	125A Max./Phase (3Ø 200~220V ± 10%V_{LL}) 65A Max./Phase (3Ø 380~400V ± 10%V_{LL}) 58A Max./Phase (3Ø 440~480V ± 10%V_{LL})	190A Max./Phase (3Ø 200~220V ± 10%V_{LL}) 100A Max./Phase (3Ø 380~400V ± 10%V_{LL}) 87A Max./Phase (3Ø 440~480V ± 10%V_{LL})	250A Max./Phase (3Ø 200~220V ± 10%V_{LL}) 130A Max./Phase (3Ø 380~400V ± 10%V_{LL}) 115A Max./Phase (3Ø 440~480V ± 10%V_{LL})
Power factor	0.99 (Typical)		
Measurement			
Voltage			
Range	0~300V	0~300V	0~300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Current			
Range (peak)	150A	225A	300A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power			
Accuracy	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.
Others			
Efficiency	80% (Typical)		
Protection	OVP, OCP, OPP, OTP, FAN		
Safety & EMC	CE (include EMC & LVD)		
Dimension (H x W x D)	1740 x 780 x 1000 mm (include wheel set)	1740 x 780 x 1000 mm (include wheel set)	1740 x 780 x 1000 mm (include wheel set)
Weight	850kg	850kg	870kg

Note*1 : Maximum distortion is tested on output 250V with maximum current to linear load
Note*2 : The DC function is mainly intended as DC offset for AC+DC output voltage function
Note*3 : Must be specified at time of order. All inputs are L-L, 3Ø, 3 wire+GND
All specifications are subject to change without notice.

PROGRAMMABLE DC POWER SUPPLY
MODEL 62000H SERIES

Chroma's new 62000H Series of programmable DC power supplies offer many unique advantages for telecom, automated test system & integration, industrial, battery charge & simulation for hybrid cars and solar panel simulation. These advantages include high power density of 15KW in 3U, precision readback of output current and voltage, output trigger signals as well as the ability to create complex DC transient waveforms to test device behavior for spikes, drops, and other voltage deviations.

The 62000H Series includes 14 different models ranging from 5KW to 15KW, with current range up to 375A and voltage range up to 1000V. The 62000H can easily parallel up to ten units capable of 150KW with current sharing for bulk power applications, for example, battery bank simulation of 450V/150A/67.5KW for electric vehicle and military use.

There are 100 user programmable input status on the front panel for automated test application and life cycle ON/OFF test. In addition, the 62000H has a 16 bit digital control with bright vacuum fluorescent display readout.

The 62000H series DC power supplies are very easy to operate either from the front panel keypad or from the remote controller via USB / RS232 / RS485 / APG (Standard) and GPIB & Ethernet (optional). Its compact size with 3U only can be stacked on a bench in a standard rack without any difficulty.

Another unique capability of the 62000H supplies is their ability to create complex DC transient waveforms. This capability allows devices to be tested to DC voltage dropouts, spikes and other voltage variations making them an ideal choice for aerospace device testing, inverter testing and other devices which will experience voltage interrupts. Applications include DC/DC Converter & Inverter voltage drop test, engine start-up simulation, battery automated charging, electronic product life cycle test, etc.

MODEL 62000H SERIES

Key Features :

- Power range: 5KW / 10KW / 15KW
- Voltage range: 0 ~ 1000V
- Current range: 0 ~ 375A
- High power density (15KW in 3U)
- Easy Master / Slave parallel & series operation up to 150KW
- Precision V&I Measurements
- High-speed programming
- Voltage & Current slew rate control
- Digital encoder knobs, keypad and function keys
- Current sharing operation
- Voltage ramp function (time range: 10 ms ~ 99 hours)
- Auto Sequencing Programming: 10 programs / 100 sequences
- OVP, current limit, thermal protection
- Standard analog programming interface
- Standard USB / RS232 / RS485 interface
- Optional GPIB / Ethernet interface
- Remote output ON / OFF (I / P)
- Remote sense line drop compensation
- LabView and Labwindows
- Solar array simulation function
- Shade I-V curve simulation
- I-V curve programming: 10 program / 100 I-V files
- CE Certified

APG RS-485 RS-232 Ethernet GPIB USB CE

ELECTRICAL SPECIFICATIONS -1

Model	62075H-30	62050H-40	62050H-450	62050H-600	62100H-30	62100H-40	62100H-450
Output Ratings							
Output Voltage	0-30V	0-40V	0-450V	0-600V	0-30V	0-40V	0-450V
Output Current	0-250A	0-125A	0-11.5A	0-8.5A	0-375A	0-250A	0-23A
Output Power	7500W	5000W	5000W	5000W	11250W	10000W	10000W
Line Regulation							
Voltage	±0.01% F.S.						
Current	±0.05% F.S.						
Load Regulation							
Voltage	±0.02% F.S.						
Current	±0.1% F.S.						
Voltage Measurement							
Range	6V / 30V	8V / 40V	90V / 450V	120V / 600V	6V / 30V	8V / 40V	90V/450V
Accuracy	0.05% + 0.05% F.S.						
Current Measurement							
Range	50A / 250A	25A / 125A	2.3A / 11.5A	1.7A / 8.5A	75A / 375A	50A / 250A	4.6A/23A
Accuracy	0.1% + 0.1% F.S.						
Output Noise & Ripple							
Voltage Noise (P-P)	60mV	60mV	300mV	350mV	60mV	60mV	300mV
Voltage Ripple (rms)	15mV	15mV	450mV	600mV	15mV	15mV	450mV
Current Ripple (rms)	100mA	50mA	20mA	15mA	150mA	100mA	40mA
OVP Adjustment Range							
Range	0-110% programmable from front panel, remote digital inputs						
Accuracy	±1% of full-scale output						
Programming Response Time							
Rise Time: Full Load	6ms	8ms	60ms	60ms	6ms	8ms	60ms
Rise Time: No Load	6ms	8ms	60ms	60ms	6ms	8ms	60ms
Fall Time: Full Load	6ms	8ms	60ms	60ms	6ms	8ms	60ms
Fall Time: 10% Load	100ms	100ms	250ms	250ms	100ms	100ms	250ms
Fall Time: No Load	1s	1s	2.5s	2.5s	1s	1s	2.5s
Slew Rate Control							
Voltage slew rate range	0.001V/ms ~ 5V/ms	0.001V/ms ~ 5V/ms	0.001V/ms ~ 7.5V/ms	0.001V/ms ~ 10V/ms	0.001V/ms ~ 5V/ms	0.001V/ms ~ 5V/ms	0.001V/ms ~ 7.5V/ms
Current slew rate range	0.001A~1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~0.1A/ms, or INF	0.001A~0.1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~0.1A/ms, or INF
Minimum transition time	0.5ms						
Transient Response Time	Recovers within 1ms to +/~0.75% of steady-state output for a 50% to 100% or 100% to 50% load change(1A/μs)						
Efficiency	0.87(Typical)						
Drift (30 minutes)							
Voltage	0.04% of Vmax						
Current	0.06% of Imax						
Drift (8 hours)							
Voltage	0.02% of Vmax						
Current	0.04% of Imax						
Temperature Coefficient							
Voltage	0.04% of Vmax/°C						
Current	0.06% of Imax/°C						

Ultra-High Stability
DC Power Supply

MODEL 62075H-30N

Key Features :

- Power range : 7.5kW
- Voltage range: 0 ~ 30V
- Current range: 0 ~ 250A
- High power density (7.5KW in 4U)
- Easy Master/Slave parallel operation up to 30V/750A
- Easy Master/Slave series operation up to 60V/250A
- Current stability : 2.5mA(10ppm)
- High-resolution current programming & Measurement: 20bit DAC/24bit ADC
- Current Slew Rate Control
- Output current waveform digitizing
- OVP, Current Limit, Thermal protection
- Standard USB Interface
- Optional Ethernet/LXI interface
- Safety interlock & Remote inhibit control (I/P)
- Magnet power supply application
- CE Certified

ULTRA-HIGH STABILITY DC POWER SUPPLY MODEL 62075H-30N

Chroma's new 62075H-30N of ultra-high stability DC power supply offers many unique advantages for magnet power supply system in synchrotron application. These advantages include excellent current stability of 1.25mA/0.5 hour and 2.5mA/8 hour, extremely low current ripple of 2.5mA, current reproducible within 10mA, precision setting and readback of output current via 20 bit DAC/24 bit ADC.

The 62075H-30N output power has maximum 7.5kW/30V/250A power module designed with 4U height that can be connected easily as master or slave with three units to 22.5kW/30V/750A in parallel or two units to 15kW/60V/250A in series and operated as a standalone unit via system bus.

The 62075H-30N provides stable DC output current source and power for precision measurement. It offers an advanced 250A/30V ultra high-stable ±10 ppm (current stability ±1.25 mA) with high efficiency and high power factor in compliance with energy savings. In addition it has a 20 bit digital control with bright vacuum fluorescent display readout.

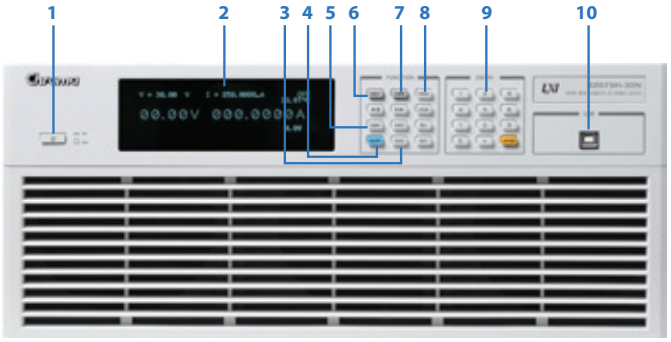
The 62075H-30N ultra-high stability power supply is very easy to operate from either the front panel keypad or the remote controller via USB (standard) and Ethernet/LXI (optional). Its compact size with 4U only can be used on a bench or installed in a standard rack without any difficulty.

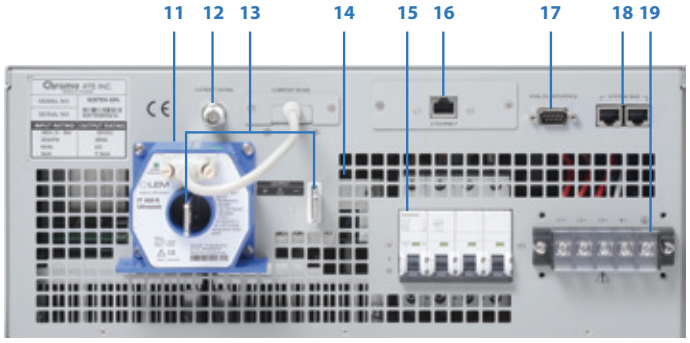
The features of the 62075H-30N includes current mode with dual loops control. It is able to provide a stable and fast output response providing excellent protection for different load variations.

The self-diagnosis routine and full protections against voltage phase loss, over/under voltage at input, over voltage/current at output, over power, over temperature, fan fail and remote inhibit ensure the quality and reliability for even the most demanding magnet power supply system in synchrotron.

Ethernet LXI USB CE

PANEL DESCRIPTION





1. **POWER Switch**
2. **VFD Display**
   Display setting, readings and operating status
3. **LOCK Key**
   Lock all settings
4. **OUTPUT Key**
   Enable or disable the output
5. **CONFIG Key**
   Set the system configuration
6. **VOLTAGE Key**
   Set the output voltage
7. **CURRENT Key**
   Set the output current
8. **PROG Key**
   Set the waveform editing
9. **NUMERIC Key**
   Set the data
10. **USB interface port**

11. **DCCT**
    Current transducer device
12. **BNC Connector**
    Analog output 0-10V for current measurement
13. **OUTPUT Terminal**
    Connect the output cable to a UUT
14. **System Fan**
    With fan speed control
15. **Input AC Breaker**
16. **ETHERNET Interface**
17. **Analog interface**
    Digital signal I/O
18. **System Bus**
    For master/slave parallel and series control
19. **AC Input Terminal**

ELECTRICAL SPECIFICATIONS

Model	62075H-30N
Output Ratings	
Output Voltage	30V max.
Output Current *1	0~250A
Output Power	7500W
Line Regulation	
Current	±5mA
Voltage Measurement	
Range	0~30V
Accuracy	±20mV
Current Measurement	
Range	0~250A
Accuracy	±10mA
Output Ripple	
Current Ripple (P-P) (1 ~ 1kHz)	±2.5 mA
OVP Protection	
Range	0 ~ 110% Programmable
Accuracy	±1% of full scale output
Slew Rate Control	
Current slew rate range	0.001A/ms ~ 0.1A/ms
Efficiency	0.85%
Stability *2	
Current (0~30 minutes)	±1.25 mA (5ppm)
Current (0~8 hours)	±2.5 mA (10ppm)
Programming &Measurement Resolution	
Current programming	20 bits ± 1LSB
Current measurement	24 bits ± 1LSB
Voltage measurement	16 bits ± 1LSB

Note *1: The operating output current range that complies with the specification is 20 ~ 250A.
Note *2: The test condition of output specification is the power supply ON over 2 hours, load = 14.3mH/76.28 mohm or 26mH/82.52mohm.

GENERAL SPECIFICATIONS

Model	62075H-30N
Remote Interface	
Ethernet Interface	Optional
USB Interface	Standard
System bus	Standard for master/slave control
Programming Accuracy*2	
Current	± 10 mA
Programming Response Time	
Iout setting	Ethernet send command to DC source receiver <20ms
Measure V&I	Under Ethernet command using Measure <25ms
System Interface (I/O)	
Current monitor output (O/P)	0~10Vdc
System Fault Indicator(O/P)	TTL: Active High
Safety interlock (I/P)	Time accuracy: <100ms
Remote inhibit (I/P)	TTL: Active High
Series & Parallel Operation	Series: two units / Parallel: three units
Sine Wave Programming	
Frequency range	0.1 ~ 20.0Hz
Amplitude	0 ~ 4A
OFFSET range	5 ~ 248A
Digitizing Current Waveform Data	
Sampling time	1k/2k/4k/5k/10k
Sampling point	2 ~ 65535
Trigger source	SW/ALARM/HW
Input Specification	
AC input voltage 3phase, 4 wire + ground	380Vac (operating range 342 ~ 418 Vac)
AC frequency range	47 ~ 63Hz
Max current (each phase)	17.5A
AC input voltage relative phase asymmetry factor	± 1.5%
General Specification	
Storage temperature range	0˚C ~ 50˚C
Operating temperature range	25˚C ± 2˚C
Relative humidity	30% to 90%
Dimension (HxWxD)	177mm x 428mm x 590mm / 6.97 x 16.85 x 23.23 inch
Weight	Approx. 34kg / 74.96 lbs

Note *1: The operating output current range that complies with the specification is 20 ~ 250A.
Note *2: The test condition of output specification is the power supply ON over 2 hours, load = 14.3mH/76.28 mohm or 26mH/82.52mohm.

MODULAR DC POWER SUPPLY
MODEL 62000B SERIES

Chroma's new 62000B series of Modular DC Power Supplies offer many unique features for Burn-in and plating/electrolysis applications. The features include a N+1 redundancy, high power densities, hot-swappable maintenance, remote ON/OFF and programmable control via the CAN bus.

The 62000B family offers 5 types of power module with ranging from 1V to 150V, current from 10A to 90A, and offers two mainframe type of six and three position. The six position mainframe can envelop in up to six power modules paralleled operation for 9KW power output. The 62000B can easily parallel up to fourteen mainframe to 120KW with current sharing and CAN bus control for bulk power applications.

The Modular DC Power Supplies of 62000B are very cost effective with high power density and low current ripple. These instruments have be designed for burn-in applications such as the LCD panels, DC-DC converters, power inverters, notebook computers, battery chargers and many other types of electronic devices.

Modern power factor correction circuitry is incorporated in 62000B providing an input power factor above 0.98 to meet the IEC requirements. This PFC correction circuity not only reduces the input current draw and to greatly reduce generation of input current harmonics. Optional graphic Soft Panels and CAN bus control allow for control and monitoring of the power system using an easy to use graphical interface.

USB GPIB APG RS-485 Ethernet CAN CE

MODEL 62000B SERIES

Key Features :

- Voltage range: 1 ~ 150V
- Current range: Up to 2000A (System)
- Power range up to 1.5KW per module up to 120KW per system
- High Power Density (464 mW / cm^3 = 7.13 W/In^3)
- N+1 Redundancy
- Hot-swappable
- Ideal for Burn-in & Plating
- Remote Sense
- Remote ON / OFF
- CAN Bus Control
- DC OK Signal Output

SPECIFICATIONS

Model	62015B-15-90	62015B-30-50	62015B-60-25	62015B-80-18	62015B-150-10
Electrical Specifications					
Output Ratings					
Output Power	1350W	1500W	1500W	1440W	1500W
Output Voltage	1~15V	1~30V	1~60V	1~80V	1~150V
Output Current	1~90A	1~50A	1~25A	1~18A	1~10A
Line Regulation	0.1% FS				
Load Regulation *1	1% FS				
Programming Accuracy	1% FS				
Measurement Accuracy	1% FS				
Output Noise (20MHz)					
Voltage Noise (P-P)	100mV	100mV	200mV	200mV	400mV
Voltage Ripple (rms)	30mV	30mV	50mV	50mV	100mV
Current Ripple (rms)	0.9A	0.5A	0.25A	0.18A	0.1A
Efficiency	> 87% @ full load	> 88% @ full load			
Turn on over shoot voltage *2	5% of nominal output				
Transient Response Time *3	< 5 ms				
AC Input Voltage					
Six Position Mainframe	187 ~ 250 Vac (3 Phase 4 Wire, △ Connection) or 323 ~ 437 Vac (3 Phase 5 Wire, Y Connection) / 45 ~ 65 Hz				
Three Position Mainframe	187 to 250 Vac (single phase) / 45 ~ 65 Hz				
Input Power Factor	> 0.98@ full load				
Protection Function					
OVP	Automatically shuts down at 115% of set value				
Adjustment Range	1~16V	1~31V	1~65V	1~83V	1~155V
OCP	Current limit (0 ~ 100%) / OCP Shutdown at 115% of F.S.				
OTP	Automatically shuts down if internal limit is reached				
I/O Signal					
Remote ON/OFF (I/P)	Dry contact (closed = enabled), vice versa				
AUX Voltage	4 ~ 24V / 0.5A at mainframe (by trimmer adjust voltage)				
DC OK Signal Type (O/P)	Dry contact (closed = enabled) (Error : OVP / OCP / OTP / AC Fault)				
Programming Response Time *4 (Typical)					
Rise Time (Full Load)	For a programmed 5% to 95% step in output voltage : 100ms				
Rise Time (No Load)	For a programmed 5% to 95% step in output voltage : 100ms				
Fall Time (Full Load)	For a programmed 95% to 5% step in output voltage : 40ms				
Fall Time (No Load)	For a programmed 95% to 5% step in output voltage : 5s				
Vout Setting	CAN Bus send command to DC module receiver : 1s				
Measurement V & I	Under CAN command using fetch : 100ms				
Delay Time	For output ON/OFF enable and disable (under CAN command) : 5s(Single Mainframe)				
General Specifications					
Remote Sensing	3V max. line loss compensation				
Parallel Operation	Current Sharing (±5%)				
Operating Temperature	0 ~ 50℃				
Humidity Range	0 ~ 90% RH. Non-condensing				
Remote Interface	CAN Bus (optional)				
Safety & EMC	CE				
Dimension (H x W x D)	Mainframe : 175.6 x 443.9 x 466.2 mm / 6.91 x 17.48 x 18.35 inch (62000B-6-1) Mainframe : 175.6 x 239.9 x 466.2 mm / 6.91 x 9.44 x 18.35 inch (62000B-3-1) Module : 138.5 x 67.5 x 377.5 mm / 5.45 x 2.66 x 14.86 inch				
Weight	Mainframe : 14 Kg / 30.8 lbs (62000B-6-1) Mainframe : 8 Kg / 17.6 lbs (62000B-3-1) Module : 4 Kg / 8.8 lbs				

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

Note*1 : For 50% step load variation with remote sense at maximum output voltage
Note*2 : based on rise time of 100ms
Note*3 : Time for the output voltage to recover within 1% of its rated for a load changed of 25%
Note*4 : Six Position Mainframe through CAN

SPECIFICATIONS

A620007 Control & Supervisor Unit	
Setting Item	Output voltage setting (V set + Rotary)
	Output current limit setting (I set + Rotary)
	Over voltage protection setting (OVP_SET) (Default : 115% Vmax.)
	Output ON/OFF
	OCP selection : CC mode or Shutdown (By Dip switch selection at rear panel)
	Max. output current setting (I max)
Measurement Display Item	Output voltage display (7 segment LED)
	Output current display (7 segment LED)
	Operating mode indicator : CV or CC
	Output ON/OFF indicator
	Max. output current display (I max button)
Alarm Indicator Item	CSU : Over voltage protection
	CSU : Over temperature protection
	AC fault alarm
	Power module fault alarm
Remote Control Interface	
CAN Bus	Standard
Ethernet	Optional
Analog Programming Interface (Standard)	Setting voltage (A/I) : 0-10Vdc or 0-1 mA of FS (Resolution : 12 bits, Accuracy : 1% FS) Setting current (A/I) : 0-10Vdc or 0-1 mA of FS (Resolution : 12 bits, Accuracy : 1% FS) Monitor voltage (A/O) : 0-10V of FS (Resolution : 12 bits, Accuracy : 1% FS) Monitor current (A/O) : 0-10V of FS (Resolution : 12 bits, Accuracy : 1% FS)
Remote Output ON/OFF	Dry contact
Output ON/OFF Indicator	Active High
CV or CC mode Indicator	TTL Level High=CV mode ; TTL Level Low=CC mode
OTP Indicator	Active High
System Fault Indicator	Active High
I/O Control Interface	I/O : I/P=10 , O/P=10
I/P Definition	
Pin 1 & 2	Temperature sensor for bulk power system rack A (Active : open / default : short)
Pin 3 & 4	Temperature sensor for bulk power system rack B (Active : open / default : short)
Pin 5 & 6	Emergency stop for bulk power system
Pin 7~20	Reserved
O/P Definition	
Pin 1 & 2	OVP
Pin 3~20	Reserved
AC Input Voltage	Single phase 187-253VAC
Dimension	High(2U) x width(19")

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

Programmable
DC Power Supply

MODEL 62000P SERIES

Key Features:

- Wide range of voltage & current combinations with constant power
- Voltage range : 0 ~ 600V
  Current range : 0 ~ 120A
  Power range : 600W, 1200W, 2400W, 5000W
- Digital encoder knobs, keypad and function keys
- Power Factor Correction (0.95)
- High-speed Programming
- Precision V&I Measurements
- Current sharing for parallel operation with Master/Slave Control
- Voltage Ramp function : Time Range (10ms~99hours)
- Auto Sequencing Programming : 10 Programs / 100 Sequences / 8 bit TTL
- Voltage & Current Slew Rate Control
- OVP, Current Limit, Thermal protection
- Remote sense, 5V line loss compensation
- APG (Analog Programmable Interface) with Isolated Analog Interface Card
- Optional GPIB control with SCPI
- Optional Ethernet interface
- Standard RS-232 & USB interface
- LabView and Labwindows
- CE Certified
- Standard USB interface

PROGRAMMABLE DC POWER SUPPLY MODEL 62000P SERIES

Chroma's new 62000P Series of programmable DC power supplies offer many unique advantages for ATE integration and testing. These advantage include a constant power operating envelope, precision readback of output current and voltage, output trigger signals as well as the ability to create complex DC transients waveforms to test device behavior to spikes, drops, and other voltage deviations.Designed for automated testing DC-DC converters and similar products, the 62000P sets a new standard for high accuracy programmable DC supplies.

The 62000P Series includes 12 different models ranging from 600W to 5000W, up to 120A and up to 600V. Due to their constant power operating envelope a single instrument can provide both high voltage/low current AND low voltage/high current thereby reducing the number of supplies needed in typical ATE applications.

The 62000P Series also includes 16 bit readback capability for accurate voltage and current readings. This means systems no longer need complex shunt/multiplexers to make accurate readings of the UUT's input parameters. The instruments also include I/O ports providing 8 bit TTLs, DC-ON, fault output signal and remote inhibit as well as a output trigger signal for system timing measurements.

Another unique capability of the 62000P Series supplies is their ability to create complex DC transient waveforms. This capability allows devices to be tested to DC voltage dropouts, spikes and other voltage variations making them an ideal choice for airborne device testing, inverter testing and other devices which will experience voltage interrupts. Applications include DC/DC Converter & Inverter voltage drop test, engine start-up simulation, battery automated charging, electronic product life cycle test, and etc.

SPECIFICATIONS -1

Model	62006P-30-80	62006P-100-25	62006P-300-8	62012P-40-120	62012P-80-60	62012P-100-50
Output Ratings						
Output Voltage	0~30V	0~100V	0~300V	0~40V	0~80V	0~100V
Output Current	0~80A	0~25A	0~8A	0~120A	0~60A	0~50A
Output Power	600W	600W	600W	1200W	1200W	1200W
Line Regulation						
Voltage	0.01%+2mV	0.01%+6mV	0.01%+18mV	0.01%+2mV	0.01%+8mV	0.01%+10mV
Current	0.01%+25mA	0.01%+5mA	0.03%+20mA	0.01%+25mA	0.01%+10mA	0.01%+12mA
Load Regulation						
Voltage	0.01%+3mV	0.01%+10mV	0.01%+50mV	0.01%+3mV	0.01%+12mV	0.01%+18mV
Current	0.01%+10mA	0.01%+5mA	0.03%+40mA	0.01%+10mA	0.01%+20mA	0.01%+28mA
Voltage Measurement						
Range	6V/30V	20V/100V	60V/300V	8V/40V	16V/80V	20V/100V
Accuracy	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.
Current Measurement						
Range	16A/80A	5A/25A	1.6A/8A	24A / 120A	12A/60A	10A/50A
Accuracy	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S..	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.
Output Noise (0 ~ 20MHz)						
Voltage Ripple (P-P)	60 mV	85 mV	180 mV	90 mV	100 mV	100 mV
Voltage Ripple (rms)	8 mV	10 mV	90 mV	10 mV	10 mV	15 mV
Current Ripple (rms)	60 mA	10 mA	60 mA	120 mA	30 mA	20 mA
OVP Adjustment Range	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax
Slew Rate Range						
Voltage (with USB)	0.001V - 5V/ms	0.001V - 10V/ms	0.01V - 10V/ms	0.001V - 5V/ms	0.001V - 10V/ms	0.001V - 10V/ms
Current (with USB)	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms
Programming Response Time (Typical)						
Rise Time (Full & No Load)	6 ms	10 ms	30 ms	8 ms	8 ms	10 ms
Fall Time	350ms(max)	300 ms(max)	2.5 s(max)	460 ms(max)	240 ms(max)	300 ms(max)
Efficiency	0.75	0.75	0.75	0.8	0.8	0.8
Drift (8 hours)						
Voltage	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax
Current	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax
Temperature Coefficient						
Voltage	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C
Current	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C
Transient Response Time	3 mS	3 mS	3mS	3mS	3 mS	3 mS
10 % step change	150 mV	180 mV	600 mV	150 mV	250 mV	250 mV
Voltage limit @ Series Mode	150V	500V	800V	200V	400V	500V
AC Input Voltage Ranges	95 to 250Vac	95 to 250Vac	95 to 250Vac	95 to 250Vac	95 to 250Vac	95 to 250Vac
Operating Temperature	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C
Dimension (H x W x D)	89 x 430 x 425 mm / 3.5 x 16.93 x 16.73 inch					
Weight	12kg / 26.43 lbs	12.1 kg / 26.65 lbs	11.2 kg / 24.67 lbs	12kg / 26.43 lbs	13 kg / 28.63 lbs	12.1 kg / 26.65 lbs

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

GENERAL SPECIFICATIONS

Programming & Measurement Resolution	
Voltage (Front Panel)	10 mV
Current (Front Panel)	10 mA
Voltage (Remote Interface)	0.003% of Vmax
Current (Remote Interface)	0.002% of Imax
Voltage (Analog Programming Interface)	0.04% of Vmax
Current (Analog Programming Interface)	0.04% of Imax
Programming Accuracy	
Voltage Programming (Front Panel and Remote Interface)	0.1% of Vmax
Voltage Programming (Analog Programming Interface)	0.2% of Vmax
Current Programming (Front Panel and Remote Interface)	0.3% of Imax
Current Programming (Analog Programming Interface)	0.3% of Imax
Programming Response Time	
Rise Time : For a programmed 5% to 95% step in output voltage.(Full & No Load)	See Electrical Specification
Fall Time : For a programmed 95% to 5% step in output voltage. (The fall time will be affected by the external loading from UUT.)	
Vout setting (USB send command to DC source receiver)	10ms
?Volt , ? Current (under USB command using Fetch)	10ms
?Volt , ? Current (under USB command using Measure)	70ms
Analog Programming Interface	
Voltage and Current Programming inputs	0~10Vdc or 0~5Vdc of F.S.
Voltage and Current monitor	0~10Vdc or 0~5Vdc of F.S.
Isolation : Maximum working voltage of any analog programming signal with respect to chassis potential.	70Vdc
Auxiliary Power Supply	
Output Voltage	12Vdc
Maximum Current Source Capability	10mA
Remote inhibit function (I/O)	
Use to disable the output of DC power supply; Active Low	TTL
DC-ON Output Signal	
Indicate the output status; Active High	TTL
Fault output signal	
Indicate if there is a fault/protection occurred; Active Low	TTL
Series & Parallel operation function with Master / Slave control	
Voltage limit @ Series Mode	See Electrical Specification
Number of DC Power Supplies allowed @ Master / Slave control mode	5
Auto Sequencing Programmable Function	
Number of program	10
Number of sequence	100
Time Range	5ms - 15,000S
TTL signal out	8 bits
TTL source capability	7 mA
Voltage Step Mode Programmable Function	
Start Voltage Range	0~full scale
End Voltage Range	0~full scale
Total Run Time Range (hhh:mm:ss.sss)	10ms - 99 hours
Slew Rate Control Function	
Voltage slew rate range (The fall slew rate will be affected by the discharge rate of the output capacitors especially under no load condition.)	See Electrical Specification
Current slew rate range	See Electrical Specification
Minimum transition time.	0.5 ms
Remote Sense	
Line loss compensation	5V

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

Programmable
AC & DC Electronic load

PROGRAMMABLE AC & DC ELECTRONIC LOAD
MODEL 63800 SERIES

Chroma's 63800 Series AC&DC Electronic Loads are designed for testing Uninterruptible Power Supplies(UPS), Off-Grid Inverters, AC sources and other power devices such as switches, circuit breakers, fuses and connectors.

The 63800 Loads can simulate load conditions under high crest factor and varying power factors with real time compensation even when the voltage waveform is distorted. This special feature provides real world simulation capability and prevents over-stressing thereby gives reliable and unbiased test results.

The 63800's state of the art design uses DSP technology to simulate non-linear rectified loads with its unique RLC operation mode. This mode improves stability by detecting the impedance of the UUT and dynamically adjusting the load's control bandwidth to ensure the system's stability.

Comprehensive measurements allow users to monitor the output performance of the UUT. Additionally, voltage & current signals can be routed to an oscilloscope through analog outputs. The GPIB/RS232 interface options provide remote control & monitor for system integration. The built-in digital outputs may also be used to control the external relays for short circuit (crowbar) testing.

Chroma's 63800 Loads feature in fan speed control to ensure low acoustic noise. The diagnosis/ protection functions include self-diagnosis routines and protection against over-power, over-current, over-temperature and over-voltage alarm.

MODEL 63800 SERIES

Key Features

- Power Rating :
  1800W, 3600W, 4500W
- Voltage Range :
  50V ~ 350Vrms
- Current Range :
  Up to 18Arms, 36Arms, 45Arms
- Peak Current :
  Up to 54A, 108A, 135A
- Parallel / 3-Phase Function
- Frequency Range :
  45 ~ 440Hz, DC
- Crest Factor Range :
  1.414 ~ 5.0
- Power Factor Range :
  0 ~ 1 lead or lag (Rectified mode)
- CC, CR, CV, CP for DC Loading
- Constant & Rectified Load Modes for AC Loading
- Analog Voltage & Current Monitor
- Timing Measurement for Battery, UPS, Fuse and Breaker tests
- Measurement :
  V, I, PF, CF, P, Q, S, F, R, Ip+/- and THDv
- Short circuit simulation
- Full Protection :
  OP, OC, OT protection and OV alarm
- GPIB & RS-232 interfaces

RS-232 GPIB CE

SPECIFICATIONS

Model	63802	63803	63804
Power	**1800W**	**3600W**	**4500W**
Current	0 ~ 18Arms (54 Apeak, continue)	0 ~ 36Arms (108 Apeak, continue)	0 ~ 45Arms (135 Apeak, continue)
Voltage*1	50 ~ 350Vrms (500 Vpeak)	50 ~ 350Vrms (500 Vpeak)	50 ~ 350Vrms (500 Vpeak)
Frequency	45 ~ 440Hz, DC	45 ~ 440Hz, DC	45 ~ 440Hz, DC
AC Section			
Constant Current Mode			
Range	0 ~ 18Arms, Programmable	0 ~ 36Arms, Programmable	0 ~ 45Arms, Programmable
Accuracy	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.
Resloution	2mA	5mA	5mA
Constant Resistance Mode			
Range	2.77Ω ~ 2.5kΩ, Programmable	1.39Ω~2.5kΩ, Programmable	1.11Ω~2.5kΩ, Programmable
Accuracy	0.5% + 0.5%F.S.	0.5% + 0.5%F.S.	0.5% + 0.5%F.S.
Resloution*2	20μS	50μS	50μS
Constant Power Mode			
Range	1800W, Programmable	3600W, Programmable	4500W, Programmable
Accuracy	0.5% + 0.5%F.S.	0.2% + 0.3%F.S.	0.2% + 0.3%F.S.
Resloution	0.375W	1.125W	1.125W
Crest Factor (under CC, CP modes)			
Range	1.414 ~ 5.0, Programmable	1.414 ~ 5.0, Programmable	1.414 ~ 5.0, Programmable
Accuracy	(0.5% / Irms) + 1% F.S.	(0.5% / Irms) + 1%F.S.	(0.5% / Irms) + 1%F.S.
Resloution	0.005	0.005	0.005
Power Factor			
Range	0 ~ 1 lead or lag, Programmable	0 ~ 1 lead or lag, Programmable	0 ~ 1 lead or lag, Programmable
Accuracy	1%F.S.	1%F.S.	1%F.S.
Resloution	0.001	0.001	0.001
Rectified Load Mode			
Operating Frequency	45Hz ~ 70Hz		
RLC Mode	Parameter : Ip(max), R_S, L_S, C, R_L		
Constant Power Mode	Parameter : Ip(max), Power setting=200W ~ 1800W, PF=0.4 ~ 0.75	Parameter : Ip(max), Power setting=200W ~ 3600W, PF=0.4 ~ 0.75	Parameter : Ip(max), Power setting=200W ~ 4500W, PF=0.4 ~ 0.75
Inrush Current Mode	Parameter : Ip(max), R_S, L_S, C, R_L, Phase		
	80A (peak current)	160A (peak current)	200A (peak current)
R_S Range	0 ~ 9.999Ω	0 ~ 9.999Ω	0 ~ 9.999Ω
L_S Range	0 ~ 9999μH	0 ~ 9999μH	0 ~ 9999μH
C Range	100 ~ 9999μF	100 ~ 9999μF	100 ~ 9999μF
R_L Range	2.77 ~ 9999.99Ω	1.39 ~ 9999.99Ω	1.11 ~ 9999.99Ω
DC Section			
Voltage Range	7.5V ~ 500V	7.5V ~ 500V	7.5V ~ 500V
Current Range	0A ~ 18A	0A ~ 36A	0A ~ 45A
Min. operating voltage	7.5V	7.5V	7.5V
Rise time	75μs	75μs	75μs
Operating Mode	CC, CV, CR, CP, DC Rectified		
Short Circuit Simulation	Use the CR mode loading under max. power rating		
Measurement Section			
DVM Range	$350V_{rms}$ ($500V_{peak}$)	$350V_{rms}$ ($500V_{peak}$)	$350V_{rms}$ ($500V_{peak}$)
DVM Accuracy	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.
DVM Resloution	10mV	10mV	10mV
DAM Range	$18A_{rms}$ ($80A_{peak}$)	$36A_{rms}$ ($160A_{peak}$)	$45A_{rms}$ ($200A_{peak}$)
DAM Accuracy(<70Hz)	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.
DAM Accuracy(>70Hz)	0.1% (1+CF^2 x kHz)+0.2% F.S.	0.1% (1+CF^2 x kHz)+0.2% F.S.	0.1% (1+CF^2 x kHz)+0.2% F.S.
DAM Resloution	1.0mA	1.0mA	1.0mA
Other Parameter	P(W), S(VA), Q(VAR), CF, PF, Freq, R, Ip-, Ip+, THDv		
Others			
Vmonitor	±500V / ±10V (Isolated)	±500V / ±10V (Isolated)	±500V / ±10V (Isolated)
Imonitor	±80A / ±10V (Isolated)	±200A / ±10V (Isolated)	±200A / ±10V (Isolated)
Protection	OCP : 19.2Arms ; OV alarm: 360Vrms (DC : 510VDC) OPP : 1920W ; OTP	OCP : 38.4Arms ; OV alarm: 360Vrms (DC : 510VDC) OPP : 3840W ; OTP	OCP : 48Arms ; OV alarm: 360Vrms (DC : 510VDC) OPP : 4800W ; OTP
Remote Interface	GPIB, RS-232		
Input Rating	1Ø 100~115Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 200~230Vac ± 10% V_{LN}, 47~63Hz		
Dimension (H x W x D)	177 x 440 x 595 mm / 7.0 x 17.32 x 23.42 inch	310 x 440 x 595 mm / 12.2 x 17.32 x 23.42 inch	310 x 440 x 595 mm / 12.2 x 17.32 x 23.42 inch
Weight	37kg / 81.57 lbs	66 kg / 145.5 lbs	66 kg / 145.5 lbs

NOTE*1 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*2 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
* All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

PROGRAMMABLE DC ELECTRONIC LOAD
MODEL 6310A SERIES

The 6310A series Programmable DC Electronic Load is ideal for the test and evaluation of multi-output AC/DC power supplies, DC/DC converters, chargers and power electronic components. It is designed for applications in research and development, production, and incoming inspection. The system is configured by plugging the user selectable load modules into the system mainframe. The user interfaces include an ergonomically designed user friendly keypad on the front panel and the following computer interfaces: RS-232C, USB or GPIB.

The 6310A series offers 12 different modules with power ratings from 20 watts to 1,200 watts, current ratings from 0.5mA to 240A, and voltage ratings from 0.5mV to 600V. The loads can be operated in constant current, constant voltage, constant power and constant resistance and may be placed in parallel for increased current and power.

The 6310A series can simulate a wide range of dynamic loading applications. The waveforms programmable parameters include: slew rate, load level, duration and conducting voltage. In addition, up to 100 sets of system operating status can be stored in EEPROM and recalled instantly for automated testing applications.

Real time measurement of voltage and current are integrated into each 6310A load module using a 16-bit precision measurement circuit. The user can perform on line voltage measurements and adjustments or simulate short circuit test using the user friendly keypad on the front panel. Additionally, the 6310A series offers an optional remote controller for automated production lines.

The 6310A series has a self-diagnosis routines to maintain instrument performance. It also provides OC, OP, OT protection, and alarm indicating OV, reverse polarity to guarantee quality and reliability for even in the most demanding engineering testing and ATE applications.

MODEL 6310A SERIES

Key Features:

- Max Power: 200W, 100W × 2(Dual), 30W & 250W, 300W, 350W, 600W, 1200W
- Wide range 0~600V operating voltage
- Compatibility between 6310 and 6310A
- Up to eight channels in one mainframe, for testing multiple output SMPS
- Parallel load modules up to 1400W for high current and power applications
- Synchronization with multiple loads
- Flexible CC, CR, CP and CV operation modes
- Dynamic loading with speeds up to 20kHz
- Fast response of 0.32mA/μs ~ 10A/μs slew rate
- Minimum input resistance allows load to sink high current at low voltage (63123A : 0.6V@70A)
- Real time power supply load transient response simulation and output measurements
- User programmable 100 sequences. Front panel input status for user-friendly operation
- High/Low limits of testing parameters to test GO/NG
- Digital I/O control
- Over current protection (OCP) testing function
- 16-bit precision voltage and current measurement with dual-range
- Remote sensing capability
- Short circuit test
- Self-test at power-on
- Full Protection: OC, OP, OT protection and OV, reverse alarm
- USB, GPIB & RS-232C interfaces

USB GPIB RS-232C CE

SPECIFICATIONS-LED LOAD SIMULATOR

Model	63110A (100Wx2)		63113A		63115A *3	
Power	100W		300W		300W	
Current	0~0.6A	0~2A	0~5A	0~20A	0~5A	0~20A
Voltage *1	0~500V		0~300V		0~600V	
Min. Operating Voltage	6V@2A		4V@20A		4V@20A	
Constant Current Mode						
Range	0~0.6A	0~2A	0~5A	0~20A	0~5A	0~20A
Resolution	12μA	40μA	100μA	400μA	100μA	400μA
Accuracy	0.1%+0.1% F.S.		0.1%+0.1% F.S.	0.1%+0.2% F.S.	0.1%+0.1% F.S.	0.1%+0.2% F.S.
Constant Resistance Mode						
Range	CRL : 3Ω~1kΩ (100W/100V) CRH : 10Ω~10kΩ (100W/500V)		CRL @ CH : 0.2Ω~200Ω (300W/60V) CRL @ CL : 0.8Ω~800Ω (300W/60V) CRH @ CL : 4Ω~4kΩ (300W/300V)		CRL @ CH : 0.2Ω~200Ω (300W/60V) CRL @ CL : 0.8Ω~800Ω (300W/60V) CRH @ CL : 8Ω~8kΩ (300W/600V)	
Resolution*2	CRL : 62.5μS CRH : 6.25μS		CRL @ CH : 100μS CRL @ CL : 25μS CRH @ CL : 5μS		CRL @ CH :100μS CRL @ CL : 25μS CRH @ CL : 2.5μS	
Accuracy	1kΩ : 4mS+0.2% 10kΩ : 1mS+0.1%		0.2% (setting + range)		0.2% (setting + range)	
Constant Voltage Mode						
Range	0~500V		0~300V		0~600V	
Resolution	20mV		6mV		12mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
LED Mode						
Range	Operating Voltage: 0~100V/0~500V R_d Coefficient : 0.001~1 V_F: 0~100V/0~500V Current : 0~2A R_d: 1Ω~1kΩ/10Ω~10kΩ		Operating Voltage : 0~60V/0~300V R_d Coefficient : 0.001~1 V_F : 0~60V/0~300V LEDL @ CH : 0~60V- 0~20A (R_d: 0.05Ω~50Ω) LEDL @ CL : 0~60V- 0~5A (R_d: 0.8Ω~800Ω) LEDH @ CL : 0~300V- 0~5A (R_d: 4Ω~4kΩ)		Operating Voltage : 0~60V/0~600V R_d Coefficient : 0.001~1 V_F : 0~60V/0~600V LEDL @ CH : 0~60V- 0~20A (R_d: 0.05Ω~50Ω) LEDL @ CL : 0~60V- 0~5A (R_d: 0.8Ω~800Ω) LEDH @ CL : 0~600V- 0~5A (R_d: 8Ω~8kΩ)	
Resolution *2	Vo : 4mV/20mV Io : 0.1mA R_d Coefficient : 0.001 R_d: 62.5μS/6.25μS V_F : 4mV/20mV		Vo : 1.2mV/6mV Io : 100μA/400μA R_d Coefficient : 0.001 R_d : 400μS / 25μS / 5μS V_F : 1.2mV/ 6mV		Vo : 1.2mV/12mV Io : 100μA/400μA R_d Coefficient : 0.001 R_d : 400μS/25mS/2.5mS V_F : 6mV/ 60mV	
Dynamic Mode						
Dynamic Mode	--		C.C. Mode		C.C. Mode	
T1 & T2	--		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	--		1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	--		0.8~200mA/μs	3.2~800mA/μs	0.8~200mA/μs	3.2~800mA/μs
Resolution	--		0.8mA/μs	3.2mA/μs	0.8mA/μs	3.2mA/μs
Accuracy	--		10% ±20μs		10% ±20μs	
Min. Rise Time	--		25μs (Typical)		25μs (Typical)	
Current	--		0~5A	0~20A	0~5A	0~20A
Resolution	--		100μA	400μA	100μA	400μA
Accuracy	--		0.4%F.S.		0.4%F.S.	
Measurement Section						
Voltage Read Back						
Range	0~100V	0~500V	0~60V	0~300V	0~60V	0~600V
Resolution	2mV	10mV	1.2mV	6mV	1.2mV	12mV
Accuracy	0.025%+0.025% F.S.		0.025%+0.025% F.S.		0.025%+0.025% F.S.	
Current Read Back						
Range	0~0.6A	0~2A	0~5A	0~20A	0~5A	0~20A
Resolution	12μA	40μA	100μA	400μA	100μA	400μA
Accuracy	0.05%+0.05% F.S.		0.05%+0.05% F.S.		0.05%+0.05% F.S.	

NOTE*1 : If the operating voltage exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.
NOTE*2 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
NOTE*3 : Call for availability

SPECIFICATIONS-1

Model	63101A		63102A (100Wx2)		63103A	
Power	20W	200W	20W	100W	30W	300W
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Voltage *3	0~80V		0~80V		0~80V	
Typical Min. Operation Voltage (DC)*1	0.4V@2A 0.8V@4A	0.4V@20A 0.8V@40A	0.4V@1A 0.8V@2A	0.4V@10A 0.8V@20A	0.4V@3A 0.8V@6A	0.4V@30A 0.8V@60A
Constant Current Mode						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.0375Ω~150Ω (200W/16V) 1.875Ω~7.5kΩ (200W/80V)		0.075Ω~300Ω (100W/16V) 3.75Ω~15kΩ (100W/80V)		0.025Ω~100Ω (300W/16V) 1.25Ω~5kΩ (300W/80V)	
Resolution*5	6.667mS (200W/16V) 133μS (200W/80V)		3.333mS (100W/16V) 66.667μS (100W/80V)		10mS (300W/16V) 200μS (300W/80V)	
Accuracy	150Ω: 0.1S+ 0.2% 7.5kΩ: 0.01S + 0.1%		300Ω: 0.1S + 0.2% 15kΩ: 0.01S + 0.1%		100Ω: 0.1S+ 0.2% 5kΩ: 0.01S+ 0.1%	
Constant Voltage Mode						
Range	0~80V		0~80V		0~80V	
Resolution	20mV		20mV		20mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Resolution	5mW	50mW	5mW	25mW	7.5mW	75mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. Mode	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	0.64~160mA/μs	6.4~1600mA/μs	0.32~80mA/μs	3.2~800mA/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.64mA/μs	6.4mA/μs	0.32mA/μs	3.2mA/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs	
Min. Rise Time	10μs (Typical)		10μs (Typical)		10μs (Typical)	
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement Section						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025% + 0.025%F.S.	
Current Read Back						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	0.0625mA	0.625mA	0.03125mA	0.3125mA	0.09375mA	0.9375mA
Accuracy	0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		0.05% + 0.05%F.S.	
Power Read Back*2						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1% + 0.1%F.S.	
Protective Section						
Over Power Protection	Yes		Yes		Yes	
Over Current Protection	Yes		Yes		Yes	
Over Temperature Protection	Yes		Yes		Yes	
Over Voltage Alarm*3	Yes		Yes		Yes	
General						
Short Circuit						
Current (CC)	-	≒40A	-	≒20A	-	≒60A
Voltage (CV)	-	0V	-	0V	-	0V
Resistance (CR)	-	≒0.0375Ω	-	≒0.075Ω	-	≒0.025Ω
Power (CP)	-	≒200W	-	≒100W	-	≒300W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		100kΩ (Typical)	
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)		100PPM/˚C (Typical)	
Power	Supply from 6314A Mainframe		Supply from 6314A Mainframe		Supply from 6314A Mainframe	
Dimensions (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs	
Operating Temperature Range	0~40˚C		0~40˚C		0~40˚C	
EMC & Safety	CE		CE		CE	

SPECIFICATIONS-2

Model	63105A		63106A		63107A (30W & 250W)		
Power	30W	300W	60W	600W	30W	30W	250W
Current	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Voltage*3	0~500V		0~80V		0~80V		
Typical Min. Operation Voltage (DC)*1	1.0V@0.5A 2.0V@1A	1.0V@5A 2.0V@10A	0.4V@6A 0.8V@12A	0.4V@60A 0.8V@120A	0.4V@2.5A 0.8V@5A	0.4V@2A 0.8V@4A	0.4V@20A 0.8V@40A
Constant Current Mode							
Range	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Resolution	0.25mA	2.5mA	3mA	30mA	1.25mA	1mA	10mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode							
Range	1.25Ω~5kΩ (300W/125V) 50Ω~200kΩ (300W/500V)		12.5mΩ~50Ω (600W/16V) 0.625Ω~2.5kΩ (600W/80V)		0.3Ω~1.2kΩ (30W/16V) 15Ω~60kΩ (30W/80V)		0.0375Ω~150Ω (250W/16V) 1.875Ω~7.5kΩ (250W/80V)
Resolution*5	200μS (300W/125V) 5μS (300W/500V)		20mS (600W/16V) 400μS (600W/80V)		833μS (30W/16V) 16.67μS (30W/80V)		6.667μS (250W/16V) 133μS (250W/80V)
Accuracy	5kΩ: 20mS+ 0.2% 200kΩ:5mS+ 0.1%		50Ω: 0.4S + 0.5% 2.5kΩ: 0.04S + 0.2%		1.2kΩ: 0.1S + 0.2% 60kΩ: 0.01S + 0.1%		150Ω: 0.1S + 0.2% 7.5kΩ: 0.01S + 0.1%
Constant Voltage Mode							
Range	0~500V		0~80V		0~80V		
Resolution	125mV		20mV		20mV		
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		
Constant Power Mode							
Range	0~30W	0~300W	0~60W	0~600W	0~30W	0~30W	0~250W
Resolution	7.5mW	75mW	15mW	150mW	7.5mW	7.5mW	62.5mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		
Dynamic Mode							
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. Mode		
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs/1ms+100ppm		
Slew Rate	0.16~40mA/μs	1.6~400mA/μs	0.002~0.5A/μs	0.02~5A/μs	0.8~200mA/μs	0.64~160mA/μs	6.4~1600mA/μs
Resolution	0.16mA/μs	1.6mA/μs	0.002A/μs	0.02A/μs	0.8mA/μs	0.64mA/μs	6.4mA/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs		
Min. Rise Time	24μs (Typical)		10μs (Typical)		10μs (Typical)		
Current	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Resolution	0.25mA	2.5mA	3mA	30mA	1.25mA	1mA	10mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.		
Measurement Section							
Voltage Read Back							
Range	0~125V	0~500V	0~16V	0~80V	0~16V	0~80V	0~16V / 0~80V
Resolution	2mV	8mV	0.25mV	1.25mV	0.25mV	1.25mV	0.25mV / 1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		
Current Read Back							
Range	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Resolution	0.016mA	0.16mA	0.1875mA	1.875mA	0.078125mA	0.0625mA	0.625mA
Accuracy	0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		
Power Read Back*2							
Range	0~30W	0~300W	0~60W	0~600W	0~30W	0~30W	0~250W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		
Protective Section							
Over Power Protection	Yes		Yes		Yes		
Over Current Protection	Yes		Yes		Yes		
Over Temperature Protection	Yes		Yes		Yes		
Over Voltage Alarm*3	Yes		Yes		Yes		
General							
Short Circuit							
Current (CC)	-	≒10A	-	≒120A	-	-	≒40A
Voltage (CV)	-	0V	-	0V	-	-	0V
Resistance (CR)	-	≒1.25Ω	-	≒0.0125Ω	-	-	≒0.0375Ω
Power (CP)	-	≒300W	-	≒600W	-	-	≒250W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		100kΩ (Typical)		
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)		100PPM/˚C (Typical)		
Power	Supply from 6314A Mainframe		Supply from 6314A Mainframe		Supply from 6314A Mainframe		
Dimensions (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch		172x164x489.5mm / 6.8x6.5x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch		
Weight	4.2 kg / 9.3 lbs		7.3 kg / 16.1 lbs		4.5 kg / 9.9 lbs		
Operating Temperature Range	0~40˚C		0~40˚C		0~40˚C		
EMC & Safety	CE		CE		CE		

NOTE*1 : Low voltage operation, under 0.8 volt, is possible at correspondingly reduced current level. Operating temperature range is 0˚C to 40˚C.

All specifications apply for 25˚C±5˚C, except as noted

NOTE*2 : Power F.S. = Vrange F.S. x Irange F.S.

SPECIFICATIONS-3

Model	63108A		63112A		63123A	
Power	60W	600W	120W	1200W	350W	
Current	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Voltage*3	0~500V		0~80V		0~120V	
Typical Min. Operation Voltage (DC)*1	1.0V@1A	1.0V@10A	0.4V@12A	0.4V@120A	0.05V@3.5A	0.3V@35A
	2.0V@2A	2.0V@20A	0.8V@24A	0.8V@240A	0.1V@7A	0.6V@70A
Constant Current Mode						
Range	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Resolution	0.5mA	5mA	6mA	60mA	0.125mA	1.25mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.1%F.S.
Constant Resistance Mode						
Range	0.625Ω~2.5kΩ (600W/125V) 25Ω~100kΩ (600W/500V)		6.25mΩ~25Ω (1200W/16V) 0.3125Ω~1.25kΩ (1200W/80V)		0.015Ω~150Ω (350W/24V)*4 2Ω~2kΩ (350W/120V)	
Resolution*5	400μS (600W/125V) 10μS (600W/500V)		40mS (1200W/16V) 800μS (1200W/80V)		1.33mS (350W/24V)*4 10μS (350W/120V)	
Accuracy	2.5kΩ: 50mS + 0.2% 100kΩ: 5mS + 0.1%		25Ω: 0.8S + 0.8% 1.25kΩ: 0.08S + 0.2%		150Ω: 67mS + 0.1% 2kΩ: 5mS + 0.2%	
Constant Voltage Mode						
Range	0~500V		0~80V		0~120V	
Resolution	125mV		20mV		2mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~60W	0~600W	0~120W	0~1200W	0~35W	0~350W
Resolution	15mW	150mW	30mW	300mW	2.5mW	25mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. MODE	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms~50ms/Res: 5μs 0.1ms～500ms / Res: 25μs 10ms～50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs /1ms+100ppm	
Slew Rate	0.32~80mA/μs	3.2~800mA/μs	0.004~1A/μs	0.04~10A/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.32mA/μs	3.2mA/μs	0.004A/μs	0.04A/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs	
Min. Rise Time	24μs (Typical)		10μs (Typical)		25μs (Typical) *6	
Current	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Resolution	0.5mA	5mA	6mA	60mA	0.125mA	1.25mA
Accuracy	0.4%F.S.		0.4%F.S.		0.1% F.S.	
Measurement Section						
Voltage Read Back						
Range	0~125V	0~500V	0~16V	0~80V	0~24V	0~120V
Resolution	2mV	8mV	0.25mV	1.25mV	0.4mV	2mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025%+0.015% F.S.	
Current Read Back						
Range	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Resolution	0.03125mA	0.3125mA	0.375mA	3.75mA	0.125mA	1.25mA
Accuracy	0.05% + 0.05%F.S.		0.075% + 0.075%F.S.		0.04%+0.04% F.S.	
Power Read Back*2						
Range	0~60W	0~600W	0~120W	0~1200W	0~35W	0~350W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1%+0.1% F.S.	
Protective Section						
Over Power Protection	Yes		Yes		Yes	
Over Current Protection	Yes		Yes		Yes	
Over Temperature Protection	Yes		Yes		Yes	
Over Voltage Alarm*3	Yes		Yes		Yes	
General						
Short Circuit						
Current (CC)	-	≒20A	-	≒240A	-	≒70A
Voltage (CV)	-	0V	-	0V	-	0V
Resistance (CR)	-	≒0.625Ω	-	≒0.00625Ω	-	≒ 0.01Ω
Power (CP)	-	≒600W	-	≒1200W	-	≒350W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		800kΩ (Typical)	
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)		100PPM/˚C (Typical)	
Power	Supply from 6314A Mainframe		Supply from 6314A Mainframe		Supply from 6314A Mainframe	
Dimensions (HxWxD)	172x164x489.5mm / 6.8x6.5x19.3inch		172x329x495mm / 6.8x12.9x19.5inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	7.3 kg / 16.1 lbs		14 kg / 30.8 lbs		4.2kg / 9.3 lbs	
Operating Temperature Range	0~40˚C		0~40˚C		0~40˚C	
EMC & Safety	CE		CE		CE	

NOTE*3 : When the operating voltage exceeds the rated voltage for 1.02 times, a warning will occur and if it exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.

NOTE*4 : Please refer to user's manual for detail specifications.

NOTE*5 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.

NOTE*6 : The loading current should be 0.35A at least.

High Speed DC Electronic Load

Model 6330A Series

KEY FEATURES

- Improve operating speeds of load for auto test system integration
- Synchronous paralleling control mode, allow Synchronous load control under static and dynamic Loading mode up to 7000W
- Up to 8 channels in one mainframe, fit for testing Multiple output SMPS.
- GPIB/RS-232/USB Interface
- Max Power: 200W, 100W x 2(Dual), 30W&250W, 300W, 350W, 600W, 1200W
- Voltage Range: 0~80V / 0V~500V
- CC, CR, CV, CP operating modes
- Dynamic loading with speed up to 20kHz
- Programmable slew rate, up to 10A/μs
- Only need 0.5V to draw rated current (63323A)
- Individual panel meters
- Real time power supplies load transient response simulation and output measurement
- 16-bit precision voltage and measurement with dual-range selection
- Remote sensing capability
- Short circuit test
- Self-test at power-on
- CE marking

Model 6330A series high speed DC electronic improves CPU clock, baud rate, parser and added synchronic parallel function for fast operation, which is ideal for auto test system integration to increase your manufacturing test throughput. Plugging the user selectable load modules into the system mainframe can also provide easy system configuration and future reconfiguration configure the system.

The 6330A family offers 11 types of modular loads with power ranging from 30 watts to 1200 watts, current from 0.5mA to 240A, and voltage measurement from 0.5mV to 500V. Each load is isolated and floating, programmable in dual current range and measuring voltage range, and capable of synchronizing with other modules for control operating. The load can be operated in constant current, constant voltage, and constant resistance.

USB RS-232 GPIB CE

With Synchronic parallel control capability, 6330A series loads allow users to parallel and synchronize more than one load together from an internal loading control signal. This feature provides synchronic dynamic loading test for multi-output power and high power test solution.

Real time measurement of voltage, current, is integrated into each 6330A load module using a 16-bit precision measurement circuit. The user can perform on line voltage measurement and adjustment, or simulate short circuit test using the simple keypad on the front panel.

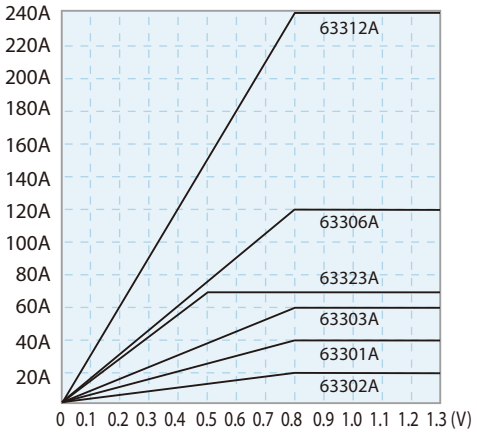
The 6330A have self-diagnosis routine to maintain instrumental performance all the time. It is also protected against OP, OC, OT protection, and alarm indicating OV, reverse polarity to guarantee quality and reliability for even the most demanding engineering testing and ATE application.

The FET technology accomplishes minimum input resistance and enables the load to sink high current even at very low voltage. For example, model 63303A is capable of sinking 60A at 1V output, and well-suited for testing the new 3V low voltage power supplies. Low voltage operation, down to zero volt, is possible at correspondingly reduced current level. (see below)

has created the industries first LED Load Simulator for simulating LED loading with our 63310A load model from our 6330A series Electronic Loads. By setting the LED power driver's output voltage, and current, the Electronic Load can simulate the LED’s loading characteristics. The LED’s forward voltage and operating resistance can also be set to further adjust the loading current and ripple current to better simulate LED characteristics. The 63310A design also has increased bandwidth to allow for PWM dimming testing.

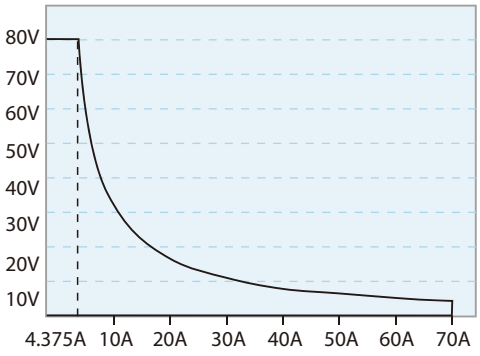
Low Voltage Characteristics (Typical)

Model 63301A/63302A/63303A/
63306A/63312A/63323A



Note: All specifications are measured at load input terminals. (Ambient Temperature of 25˚C)

Model 63323A Input Characteristics



6330A Series High Speed DC Electronic Load Family

SPECIFICATIONS-1						
Model	**63301A**		**63302A (100Wx2)**		**63303A**	
Power	20W	200W	20W	100W	30W	300W
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Voltage *3	0~80V		0~80V		0~80V	
Min. Operation Voltage (DC) *1	0.4V@2A	0.4V@20A	0.4V@1A	0.4V@10A	0.4V@3A	0.4V@30A
(Typical)	0.8V@4A	0.8V@40A	0.8V@2A	0.8V@20A	0.8V@6A	0.8V@60A
Constant Current Mode						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.0375Ω~150Ω (200W/16V) 1.875Ω~7.5kΩ (200W/80V)		0.075Ω~300Ω (100W/16V) 3.75Ω~15kΩ (100W/80V)		0.025Ω~100Ω (300W/16V) 1.25Ω~5kΩ (300W/80V)	
Resolution*5	6.667mS (200W/16V) 133μS (200W/80V)		3.333mS (100W/16V) 66.667μS (100W/80V)		10mS (300W/16V) 200μS (300W/80V)	
Accuracy	150Ω: 0.1S + 0.2% 7.5kΩ: 0.01S + 0.1%		300Ω: 0.1S + 0.2% 15kΩ: 0.01S + 0.1%		100Ω: 0.1S+ 0.2% 5kΩ: 0.01S+ 0.1%	
Constant Voltage Mode						
Range	0~80V		0~80V		0~80V	
Resolution	20mV		20mV		20mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Resolution	5mW	50mW	5mW	25mW	7.5mW	75mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. Mode	
T1 &T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	0.64~160mA/μs	6.4~1600mA/μs	0.32~80mA/μs	3.2~800mA/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.64mA/μs	6.4mA/μs	0.32mA/μs	3.2mA/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs	
Min. Rise Time	10μs (Typical)		10μs (Typical)		10μs (Typical)	
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement Section						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025% + 0.025%F.S.	
Current Read Back						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	0.0625mA	0.625mA	0.03125mA	0.3125mA	0.09375mA	0.9375mA
Accuracy	0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		0.05% + 0.05%F.S.	
Power Read Back*2						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1% + 0.1%F.S.	
Protective Section						
Over Power Protection	≒20.8W	≒208W	≒20.8W	≒104W	≒31.2W	≒312W
Over Current Protection	≒4.08A	≒40.8A	≒2.04A	≒20.4A	≒6.12A	≒61.2A
Over Temperature Protection	≒85°C		≒85°C		≒85°C	
Over Voltage Alarm*3	≒81.6V		≒81.6V		≒81.6V	
General						
Short Circuit						
Current (CC)	-	≒40A	-	≒20A	-	≒60A
Voltage (CV)	-	0V	-	0V	-	0V
Resistance (CR)	-	≒0.0375Ω	-	≒0.075Ω	-	≒0.025Ω
Power (CP)	-	≒200W	-	≒100W	-	≒300W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		100kΩ (Typical)	
Temperature Coefficient	100PPM/°C (Typical)		100PPM/°C (Typical)		100PPM/°C (Typical)	
Power	Supply from 6334A Mainframe		Supply from 6334A Mainframe		Supply from 6334A Mainframe	
Dimension (H x W x D)	172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs	
Operating Range	0~40°C		0~40°C		0~40°C	
EMC & Safety	CE		CE		CE	

SPECIFICATIONS-2				
Model	**63305A**		**63306A**	
Power	30W	300W	60W	600W
Current	0~1A	0~10A	0~12A	0~120A
Voltage*3	0~500V		0~80V	
Min. Operation Voltage (DC) *1	1.0V@0.5A	1.0V@5A	0.4V@6A	0.4V@60A
(Typical)	2.0V@1A	2.0V@10A	0.8V@12A	0.8V@120A
Constant Current Mode				
Range	0~1A	0~10A	0~12A	0~120A
Resolution	0.25mA	2.5mA	3mA	30mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode				
Range	1.25Ω~5Ω (300W/125V) 50Ω~200kΩ (300W/500V)		12.5mΩ~50Ω (600W/16V) 0.625Ω~2.5kΩ (600W/80V)	
Resolution*5	200μS (300W/25V) 5μS (300W/500V)		20mS (600W/16V) 400μS (600W/80V)	
Accuracy	5kΩ: 20mS+ 0.2% 200kΩ:5mS+ 0.1%		50Ω: 0.4S + 0.5% 2.5kΩ: 0.04mho + 0.2%	
Constant Voltage Mode				
Range	0~500V		0~80V	
Resolution	125mV		20mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode				
Range	0~30W	0~300W	0~60W	0~600W
Resolution	7.5mW	75mW	15mW	150mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode				
Dynamic Mode	C.C. Mode		C.C. Mode	
T1 &T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	0.16~40mA/μs	1.6~400mA/μs	0.002~0.5A/μs	0.02~5A/μs
Resolution	0.16mA/μs	1.6mA/μs	0.002A/μs	0.02A/μs
Accuracy	10% ±20μs		10% ±20μs	
Min. Rise Time	24μs (Typical)		10μs (Typical)	
Current	0~1A	0~10A	0~12A	0~120A
Resolution	0.25mA	2.5mA	3mA	30mA
Accuracy	0.4%F.S.		0.4%F.S.	
Measurement Section				
Voltage Read Back				
Range	0~125V	0~500V	0~16V	0~80V
Resolution	2mV	8mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.	
Current Read Back				
Range	0~1A	0~10A	0~12A	0~120A
Resolution	0.016mA	0.16mA	0.1875mA	1.875mA
Accuracy	0.25mA	2.5mA	0.05% + 0.05%F.S.	
Power Read Back*2				
Range	0~30W	0~300W	0~60W	0~600W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.	
Protective Section				
Over Power Protection	≒31.2W	≒312W	≒62.4W	≒624W
Over Current Protection	≒1.02A	≒10.2A	≒12.24A	≒122.4A
Over Temperature Protection	≒85˚C		≒85˚C	
Over Voltage Alarm*3	≒510V		≒81.6V	
General				
Short Circuit				
Current (CC)	-	≒10A	-	≒120A
Voltage (CV)	-	0V	-	0V
Resistance (CR)	-	≒1.25Ω	-	≒0.0125Ω
Power (CP)	-	≒300W	-	≒600W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)	
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)	
Power	Supply from 6334A Mainframe		Supply from 6334A Mainframe	
Dimension (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch		172x164x489.5mm / 6.8x6.5x19.3inch	
Weight	4.2 kg / 9.3 lbs		7.3 kg / 16.1 lbs	
Operating Range	0~40˚C		0~40˚C	
EMC & Safety	CE		CE	

SPECIFICATIONS-3						
Model	**63307A (30W & 250W)**			**63308A**		
Power	30W	30W	250W	60W	600W	
Current	0~5A	0~4A	0~40A	0~2A	0~20A	
Voltage*3	0~80V			0~500V		
Min. Operation Voltage (DC) *1	0.4V@2.5A	0.4V@2A	0.4V@20A	1.0V@1A	1.0V@10A	
(Typical)	0.8V@5A	0.8V@4A	0.8V@40A	2V@2A	2V@20A	
Constant Current Mode						
Range	0~5A	0~4A	0~40A	0~2A	0~20A	
Resolution	1.25mA	1mA	10mA	0.5mA	5mA	
Accuracy	0.1%+0.1%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	
Constant Resistance Mode						
Range	0.3Ω~1.2kΩ (30W/16V) 15Ω~60kΩ (30W/80V)	0.0375Ω~150Ω (250W/16V) 1.875Ω~7.5kΩ (250W/80V)		0.625Ω~2.5kΩ (600W/125V) 25Ω~100kΩ (600W/500V)		
Resolution*5	833μS (30W/16V) 16.67μS (30W/80V)	6.667μS (250W/16V) 133μS (250W/80V)		400μS (600W/125V) 10μS (600W/500V)		
Accuracy	1.2kΩ: 0.1S + 0.2% 60kΩ: 0.01S + 0.1%	150Ω: 0.1S + 0.2% 7.5kΩ: 0.01S + 0.1%		25kΩ: 50mS+ 0.2% 100kΩ: 5mS+ 0.1%		
Constant Voltage Mode						
Range	0~80V			0~500V		
Resolution	20mV			125mV		
Accuracy	0.05% + 0.1%F.S.			0.05% + 0.1%F.S.		
Constant Power Mode						
Range	0~30W	0~30W	0~250W	0~60W	0~600W	
Resolution	7.5mW	7.5mW	62.5mW	15mW	150mW	
Accuracy	0.5% + 0.5%F.S.			0.5% + 0.5%F.S.		
Dynamic Mode						
Dynamic Mode	C.C. Mode			C.C. Mode		
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms			0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew Rate	0.8~200mA/μs	0.64~160mA/μs	64~1600mA/μs	0.32~80mA/μs	3.2~800mA/μs	
Resolution	0.8mA/μs	0.64mA/μs	64mA/μs	0.32mA/μs	3.2mA/μs	
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10μs (Typical)			24μs (Typical)		
Current	0~5A	0~4A	0~40A	0~2A	0~20A	
Resolution	1.25mA	1mA	10mA	0.5mA	5mA	
Accuracy	0.4%F.S.			0.4%F.S.		
Measurement Section						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~125V	0~500V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV	2mV	8mV
Accuracy	0.025% + 0.025%F.S.			0.025% + 0.025%F.S.		
Current Read Back						
Range	0~5A	0~4A	0~40A	0~2A	0~20A	
Resolution	0.078125mA	0.0625mA	0.625mA	0.03125mA	0.3125mA	
Accuracy	0.05% + 0.05%F.S.			0.05% + 0.05%F.S.		
Power Read Back*2						
Range	0~30W	0~30W	0~250W	0~60W	0~600W	
Accuracy	0.1% + 0.1%F.S.			0.1% + 0.1%F.S.		
Protective Section						
Over Power Protection	≒31.2W	≒31.2W	≒260W	≒62.4W	≒624W	
Over Current Protection	≒5.1A	≒4.08A	≒40.8A	≒2.04A	≒20.4A	
Over Temperature Protection	≒85°C			≒85°C		
Over Voltage Alarm*3	≒81.6V			≒510V		
General						
Short Circuit						
Current (CC)	-	-	≒40A	-	≒20A	
Voltage (CV)	-	-	0V	-	0V	
Resistance (CR)	-	-	≒0.0375Ω	-	≒0.625Ω	
Power (CP)	-	-	≒250W	-	≒600W	
Input Resistance (Load Off)	100kΩ (Typical)					
Temperature Coefficient	100PPM/°C (Typical)					
Power	Supply from 6334A Mainframe					
Dimension (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch			172x164x489.5mm / 6.8x6.5x19.3inch		
Weight	4.5 kg / 9.9 lbs			7.3 kg / 16.1 lbs		
Operating Range	0~40°C					
EMC & Safety	CE					

SPECIFICATIONS-4				
Model	**63312A**		**63323A**	
Power	120W	1200W	350W	
Current	0~24A	0~240A	0~7A	0~70A
Voltage*3	0~80V		0~80V	
Min. Operation Voltage (DC) *1 (Typical)	0.4V@12A	0.4V@120A	0.25V @ 3.5A	0.2V @ 35A
	0.8V@24A	0.8V@240A	0.5V @ 7A	0.5V @ 70A
Constant Current Mode				
Range	0~24A	0~240A	0~7A	0~70A
Resolution	6mA	60mA	0.5mA	5mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode				
Range	6.25mΩ~25Ω (1200W/16V) 0.3125Ω~1.25kΩ (1200W/80V)		0.01Ω~100Ω (350W/16V)*4 1.25Ω~7.5kΩ (350W/80V)	
Resolution*5	40mS (1200W/16V) 80μS (1200W/80V)		6.25mS (350W/16V)*4 50μS (350W/80V)	
Accuracy	25Ω: 0.8S+ 0.8% 1.25kΩ: 0.08S+ 0.2%		100Ω: 0.1S+0.2% *4 12.5kΩ: 0.01S+0.1%	
Constant Voltage Mode				
Range	0~80V		0~80V	
Resolution	20mV		5mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode				
Range	0~120W	0~1200W	0~35W	0~350W
Resolution	30mW	300mW	2.5mW	25mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode				
Dynamic Mode	C.C. Mode		C.C. MODE	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms~50ms/Res: 5μs 0.1ms~500ms / Res: 25μs 10ms~50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs /1ms+100ppm	
Slew Rate	0.004~1A/μs	0.04~10A/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.004A/μs	0.04A/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs	
Min. Rise Time	10μs (Typical)		10μs (Typical)	
Current	0~24A	0~240A	0~7A	0~70A
Resolution	6mA	60mA	0.5mA	5mA
Current Accuracy	0.4%F.S.		0.4% F.S.	
Measurement Section				
Voltage Read Back				
Range	0~16V	0~80V	0~16V	0~80V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025%+0.025% F.S.	
Current Read Back				
Range	0~24A	0~240A	0~7A	0~70A
Resolution	0.375mA	3.75mA	0.109375mA	1.09375mA
Accuracy	0.075% + 0.075%F.S.		0.05%+0.05% F.S.	
Power Read Back*2				
Range	0~120W	0~1200W	0~35W	0~350W
Accuracy	0.1% + 0.1%F.S.		0.1%+0.1% F.S.	
Protective Section				
Over Power Protection	≒124.8W	≒1248W	≒36W	≒360W
Over Current Protection	≒24.48A	≒244.8A	≒6.12A	≒61.2A
Over Temperature Protection	≒85°C		≒85°C	
Over Voltage Alarm*3	≒81.6V		≒81.6V	
General				
Short Circuit				
Current (CC)	-	≒240A	-	≒70A
Voltage (CV)	-	0V	-	0V
Resistance (CR)	-	≒0.00625Ω	-	≒ 0.01Ω
Power (CP)	-	≒1200W	-	≒ 350W
Input Resistance (Load Off)	100kΩ (Typical)		800kΩ (Typical)	
Temperature Coefficient	100PPM/°C (Typical)		100PPM/°C (Typical)	
Power	Supply from 6334A Mainframe		Supply from 6334A Mainframe	
Dimension (HxWxD)	172x329x495mm / 6.8x12.9x19.5inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	14 kg / 30.8 lbs		4.2kg / 9.3 lbs	
Operating Range	0~40°C		0~40°C	
EMC & Safety	CE		CE	

NOTE*1 : Low voltage operation, under 0.8 volt, is possible at correspondingly reduced current level. Operating temperature range is 0ºC to 40˚C. All specifications apply for 25˚C±5˚C, except as noted

NOTE*2 : Power F.S.=Vrange F.S. x Irange F.S.

NOTE*3 : When the operating voltage exceeds the rated voltage for 1.02 times, a warning will occur and if it exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.

NOTE*4 : Please refer to user's manual for detail specifications.

NOTE *5 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.

SPECIFICATIONS				
Model	**63310A (100Wx2)**		**63313A *3**	
Power	100W		300W	
Current	0~0.6A	0~2A	0~5A	0~20A
Voltage *1	0~500V		0~300V	
Min. Operating Voltage	6V@2A		4V@20A	
LED Mode				
Range	Operation Voltage: 0~100V/0~500V Rd Coefficient : 0.001~1 VF: 0~100V/0~500V Current : 0~2A Rd: 1Ω~1kΩ/10Ω~10kΩ		Operating Voltage : 0~60V/0~300V Rd Coefficient : 0.001~1 VF : 0~60V/0~300V LEDL @ CCH : 0~60V- 0~20A (Rd: 0.05Ω~50Ω) LEDL @ CCL : 0~60V- 0~5A (Rd: 0.8Ω~800Ω) LEDH @ CCL : 0~300V- 0~5A (Rd: 4Ω~4kΩ)	
Resolution *2	Vo : 4mV/20mV Io : 0.1mA Rd Coefficient : 0.001 Rd : 62.5μs/6.25μs VF : 4mV/20mV		Vo : 1.2mV/6mV Io : 100μA/400μA Rd Coefficient : 0.001 Rd : 400μs / 25μS / 5μS VF : 1.2mV/ 6mV	
Constant Resistance Mode				
Range	CRL : 3Ω~1kΩ (100W/100V) CRH : 10Ω~10kΩ (100W/500V)		CRL @ CCH : 0.2Ω~200Ω (300W/60V) CRL @ CCL : 0.8Ω~800Ω (300W/60V) CRH @ CCL : 4Ω~4kΩ (300W/300V)	
Resolution*2	CRL : 62.5μS CRH : 6.25μS		CRL @ CCH : 100μS CRL @ CCL : 25μS CRH @ CCL : 5μS	
Accuracy	1kΩ : 4mS+0.2% 10kΩ : 1mS+0.1%		200Ω : 0.2% (setting + range) 800Ω : 0.2% (setting + range) 4kΩ : 0.2% (setting + range)	
Constant Voltage Mode				
Range	0~500V		0~300V	
Resolution	20mV		6mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Current Mode				
Range	0~0.6A	0~2A	0~5A	0~20A
Resolution	12μA	40μA	100μA	400μA
Accuracy	0.1%+0.1% F.S.		0.1%+0.1% F.S.	0.1%±0.2% F.S.
Measurement Section				
Voltage Read Back				
Range	0~100V	0~500V	0~60V	0~300V
Resolution	2mV	10mV	1.2mV	6mV
Accuracy	0.025%+0.025% F.S.		0.025%+0.025% F.S.	
Current Read Back				
Range	0~0.6A	0~2A	0~5A	0~20A
Resolution	12μA	40μA	100μA	400μA
Accuracy	0.05%+0.05% F.S.		0.05%+0.05% F.S.	

NOTE*1 : If the operating voltage exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.
NOTE*2 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
NOTE*3 : Call for availability

Mainframe Model	**6332A**	**6334A**
Dimension (HxWxD)	194x275x550mm / 7.6x10.8x21.7inch	194x439x550mm / 7.6x17.3x21.7inch
Weight	15 kg / 33.1 lbs	21.5 kg / 47.4 lbs

PROGRAMMABLE DC ELECTRONIC LOAD
MODEL 63200 SERIES

Chroma's 63200 series of programmable electronic loads are designed for a wide variety of dc power conversion products including; DC power sources, battery chargers, server power supplies, dc-dc converters, batteries and many others. The high power rating, parallel and synchronization capabilities, and the ability to provide up to 2.7 times of rated power for short duty cycle loading make 63200 series especially well-suited for high power applications such as switch-mode rectifiers and for discharging batteries packs and fuel cells.

The 63200 series offers 12 different models with power ranges from 2600 watts to 15600 watts, currents from 50A to 1000A and operating voltages from 0 to 1000V. By paralleling modules very large systems can be assembled existing 93.6kW. Four operating modes provide different load simulation methods designed for various applications. The CC/CR modes are designed to test constant voltage power supplies and converters. CV mode simulates the battery for testing battery chargers and current sources, and CP mode is ideal for battery testing by simulating real discharge profiles.

The 63200 series can sink rated current down to 1VDC even under the highest specified rise time. This unique feature guarantees the best loading performance for low voltage/high current applications. With it's unique external waveform simulation and Master / Slave control capability, the 63200 series electronic loads allow users to parallel and synchronize more than one load together using an internal or external loading control signal. This feature provides unlimited load simulation and increased power.

The 63200 series also provides necessary measurement functions and short circuit simulations that extend the test capability for the most demanding engineering and automated test applications.

With front LCD displays and rotary knob, the 63200 loads offer versatile bench top operation. Users are also able to control the loads remotely via GPIB or RS-232 interface or with a USB adapter. Complex waveforms can also be created by driving the loads from an analog programming source (i.e. function generator).

63200 loads incorporate built-in fan speed controls to minimize audio noise. The self-diagnosis routines, built-in protection against OC, OP, OT, and an alarm indicating OV reverse polarity to ensure safe operation and reliability.

RS-232 GPIB CE

MODEL 63200 SERIES

Key Features

- Power Rating :
  2600W, 5200W, 6500W, 10000W, 10400W, 14500W, 15600W
- Voltage range : 0 ~ 80V/0 ~ 600V/0 ~ 1000V
- Current range : Up to 1000A
- CC, CR, CV, CP load modes
- Master/Slave paralleling control mode, allow synchronous load control under static and dynamic loading mode (Up to 93.6kW)
- Dynamic loading : Up to 20kHz
- Only need 1V to draw rated current
- Programmable slew rate, up to 41A/μs
- Measurement : Voltage/Current/ Power/Resistance
- Large LED/LCD display
- External loading waveform simulation
- Short circuit simulation and short circuit current measurement
- Full protection : OC, OP, OT protection and OV, reverse alarm
- Versatile remote controller
- GPIB & RS-232 interfaces
- Surge load capability
- Battery discharge timer

SPECIFICATIONS-1

Model	63201		63202		63203	
Power *1	260W	2600W	260W	2600W	520W	5200W
Current	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Voltage *2	0~80V		0~600V		0~80V	
Min. Operating voltage	0.5V @ 15A 1V @ 30A	0.5V @ 150A 1V @ 300A	1.5V @ 2.5A 3V @ 5A	1.5V @ 25A 3V @ 50A	0.5V @ 30A 1V @ 60A	0.5V @ 300A 1V @ 600A
Constant Current mode						
Range	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Resolution	7.7mA	77mA	1.4mA	14mA	16mA	160mA
Accuracy	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.
Constant Resistance Mode						
Range	0.005~20Ω	0.25~1000Ω	0.25~1000Ω	10~40000Ω	0.0025~10Ω	0.125~500Ω
Resolution*3	52mS	1.04mS	1.2mS	28.8μS	104mS	2.1mS
Accuracy*4	0.104S+0.35%	0.9S+0.1%	0.0046S+0.35%	0.04S+0.1%	0.208S+0.35%*5	1.2S+0.1%
Accuracy*6 (Vin>7V)	0.104S+0.35%	0.0021S+0.35%	0.0046S+0.35%	114μS+0.35%	0.208S+0.35%	0.0042S+0.35%
Constant Voltage mode						
Range	0~16V	0~80V	0~150V	0~600V	0~16V	0~80V
Resolution	4mV	20mV	40mV	162mV	4mV	20mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	0.6~260W	6~2600W	0.625~260W	6.25~2600W	1.2~520W	12~5200W
Resolution	7.5mW	75mW	3.125mW	31.25mW	22.5mW	225mW
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	5mA~1.25A/μs	50mA~12.5A/μs	0.8mA~0.2A/μs	8mA~2A/μs	10mA~2.5A/μs	100mA~25A/μs
Resolution	5mA/μs	50mA/μs	0.8mA/μs	8mA/μs	10mA/μs	100mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	24μs (typical)		24μs (typical)		24μs (typical)	
Current						
Range	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Resolution	7.7mA	77mA	1.4mA	14mA	16mA	160mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~16V	0~80V	0~150V	0~600V	0~16V	0~80V
Resolution	0.6mV	2.6mV	5.1mV	21mV	0.6mV	2.6mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Resolution	1mA	10mA	0.18mA	1.8mA	2mA	20mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~260W	0~2600W	0~260W	0~2600W	0~520W	0~5200W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
current	30A	300A	5A	50A	60A	600A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	177 x 440 x 589 mm / 6.9 x 17.3 x 23.2 inch		177 x 440 x 589 mm / 6.9 x 17.3 x 23.2 inch		353 x 440 x 589 mm / 13.9 x 17.3 x 23.2 inch	
Weight	30 kg / 66.13 lbs		30 kg / 66.13 lbs		62 kg / 136.68 lbs	
Safety & EMC	CE		CE		CE	

SPECIFICATIONS-2

Model	63204		63205		63206	
Power*1	520W	5200W	650W	6500W	1040W	10400W
Current	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Voltage*2	0~600V		0~80V		0~80V	
Min. Operating voltage	1.5V @ 5A 3V @ 10A	1.5V @ 50A 3V @ 100A	0.5V @ 9A 1V @ 18A	0.5V @ 90A 1V @ 180A	0.5V @ 30A 1V @ 60A	0.5V @ 300A 1V @ 600A
Constant Current mode						
Range	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Resolution	2.8mA	28mA	5.2mA	52mA	21mA	170mA
Accuracy	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.125~500Ω	5~20000Ω	0.008~32Ω	0.4~1600Ω	0.0025~10Ω	0.125~500Ω
Resolution*3	2.3mS	57.56μS	35mS	0.7mS	112.5mS	2.25mS
Accuracy*4	0.0046S+0.35%	0.08S+0.1%	0.07S+0.35%	0.75S+0.1%	0.225S+0.35% *5	1.2S+0.1%
Accuracy*6 (Vin>7V)	0.0046S+0.35%	115.51μS+0.35%	0.07S+0.35%	0.0014S+0.35%	0.225S+0.35%	0.0045S+0.35%
Constant Voltage mode						
Range	0~150V	0~600V	0~16V	0~80V	0~16V	0~80V
Resolution	40mV	162mV	4mV	20mV	4mV	20mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	1.25~520W	12.5~5200W	0.36~650W	3.6~6500W	1.2~1040W	12~10400W
Resolution	6.25mW	62.5mW	4.6mW	46mW	22.5mW	225mW
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	1.6mA~0.4A/μs	16mA~4A/μs	3mA~0.75A/μs	30mA~7.5A/μs	10mA~3A/μs	100mA~25A/μs
Resolution	1.6mA/μs	16mA/μs	3mA/μs	30mA/μs	12mA/μs	100mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	24μs (typical)		24μs (typical)		20μs (typical)	
Current						
Range	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Resolution	2.8mA	28mA	5.2mA	52mA	21mA	170mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~150V	0~600V	0~16V	0~80V	0~16V	0~80V
Resolution	5.1mV	21mV	0.6mV	2.6mV	0.6mV	2.6mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Resolution	0.35mA	3.5mA	0.7mA	7mA	2.6mA	21mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~520W	0~5200W	0~650W	0~6500W	0~1040W	0~10400W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
current	10A	100A	18A	180A	60A	600A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	353 x 440 x 589 mm / 13.9 x 17.3 x 23.2 inch		310 x 440 x 589 mm / 12.2 x 17.3 x 23.2 inch		443.7 x 440 x 589 mm / 17.5 x 17.3 x 23.2 inch	
Weight	62 kg / 136.68 lbs		62 kg / 136.68 lbs		90 kg / 198.41 lbs	
Safety & EMC	CE		CE		CE	

SPECIFICATIONS-3

Model	63207		63208		63209	
Power *1	1040W	10400W	1560W	15600W	1560W	15600W
Current	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Voltage*2	0~80V		0~80V		0~80V	
Min. Operating voltage	0.5V @ 15A 1V @ 30A	0.5V @ 150A 1V @ 300A	0.5V @ 30A 1V @ 60A	0.5V @ 300A 1V @ 600A	0.5V @ 50A 1V @ 100A	0.5V @ 500A 1V @ 1000A
Constant Current mode						
Range	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Resolution	10.3mA	82mA	21mA	163mA	34.2mA	274mA
Accuracy	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.005~20Ω	0.25~1000Ω	0.0025~10Ω	0.125~500Ω	0.0015~6Ω	0.075~300Ω
Resolution*3	55.7mS	1.1mS	110mS	2.22mS	186.5mS	3.73mS
Accuracy *4	0.111S+0.35%	0.9S+0.1%	0.22S+0.35% *5	1.2S+0.1%	0.373S+0.35% *5	1.2S+0.1%
Accuracy *6 (Vin>7V)	0.111S+0.35%	0.0022S+0.35%	0.22S+0.35%	0.0044S+0.35%	0.373S+0.35%	0.0075S+0.35%
Constant Voltage mode						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	4mV	20mV	4mV	20mV	4mV	20mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	0.744~1040W	6~10400W	1.2~1560W	12~15600W	2.5~1560W	20~15600W
Resolution	9.3mW	75mW	22.5mW	225mW	31.255mW	250mW
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	6mA~1.5A/μs	50mA~12.5A/μs	12mA~3A/μs	100mA~25A/μs	20mA~5A/μs	166mA~41.6A/μs
Resolution	6mA/μs	50mA/μs	12mA/μs	100mA/μs	20mA/μs	166mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	20μs (typical)		20μs (typical)		20μs (typical)	
Current						
Range	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Resolution	10.3mA	82mA	21mA	163mA	34.2mA	274mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	0.6mV	2.6mV	0.6mV	2.6mV	0.6mV	2.6mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Resolution	1.3mA	11mA	2.7mA	21mA	4.5mA	36mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~1040W	0~10400W	0~1560W	0~15600W	0~1560W	0~15600W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
Current	30A	300A	60A	600A	100A	1000A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	443.7 x 440 x 589 mm / 17.5 x 17.3 x 23.2 inch		762.8 x 546 x 700 mm / 30 x 21.5 x 27.6 inch		762.8x546x700mm/ 30x21.5x27.6inch(cabinet)	
Weight	90 kg / 198.24 lbs		170 kg / 374.45 lbs		170 kg / 374.45 lbs	
Safety & EMC	CE		CE		CE	

SPECIFICATIONS-4

Model	63210		63211		63212	
Power *1	1450W	14500W	15600W	15600W	10000W	10000W
Current	0~15A	0~150A	0~30A	0~150A	0~30A	0~150A
Voltage*2	0~600V		10~1000V		10~1000V	
Min. Operating voltage	1.5V @ 7.5A 3V @ 15A	1.5V @ 75A 3V @ 150A	5V @ 15A 10V @ 30A	5V @ 75A 10V @ 150A	5V @ 15A 10V @ 30A	5V @ 75A 10V @ 150A
Constant Current mode						
Range	0~15A	0~150A	0~30A	0~150A	0~30A	0~150A
Resolution	4.9mA	39mA	7.5mA	37.5mA	7.5mA	37.5mA
Accuracy	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.
Constant Resistance Mode						
Range	0.1~400Ω	5~20000Ω	0.2~200Ω	8~8000Ω	0.2~200Ω	8~8000Ω
Resolution*3	3.21mS	80.1μS	14.3mS	360μS	14.3mS	360μS
Accuracy *4	0.0128S+0.35%	0.092S+0.1%	28.7mS+0.5%	715μS+0.5%	28.7mS+0.5%	715μS+0.5%
Accuracy *6 (Vin>7V)	0.0128S+0.35%	317.7μS+0.35%	--	--	--	--
Constant Voltage mode						
Range	0~150V	0~600V	0~250V	0~1000V	0~250V	0~1000V
Resolution	40mV	162mV	62.5mV	250mV	62.5mV	250mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	5~1450W	50~14500W	2.5~1560W	20~15600W	2.5~1000W	20~10000W
Resolution	25mW	250mW	390mW	3.9W	25mW	2.5W
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	3mA~0.75A/μs	25mA~6A/μs	5mA~1.25A/μs	25mA~6.25A/μs	5mA~1.25A/μs	25mA~6.25A/μs
Resolution	3mA/μs	25mA/μs	5mA/μs	25mA/μs	5mA/μs	25mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	150 μs (typical)		24 μs (typical)		24 μs (typical)	
Current						
Range	0~15A	0~150A	0~30A	0~150A	0~30A	0~150A
Resolution	4.9mA	39mA	0.6mA	3mA	0.6mA	3mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~150V	0~600V	0~250V	0~1000V	0~250V	0~1000V
Resolution	5.1mV	21mV	5mV	20mV	5mV	20mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~15A	0~150A	0~30A	0~150A	0~30A	0~150A
Resolution	0.64mA	5.1mA	0.6mA	3mA	0.6mA	3mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~1450W	0~14500W	0~1560W	0~15600W	0~1000W	0~10000W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
Current	15A	150A	30A	150A	30A	150A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	762.8x546x700mm/ 30x21.5x27.6inch(cabinet)		762.8x546x700mm/ 30x21.5x27.6inch(cabinet)		762.8x546x700mm/ 30x21.5x27.6inch(cabinet)	
Weight	170 kg / 374.45 lbs		170 kg / 374.45 lbs		170 kg / 374.45 lbs	
Safety & EMC	CE		CE		CE	

NOTE*1 : The power rating specifications at ambient temperature=25˚C and see the diagram below for power derating.
NOTE*2 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*3 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
NOTE*4 : The Vin must be greater than min. operating voltage of each model.
NOTE*5 : Setting error will be 1% for R<0.005Ω at CRL range.
NOTE*6 : The Vin must be greater than 7V of each model.
NOTE*7 : Power F.S. = Vrange x Irange F.S.

PROGRAMMABLE DC ELECTRONIC LOAD
MODEL 63600 SERIES

Chroma's 63600 series DC electronic loads are designed for testing multi-output AC/DC power supplies, DC/DC converters, chargers, batteries, server power supplies, and power electronic components. They are excellent for research, development, production, and incoming inspection applications.

The 63600's state of the art design uses DSP technology to simulate non-linear loads using a unique CZ operation mode allowing realistic loading behavior.

The 63600 series can draw its rated current under very low voltage (0.4V typical). This unique feature guarantees the best loading performance for modern Point-of-Load conditions and fuel cells.

The 63600 series can simulate a wide range of dynamic loading applications, with programmable load levels, slew rates, duration, and conducting voltage. The 63600 also has a dynamic sweep function to meet the test requirements of ATX power supplies. The instrument allows up to 100 sets of system operating status which can be stored in the EEPROM and recalled instantly for automated testing application.
Real time measurement of voltage and current are integrated into each 63600 load module using a 16-bit measurement circuit with three current ranges. The user can perform online voltage measurements and adjustments or simulate short circuit tests using the simple keypad on the front panel.

With the VFD display and rotary knob, the 63600 loads offer versatile front panel operation. Users are able to control the 63600 family remotely via Ethernet, USB, or GPIB interface.

Also included in the 63600 are self-diagnostic routines and full protections against OP, OC, OT and alarm indicating OV, reverse polarity. This ensures the quality and reliability of the 63600 and provides protection to units under test.

MODEL 63600 SERIES

Key Features :

- Max. power : 100W×2(Dual), 300W & 400W
- Voltage range : up to 600V
- 5 module mainframe Max. 2000W, load modules up to 400W/ea
- Up to 10 channels in one mainframe, fit for testing multiple output SMPS
- 0.4V @ 80A (Typical) low voltage operating characteristics
- Flexible CC, CR, CV and CP operation modes
- CZ mode for turn on capacitive load simulation
- Parallel mode for high current and power application up to 2kW
- Multi channel synchronous control
- Auto frequency sweep up to 50kHz
- Real time power supply load transient response simulation and Vpk+/- measurement
- User defined waveform
- Max. Power Point Tracking
- User programmable 100 sequential front panel input status for user-friendly operation
- Precision voltage and current measurement
- Precision high speed digitizing measurement/ data capture
- Voltage, current and P_{max} measurement for OCP/OLP testing
- Timing measurement for batteries
- Short circuit simulation
- Self-test at power-on
- Full protection : OC, OP, OT protection and OV alarm
- Ethernet, USB and GPIB interfaces

Ethernet GPIB USB CE

MAINFRAME SPECIFICATION

Model	63600-1*	63600-2	63600-5
Number of slots	1 slot	2 slots	5 slots
Operating temperature	0~40˚C	0~40˚C	0~40˚C
Input Rating	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Switchable, 47~63Hz	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Switchable, 47~63Hz	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Auto Range, 47~63Hz
Mainframe dimension (HxWxD)	177x70.22x554.9mm / 7.0x2.76x21.8 inch	177x210x554mm / 7.0x8.27x21.8 inch	177x447x554mm / 7.0x17.6x21.8 inch (Full Rack)
Weight	7.5kg / 16.53lbs	11.5kg / 23.35lbs	15.6kg / 34.39lbs

* None digital interface option

SPECIFICATIONS-1

Model	63610-80-20			63630-80-60		
Configuration	100Wx2			300W		
Voltage *1 *8	0~80V			0~80V		
Current	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Power *2	0~16W	0~30W	0~100W	0~30W	0~60W	0~300W
Static Mode						
Typical Min. Operating Voltage (DC)	0.5V@0.2A	0.5V@2A	0.5V@20A	0.5V@0.6A	0.5V@6A	0.5V@60A
Constant Current Mode						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.01mA	0.1mA	1mA	0.01mA	0.1mA	1mA
Accuracy	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Constant Resistance Mode						
Range	CRL : 0.04~80Ω (100W/6V) CRM: 1.44~2.9kΩ (100W/16V) CRH : 5.76~12kΩ (100W/80V)			CRL : 0.015~30Ω (300W/6V) CRM: 0.3~600Ω (300W/16V) CRH : 1.5~3kΩ (300W80V)		
Resolution *9	0.3288mS			0.9864mS		
Accuracy *3	0.1%+0.075S (6V) 0.1%+0.01S (16V) 0.1%+0.00375S (80V)			0.1%+0.2S (6V) 0.1%+0.03S (16V) 0.1%+0.01S (80V)		
Constant Voltage Mode						
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Resolution	0.1mV	1mV	1mV	0.1mV	1mV	1mV
Accuracy	0.05%+0.1%F.S.			0.05%+0.1%F.S.		
Constant Power Mode						
Range	0~2W	0~10W	0~100W	0~6W	0~30W	0~300W
Resolution *9	1mW	10mW	100mW	3.2mW	32mW	320mW
Accuracy *4	0.3%+0.3%F.S.			0.3%+0.3%F.S.		
Dynamic Mode - CC						
Min. Operating Voltage	1.5V			1.5V		
Frequency	100Hz~50kHz/0.01Hz~1kHz			100Hz~50kHz/0.01Hz~1kHz		
Duty	1~99% (Min. Rise Time Dominated)			1~99% (Min. Rise Time Dominated)		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew Rate	0.04A/ms~0.02A/μs	0.4A/ms~0.2A/μs	4A/ms~2A/μs	0.12A/ms~0.06A/μs	1.2A/ms~0.6A/μs	12A/ms~6A/μs
Resolution	0.01mA/μs	0.1mA/μs	1mA/μs	0.01mA/μs	0.1mA/μs	1mA/μs
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10 μs			10 μs		
Current						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.01mA	0.1mA	1mA	0.01mA	0.1mA	1mA
Ext Wave Mode(20kHz) : CC						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Level	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		

SPECIFICATIONS-1

Measurement						
Voltage Read Back						
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Resolution	0.1069mV	0.2849mV	1.3537mV	0.1069mV	0.2849mV	1.3537mV
Accuracy *5	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.
Current Read Back						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.003349mA	0.034628mA	0.329561mA	0.009942mA	0.101748mA	1.009878mA
Accuracy *5	0.05%+0.05%F.S.			0.05%+0.05%F.S.		
Power Read Back						
Range	0~16W	0~30W	0~100W	0~30W	0~60W	0~300W
Accuracy *5	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Voltage Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Current Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~0.2A	0~2A	0~20A	0~0.1A	0~1A	0~10A
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
General						
Program mode						
Sequence No.	100/Program			100/Program		
Dwell / SEQ	0.1ms ~ 30s (Resolution : 0.1ms)			0.1ms ~ 30s (Resolution : 0.1ms)		
Load Setting	Refer to Static mode specifications			Refer to Static mode specifications		
Spec Check	Voltage/Current/Power			Voltage/Current/Power		
Protection						
Over Power	Yes			Yes		
Over Current	Yes			Yes		
Over Voltage Alarm*8	Yes			Yes		
Over Temperature	Yes			Yes		
Reverse	Yes			Yes		
Interface						
USB	Standard			Standard		
Ethernet	Optional			Optional		
GPIB	Optional			Optional		
System BUS	Master/Slave			Master/Slave		
Dout						
No. of bits	2 bits per mainframe			2 bits per mainframe		
Level - H	1.8V/3.3V/5V switchable			1.8V/3.3V/5V switchable		
Level - L	<0.6V@I_{sink}=10mA			<0.6V@I_{sink}=10mA		
Drive	Pull_up resistor = 4.7kΩ			Pull_up resistor = 4.7kΩ		
Din (TTL Compatible, Rising Edge)						
No. of bits	2 bits per mainframe			2 bits per mainframe		
External Trig. for Digitizing						
No. of bits	1 bit per mainframe			1 bit per mainframe		
External Trig. for Auto Sequences (TTL Compatible, Rising Edge)						
No. of bits	1 bit per mainframe			1 bit per mainframe		
Load ON - O/P						
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
Short ON - O/P						
No. of channels	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe			2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe		
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
Short circuit						
Current *6	Set to 100% of rated current			Set to 100% of rated current		
Input Resistance (Load Off)	700kΩ (Typical)			700kΩ (Typical)		
Dimensions (HxWxD)	142x86x514mm / 5.6x3.4x20.2 inch			142x86x514mm / 5.6x3.4x20.2 inch		
Weight	5kg / 11 lbs			4kg / 8.8 lbs		
Operating Temperature	0~40˚C			0~40˚C		
Storage Temperature	-20~80˚C			-20~80˚C		
Power	Supply from mainframe			Supply from mainframe		
EMC & Safety	CE			CE		

SPECIFICATIONS-2

Model	63630-600-15			63640-80-80		
Configuration	300W			400W		
Voltage *1 *8	0~600V			0~80V		
Current	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Power *2	0~90W	0~300W	0~300W	0~60W	0~60W	0~400W
Static Mode						
Typical Min. Operating Voltage (DC)	2V@0.15A	2V@1.5A	2V@15A	0.4V@0.8A	0.4V@8A	0.4V@80A
Constant Current Mode						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.005mA	0.05mA	0.5mA	0.01mA	0.1mA	1mA
Accuracy	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Constant Resistance Mode						
Range	CRL : 0.133~270Ω (300W/80V) CRM: 1.92~4kΩ (300W/150V) CRH: 208~200kΩ (300W/600V)			CRL : 0.01~20Ω (400W/6V) CRM: 0.36~720Ω (400W/16V) CRH : 1.45~2.9kΩ (400W/80V)		
Resolution *9	0.2435mS			1.322mS		
Accuracy *3	0.1%+0.02S (80V) 0.1%+0.0005S (150V) 0.1%+0.0003S (600V)			0.1%+0.275S (6V) 0.1%+0.036S (16V) 0.1%+0.01375S (80V)		
Constant Voltage Mode						
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Resolution	1mV	10mV	10mV	0.1mV	1mV	1mV
Accuracy	0.05%+0.1%F.S.			0.05%+0.1%F.S.		
Constant Power Mode						
Range	0~6W	0~30W	0~300W	0~8W	0~40W	0~400W
Resolution *9	5.625mW	56.25mW	562.5mW	4mW	40mW	400mW
Accuracy *4	0.3%+0.3%F.S.			0.3%+0.3%F.S.		
Dynamic Mode - CC						
Min. Operating Voltage	3V			1.5V		
Frequency	100Hz~50kHz/0.01Hz~1kHz			100Hz~50kHz/0.01Hz~1kHz		
Duty	1~99% (Min. Rise Time Dominated)			1~99% (Min. Rise Time Dominated)		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew rate	0.03A/ms~0.015A/μs	0.3A/ms~0.15A/μs	3A/ms~1.5A/μs	0.16A/ms~0.08A/μs	1.6A/ms~0.8A/μs	16A/ms~8A/μs
Resolution	0.005mA/μs	0.05mA/μs	0.5mA/μs	0.01mA/μs	0.1mA/μs	1mA/μs
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10 μs			10 μs		
Current						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.005mA	0.05mA	0.5mA	0.01mA	0.1mA	1mA
Ext Wave Mode(20kHz) : CC						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Level	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Measurement						
Voltage Read Back						
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Resolution	1.4194mV	2.661mV	10.645mV	0.1069mV	0.2849mV	1.3537mV
Accuracy *5	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.
Current Read Back						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.00275mA	0.0266mA	0.255mA	0.013695mA	0.138766mA	1.31406mA
Accuracy *5	0.05%+0.05%F.S.			0.05%+0.05%F.S.		
Power Read Back						
Range	0~90W	0~300W	0~300W	0~60W	0~60W	0~400W
Accuracy *5	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Voltage Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Current Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		

SPECIFICATIONS-2

General		
Program mode		
Sequence No.	100/Program	100/Program
Dwell / SEQ	0.1ms ~ 30s (Resolution : 0.1ms)	0.1ms ~ 30s (Resolution : 0.1ms)
Load Setting	Refer to Static mode specifications	Refer to Static mode specifications
Spec Check	Voltage/Current/Power	Voltage/Current/Power
Protection		
Over Power	Yes	Yes
Over Current	Yes	Yes
Over Voltage Alarm*8	Yes	Yes
Over Temperature	Yes	Yes
Reverse	Yes	Yes
Interface		
USB	Standard	Standard
Ethernet	Optional	Optional
GPIB	Optional	Optional
System BUS	Master/Slave	Master/Slave
Dout		
No. of bits	2 bits per mainframe	2 bits per mainframe
Level - H	1.8V/3.3V/5V switchable	1.8V/3.3V/5V switchable
Level - L	<0.6V@I_{sink}=10mA	<0.6V@I_{sink}=10mA
Drive	Pull_up resistor = 4.7kΩ	Pull_up resistor = 4.7kΩ
Din (TTL Compatible, Rising Edge)		
No. of bits	2 bits per mainframe	2 bits per mainframe
External Trig. for Digitizing		
No. of bits	1 bit per mainframe	1 bit per mainframe
External Trig. for Auto Sequences (TTL Compatible, Rising Edge)		
No. of bits	1 bit per mainframe	1 bit per mainframe
Load ON - O/P		
Level	TTL Compatible, Level, Active High	TTL Compatible, Level, Active High
Short ON - O/P		
No. of channels	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe
Level	TTL Compatible, Level, Active High	TTL Compatible, Level, Active High
Short circuit		
Current *6	Set to 100% of rated current	Set to 100% of rated current
Input Resistance (Load Off)	2MΩ (Typical)	700kΩ (Typical)
Dimensions (HxWxD)	142x86x514mm / 5.6x3.4x20.2 inch	142x86x514mm / 5.6x3.4x20.2 inch
Weight	5kg / 11 lbs	4.5kg / 9.9 lbs
Operating Temperature	0~40˚C	0~40˚C
Storage Temperature	-20~80˚C	-20~80˚C
Power	Supply from mainframe	Supply from mainframe
EMC & Safety	CE	CE

NOTE*1 : The maximum current loading below the minimum operating voltage (0.5V) will follow a derating curve.
NOTE*2 : The 400W power rating of the 63640-80-80 specified at an ambient temperature of 35˚C, please refer to the power rating curve on the right.
NOTE*3 : Does not apply to setting current < 0.25% full scale current in high range. Does not apply to setting current < 0.05% full scale current in low and middle range.
NOTE*4 : The full scale is Vmax x Imax.
NOTE*5 : The DC level measurements are made over a period of 20ms, and does not measure any transient signals in the DC measurements.
NOTE*6 : Its limits are the maximum power and maximum current of the current ragne.
NOTE*7 : The 63600 is guaranteed to meet specified performance at temperature range of 25±5˚C.
NOTE*8 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*9 : Please refer to user's manual for detail specifications, and S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.

DIGITAL POWER METER
MODEL 66200 SERIES

Chroma's 66200 Series Digital Power Meter is designed for single-phase measurements of AC power signals and related parameters common to most electronic products. Instead of traditional analog measurement circuits, the 66200 uses state-of-the-art DSP digitizing technology. The internal 16 bits analog/digital converters with sampling rates of up to 240kHz provide both high speed and high accuracy measurements which is unprecedented within the industry for this class of power meters current on the market.

The instruments include a four part display with 7-segment LED front panel readouts. Users can easily select desired parameters and readouts at a touch of a button. Instruments also include optional remote control using USB or GPIB interfaces via rear panel connections. The 66200 is packaged in a 2U high, half rack enclosure suitable for benchtop or system integration.

The Model 66201 includes simple measurement functions designed for low power applications (maximum current 2A). Examples of these devices are AC adapters, battery chargers, LCD monitors, and similar devices. Included measurement data is as following :

1. Voltage : Vrms, Vpeak+, Vpeak-
2. Current : Irms, Ipeak+, Ipeak-
3. Power : Watts, Power Factor,
Apparent Power VA,
Reactive Power VAR
4. Current Crest Factor & Frequency

The Model 66202 includes a 2-shunt design to provide highly accurate readings for both low and high current measurements. In addition to the parameters measured by Model 66201, the 66202 includes Inrush current, Total Harmonic Distortion of V/I, and Energy measurements. With these practical functions, the Model 66202 is suitable for the most demanding of R&D and quality control departments.

MODEL 66200 SERIES

Key Features:

- Voltage Range : 150/300/500 Vrms
- Current Range :
  Model 66201 - 0.01/0.1/0.4/2 Arms
  Model 66202 - 0.01/0.1/0.4/2 Arms
  0.2/2/8/20 Arms
- Frequency Range : DC, 15Hz~10kHz
- Embedded high speed DSP, 16 bits Analog/ Digital converters
- 10 mA minimum current range & 0.1mW power resolution
- Meets ENERGY STAR / IEC 62301 / EN 50564 / ErP measurement requirements
- Accumulated energy methods for unstable power measurement
- User-define criteria provides automatic PASS/FAIL indications
- Half rack width and 2U height, suitable for system integration
- Dual current shunt design provides high accuracy over a wide current range (Model 66202)
- THD and user-specify order distortion measurement (Model 66202)
- Inrush current and energy measurement (Model 66202)
- Interface options : USB or USB+GPIB
- Voltage/ Current harmonics measurement up to 50 orders

USB GPIB CE

SPECIFICATIONS

Model	**66201**	**66202**
Channel	1	1
Parameters	V, Vpk, I, Ipk, W, VA, VAR, PF, CF_I, F	V, Vpk, I, Ipk, Is, W, VA, VAR, PF, CF_I, F, THD_V, THD_I, Energy
AC Voltage		
Range	150/300/500Vrms (CF = 1.6)	150/300/500Vrms (CF = 1.6)
Accuracy	(0.1% + 0.05% x kHz) of rdg + 0.08% of rng	(0.1% + 0.05% x kHz) of rdg + 0.08% of rng
Input Resistance	1MΩ	1MΩ
AC Current		
Range	0.01/0.1/0.4/2 Arms (CF=4) *1	SHUNT H : 0.2/2/8/20Arms (CF=2@0.2/2/8A, CF = 4@ 20A) SHUNT L : 0.01/0.1/0.4/2Arms (CF=4)
Accuracy *2	0.01A range : (0.1 + 0.05 x kHz)% of rdg + 0.25% of rng 0.1/0.4/2 A range : (0.1 + 0.05 x kHz)% of rdg + 0.1% of rng	SHUNT H : 0.2A range : (0.1 + 0.05 x kHz)% of rdg + 0.12% of rng 2/8/20 A range : (0.1 + 0.05 x kHz)% of rdg +0.1% of rng SHUNT L : 0.01A range : (0.1 + 0.05 x kHz)% of rdg + 0.25% of rng 0.1/0.4/2 A range: (0.1 + 0.05 x kHz)% of rdg + 0.1% of rng
Power		
Range(W)=VoltagexCurrent	1.5W ~ 1000W, 12 ranges	1.5W ~ 10kW, 24 ranges
Accuracy	47Hz ~ 63Hz : 0.1% of rdg + 0.1% of rng 15Hz ~ 1kHz : (0.1+ 0.2/PF x kHz)% of rdg+0.18% of rng	47Hz ~ 63Hz : 0.1% of rdg + 0.1% of rng 15Hz ~ 1kHz : (0.1+ 0.2/PF x kHz)% of rdg+0.18% of rng
	For EN 50564 (300V x 100mA range) 0.1% of rdg + 0.05% of rng	For EN 50564 (300V x 100mA range) 0.1% of rdg + 0.05% of rng
Power Factor Accuracy *3	0.006 + (0.003/PF) x kHz	0.006 + (0.003/PF) x kHz
Frequency		
Range	DC, 15Hz ~ 10kHz	DC, 15Hz ~ 10kHz
Measuring Condition	Voltage (10 ~ 100% of the voltage range)	Voltage (10 ~ 100% of the voltage range)
Others		
Display Resolution	5 Digits	
Display update rate	0.25~2 sec	
Power Supply	90V ~ 130V /180V ~ 250V, 50Hz/ 60Hz, 30VA	
Interface	Option: USB or GPIB+USB	
Operating Temperature	0˚C ~ 40˚C	
Storage	-40˚C ~ 85˚C	
Safety & EMC	CE (include EMC & LVD)	
Dimension (H x W x D)	88 x 212 x 348.1 mm / 3.46 x 8.35 x 13.7 inch (excluding projections)	
Weight	3.8 kg / 8.37 lbs	

The specifications are valid only after the power meter is turned on more than one hour in a thermally stable environment.

Note*1 : The maximum measurable current of 66201 is 4 Arms.

Note*2 : The current accuracy applies temperature range 23 ± 1˚C for 0.01A & 0.2A (CF=2). For all the other current ranges, the spec. applied under 23 ± 5˚C.

Note*3 : The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges.

MODEL 66203/66204

Key Features :

- Voltage Ranges : 15/30/60/150/300/600 Vrms, 1200Vrms (optional kit)
- Current Ranges : 0.005/0.02/0.05/0.2/0.5/2/5/20 Arms
- Frequency Range : DC, 15Hz~10kHz
- Embedded high speed DSP, 16 bits Analog/Digital converters
- Half rack size, up to 4 input modules
- Supports various single and 3 phase wiring configurations (see diagram)
- Supports external shunt and CT for higher current applications
- 5 mA minimum current range & 0.1mW power resolution
- Meets ENERGY STAR / EN 50564 / IEC 62301 / ErP
- Includes accumulated energy methods for unstable power measurement
- User-define criteria provides automatic PASS/FAIL indications
- Dual current shunt design provides high accuracy over a wide current range
- THD and user-specify order distortion measurement
- Inrush current and energy measurements
- Voltage / Current harmonics measurements up to 50 orders

DIGITAL POWER METER
MODEL 66203/66204

66203/66204 Power Meters are designed for multiple phase power measurement applications. The wiring mode function allows the user to take accurate power measurements for various wiring modes 1P2W/1P3W/3P3W/3P4W as well as providing accurate standard power measurements common for most electrical devices. A unique feature of the 66203/66204 is its state-of-the-art DSP digitizing technology instead of less accurate and slower traditional analog circuits. The internal 16 bits analog/digital converters with sampling rates of up to 250kHz provide both high speed and high accuracy measurements which is unprecedented within the industry for this class of power meters.

The instruments include a four part display with 7-segment LED front panel readouts. Users can easily select desired parameters and readouts with a touch of a button. The 66203/66204 meters also include remote control using USB or GPIB interfaces via rear panel connections.

The 66203/66204 are packaged in a 3U high, half rack enclosure suitable for bench top or system integration. The power meters are capable of supporting external shunts and CT for higher current application. The 4 channel 66204 is suitable for input and output parameter measurement and efficiency of 3 phase PV inverters can be calculated with measurement of the DC voltage/current at the input side of the inverter.

The 66203/66204 power meters include a 2-shunt design to provide high accurate readings for both low and high current measurements. The power meters also support features such as Inrush current, Total Harmonic Distortion of V/I, and Energy measurements. With these practical functions, the 66203/66204 power meters are suitable for meeting the demanding tasks of R&D, production and quality control departments.

USB GPIB CE

SPECIFICATIONS

Model	66203	66204
Meas. Channel	3	4
Parameters	V, Vpk, I, Ipk, Is, W, VA, VAR, PF, CFi, F, THD V, THD I, E	
AC/DC Voltage		
Voltage Range (V)	15V/30V/60V/150V/300V/600Vrms (CF=2), 6 range HV option up to 1200Vrms	
Voltage Accuracy	15Hz to 1kHz : 0.1% RD + 0.08% RNG 1kHz to 10kHz: (0.1+0.05*kHz)% RD + 0.05% RNG	
Voltage Harmonics Accuracy	15Hz to 1kHz : 0.1% RD + 0.08% RNG 1kHz to 10kHz: (0.1+0.05*kHz)% RD + 0.05% RNG	
DC Voltage Accuracy	0.1% RD + 0.08% RNG	
AC/DC Current		
Current Range (I)	5mA/20mA/50mA/200mA/500mA/2A/5A/20Arms (CF=4)	
Current Accuracy	15Hz to 1kHz : 0.1% RD + 0.12% RNG 1kHz to 10kHz: (0.1+0.05*kHz)% RD + 0.1% RNG	
Current Harmonics Accuracy	15Hz to 1kHz : 0.1% RD + 0.12% RNG 1kHz to 10kHz: (0.1+0.05*kHz)% RD + 0.1% RNG	
DC Current Accuracy	0.1% RD + 0.1% RNG	
Power		
Power Range (W)	75mW ~ 12kW (48 ranges)	
Power Accuracy	47Hz to 63Hz : 0.1% RD + 0.1% RNG 1KHz to 10KHz: (0.1+0.1*kHz+0.3/PF*kHz)% RD + 0.18% RNG	
Power Factor accuracy	0.001+(15ppm/PF)*Hz	
Frequency		
Fundamental Frequency Range	DC, 15Hz ~ 10kHz	
THD Frequency Range	40Hz ~ 70Hz (100 order) 70Hz ~ 440Hz (50 order)	
Bandwidth	50kHz	
Others		
Display Resolution	5 Digits	
Display Update Rate	0.25sec/0.5sec/1sec/2sec	
Input Voltage	100~240V ± 10%, 50/60Hz	
Interface	USB+GPIB (Standard)	
Operation Temperature	0˚C ~ 40˚C	
Storage	-40˚C ~ 85˚C	
Safety & EMC	CE (include EMC & LVD)	
Dimension (H x W x D)	133 x 212 x 420 mm / 5.25 x 8.25 x 16.3 inch	
Weight	7.5 kg / 16.5 lbs	8.5 kg / 18.7 lbs

The specifications are valid only after the power meter is turned on more than one hour in a thermally stable environment.

DIGITAL POWER METER MODEL 66205

The 66205 is the 2nd generation of the 66200 series power meter designed specifically for single channel measurement. Its state of art design is capable of providing highly accurate power measurements to meet the requirements of IEC 62301/EN50564 standards. Functionality improvements of the 66205 increase power measurement capabilities to a wider range of applications.

The Smart Range function is one of the most important new features added to the 66205 power meter. Smart Range allows the power integration mode to perform active power measurements with the measurement range in auto mode. Chroma' s proprietary design automatically selects the appropriate range, based on changes in sensed voltage and current, ensures the best accuracy when integrating the measurements over time.

The 66205 provides 10 selectable current measurement ranges from 5mA up to 30A. External sensor options A662017~A662020 are available to increase the current measurement range. Six selectable voltage ranges are available up to 600V.

External sensor option A662012 can be used to increase the voltage measurement range to 1.2kV. The 66205 provides a low range error up to 0.05% and is capable of meeting the measurement uncertainty requirement of IEC 62301/EN50564.

66205 power meter is designed to comply with IEC 61000-4-7. Continuous high-performance harmonic measurement, with 5Hz frequency resolution and a packet harmonic function, it can accurately measure sub-harmonics, inter-harmonics and harmonics.

For remote operation, the 66205 offers 4 types of communication interfaces including GPIB, USB, RS-232 and LAN (optional). Using the softpanel, it can create complete test reports and perform power quality as well as regulation tests. In addition, its STORE function records the measured values and saves them to a USB storage device. The Limit function can be used for production tests by performing GO/NG tests on the upper and lower limits of voltage, current and power parameters; additionally, it can be integrated into automated production when I/O port is used. The 66205 is a great fit for meeting the demanding tasks of R&D, production and quality control.

MODEL 66205

KEY FEATURES

- Voltage Ranges: 15/30/60/150/300/600 Vrms 1200Vrms (optional)
- Current Ranges : 0.005/0.02/0.05/ 0.2/0.3/0.5/2/5/20/30 Arms
- Frequency Range : DC, 15Hz~10kHz
- Embedded high speed DSP, 16 bits Analog/Digital converters with max samipling rate up to 250kHz
- Capable of meeting the IEC 61000-4-7 harmonics measurement requirements
- Smart Range function provides seamless power integration measurement under auto range mode
- Supports external shunt and CT for higher current applications
- 5 mA minimum current range & 0.1mW power resolution
- Meets ENERGY STAR /EN 50564/ IEC 62301/ErP requirements
- User-define criteria provides automatic PASS/FAIL indications
- THD and user-specify order distortion measurement
- Inrush current and energy measurements
- Voltage/ Current harmonics measurements up to 100 orders
- USB (Host) interface provides data logging functionality
- Support GPIB, USB, RS232, LAN (option) interface

SPECIFICATIONS

Model	66205
Channel	1
Parameters	Vrms, Vpk+, Vpk-, V_harm, V_THD, CFv, Irms, Ipk+, Ipk-, I_harmonic, I_THD, CFi, Is, W, VA, var, PF, Freq_V, Freq_I, Wh, Ah, ° (degree)
AC/DC Voltage	
Range	15V/30V/60V/150V/300V/600Vrms (CF=2), 6 ranges
Accuracy	DC, 10Hz to 850Hz : 0.1% rdg+0.05% rng 850Hz to 10kHz : (0.1+0.05*kHz)% rdg+0.08% rng
Harmonics Accuracy	DC, 10Hz to 850Hz : 0.1% rdg+0.05% rng 850Hz to 10kHz : (0.1+0.05*kHz)% rdg+0.08% rng
Input Resistance	2MΩ
AC/DC Current	
Range	Low Shunt: 5mA/20mA/50mA/200mA/300mA (CF=4) High Shunt: 500mA/2A/5A/20Arms/30Arms (CF=4)
Accuracy	DC, 10Hz to 850Hz : 0.1% rdg+0.05% rng 850Hz to 10kHz : (0.1+0.05*kHz)% rdg+0.1% rng
Harmonics Accuracy	DC, 10Hz to 850Hz : 0.1% rdg+0.05% rng 850Hz to 10kHz : (0.1+0.05*kHz)% rdg+0.1% rng
Power	
Range	75mW ~ 18kW (60 ranges)
Accuracy	DC, 10Hz to 850Hz : 0.1% rdg+0.05% rng 850Hz to 10kHz : (0.1+0.07*kHz)% rdg+0.15% rng
Power Factor accuracy	0.001+(15ppm/PF) x Hz
Frequency	
Range	DC, 10Hz ~ 10kHz
Measuring Condition	Synchronizing by voltage signal (10%~100% of the voltage range) Synchronizing by current signal (30%~100% of the current range)
Others	
Display Resolution	5 digits
Display Update Rate	50ms/100ms/250ms/500ms/1s/2s/5s/10s
Input Voltage	100~240 ± 10%, 50/60Hz
Interface	Standard : USB (host), USB (device), GPIB and RS232 Optional : LAN
Operation Temperature	0˚C ~ 40˚C
Storage	-40˚C ~ 85˚C
Safety & EMC	CE (include EMC & LVD)
Dimension (H x W x D)	88mm x 208mm x 348mm / 3.47" x 8.19" x 13.7"
Weight	Approx. 4.4kg / 9.7lbs

ELECTRICAL SAFETY ANALYZER
MODEL 19032/19032-P

General Electrical Safety Testing Solution
Electrical safety testing is one of the major item in the electrical product quality tests. All electrical products consisting of adapter, SMPS, charger, house appliance, information technology product and video product are required to perform electrical safety tests.

The 19032 series combines Hi-Pot, IR, GB, LC/ALC/DLC and Dynamic Function Test. That can save 50% of production line space without purchasing several Hi-Pot testers , 19032 is able to increase efficiency of electrical safety test during manufacturing and reduce the risk on testing.

Open/Short Check (OSC)
Patent No. : 254135
All manufacturers have to solve the problems of error connections and unconnected test cables caused by the production line testers. 19032 equipp with the up-to-date open/short check function (OSC) for product testing.It can free the tests from such problem.

Twinport™ Function
USA Patent No.: US6504381
The key factor affecting the efficiency of manufacturing is the efficiency for electrical safety test. Twinport function can lower the time for safety test, and safety workstation will no longer be a bottleneck in production line.

Product Application
The 19032 can be applied to versatile tests of electrical products which include quality assurance sampling inspection test, manufacturing test and development validation.
- Power cord
- Adapter, SMPS
- House appliance
- Information technology product
- Medical equipment
- Lab/testing equipment
- EMI FILTER

EN50191 Floating Output Function
The leakage current of any ground terminal should be lower than 3.5mA when operating Floating output function. Therefore, the operator who near to potential ground terminal can avoid electrical hazard.

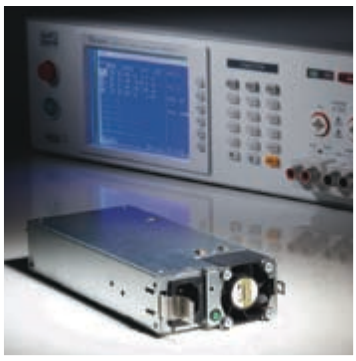
MODEL 19032/19032-P

Key Features :

- AC/DC/IR/GB/LC five instruments in one
- Function test up to 20A
- Programmable voltage output and limit value
- OSC open/short check
- Flashover detection
- Human protection circuit
- Multi-scan device support dynamic leakage current test
- Standard RS232 interface
- Optional GPIB interface
- Large LCD panel
- Front panel lockout function
- Support PC software
- UL/TUV/CE

Key Features 19032-P :

- 500VA output
- Floating output , compliance with EN50191
- USB interface, compatible with USB TMC
- GFI human body protection circuit
- CE certification (only)



SPECIFICATIONS

Model	19032	19032-P
Mode	**AC/DC/IR/GB/LC**	
Withstanding Voltage Test		
Output Voltage	DC:0.05 ~ 6kV , AC : 0.05 ~ 5kV	
Load Regulation	±(1% reading +0.1% range)	±(2% reading +0.1% range)
Voltage Resolution	2V	
Voltage Accuracy	±(1% reading +0.1% range)	±(2% reading +0.1% range)
Cutoff Current	DC : 20mA , AC : 40mA	DC : 20mA , AC : 100mA
Current Resolution	0.1 μA DC ; 1μA AC	
Current Accuracy	±(1% reading +0.1% range)	±(2% reading +0.5% range)
Output Frequency	50Hz / 60Hz	
Test Time	0.3 ~ 999 sec , continue	
Ramp Time	0.1 ~ 99.9 sec, Off	
Fall Time	0.1 ~ 99.9 sec, Off	
Waveform	Sine wave	
Insulation Resistance Test		
Output Voltage	DC : 0.05 ~ 1kV	
Voltage Resolution	2V	
Voltage Accuracy	±(2% of reading +0.5% of range)	
IR Range	1MΩ ~ 50GΩ	
Resistance Resolution	0.1MΩ	
Resistance Accuracy	5% typical	
Ground Bond Test		
Output Current	AC : 1 ~ 30A	AC : 3 ~ 40A
Current Accuracy	±(1% of reading +0.2% of range)	
GR Range	10mΩ ~ 510mΩ	
Resistance Resolution	0.1mΩ	
Resistance Accuracy	± (1% of reading + 0.1% of full scale)	
Test Method	4 wires	
Flashover Detection		
Setting Mode	Programmable setting	
Detection Current	AC : 20mA, DC : 10mA	
Secure Protection Function		
Ground Fault Interrupt	-	0.5mA ±0.25mA AC
Floating Output	-	3.5mA, front output only
Panel Operation Lock	Present password	
Interlock	YES	
GO/NG Judgment Window		
Indication,Alarm	GO : Short sound,Green LED ; NG : Long sound, Red LED	
Data Hold	Least tests data memories	
Memory Storage	50 setups with up to 100 groups recall	
Interface		
9pin D-sub I/O control / RS232 / GPIB (Optional) / USB TMC (19032-P)		
General		
Operation Environment	Temperature : 0°C ~ 40°C, Humidity : ± 80 % RH	
Power Consumption	No load : < 100 W With Rated load : 800 W	No load : < 100W Rated load : 1000W Maximum load : 1200W
Power Requirements	90~132Vac or 198~264Vac, 47~66Hz	
Weight	Approx. 20KG(19032) 25KG (19032-P)	

Option	6000-04 ~ 08*
Support Mode	**AC/DC/IR/LC**
DUT Input Power Capacity	AC : 300V / 10A / 20A max.
Short Protection	20A, 250V fuse for DUT shorted.
Measurement Mode	
Input Characteristic	DC - 1MHz Input Impedance : 1M//20pF
Measurement Mode	Normal, Reverse, Single Fault Normal, Single Fault Reverse
Measurement Devices (Five measure device)	UL 544 NP ; UL 544 P UL 1563 ; UL 60601-1, IEC60601-1; UL 3101-1, UL/IEC 60950, UL 1950-U1* ; UL 2601-U1* IEC60990
Probe Connection	Line to Ground, Line to P2, P1 to P2
HI-LO Limit	
LC HI-LO Limit	0 ~ 9.99mA, 1μA resolution
Current HI-LO Limit	0 - 19.99Amp*
VA HI-LO Limit	0 - 4400VA
VA Resolution	0.1VA

*Different option have different specification.

AC/DC/IR HIPOT TESTER
MODEL 19070 & 19050 SERIES

Complete Dielectric Testing Solution

The 19050 series electrical safety testers are advanced digital hipots with load and line regulation to ensure the measurement integrity. Multi-step capability allows users to perform multiple tests in a sequence such as AC hipot followed by IR.

The Hipot Tester 19050 series provides 3 models for choice. The 19052 is for AC/DC/IR Hipot testing and insulation resistance (IR) measurements. The 19053 IR measurement is with 8 scan channels, and the 19054 IR measurement is with 4 scan channels capability into a single compact unit.

The Hipot Tester 19070 series provides 2 models for choice. The 19071 is for AC Hipot testing. The 19073 combines both AC and DC Hipot with insulation resistance (IR) measurements into a single compact unit.

Open Short Check (OSC)

The OSC function is used to check whether the connection is open circuit between instrument and DUT or breakdown inside DUT before testing the electrical safety.

Flashover (ARC) Detection

The 19070 and 19050 series are sensitive enough to monitor current spikes even if they do not exceed the maximum trip current level.

Ground Continuity Check

All of the 19050 series testers have a ground continuity check feature to determine the resistance, that is between the ground blade of power cord and any exposed metal on the product, is less than 1Ω.

Ground Fault Interrupt (GFI)

GFI is required by the National Electrical Code in wet locations. Such devices automatically interrupt power when a ground current > 0.5mA existed for more than a few milli-seconds to protect users.

Quick Discharge

In DC hipot and IR test the device under test is discharged back through the HV transformer. This technique results in a rapid and safe discharge.

MODEL 19070 SERIES
19050 SERIES

Key Features

- AC/DC/IR 3 in 1 hipot tester
- AC 5kV and DC 6kV output
- 1kV insulation resistance test
- Insulation resistance measurement from 1MΩ to 50GΩ
- Ground continuity check
- Standard RS-232 interface
- Open short check(OSC) function
- GFI shutdown the instrument when imbalance current > 0.5mA
- Flashover (ARC) detection
- Quick discharge of DUT in IR and DC test
- Pause mode
- UL and TUV approved (*see spec)
- CE mark
- Programmable ramp/fall and test time
- Programmable high/low limit
- Save/Recall program test function
- Remote control and interface support

GPIB RS-232 PRINTER

SPECIFICATIONS

Model			19071	19073	19052	19053	19054
Mode			AC	AC/DC/IR	AC/DC/IR	AC/DC/IR/SCAN	
Scanner Unit			-	-	-	8 ports,±phase	4 ports,±phase
Withstanding Voltage Test							
Output Voltage			AC : 0.05 ~ 5kV, DC : 0.05 ~ 6kV				
Load Regulation			1% of setting + 5V				
Voltage Resolotion			2V				
Voltage Accuracy			1% of setting + 5 count				
Cutoff Current			AC : 0.1~20mA, DC : 0.01 ~ 5mA		AC : 0.1 ~ 30mA, DC : 0.01 ~ 10mA		
Current Resolution			AC : 1μA, DC : 0.1μA				
Current Accuracy			1% of setting + 5 count				
Output Frequency			50Hz / 60Hz				
Test Time			0.3 ~ 999 sec., continue				
Ramp Time			0.1 ~ 999 sec., off				
Fall Time			0.1 ~ 999 sec., off				
Dwell Time			0.1 ~ 999 sec., off				
Waveform			Sine wave				
Insulation Resistance							
Output Voltage			-	DC : 0.05 ~ 1kV			
Voltage Resolution			-	2V			
Voltage Accuracy			-	± (1.5% of reading + 5 counts)			
IR Range			-	1MΩ~50GΩ		1MΩ~10GΩ	
Resistance Accuracy	≥ 500V	1.00MΩ~ 25.00MΩ	-	± (5% of reading + 2% of full scale)			
		22.0 MΩ~250.0MΩ	-				
		0.220GΩ~1.000GΩ	-	± (5% of reading + 5% of full scale)			
		1.000GΩ~2.500 GΩ	-	± (10% of reading + 2% of full scale)			
		2.20GΩ~10.00GΩ	-	± (15% of reading + 5% of full scale)			
		10.00GΩ~50.00GΩ	-	± (15% of reading + 1% of scale)		-	
	≤ 500V	0.10 MΩ~25.00MΩ	-	± (10% of reading + 2% of full scale)			
		22.0MΩ~250.0MΩ	-				
		0.220 GΩ~1.000GΩ	-	± (10% of reading + 5% of full scale)			
Flashover (ARC) Detection							
Setting Mode			Programmable setting				
Detection Current			AC : 1mA ~ 15mA, DC : 1mA ~ 5mA		AC : 1mA ~ 15mA, DC : 1mA ~ 10mA		
Secure Protection Function							
Fast Output Cut-off			0.4ms after NG happen				
Ground Fault Interrupt			0.5mA ±0.25mA AC, ON/OFF				
Panel Operation Lock			Present password				
Continuity Check			1Ω ± 0.2Ω, ON/OFF				
GO/NG Judgment Window							
Indication, Alarm			GO : Short sound, Green LED ; NG : Long sound, Red LED				
Data Hold			Least tests data memories				
Memory Storage			60 steps in 60 groups		500 steps in 99 groups		
Remote & Interface							
Remote control			Input : Start, Stop, Interlock (at 11 pin terminal block only) ; Output : Under test, Pass, Fail				
Communication Interface			RS485 (Option)		RS232 (Standard), GPIB (Option).		
General							
Operation Environment			Temperature : 0°C~40°C, Humidity : 15% to 95% R.H@≤40°C				
Power Requirements			100V/120V/220V/240V (AC ±10%), 50/60Hz				
Power Consumption			300W		500W		
Dimension (W x H x D)			270 x 105 x 350 mm		320 x 105 x 400 mm		
Weight			Approx.12 KG		Approx.15 kg		
Certification			UL, TUV, CE		UL, TUV, CE	CE	UL, TUV, CE

*All specifications are subject to change without notice.

ELECTRICAL SAFETY TEST SCANNER MODEL 19200

In recent years, International Electrotechnical Commission (IEC) in order to make consumers safer while using the electrical products, join more requirements to test in the standard. In addition to AC/DC Hi-Pot (Withstanding Voltage) test, IR (Insulating Resistance) test, impulse test of component, GB (Ground Bond) test, ELC (Earth Leakage Current) test, we also need to test ECLC (Enclosure Leakage Current), PLC (Patient Leakage Current), PALC (Patient Auxiliary Leakage Current) for Medical Equipment Electrical Safety Test. It makes electric to fit requirements by all tests be performed which are very complicated and different. The problem not only the course is complicated and apt to make mistakes, but also the manpower costs more.

19200 can perform high / low voltage switching and scan all safety tests with EST Analyzer (19032) inputs. All channels can perform 5kVac/6kVdc and 40mA for withstanding test; Some modules support 20A for Leakage Current test and Function Test; GB & GBF modules support 40A and Ground Floating. All output controls operated by RS232, GPIB or USB interface.

19200 can be installed in 8900 electrical equipment ATS for DUT which needs a lot of procedures to test like medical equipment, medical power, UPS, motor, etc., ATS can save the manpower cost , reduce manual mistake, data management to improve quality and efficiency.

Removable and Master/Slave design

Because different products have different requirements and test procedures, 19200 offers different scanning modules for combinations. These modules are: AC LINE module, GENERAL module, AC LINE2 module. EARTH module, GB&GBF module and SWITCH module. Due to different modules have different functions, users are able to combine different modules for your needs.

19200 can support max. 288 test points by 8 removable slots for module plug-in and Max. 8 units for multiple scanners (master/slave).User can directly program different test circuits and report editors, what has been made many kinds of associations by switching.

High / Low voltage circuit insulation

Most of products have to perform Electrical Safety Test (high voltage) and Function Test (low voltage). 19200 supports high and low voltage isolation by SWITCH module. User can combine high and low voltage tests like LCR measurement, power performance and function test for one sequence in one station and data collecting. That improves test efficiency and reduces occurred test risk.

CE

MODEL 19200

Key Features :

- Support Electrical Safety Test:
  - -Withstanding Voltage Test
  - -Insulation Resistance Test
  - -Ground Bond Test
  - -Earth Leakage Current Test
  - -Enclosure Leakage Current Test
  - -Patient Leakage Current Test
  - -Patient Auxiliary Leakage Current Test
- Support High / Low voltage circuit insulation (Switch module)
- Support 8 slots for plug-in (removable)
- Max.8 units for multiple scanners (master/ slave interface)
- Standard RS232 and USB interface
- Optional GPIB interface
- CE Mark
- 19200 Can be installed in Electrical Equipment ATS model 8900.

WOUND COMPONENT EST ANALYZER MODEL 19036

19036 is the industr y's first Wound Component Electrical Safety Test (EST) Analyzer that combines the functions of impulse test, hipot, insulation resistance and DC resistance measurements. It has 5kVac/ 6kVdc high voltage output, 5kV insulation resistance, 6kV layer short impulse voltage and 4-wire DC resistance measurement that can comply with the wound components test demands by providing maximum 10 channels output for multichannel scanning tests to save time and labor costs.

The test items for wound components include AC/ DC hipot test, IR test, IWT (Impulse Winding Test) and DCR (DC Resistance). integrates the above tests into 19036 Wound Component EST Analyzer that can perform safety tests on wound components like motors, transformers and solenoid valves to verify their quality.

Poor insulation of coil often causes layer short, cross-line short or pin short during usage, and the reason could be initial design error, poor fabrication process or bad insulation material. Thus, to add layer short test in the electrical safety test manufacturing process can complete the scanning test for multiple windings at once to increase the quality of wound components.

Combining the layer short testing function, the 19036 has 6kV impulse voltage with area, differential area, Flutter and Laplacian judgments to supply effective measures for inspecting poor coil insulation.

The 19036 is equipped with a patented 4-wire DC resistance test that has both Drive and Sense in compliance with withstanding specification to provide 10 channels of 4-wire DC resistance test functions. Up to 40ch of scanning test can be conducted when the 19036 is configured with 16ch scan boxs.

The 19036 also has HSCC functions to scan multiple windings rapidly for normal connection. It can solve the test fail problems caused by bad contact of cabling or test fixture.

The motor standard such as UL 1004-1 requires high power safety tester. 19036 with the capability of outputting & measuring AC100mA/DC 20mA is suitable for testing large leakage current or big electrical safety equipment. 19036 as a comprehensive tester integrated with high power hipot test and other safety tests can bring the maximum benefit to the production line as well as to quality assurance. Its 500VA design is also compliant with the output power requirements of EC/UL.

MODEL 19036

Key Features :

- 5 in 1 (10 channels) composite analyzer (ACWV / DCWV/ IR / Impulse / DCR)
  - Hi-pot test
    - 5kVac / 6kVdc
    - HSCC(High Speed Contact Check)
    - 500 VA output
  - Insulation Resistance test
    - 5kV Max.
  - Impulse Winding Test (IWT)
    - 6kV impulse voltage
    - High sampling rate (200MHz)
  - DCR measurement
    - 4-wire DCR measurement
    - △ / Y motor winding calculation
- Support max. 40 channels scanning test
- English, Traditional Chinese and Simplified Chinese User Interface
- USB waveform storage& Hard copy function
- Graphic color display
- Standard LAN,USB,RS232 interface
- GFI (Ground Fault Interrupt) for body protection

HANDLER LAN USB RS-232 CE

SPECIFICATIONS

Model		19036
AC/DC Withstanding Test		
Output Voltage		AC: 0.05~5.0kV / DC : 0.05~6.0kV
Load Regulation		≦(1% of output + 0.1% of full scale)
Voltage Accuracy		± (1% of setting + 0.1% of full scale)
Voltage Resolution		2V
Cutoff Current		AC: 0.001mA~120mA (Voltage ≦4kV)
		AC: 0.001mA~100mA (Voltage >4kV)
		DC: 0.0001mA~20mA
Current Accuracy		± (1% of reading + 0.5% of range)
Test Timer		Test time:0.3 ~ 999 sec., and continue
		Ramp / Fall / Dwell time:0.1 ~ 999 sec., and off
Output Frequency		50Hz / 60Hz (for AC)
Waveform		Sine wave (for AC)
Insulation Resistance Test		
Output Voltage		DC : 0.050 ~ 5.000kV, Steps : 0.002kV
Load Regulation		≦(1% of output + 0.1% of full scale)
Voltage Accuracy		± (1% of setting + 0.1% of full scale)
IR Range		0.1MΩ ~ 50GΩ
Resistance Accuracy	>1kV	1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range)
		1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range)
		10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)
	≧0.5kV and ≦1kV	0.1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range)
		1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range)
		10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)
	<0.5kV	1MΩ ~ 1GΩ : ± (5% of reading + (0.2*500/Vs)% of full scale)
Impulse Winding Test		
Applied Voltage, Step, and Energy		0.5 ~ 6kV ,10V Step ,Max 0.21 Joules
Inductance Test Range		More than 10uH
Sampling Speed		10bit / 5ns (200MHz)
Sampling Range		11 Ranges
Pulse Number		Pulse Number: 1~32, Dummy Pulse Number: 0~9
Detection Mode		Area / Differential Area ； Flutter/ Laplacian Detection
DC Resistance Measurement		
Test Signal		<DC 10V , <DC 200mA
Measurement Range		0.1mΩ~ 500kΩ
Measurement Accuracy	100mΩ	± (0.5% of reading + 1% of full range)
	1Ω	± (0.5% of reading + 0.2% of full range)
	10Ω	± (0.5% of reading + 0.05% of full range)
	100Ω	± (0.5% of reading + 0.05 % of full range)
	1kΩ	± (0.5% of reading + 0.05 % of full range)
	10kΩ	± (0.5% of reading + 0.05 % of full range)
	100kΩ	± (0.5% of reading + 0.05 % of full range)
Flashover Detection		
Detection Current		Programmable setting AC : 20mA ； DC : 10mA
Contact Check Function		
Contact Check		OSC (open/short check)
		HFCC (High Frequency Contact Check)
		HSCC (High Speed Contact Check; winding DCR check)
Electrical Hazard Protection Function		
Ground Fault Interrupt		0.5mA ±0.25mA AC, ON/OFF
Key Lock		Yes (password control)
Interlock		YES
Indication, Alarm		GO : Short sound, Green LED; NG : Long sound, Red LED
Memory Storage		200 sets, max. 40 steps per set
Interface		
Standard : RS232, Handler ,USB , LAN interface		
General		
Operation Environment		Temperature: 0˚C ~ 45˚C, Humidity: 15% to 95% R.H@≦ 40˚C
Power Consumption		No Load: <150VA ; Rated Load: <1000VA
Power Requirements		90 ~ 264Vac, 47 ~ 63Hz
Dimension (W ×H ×D)		428 × 177 × 500mm / 16.850 x 6.969 x 19.685 inch
Weight		26kg / 57.32 lbs

WOUND COMPONENT EST SCANNER MODEL 19035 SERIES

Wound Component Testing Solution

The quality verification tests for wound components consist mainly of AC/DC Hipot tests and Insulation Resistance (IR) tests. The 19035 Wound Component EST Scanner Series perform safety tests for motor, transformer, and heater related wound products. Reliable quality control and efficient product control are obtained when implementing this scanner for quality verification by wound component manufacturers.

The 19035 Series supports 5kVac/6kVdc high voltage output to conform with withstand voltage test requirements for wound components, and has a maximum output current up to 30mA. The Insulation Resistance (IR) test measurement ranges from 1MΩ to 50GΩ, and voltage output can be up to 5kV; while the DCR test can measure the resistance parameter of wound components and test the circuit connection (contact check) before the withstand voltage test.

The 19035 Series also has powerful functions for Flashover detection and Open/Short Check (OSC), as well as programmable voltage and time parameters for various characteristics of DUTs for increased testing reliability and product quality.

Applications

The 19035 Series is a comprehensive safety tester designed for motor, transformer, and heat related wound component tests. Most wound components have multiple windings, such as 3-phase motors and dual winding transformers. With 8-channel scanning ability the 19035 can measure multiple test points in one test instead of switching test points manually. This reduces test time and labor cost immensely.

The built in OSC and DCR functions verify poor contact or short circuits that occur during test, and solves the contact problems with wound components improving test quality and prolonging test equipment lifespans.

- ◆ Motor, Fan : 19035-M
- ◆ Electric Heater Tube : 19035-M
- ◆ Transformer : 19035
- ◆ Switch, Wire : 19035
- ◆ Camera Micro Motor, Coil : 19035-S

Heater Transformer Motor

MODEL 19035
19035-M
19035-S

Functions

- ■ 5kVAC & 6kVDC Hipot test
- ■ 1MΩ~50GΩ /5kV IR test
- ■ 10mΩ~100kΩ DCR test
- ■ 8 channel scanner

Key Features

- ■ Support 16CH scan box (19035 only)
- ■ High Speed Contact Check (HSCC)
- ■ SUB-STEP function
- ■ Open / Short Check (OSC)
- ■ GFI human protection
- ■ Flashover detection
- ■ Key lock function
- ■ RS232 Interface (standard*1)
- ■ GPIB & HANDLER (optional)
- ■ CE mark

SPECIFICATIONS

Model		**19035**	**19035-M**	**19035-S**
Mode		ACV / DCV / IR / DCR -8CH	ACV / DCV / IR / DCR -8CH	ACV / DCR -8CH
Channel Programming		H/L/X in 8CHs	H/X in CH 1,2,3,5,6,7 ; L/X in CH 4,8	H/L/X in 8CHs
Withstanding Voltage Test				
Output Voltage		AC:0.05 ~ 5KV, DC : 0.05 ~ 6kV		AC:0.05 ~ 5KV
Load Regulation		≦(1% of setting + 0.1% of full scale)		
Voltage Resolution		2V		
Voltage Accuracy		±(1% of setting + 0.1% of full scale)		
Cutoff Current		AC : 30mA, DC : 10mA		
Current Resolution		AC : 1 μA, DC : 0.1 μA		
Current Accuracy		±(1% of reading + 0.5% of range)		
Output Frequency		50Hz / 60Hz		
Test / Ramp / Fall / Dwell Time		0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off		
Waveform		Sine wave		
Insulation Resistance Test				
Output Voltage		DC : 0.05 ~ 5kV		--
Voltage Resolution		2V		--
Voltage Accuracy		1% of setting + 0.1% of full range		--
IR Range		0.1MΩ ~ 50GΩ		--
Resistance Resolution		0.1MΩ		--
Resistance Accuracy	≧1000V	1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range) 1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range) 10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)		--
	500V~1000V	0.1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range) 1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range) 10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)		--
	< 500V	0.1MΩ ~ 1GΩ : ± 3% of reading + (0.2*500/Vs)% of full scale		--
Scanner Unit		8 ports, ±phase (4W DCR only 4 ports)		
DC Resistance Measurement				
Test Signal		<DC 10V. < DC 140mA		
Measurement mode		2 terminals (2W) / 4 terminals(4W) measurement selectable ; Range : 50mΩ~500kΩ		
Measurement Accuracy (2W/ 4W)	1Ω (4W only)	-- / ±(0.5% of reading + 0.5% of range)		
	10Ω	± (2% of reading + 0.5% of range) / ± (0.5% of reading + 0.05% of range)		
	100Ω	± (2% of reading + 0.5% of range) / ± (0.5% of reading + 0.05% of range)		
	1kΩ	± (2% of reading + 0.5% of range) / ± (0.5% of reading + 0.05% of range)		
	10kΩ	± (2% of reading + 0.5% of range) / ± (0.5% of reading + 0.05% of range)		
	100kΩ	± (2% of reading + 0.5% of range) / ± (0.5% of reading + 0.05% of range)		
Flashover Detection				
Setting Mode		Programmable setting		
Detection Current		AC : 1mA ~ 15mA, DC : 1mA ~ 10mA		
Secure Protection Function				
Fast Output Cut-off		0.4ms after NG happen		
Ground Fault Interrupt		0.5mA ±0.25mA AC, ON/OFF		
Panel Operation Lock		Present password		
Interlock		YES		
GO/NG Judgment Window				
Indication, Alarm		GO : Short sound, Green LED; NG : Long sound, Red LED		
Data Hold		Least tests data memories		
Memory Storage		50 instrument setups with up to 20 test steps		
Interface		RS-232*1 (Standard), RS-232*1 or GPIB & Handler & Temperature interface (Optional)		
General				
Operation Environment		Temperature: 0˚C ~ 45˚C, Humidity: 15% to 95% R.H@≦40˚C		
Power Consumption		500VA		
Power Requirements		90~132Vac or 180~264Vac, 47~63Hz		
Dimension (H x W x D)		133x430x470mm/5.24x16.93x18.50 inch		
Weight		Approx.20 kg/44.09 lbs		

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

MULTI-CHANNEL HIPOT TESTER
MODEL 19020 SERIES

High Efficiency Hipot Test Solution

Hipot test is one of the major test items in electrical safety test. All electrical components and products including transformers, capacitors, power supplies, chargers and home appliances all require Hipot test.

With more than 25 years of experience in developing the instruments for test and measurement, creates the 19020 multi-channel Hipot tester with a brand new architecture. It can measure the Hipot leakage current of all channels at the same time and conduct tests on 100 DUTs maximum simultaneously.

There is no need to purchase various Hipot testers to save the production line space. Its one time multi-channel test can increase the efficiency of electrical regulatory test. It improves the productivity and reduces the risk of test for the products that require Hipot test only.

19020 also has powerful functions in Flashover detection and Open/Short Check. It contains several international patents and is the best tool for electrical regulatory Hipot test as not only reliable quality can be obtained, but highly efficient test platform can also be created.

World's First Sync Hipot Test (Patent Registered)

19020 has equipped with the world's first sync Hipot test function that one single unit can perform 10 channels sync output and measurements simultaneously. Maximum 10 units (master & slave) can be controlled to have 100 channels in total. They can be grouped for output to avoid creating voltage difference due to adjacent tests as well as to improve the productivity.

Applications

19020 can be applied to various electrical products for time consuming tests such as quality assurance sampling test and production line test.

- Power cord
- Capacitor
- Resistance
- Switch
- Connector
- Transformer
- Charger
- Adapter

Adapter Transformer Capacitor Switch

MODEL 19020 SERIES

Key Features :

- 10 channels in one design
- 10 sets of sync output and measurement
- AC/DC/IR 3 in 1 EST test
- Master/Slave link - 10 units max.
- Programmable V-output and limits
- OSC (Open/Short Check)
- Flashover detection
- 5kVAC & 6kV DC hipot test
- 1MΩ~50GΩ insulation resistance test
- Standard RS232 / Handler interface
- Optional GPIB interface
- Large LCD panel
- Key lock function
- CE Mark

SPECIFICATIONS

Model	19020	19020-4	19021	19022	19022-4
Mode	AC/DC/IR	AC/DC/IR	AC	DC/IR	DC/IR
Channel	10	4	10	10	4
Withstanding Voltage Test					
Output Voltage	AC:0.05kV-5kV ; DC:0.05kV-6kV		AC:0.05kV-6kV	DC:0.05kV-8kV	
Load Regulation	2% of setting + 0.1% of full scale				
Voltage Resolution	2V				
Voltage Accuracy	2% of setting + 0.1% of full scale				
Cutoff Current	AC : 0.01 ~ 10mA, DC : 0.001 ~ 5mA				
Current Resolution	AC : 1 μA, DC : 0.1 μA				
Current Accuracy	1% of setting +0.5% of full scale				
Output Frequency	50Hz / 60Hz				
Flashover Detection	AC : 1mA ~ 15mA, DC : 1mA ~ 5mA , step 0.1mA				
Test Time	0.03 ~ 999.9 sec, continue				
Ramp Time	0.1 ~ 999.9 sec, off				
Fall Time	0.1 ~ 999.9 sec, off				
Dwell Time	0.1 ~ 999.9 sec, off				
Waveform	Sine wave				
Insulation Resistance Test(19020&19022 series only)					
Output Voltage	DC : 0.05 ~ 1kV				
Voltage Resolution	2V				
Voltage Accuracy	2% of setting + 0.1% of full range				
IR Range	1MΩ ~ 50GΩ				
Resistance Accuracy	≥ 500V		1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range 1GΩ ~ 10GΩ : ± 7% of reading + 0.2% of full range 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range		
	≤ 500V		1MΩ ~ 1GΩ : ± 3% of reading + (0.2*500/Vs)% of full scale		
Test Time	0.3 ~ 999.9 sec, continue				
Memory Storage					
Save/Recall	30 instrument setups with up to 10 test steps can be stored into and recalled from the internal memory				
Secure Protection Function					
Fast Output Cut-off	0.4ms after NG happen				
Panel Operation Lock	Present password				
Interlock	YES				
GO/NG Judgment Window					
Indication, Alarm	GO : Short sound, Green LED, NG : Long sound, Red LED				
Data Hold	Least tests data memories				
Memory Storage	30 instrument setups with up to 10 test steps				
Interface					
RS232 & Handler (Standard), GPIB (Optional)					
CANBUS & data control interface are used for Max. 10 units of master & slaves connection					
General					
Operation Environment	18 to 28°C (64 to 82°F), 70% RH. Maximum relative humidity 80% for temperature up to 31°C (88°F) Decreasing linearly to 50% relative humidity at 40°C(104°F)				
Power Consumption	Standby : < 250W ; With rated load : <1000W				
Power Requirements	AC 100V~240V, 47~66 Hz				
Weight	Approx.40 kg				

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

HIPOT ANALYZER
MODEL 19055

19055 Series Hipot Analyzers are designed for hipot tests and analysis. The tests of AC/DC/IR can be programmed in 5kV/100mA with 500VA output rating which complies with the EN50191 requirements. (Please refer to the application notes for more detail information.)

The 19055-C has not only the AC/DC/IR tests but also a new measurement technology - Corona Discharge Detection (CDD) that can detect the following via the Discharge Level Analysis (DLA) test mode.
- Corona discharge Start Voltage (CSV)
- Flashover Start Voltage (FSV)
- BreakDown Voltage (BDV)

As to the Contact Check during Hipot test, 19055 Series is equipped with a new function of High Frequency Contact Check (HFCC) besides the Open Short Check (OSC). By conducting the Contact Check during Hipot test, it can increase the test reliability and efficiency significantly.

For convenience use, 19055 has large LCD screen for operation and judgment. In addition, the GFI human protection circuit and Floating safety output prevent the operators from electrical hazard.

Applications

Motor: The 19055 Series Hipot Analyzers with 500VA output rating can be used to test and analyze the withstand voltage of high power and leakage current for the products like motor stators and rotors with high parasitic capacitance. Corona detection can be used for turn-to-turn or turn-to-ground test to avoid winding insulation failure from corona discharge.

Transformer: When using a power transformer under the normal voltage, a primary side corona discharge could cause the adjacent components to be damaged if occurred. Thus, the function of Corona Discharge Detection (CDD) of 19055-C can be used to detect if there is any corona discharge occurred to improve the product quality.

High Voltage Capacitor, Photocoupler & Insulation Material: If any gaps, voids or impurities appeared when doing molding in the manufacturing process, the insulation capability may be affected. The Corona Discharge Detection (CDD) equipped by 19055-C is able to defect if there is any corona discharge occurred to enhance the product quality.

With these functions the R&D engineers are able to analyze the products for the components with poor insulation and solve the problem.

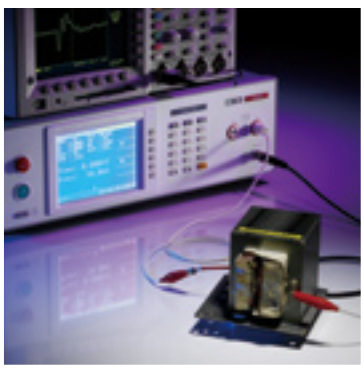
MODEL 19055

Functions:

- Hi-Pot
  - AC 5kV/100mA
  - DC 6kV/20mA
- Insulation
  - 5kVmax
  - 1MΩ~50GΩ

Key Features:

- 500VA output rating
- Floating output complies with EN50191
- Corona Discharge Detection (CDD, option)
- Flashover Detection
- Discharge Level Analysis (DLA)
- Open Short Check (OSC)
- High Frequency Contact Check (HFCC)
- Ground Fault Interrupt
- Standard RS232 interface
- Option GPIB & HANDLER interface
- Key lock when fail
- Programmable voltage & test limit
- CE Mark



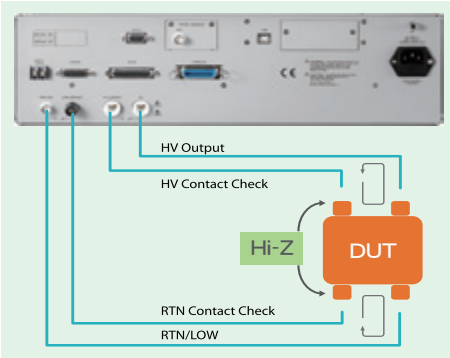
SPECIFICATIONS

Model		**19055**
Mode		ACV / DCV / IR
Withstanding Voltage Test		
Output Voltage		AC : 0.05 ~ 5KV, DC : 0.05 ~ 6KV
Load Regulation		1% of setting + 0.5% full range
Voltage Accuracy		1% of setting + 0.5% full range
Voltage Resolution		2V
Cutoff Current		AC:100mA;DC:20mA
Current Accuracy		1% of setting + 0.5% full range
Current Resolution		AC : 1 μA, DC : 0.1 μA
Output Frequency		50Hz / 60Hz
Test/Ramp/Fall/Dwell Time		0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off
Waveform		Sine wave
Insulation Resistance Test		
Output Voltage		DC : 0.05 ~ 5kV
Voltage Resolution		2V
Voltage Accuracy		1% of setting + 0.5% full range
IR Range		1MΩ ~ 50GΩ
Resistance Resolution		0.1MΩ
Resistance Accuracy	>1kV	1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range, 1GΩ ~ 10GΩ : ± 7% of reading + 2% of full range, 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range,
	≧500V ≦1kV	0.1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range, 1GΩ ~ 10GΩ : ± 7% of reading + 2% of full range, 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range,
	<500V	0.1MΩ ~ 1GΩ : ± 3% of reading + (0.2*500/Vs)% full range
Flashover Detection		
setting Mode		Programmable setting
Detection Current		AC: 20mA;DC: 10mA
Contact Check Function		
HFCC		High frequency contact check
OSC (open/short check)		600Hz, 0.1s
Electrical Hazard Protection Function		
Floating output design		Leakage current <3 mA
Fast Output Cut-off		0.4ms after NG happen
Ground Fault Interrupt		0.5mA ±0.25mA AC, ON/OFF
Panel Operation Lock		Present password
Interlock		YES
GO/NG Judgment Window		
Indication, Alarm		GO : Short sound, Green LED; NG : Long sound, Red LED
Data Hold		Least tests data memories
Memory Storage		100 sets, max. 50 steps per set
Interface		RS232, Handler interface (Standard), GPIB interface (Optional)
General		
Operation Environment		Temperature: 0˚C ~ 45˚C, Humidity: 15% to 95% R.H@≦ 40˚C
Power Consumption		500VA
Power Requirements		90~132Vac or 198~264Vac, 47~66Hz
Weight		Approx. 20kg

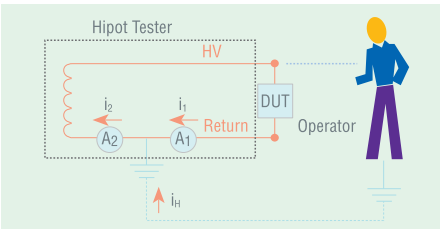
All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

HIPOT ANALYZER
MODEL 19056/19057 SERIES

19056/19057 Hipot Analyzer is an equipment specially designed for testing and analyzing ultra-high withstand voltage. The series of models include 10kVac/12kVdc/20kVdc with maximum AC20mA/DC10mA output can perform AC/DC withstand voltage and insulation resistance tests with contact check during production line test. In addition to the patented OSC (Open Short Check), High Voltage Contact Check is added to test the components with high insulation capability when high voltage outputs to improve the testing reliability and efficiency.



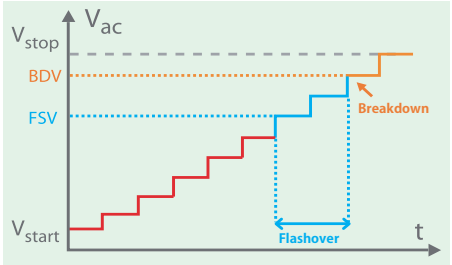
19056/19057 with GFI (Ground Fault Interrupt) is designed to protect operator's safety when abnormal ground current (A_2-A_1) occurs.



The Hipot Analyzer provides high withstand voltage test and analysis for optical couplers, HV relays, HV switches and PV modules, which have better insulation capability.

Charge and discharge are required for capacitive components when doing DC withstand voltage test. The Hipot Analyzers have fast charge function that can increase the production test efficiency .

The Hipot Analyzer of entire series has Flashover (ARC) detection function. Through the start voltage , end voltage, no. of steps and time, it can perform discharge level analysis. Phase judgment is provided in DLA (Discharge Level Analysis) mode to set inspection for Flashover (ARC) and Breakdown test (high limit). When a defect appears in the test, the 19056/19057 will show the withstanding voltage to indicate the Flashover Start Voltage (FSV) or BreakDown Voltage (BDV) respectively. In addition, External Oscilloscopes can be mounted to check the waveform at the same time during analysis. The R&D engineers can perform product analysis and study utilizing the test results to improve the weakness of insulation components.

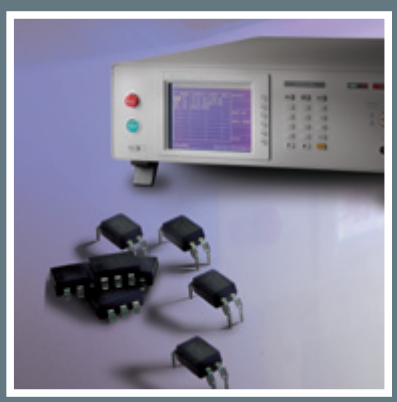


USB RS-232 GPIB CE

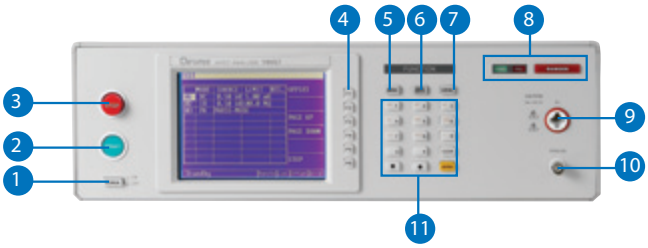
MODEL 19056
19057 Series

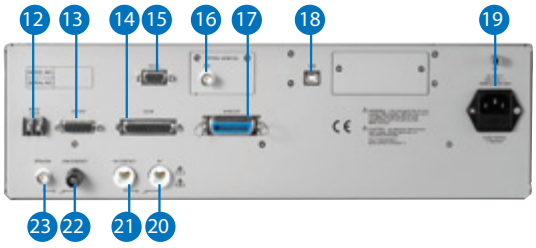
Key Features :

- 10kV AC & 20kV DC withstand voltage test
- 0.1MΩ~50GΩ insulation impedance test
- BDV (BreakDown Voltage test)
- HVCC (High Voltage Contact Check)
- HFCC (High Frequency Contact Check)
- OSC (Open Short Check)
- GFI (Ground Fault Interrupt) human protection circuit
- Fast charge/discharge function
- Programmable output & test limit
- Standard RS232 interface
- Optional GPIB&HANDLER interface
- Key lock function
- CE Mark



PANEL DESCRIPTION





1. Power Switch
2. Start Key
3. Stop Key
4. Function Key
5. Menu Key
6. Main Index Key
7. Local Key
8. LED Display
9. HV Output
10. RTN/LOW
11. Entry Keys
12. Interlock
13. OPTION
14. SCAN
15. RS232 Interface
16. ARC Signal Output
17. HANDLER Interface
18. USB Interface
19. Power Inlet
20. HV
21. HV CONTACT
22. LOW/CONTACT
23. RTN/LOW

SPECIFICATIONS

Model		**19056**	**19057**	**19057-20**
Mode		ACV	DCV / IR	DCV / IR
Withstanding Voltage Test				
Output Voltage		AC: 0.1~10kV	DC: 0.1~12kV	DC : 0.1 ~ 20kV
Load Regulation		± (1% of output + 10V), Rated load		
Voltage Accuracy		1% of reading + 0.1% of full scale		1.5% of reading + 0.1% of full scale
Voltage Regulation		± (1% of output + 10V), Rated load		
Cutoff Current		0.001~20mA	0.0001~10mA	0.0001~5 mA
Current Accuracy		0.100mA~2.999mA : ±(1% of reading + 0.3% of full range) 3.00mA~20.00mA : ±(1.5% of reading + 0.3% of full range)	±(1% of reading + 0.5% of full range)	
Current Resolution		AC : 1 μA	DC : 0.1 μA	
Output Frequency		50Hz / 60Hz	-	-
Test/Ramp/Fall/Dwell Time		0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off		
Waveform		Sine wave	-	-
Insulation Resistance Test				
Output Voltage		-	DC : 0.1 ~ 5kV	
Voltage Resolution		-	2V	
Voltage Accuracy		-	1% of setting + 0.5% of full scale	1.5% of setting + 0.5% of full scale
IR Range		-	0.1MΩ ~ 50GΩ	
Resistance Resolution		-	0.1MΩ	
Resistance Accuracy	≧ 0.5kV	-	1MΩ ~ 1GΩ : ± 3% of reading + 0.5% of full range 1GΩ ~ 10GΩ : ± 5% of reading + 1% of full range 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range	
	<0.5kV	-	1MΩ ~ 1GΩ : ± 5% of reading + (0.5*500/Vs)% of full scale	
Flashover Detection				
Setting Mode		Programmable setting		
Detection Current		AC : 20mA	DC : 10mA	DC : 10mA
Contact Check Function				
Contact Check		OSC (open/short check) HVCC(High Voltage contact check) HFCC (High Frequency Contact Check)	HVCC(High Voltage contact check) HFCC (High Frequency Contact Check)	HVCC(High Voltage contact check) HFCC (High Frequency Contact Check)
Electrical Hazard Protection Function				
Ground Fault Interrupt		0.5mA±0.25mA AC, ON/OFF	-	-
Key Lock		Yes (password control)		
Interlock		YES		
GO/NG Judgment Window				
Indication, Alarm		GO : Short sound, Green LED; NG : Long sound, Red LED		
Memory Storage		100 sets ,max. 50 steps per set		
Interface		Standard-RS232, Handler interface ,USB , SCAN Optional - GPIB interface		
General				
Operation Environment		Temperature: 0˚C ~ 45˚C ; Humidity: 15% to 95% R.H@ ≦ 40˚C		
Power Consumption		600VA		
Power Requirements		100~240Vac, 47~66Hz		
Dimension (HxWxD)		130x430x500 mm/5.12x16.93x19.69 inch		
Weight		28kg / 61.7 lbs		

All specifications are subject to change without notice

AC/DC/IR HIPOT TESTER
MODEL 19070 & 19050 SERIES

Complete Dielectric Testing Solution
The 19050 series electrical safety testers are advanced digital hipot testers with load and line regulation to ensure measurement integrity. Multi-step capability allows users to perform multiple tests in sequence, such as AC hipot followed by IR.

The Hipot Tester 19050 series provides 3 models to choose from. The 19052 includes AC/DC/IR Hipot testing and insulation resistance (IR) measurements. The 19053 provides 8 scan channels for IR measurement, and the 19054 provides 4 scan channels for IR measurement in a single compact unit.

The Hipot Tester 19070 series provides 2 models to choose from. The 19071 is for AC Hipot testing. The 19073 combines both AC and DC Hipot with insulation resistance (IR) measurements into a single compact unit.

Open Short Check (OSC)
The OSC function is used to check whether the connection is an open circuit between the instrument and the DUT or if there is a breakdown inside the DUT before testing for electrical safety.

Flashover (ARC) Detection
The 19070 and 19050 series are sensitive enough to monitor for current spikes even if they do not exceed the maximum trip current level.

Ground Continuity Check (GC)
All of the 19050 series testers have a ground continuity check feature to determine if the resistance between the ground blade of the power cord and any exposed metal on the product is less than 1Ω.

Ground Fault Interrupt (GFI)
GFI is required by the National Electrical Code in wet locations. Such devices automatically interrupt power when a ground current > 0.5mA exists for more than a few milli-seconds to protect users.

Quick Discharge
In DC hipot and IR tests, the device under test is discharged back through the HV transformer. This technique results in a rapid and safe discharge.

MODEL 19070 SERIES
19050 SERIES

Key Features

- AC/DC/IR 3 in 1 hipot tester
- AC 5kV and DC 6kV output
- 1kV insulation resistance test
- Insulation resistance measurement from 1MΩ to 50GΩ
- Ground continuity check (GC)
- Standard RS-232 interface
- Open short check(OSC) function
- GFI shutdown of the instrument when current imbalance > 0.5mA
- Flashover (ARC) detection
- Quick discharge of DUT in IR and DC test
- Pause mode
- UL and TUV approved (*see spec)
- CE mark
- Programmable ramp/fall and test time
- Programmable high/low limit
- Save/Recall program test function
- Remote control and interface support

GPIB RS-232 PRINTER

SPECIFICATIONS

Model			19071	19073	19052	19053	19054
Mode			ACV	ACV / DCV / IR	ACV / DCV / IR	ACV / DCV / IR / SCAN	
Scanner Unit			-	-	-	8 ports,±phase	4 ports,±phase
Withstanding Voltage Test							
Output Voltage			AC : 0.05 ~ 5kV, DC : 0.05 ~ 6kV				
Load Regulation			≦(1%+5V)				
Voltage Resolotion			2V				
Voltage Accuracy			1% of setting + 5 count				
Cutoff Current			AC : 0.1~20mA, DC : 0.01 ~ 5mA		AC : 0.1 ~ 30mA, DC : 0.01 ~ 10mA		
Current Resolution			AC : 1μA, DC : 0.1μA				
Current Accuracy			±(1.5% of reading + 5 counts)		±(1% of reading + 5 counts)		
Output Frequency			50Hz / 60Hz				
Test Time			0.3 ~ 999 sec., continue				
Ramp Time			0.1 ~ 999 sec., off				
Fall Time			0.1 ~ 999 sec., off				
Dwell Time			0.1 ~ 999 sec., off				
Waveform			Sine wave				
Insulation Resistance							
Output Voltage			-	DC : 0.05 ~ 1kV			
Voltage Resolution			-	2V			
Voltage Accuracy			-	±(1% of reading + 5 counts)			
IR Range			-	1MΩ~50GΩ	1MΩ~10GΩ		
Resistance Accuracy	≥ 500V	1.00MΩ~ 25.00MΩ	-	±(4% of reading + 5 counts)	± (5% of reading + 2% of full scale)		
		22.0 MΩ~250.0MΩ	-				
		0.220GΩ~1.000GΩ	-		± (5% of reading + 5% of full scale)		
		1.000GΩ~2.500 GΩ	-	±(7% of reading + 5 counts)	± (10% of reading + 2% of full scale)		
		2.20GΩ~10.00GΩ	-		± (15% of reading + 5% of full scale)		
		10.00GΩ~50.00GΩ	-	±(12% of reading + 5 counts)	± (15% of reading + 1% of full scale)		
	≤ 500V	0.10 MΩ~25.00MΩ	-	±(7% of reading + 5 counts)	± (10% of reading + 2% of full scale)		
		22.0MΩ~250.0MΩ	-				
		0.220 GΩ~1.000GΩ	-		± (10% of reading + 5% of full scale)		
Flashover (ARC) Detection							
Setting Mode			Programmable setting				
Detection Current			AC : 1mA ~ 20mA, DC : 1mA ~ 5mA		AC : 1mA ~ 15mA, DC : 1mA ~ 10mA		
Secure Protection Function							
Fast Output Cut-off			0.4ms after NG happen				
Ground Fault Interrupt			0.5mA ±0.25mA AC, ON/OFF				
Panel Operation Lock			Present password				
Continuity Check			1~5Ω ± 0.2Ω, ON/OFF		1Ω ± 0.2Ω, ON/OFF		
GO/NG Judgment Window							
Indication, Alarm			GO : Short sound, Green LED ; NG : Long sound, Red LED				
Data Hold			Least tests data memories				
Memory Storage			10 steps or 60 groups for total 60 memory		99 steps or 99 groups for total 500 memory		
Remote & Interface							
Remote control			Input : Start, Stop, Interlock (at 11 pin terminal block only) ; Output : Under test, Pass, Fail				
Communication Interface			RS485 (Option)		RS232 (Standard), GPIB (Option)		
General							
Operation Environment			Temperature : 0°C~40°C ; Humidity : 15% to 95% R.H@≤40°C				
Power Requirements			100V/120V/220V/240V (AC ±10%), 50/60Hz				
Power Consumption			300W		500W		
Dimension (W x H x D)			270 x 105 x 350 mm		320 x 105 x 400 mm		
Weight			Approx.12 KG		Approx.15 kg		
Certification			UL, TUV, CE		UL, TUV, CE	CE	UL, TUV, CE

*All specifications are subject to change without notice.

Timing / Noise Analyzer

power supp y automatic test system model 8000 provides an unique t ming / noise analyzer, Model 6011/80611/80614. Its modu ar des gn allows users to expand up to 1 0 input measurement modules. Each module is capable of measur ng timing period and noise eve. Fur thermore, it also provides 16 bits TTL sgna s and 8 pairs of float ng reays for externa control. Meanwhle, the 10 mut plexer inputs and 1DMM further extend the Mode 80611 for advanced measurement requirements.

Timing/Noise Analyzer			
Model	**6011**	**80611**	**80614**
NO. of input module	Up to 10	Up to 10	Up to 4
Noise measurement range	2V/0 4V	2V/0.4V	2V/0.4V
Low Pass Filter	Up to 20MHz	Up to 20MHz	Up to 20MHz
Input circuit	Differential nput	Different a input	D fferential input
Timing range	0 64 second	0 64 second	0 64 second
NO. of trigger input	4 sets	6 sets	6 sets
NO. of comparator	2 nput module	4 Input module	4 nput modu e
Controllable TTL bits	16 output	16 output / 16 input	No
Controllable floating relay	6	8	6
NO. of multiplex input	10	1 0	No
NO. of multiplex output	2 for DMM & 2 for DSO	1 for DMM	No

Short Circuit / OVP Tester

Short circuit / OVP tester prov des mode 6012 and 806 12 versati e too for OVP/ UVP / Short circuit. ts unique programmable impedance makes it deal to simulate OV / UV situat on fo r a l types of power suppl es.

Short Circuit/OVP Tester		
Model	**6012**	**80612**
NO. of input terminal	Up to 6	Up to 6
Short circuit impedance	< 0.1 ohm	< 0.05 ohm
Short current measurement	Yes	Yes
Sync. Signal for short circuit	6 relay signa	6 relay signa
OVP/UVP testing	Internal / External	Internal / External
Internal impedance range	1K 1M ohm	100 1M ohm
External OVP/UVP source	DC source	DC source
Measurement Capability	By external DMM	Internal
Control Interface	Via 6011	RS 485

ON/ OFF Controller

ON / OFF controller Model 6013 and 80613 are used to control AC and DC inputs simultaneously. Meanwhile, it can control AC to turn on and off at any phase angle and measure the input inrush current of the UUT.

ON/OFF Controller		
Model	**6013**	**80613**
Input	AC/DC	AC/DC
ON/OFF range - AC	0-360 deg	0-360 deg
Voltage range - AC	250V	277V
Current range - AC	30A	30A
Voltage range - DC	200V	200V
Current range - DC	40A	60A
Measurement Capability	By external DMM	Internal
Control Interface	Via 6011	RS 485

Digital Multi-Meter & Storage Oscilloscope

power supply auto test system model 8000 is capable to support Chroma12061, Agilent 34401A / 34970A and Keithley 2700 series DMM and most of Tektronix Scopes. Other DMM and DSO are supported upon request.

SELECTION GUIDE

Model / Applications / Equipment	PC Power Supply	Server Power Supply	Adapter/Charger	Telecom Power Supply	DC-DC Converter	Industrial Power Supply
AC Source	61500, 61600, 6400, 6500	61500, 61600, 6400, 6500	61500, 61600, 6400	61500, 61600, 61700, 6400,6500	-	61500, 61600, 6400, 6500
DC Source	62000H, 62000P	62000H, 62000P	62000H, 62000P	62000H, 62000P	62000H, 62000P	62000H, 62000P
Digital Power Meter	66200	66200	66200	66200	66200	66200
Electronic Load	63600, 6310A, 6330A	63600, 6310A, 63200, 6330A	63600, 6310A, 6330A	63600, 63200, 6330A	63600, 6310A, 63200, 6330A	63600, 6310A, 63200, 6330A
Timing Noise Analyzer	6011, 80611, 80614	6011, 80611, 80614	6011, 80611, 80614	6011, 80611, 80614	6011, 80611, 80614	6011, 80611, 80614
Short / OVP Tester	6012, 80612	6012, 80612	6012, 80612	6012, 80612	6012, 80612	6012, 80612
ON/OFF Controller	6013, 80613	6013, 80613	6013, 80613	6013, 80613	6013, 80613	6013, 80613
DSO	User Selectable	User Selectable	User Selectable	User Selectable	User Selectable	User Selectable
DMM	-	User Selectable	-	User Selectable	-	User Selectable
Other Instrument	-	-	-	Voice Band/RF Noise Meter	-	-

Switching Power Supply ATS

Model No. 8200

Switching Power Supply ATS
Model 8200

KEY FEATURES

- User editable test program
- User editable report format
- User authority control
- Release control
- Activity log
- Comprehensive hardware modules provide high accuracy repetitive and measurements
- High test throughput by system default test items
- Cost effective
- Windows 98/NT/2000 or higher based software

TEST ITEMS

1. DC output voltage
2. DC output current
3. Voltage regulation
4. Current regulation
5. Turn ON time
6. Hold-up time
7. Power good signal
8. P/S ON signal
9. Efficiency
10. Input RMS current
11. Input peak current
12. Input power
13. Input power factor
14. Short circuit test
15. Short circuit current
16. OV protection
17. OL protection
18. OP protection
19. In-test adjustment

Power Supply Auto Test System model 8200 provides complete solution for PC ATX power supply, adapter and battery charger testing. The application oriented system structure makes it the most cost effective test equipment for initial test in power supply production line.

To meet the power supply test requirements, Power Supply Auto Test System model 8200 has built in 20 ready-made test items. Users can simply enter the test conditions and test the power supply features while proceeding.

With the report and management functions, Power Supply Auto Test System model 8200 is able to provide versatile tools to establish test documents and perform system administration.

Meanwhile, Power Supply Auto Test System model 8200 can be upgraded to model 8000, the ultimate power supply auto test system, to fit the future test needs by changing system software and adding new hardware devices.

SPECIFICATIONS

Accurate and highly reliable hardware devices :

System Controller	
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

Extended Controller	
MODEL	**8125**
Input channels for timing	8 differential
Timing accuracy	40 uS
Controllable TTL bits	16
Input circuit	Differential input
Input impedance	10M ohm
Output channels for OVP	3
OVP voltage	8V/4.8V/16V
Maximum current	3A/Channel

Regenerative Battery Pack Test System

Model 17030

Key Features

- Supports high power battery certification : IEC, SAE, GB…etc.
- Regenerative battery discharge, Saves energy, environment-friendly and provides low heat dissipation
- Driving cycle simulator
- Industry Leading Accuracy
- 10ms Data acquisition
- Charge / discharge mode
  - Constant Current
  - Constant Voltage
  - Constant Power
- Customized rating power
  - Voltage range ： 10~1200V
  - Current range ： 0~1000A
  - Power range ： 90~500kW
- System Integration:
  - Chamber Control
  - Multi-channels voltage/ temperature measurement (Max 256CH)
  - BMS Communication

REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17030

Chroma's 17030 is an automated regenerative test system specifically designed for high power battery pack tests. Accurate power sources and measurements ensure test quality suitable for repetitive and reliable testing of crucial battery packs. Applications include incoming inspections capacity validation, production and certification testing.

Chroma's 17030 system architecture offers regenerative discharging designed to recycle the electric energy sourced by the battery pack. This feature saves electricity, reduces the facilities costs, reduces the thermal foot print and provides a green solution by reducing the environmental impact to the planet.

Chroma's 17030 system include a driving cycle simulation function. Since automotive battery packs are used at quick and irregular intervals, the 17030 incudes the capability to create seamless transitions between maximum charge and maximum discharge (or maximum discharge and maximum charge) with a rapid 50 ms conversion. This feature allows for charge/discharge mode simulations of real world driving scenarios. The system simulates the real conditions on the battery pack in its working condition.

Chroma's 17030 system has flexible programming functions and includes Chroma's powerful Battery Pro software. Battery Pro is a user friendly software environment allowing for the creation of a wide range of test scenarios from basic charge and discharge to complex drive cycle testing. Battery Pro's features allows quick and intuitive test development to eliminate the need for tedious scripting or programming by a software developer.

There are multiple safety features built into the 17030 including battery polarity checks, overvoltage protection, overcurrent protection and over temperature protection. In the unlikely event of a power or computer communication loss, the data is securely stored within the system in non-volatile memory thereby protecting against potential data loss and allowing for continuous flow after restart.

Ethernet CE

PROTECTION FUNCTION AND DATA RECOVERY

Safety Protection

- Channel monitoring icon: empty, contact checking, contact check failed, reverse polarity, standby, running, pause, finish, communication error, etc
- Save testing data when PC is down or disconnected
- Save the test settings to resume after the power failure is recovered

SPECIFICATIONS-1

Model		**17030 ***				
Channel		1	2	1	1	1
Max Power *1		90kW	180kW	180kW	250kW	210kW
Max Power /Per channel		90kW	90kW	180kW	250kW	210kW
Max Voltage		450V	450V	700V	700V	900V
Max Current / Per channel		200A	200A	300A	500A	500A
Constant Voltage Mode						
Voltage Range *2		15-450Vdc	15-450Vdc	15-700Vdc	15-700Vdc	19-900 Vdc
Voltage accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Voltage resolution		10mV	10mV	15mV	15mV	20mV
Constant Current Mode						
Maximum Current		200A	200A	300A	500A	500A
Current accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Current resolution		10mA	10mA	15mA	20mA	20mA
Constant Power Mode						
Max Power / Per channel		90kW	90kW	180kW	250kW	210kW
Power accuracy		0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
Power resolution		5W	5W	10W	20W	20W
Current Rising Time (10% to 90% Load)		10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load
Ripple Noise (DC Current)		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Overshoot		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Measurement *3						
Voltage Read Back						
range		0~450V	0~450V	0~700V	0~700V	0~900V
accuracy		0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.
resolution		10mV	10mV	15mV	15mV	20mV
Current Read Back						
High range		0~200A	0~200A	0~300A	0~500A	0~500A
accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Low range		0~50A	0~50A	0~75A	0~125A	0~125A
accuracy		0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
resolution		10mA	10mA	15mA	20mA	20mA
Power Read Back						
Power range		90kW	90kW	180kW	250kW	210kW
Power accuracy		0.2% F.S.	0.2% F.S.	0.2% F.S.	0.2% F.S.	0.2% F.S.
Power resolution		5W	5W	10W	20W	20W
Thermal Sensor						
range		0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C
accuracy		±0.2˚C	±0.2˚C	±0.2˚C	±0.2˚C	±0.2˚C
resolution		0.1˚C	0.1˚C	0.1˚C	0.1˚C	0.1˚C
AC Input						
Line voltage / Frequency *4		3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz				
Others						
Audible noise level (in 1m distance)		Under 80dB				
Efficiency (Typical)		85%				
Interface *5		Ethernet				
Operation Temperature		0 ˚C ~ 40 ˚C				
Dimension (H x W x D) *6	Transformer	1111 x 813 x 686mm / 43.75 x 32 x 27 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch
	Power Enclosure	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch
Weight *7	Transformer	approx. 465 kg / approx. 1025 lbs	approx. 710 kg / approx. 1560 lbs	approx. 640 kg / approx. 1400 lbs	approx. 710 kg / approx. 1560 lbs	approx. 710 kg / approx. 1560 lbs
	Power Enclosure	approx. 1140 kg / approx. 2500 lbs	approx. 1600 kg / approx. 3500 lbs	approx. 1140 kg / approx. 2500 lbs	approx. 1140 kg / approx. 2500 lbs	approx. 1270 kg / approx. 2800 lbs

SPECIFICATIONS-2

Model		**17030 ***			
Channel		1	2	1	1
Max Power *1		250kW	280kW	300kW	500kW
Max Power / Per channel		250kW	140kW	300kW	500kW
Max Voltage		900V	700V	700V	1200V
Max Current / Per channel		500A	200A	1000A	700A
Constant Voltage Mode					
Voltage Range *2		19-900 Vdc	15-700Vdc	15-700Vdc	30-1200Vdc
Voltage accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Voltage resolution		20mV	15mV	15mV	30mV
Constant Current Mode					
Maximum Current		500A	200A	1000A	700A
Current accuracy		0.1%F.S.	0.1%F.S.	0.1%F.S.	0.1%F.S.
Current resolution		20mA	10mA	40mA	30mA
Constant Power Mode					
Max Power / Per channel		250kW	140kW	300kW	500kW
Power accuracy		0.2%F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
Power resolution		20W	10W	20W	40W
Current Rising Time (10% to 90% Load)		10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load	10ms with 0.2Ω Resistive load
Ripple Noise (DC Current)		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Overshoot		<1%F.S.	<1%F.S.	<1%F.S.	<1%F.S.
Measurement *3					
Voltage Read Back					
Range		0~900V	0~700V	0~700V	0~1200V
Accuracy		0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.	0.05% rdg.+0.05% F.S.
Resolution		20mV	15mV	15mV	30mV
Current Read Back					
High range		0~500A	0~200A	0~1000A	0~700A
Accuracy		0.1% F.S.	0.1%F.S.	0.1%F.S.	0.2%F.S.
Low range		0~125A	0~50A	0~250A	0~175A
Accuracy		0.2% F.S.	0.2%F.S.	0.2%F.S.	0.2%F.S.
Resolution		20mA	10mA	40mA	30mA
Power Read Back					
Power range		250kW	140kW	300kW	500kW
Power accuracy		0.2% F.S.	0.2% F.S.	0.2% F.S.	0.2% F.S.
Power resolution		20W	10W	20W	40W
Thermal Sensor					
Range		0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C	0˚C ~90˚C
Accuracy		±0.2˚C	±0.2˚C	±0.2˚C	±0.2˚C
Resolution		0.1˚C	0.1˚C	0.1˚C	0.1˚C
AC Input					
Line voltage / Frequency *4		3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz			
Others					
Audible noise level (in distance)		Under 80dB			
Efficiency (Typical)		85%			
Interface *5		Ethernet			
Operation Temperature		0 ˚C~ 40 ˚C			
Dimension (H x W x D) *6	Transformer	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	1257 x 1041 x 813mm / 49.5 x 41 x 32 inch
	Power Enclosure	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	1982 x 1982 x 915mm / 78 x 78 x 36 inch	2286 x 5030 x 609mm / 90 x 198 x 24 inch
Weight *7	Transformer	approx. 710 kg / approx. 1560 lbs	approx. 710 kg / approx. 1560 lbs	approx. 710 kg / approx. 1560 lbs	approx. 1420 kg / approx. 3120 lbs
	Power Enclosure	approx. 1270 kg / approx. 2800 lbs	approx. 1270 kg / approx. 2800 lbs	approx. 1650 kg / approx. 3640 lbs	approx. 2270 kg / approx. 5000 lbs

Note*1 : Customized rated power : Voltage 10~1200V; max Current 1000A ; Power 90~500kW

Note*2 : The output range of voltage is referred by the cabling. The connection between the device and battery is 3 meters long as standard accessory.

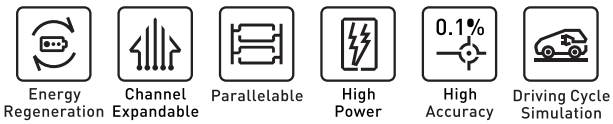
Note*3 : 20us sampling rate for calculating battery capacity and energy

Note*4 : The transformer is for isolation and to accommodate various facility voltages

Note*5 : The interface from PC to 17030 is through Ethernet

Note*6 : The dimension is for reference. The dimensions are subject to change base on real condition

Note*7 : The weight is for reference. The weight are subject to change base on real condition



REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17040

The 17040 Regenerative Battery Pack Test System is a high precision system specifically designed for secondary battery module and pack tests. It has an energy regenerative function to greatly reduce power consumption during discharge, and ensure a stable power grid without generating harmonic pollution on other devices - even in dynamic charge and discharge conditions. It is capable of recycling the electric energy discharged by the battery module back to the grid reducing wasted energy that is discharged by traditional equipment in the form of heat, thus reducing the HVAC requirements.

The 17040 system has built in parallel channels and dynamic profile simulation functions. The parallel capability increases the charge and discharge current and power to its maximum, thus increasing the efficiency and flexibility of device usage. The dynamic profile simulation allows the user to load a battery waveform of a given drive profile in either current or power mode to meet the NEDC/FUDS requirements. Its bi-directional architecture ensures that the current will not be interrupted during the charge and discharge transient state so that the driving conditions can be accurately simulated to be in line with the ISO, IEC, UL and GB/T international testing standards.

Equipped with Chroma's powerful "Battery Pro" software, the 17040 system has flexible test editing functions to perform independent channel tests, and conforms to the diversified requirements for testing secondary battery packs with high safety and stability. It also supports power failure recovery functions that ensure test data is not interrupted.

The test system has multiple safety features including Over Voltage Protection, Over Current Protection Check, Over Temperature Protection, and external parameter detection to ensure protected charge/discharge testing on the batteries. Furthermore data loss, storage and recovery are protected against power failure.

MODEL 17040

KEY FEATURES

- Conforms to international standards for battery testing: IEC, ISO, UL, and GB/T, etc.
- Regenerative battery energy discharge (Eff. >90%, PF >0.95, I_THD <5%)
- Multiple voltage and current ranges for auto ranging function to provide optimum resolution
- High accuracy current/voltage measurement (±0.05%FS/±0.02%FS)
- 2ms current slew rate (-90%~90%)
- Dynamic (current/power) driving profile simulation tests for NEDC, FUDS, HPPC
- Test channel parallel function
- Test data analysis function
- Data recovery protection (after power failure)
- Automatic protection for error condition
- Battery simulator (option)
- High power testing equipment
  - Voltage range : 50~1000V
  - Current range : 0~750A
  - Power range : 0~300kW
- Customized integration functions
  - Integrated temperature chamber
  - BMS data analysis
  - Multi-channel voltage/temperature recording

FIELDS OF APPLICATION

- Power battery module
- Energy storage system
- Motor driver
- Power control system

SPECIFICATIONS

Model		17040							
Max. Power		60kW			120kW			180kW	
Max. Voltage		500V	750V	1000V	500V	750V	1000V	500V	750V	1000V
Max. Current		150A	150A	150A	300A	300A	300A	450A	450A	450A
Channel		1			1			1		
Constant Voltage Mode										
Voltage Range		50~500V	50~750V	50~1000V	50~500V	50~750V	50~1000V	50~500V	50~750V	50~1000V
Voltage Accuracy		±0.1%FS			±0.1%FS			±0.1%FS		
Voltage Resolution		10mV	15mV	20mV	10mV	15mV	20mV	10mV	15mV	20mV
Constant Current Mode										
Current Accuracy		±0.1%FS			±0.1%FS			±0.1%FS		
Current Resolution		10mA			20mA			30mA		
Constant Power Mode										
Power Accuracy		±0.2%FS			±0.2%FS			±0.2%FS		
Power Resolution		100mW			100mW			100mW		
Battery Simulator Mode										
Voltage Range		50~500V	50~750V	50~1000V	50~500V	50~750V	50~1000V	50~500V	50~750V	50~1000V
Voltage Accuracy		±0.1%FS			±0.1%FS			±0.1%FS		
Voltage Ripple (rms)		< 1%FS			< 1%FS			< 1%FS		
Measurement										
Voltage Range (3 Scales as F.S.)	1	500V	750V	1000V	500V	750V	1000V	500V	750V	1000V
	2	350V	500V	700V	350V	500V	700V	350V	500V	700V
	3	150V	350V	450V	150V	350V	450V	150V	350V	450V
Voltage Accuracy		±(0.02% rdg + 0.02% FS)			±(0.02% rdg + 0.02% FS)			±(0.02% rdg + 0.02% FS)		
Voltage Resolution		10mV	15mV	20mV	10mV	15mV	20mV	10mV	15mV	20mV
Current Range (4 Scales as F.S.)	1	150A	150A	150A	300A	300A	300A	450A	450A	450A
	2	75A	75A	75A	150A	150A	150A	225A	225A	225A
	3	30A	30A	30A	60A	60A	60A	90A	90A	90A
	4	10A	10A	10A	20A	20A	20A	30A	30A	30A
Current Accuracy		±(0.05% rdg + 0.05% FS)			±(0.05% rdg + 0.05% FS)			±(0.05% rdg + 0.05% FS)		
Current Resolution		0.1mA @ 10A Current Scale			0.2mA @ 20A Current Scale			0.3mA @ 30A Current Scale		
Power Accuracy		±0.15% FS			±0.15% FS			±0.15% FS		
Power Resolution		1mW			1mW			1mW		

Model		17040					
Max. Power		250kW			300kW		
Max. Voltage		500V	750V	1000V	500V	750V	1000V
Max. Current		600A	600A	600A	750A	750A	750A
Channel		1			1		
Constant Voltage Mode							
Voltage Range		50~500V	50~750V	50~1000V	50~500V	50~750V	50~1000V
Voltage Accuracy		±0.1%FS			±0.1%FS		
Voltage Resolution		10mV	15mV	20mV	10mV	15mV	20mV
Constant Current Mode							
Current Accuracy		±0.1%FS			±0.1%FS		
Current Resolution		40mA			50mA		
Constant Power Mode							
Power Accuracy		±0.2%FS			±0.2%FS		
Power Resolution		1W			1W		
Battery Simulator Mode							
Voltage Range		50~500V	50~750V	50~1000V	50~500V	50~750V	50~1000V
Voltage Accuracy		±0.1%FS			±0.1%FS		
Voltage Ripple (rms)		< 1%FS			< 1%FS		
Measurement							
Voltage Range (3 Scales as F.S.)	1	500V	750V	1000V	500V	750V	1000V
	2	350V	500V	700V	350V	500V	700V
	3	150V	350V	450V	150V	350V	450V
Voltage Accuracy		±(0.02%rdg+0.02% FS)			±(0.02%rdg+0.02% FS)		
Voltage Resolution		10mV	15mV	20mV	10mV	15mV	20mV
Current Range (4 Scales as F.S.)	1	600A	600A	600A	750A	750A	750A
	2	300A	300A	300A	375A	375A	375A
	3	120A	120A	120A	150A	150A	150A
	4	40A	40A	40A	50A	50A	50A
Current Accuracy		±(0.05% rdg + 0.05% FS)			±(0.05% rdg + 0.05% FS)		
Current Resolution		0.4mA @ 40A Current Scale			0.5mA @ 50A Current Scale		
Power Accuracy		±0.15% FS			±0.15% FS		
Power Resolution		10mW			10mW		

BATTERY CELL CHARGE & DISCHARGE TEST SYSTEM MODEL 17011

The 17011 Battery Cell Charge and Discharge Test System is a high precision system designed specifically for testing lithium-ion batteries (LIB), electrical double layer capacitors (EDLC), and lithium-ion capacitors (LIC). It is suitable for product characteristics screening, cycle life testing, incoming and shipping inspection, material experiment, and balancing battery voltage.

Based on the test characteristics and size of battery current, the 17011 test system has AC/DC bi-directional regenerative series and linear circuit series with precision output and measurement traceability to guarantee product specifications. Small errors among channels and relatively reliable test data are suitable for analyzing the characteristics differences and detecting changes in detail. The system is equipped with energy-saving design and thermal management capable of running stably for long periods and providing reliable real-life testing data. The modular design allows the system to be configured based on test requirements, and each channel can run tests independently with parallel output supported. The test system has high product compatibility and testing flexibility.

In view of energy issues, the fabrication of green products should be in line with production methods that are environmentally friendly. The 17011 AC/DC bi-directional regenerative test system has an energy recycling function that can convert the discharged energy to the charging channel improving power efficiency when in use. The excess power will feed back to grid if the energy recovered is more than the system requires. In addition to decreasing electricity costs, the regenerative power function reduces system heat significantly by lowering air conditioning demands and operation costs. It not only improves system stability, extends service life, but also creates a low carbon emission environment for production.

For small current testing and material development, the 17011 linear circuit series features low noise and precision outputs, with redundant DC power supplies which are more stable and reliable when compared to general switching power supplies. When a power module fails, it will shut down automatically, and the rest of the modules can be paralleled in order to output sufficient power, maintaining a stable power supply. In addition, it supports a hot swap function that allows the malfunctioning module to be switched without shutting down the system to make sure no interruptions occur during testing.

Four current range models are available for material research and development. The standalone device can easily be placed on the lab desk. This device is suitable for precision and leakage current testing with an automatic current shift resolution up to 0.1uA. With data refresh rate up to 1ms in pulse mode, it can perform rapid pulse current charge/discharge tests on various material samples for characteristics verification.

The lithium ion battery cell tests include life and characteristics tests such as ACIR, DCIR and HPPC, etc. The 17011 includes built in test steps in line with regulations that can provide test results fast and accurately without requiring conversion afterwards. It provides easy operation with low chances of human error, and can draw battery characteristic curves via software for specification comparison or application parameter analysis.

For EDLC and lithium capacitors, capacitance, DCIR and leakage current tests are included. The test steps built into the 17011 comply with the standards which get the capacitance and DCIR test results with one step. It also measures the leakage current directly.

Ethernet CE

MODEL 17011

KEY FEATURES

- High precision output and measurement up to 0.02%F.S.
- High sampling rate up to 10ms
- Channel parallel output function with maximum 1200A output
- Operating modes: CC/CC-CV/CP/CR
- Dynamic working condition simulation (current/power)
- Built-in DCIR test
- Built-in HPPC test
- Built-in EDLC capacitance and DCIR test
- Built-in LIC capacitance and DCIR test
- Flexible sampling recording (t, V, I, Q, W)
- Low ripple current
- Real time external circuit resistance monitoring function
- Equipped with redundant DC power supply to avoid affecting the cycle life test due to power failure factor (linear circuit series)
- Energy recycling during discharge (AC/DC bi-directional regenerative series)
- Integrating ACIR test fixture, temperature/data logger and humidity chamber

FUNCTIONS

- LIB charge/discharge test Capacity, ACIR and DCIR tests
- EDLC charge/discharge test Capacitance, ACIR, DCR and LC tests
- LIC charge/discharge test Capacitance, ACIR, DCR and LC tests

APPLICATIONS

- Characteristics analysis
- Product life test
- Material test
- Production test
- Voltage adjustment application
- Quality assurance for incoming/shipping inspection

SPECIFICATIONS

Module	17202-5-20		17202-5-30		17212R-5-100		17216M-10-6	
Maximum Voltage/Current	5V/20A		5V/30A		5V/100A		10V/6A	
Maximum Channel	2 ch/module, 10 ch/frame		2 ch/module, 10 ch/frame		12 ch/set (fixed)		16 ch/set (fixed)	
Parallelable Current	40A, 100A, 200A		60A, 150A, 300A		200A, 300A, 400A, 600A, 1200A		6A to 96A	
Voltage								
Setting Range	0 mV ~ 5000 mV, resolution 1mV		0 mV ~ 5000 mV, resolution 1mV		0mV~5000mV *1, resolution 1mV		0V~10V or -5V~5V, resolution 1mV	
Reading Range	0.0 mV ~ +5199.9 mV, resolution 0.1mV		0.0 mV ~ +5199.9 mV, resolution 0.1mV		0.0 mV ~ +5199.9 mV, resolution 0.1mV		0V~10.4V or -5V~5.04V, resolution 0.2mV	
Accuracy	± (0.02% rdg.+0.02% F.S.)		± (0.02% rdg.+0.02% F.S.)		± (0.02% rdg.+0.02% F.S.)		± (0.02% F.S.)	
Current								
Setting Range	3A	1mA ~ 3,000mA , resolution 1mA	4A	1mA ~ 4,000mA , resolution 1mA	100A	0.01A ~ 100.00A, resolution 0.01A	200µA	0.1µA ~ 200µA , resolution 0.1µA
							6mA	1µA ~ 6mA, resolution 1uA
	20A	0.01A ~ 20.00A , resolution 0.01A	30A	0.01A ~ 30.00A , resolution 0.01A			200mA	0.1mA ~ 200mA, resolution 0.1mA
							6A	1mA ~ 6A, resolution 1mA
Reading Range	3A	0.0mA~ 3,150.0mA, resolution 0.1mA	4A	0.0mA ~ 4,200.0mA, resolution 0.1mA	100A	0.000A ~ 105.000A, resolution 0.001A	200µA	0A ~ 210µA, resolution 0.01µA
							6mA	0A ~ 6.3mA, resolution 0.2µA
	20A	0.000A ~ 21.000A , resolution 0.001A	30A	0.000A ~ 31.500A, resolution 0.001A			200mA	0A ~ 210mA, resolution 0.01mA
							6A	0A ~ 6.3A, resolution 0.2mA
Accuracy	3A	± (0.02% rdg.+ 0.02% rng.)	4A	± (0.05% rdg.+ 0.05% rng.)	100A	± (0.05% rdg.+ 0.05% F.S.)	200µA	± (0.02% rng.)
							6mA	
	20A	± (0.03% rdg.+ 0.03% rng.)	30A	± (0.05% rdg.+ 0.05% rng.)			200mA	
							6A	
Power								
Setting Range	15W	10 mW ~ 15,000 mW, resolution 1 mW	20W	10 mW ~ 20,000 mW, resolution 1 mW	500W	0.05W~500.00W, resolution 0.01W	2mW	1µW~2mW, resolution 1µW
							60mW	10µW~60mW, resolution 10µW
	100W	0.05 W ~ 100.00 W, resolution 0.01 W	150W	0.05 W ~ 150.00 W, resolution 0.01 W			2W	1mW~2W, resolution 1mW
							60W	10mW~60W, resolution 10mW
Reading Range	15W	0.0 mW ~ 15,600.0 mW, resolution 0.1 mW	20W	0.0 mW ~ 21,000.0 mW, resolution 0.1 mW	500W	0.000 W~520.000 W, resolution 0.001W	2mW	0W~2.1mW, resolution 0.1µW
							60mW	0W~63mW, resolution 2µW
	100W	0.000 W ~ 104.000 W, resolution 0.001 W	150W	0.000 W ~ 160.000 W, resolution 0.001 W			2W	0~2.1W, resolution 0.1mW
							60W	0~63W, resolution 2mW
Accuracy	15W	± (0.04% rdg.+ 0.04% rng.)	20W	± (0.07% rdg.+ 0.07% rng.)	500W	± (0.07% rdg.+ 0.07% F.S.)	2mW	± (0.04% rng.)
							60mW	
	100W	± (0.05% rdg.+ 0.05% rng.)	150W	± (0.07% rdg.+ 0.07% rng.)			2W	
							60W	
Flow Edit Capability	Max. step number in one flow: 500 steps ; Max. cycle number in one step: 999999 steps							
Data Storage	10ms~60min *2							
Power Supply	Built in 62015B-24-62 DC Power Supply Module				A691103、A691104 DC/AC Bi-direction Converter		Built in	
AC Input Voltage	1Φ, 220V 3Φ 4 wire, △connection, 220V / 380V				3Φ 4 wire, △connection, 220V / 380V		1Φ, 220V	

Note *1: The maximum discharge current will derate at low voltage range between 1V to 0V.
Note *2 : The model 17202-5-20 and 17202-5-30 of 10ms sampling time, the current and power accuracy specification is a bit lower than 100ms.
* All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

REGENERATIVE BATTERY PACK TEST SYSTEM MODEL 17020

Chroma's 17020 is a high precision system specifically designed for secondary battery module and pack tests. Highly accurate sources and measurements ensure that the test quality is suitable for performing repetitive and reliable tests crucial for battery modules/packs, incoming, and outgoing inspections as well as capacity, performance, production, and qualification testing.

The system architecture of the 17020 offers regenerative discharge capabilities designed to recycle the electric energy sourced by the battery module either back to the channels in the system performing a charging function or to the utility mains in the most energy efficient manner. This feature saves electricity, reduces the facilities thermal foot print, and provides a green solution.

The 17020 system is equipped with multiple independent channels to support dedicated charge/discharge tests on multiple battery modules/packs, each with discrete test characteristics. Channels can easily be paralleled to support higher current requirements. This feature provides the ultimate in flexibility between high channel count and high current testing.

The 17020 advanced hardware design creates seamless transitions between maximum charge and maximum discharge (or maximum discharge and maximum charge) with a rapid 50 ms conversion. This feature allows for charge/discharge modes that simulate real world scenarios.

The 17020 system has flexible programming functions and may be operated with Chroma's powerful "Battery Pro" software. With the Battery Pro software, cycling tests from basic charge or discharge to complex drive cycle testing can be created and utilized for each channel or channel groups. A thermal chamber control can be integrated into a profile and triggered by time or test results yielding a dynamic profile. Battery Pro's features allow quick and intuitive test development, eliminating the need of tedious scripting or programming by a software engineer.

The 17020 system has multiple safety features including Battery Polarity Check, Over Voltage Protection, Over Current Protection Check and Over Temperature Protection to ensure protected charge/discharge testing. In the unlikely event of power or computer communication loss, data is securely stored in system non-volatile memory protecting against potential data loss and allowing for continuous flow after restart.

Ethernet CE

MODEL 17020

Key Features

- Regenerative battery energy discharge, efficiency 85%
  - Energy saving
  - Environment protection
  - Low heat generate
- Channels paralleled for higher currents
- Charge/discharge modes (CC, CV, CP)
  - Power Range: 600W, 1.25KW, 2.5KW, 5KW, 10KW, 20kW, 30kW, 50kW, 60KW per channel
  - Voltage Range: 20V, 60V, 100V, 200V, 500V per channel
  - Current Range: up to 2600A (parallel)
- Driving cycle simulation
- High precision measurement
- Fast current conversion
- Smooth current without over shoot
- Test data analysis function
- Data recovery protection (after power failure)
- Independent protection of multi-channel
- BMS data recording
- Thermal chamber control integration

Applications

- EV battery module
- Electric scooter
- Electric bike
- UPS
- Energy storage battery
- Power tools
- Car battery
- Lead-acid battery

SPECIFICATIONS

Model	**17020**						
Voltage	20V	60V	60V	60V	100V	200V	500V
Current	65A	13A	62.5A	62.5A	50A	30A	13A
Power	1.25kW	600W	1.25kW	2.5kW	2.5kW	2.5kW	2.5kW
Channels	4~40	8~56	4~40	4~24	4~24	4~24	4~24
Max. Power (Parallelable)	50kW	33.6kW	50kW	60kW	60kW	60kW	60kW
Max. Current (Parallelable)	2600A	728A	2500A	1500A	1200A	720A	312A
Battery Cycler							
Charge / Discharge Mode per channel							
Voltage Range*1	0~20V	0~60V.	0~60V	0~60V	0~100V	0~200V	0~500V *3
Voltage Accuracy	0.1% stg.+ 0.05% F.S.	0.1% stg.+ 0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg. + 0.05%F.S.	0.1% stg. + 0.05%F.S.	0.1% stg. + 0.05%F.S.
Voltage Resolution	0.5mV	1mV	1mV	1mV	3mV	5mV	10mV
Current*2	65A	13A	62.5A	62.5A	50A	30A	13A
Current Accuracy	0.1% stg.+ 0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg. + 0.05%F.S.	0.1% stg. + 0.05%F.S.	0.1% stg.+ 0.05% F.S.
Current Resolution	5mA	1mA	5mA	5mA	5mA	5mA	1mA
Power	1.25kW	600W	1.25kW	2.5kW	2.5kW	2.5kW	2.5kW
Power Accuracy	0.2% stg.+ 0.1% F.S.	0.2% stg. + 0.1% F.S.	0.2% stg. + 0.1% F.S.	0.2% stg. + 0.1% F.S.	0.2% stg. + 0.1%F.S.	0.2% stg. + 0.1%F.S.	0.2% stg.+ 0.1% F.S.
Power Resolution	0.1W	0.1W	0.3W	0.3W	0.5W	0.5W	0.5W
Measurement per channel							
Voltage Range	0~20V	0~60V	0~60V	0~60V	0~100V	0~200V	0~500V
Voltage Accuracy	0.02% rdg. + 0.02% F.S.	0.02% rdg. + 0.02% F.S.	0.02% rdg. + 0.02% F.S.	0.02% rdg. + 0.02% F.S.	0.02% rdg. + 0.02% F.S.	0.02% rdg. + 0.02% F.S.	0.02% rdg. + 0.02% F.S.
Voltage Resolution	0.5mV	1mV	1mV	1mV	3mV	5mV	10mV
Current Range	24A/65A	4.8A/13A	24A/62.5A	24A/62.5A	20A/50A	12A/30A	4.8A/13A
Current Accuracy	0.1% rdg. + 0.05% rng.	0.05% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.
Current Resolution	5mA	1mA	5mA	5mA	5mA	5mA	1mA
Power Range	1.25kW	600W	1.25kW	2.5kW	2.5kW	2.5kW	2.5kW
Power Accuracy	0.12% rdg. + 0.07% rng.	0.12% rdg. + 0.07% rng.	0.12% rdg. + 0.07% rng.	0.12% rdg. + 0.07% rng.	0.12% rdg. + 0.07% rng.	0.12% rdg. + 0.07% rng.	0.12% rdg. + 0.07% rng.
Power Resolution	0.1W	0.1W	0.3W	0.3W	0.5W	0.5W	0.5W

Battery Simulator	
Internal resistance setting	10mΩ~1Ω
Output Noise (0~20MHz)	
Voltage Ripple(P-P)	0.5% F.S.
Voltage Ripple(rms)	0.1% F.S.
Transient Response Time *4	10 ms
Bi-directional Transient Response Time *5	20 ms
Road Regulation	< 0.1% F.S.
Program time *6	< 1s

Others - 17020 Power / Channels							
Voltage	20V	20V	20V	20V	60V	60V	60V
Current	130A	260A	520A	2600A	125A	125A	250A
Power	2.5KW	5KW	10KW	50KW	2.5KW	5KW	10KW
Channels	2 - 20	1 - 10	1 - 5	1	2 - 20	2 - 12	1 - 6
Model	17020						
Voltage	60V	60V	60V	100V	100V	100V	100V
Current	500A	750A	1500A	100A	200A	400A	600A
Power	20KW	30KW	60KW	5KW	10KW	20KW	30KW
Channels	1 - 3	1 - 2	1	2 - 12	1 - 6	1 - 3	1 - 2
Model	17020						
Voltage	200V	200V	200V	500V	500V	500V	500V
Current	60A	120A	60A	26A	52A	156A	312A
Power	5KW	10KW	30KW	5KW	10KW	30KW	60KW
Channels	2 - 12	1 - 6	1 - 2	2 - 12	1 - 6	1 - 2	1

Transformer Test System

Model 3250/3252/3302

HANDLER PRINTER RS-232 GPIB CE

The 3250/3252/3302 Transformer Test System are the precision test systems, designed for transformer production line or incoming/ outgoing inspection in quality control process, with high stability and high reliability.

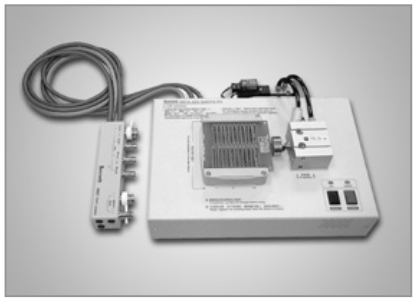
The 3250/3252 provide 20Hz-200kHz test frequencies, and 3302 provides 20Hz-1MHz test frequencies. In addition to transformer scanning test function, the 3252/3302 have LCR Meter function. In test items, The 3250/3252/3302 cover most of transformer's low-voltage test parameters which include primary test parameters as Inductance, Leakage Inductance, Turns-Ratio, DC resistance, Impedance, and Capacitance (between windings) etc.; secondary test parameters as Quality Factor and ESR etc.; and pin-short test function. High-speed digital sampling measurement technology combined with scanning test fixture (A132501) design, improve low-efficiency transformer inspection to be more accurate and faster.

The 3250/3252/3302 even provide several output impedance selection to solve inductance measurement error problem caused by different test current caused by different output impedance provided by different LCR Meters. And, equivalent turns-ratio calculated from measured inductance of windings is also provided to improve turns-ratio measurement error problem caused by large leakage magnetic flux in transformer with low permeability magnetic core.

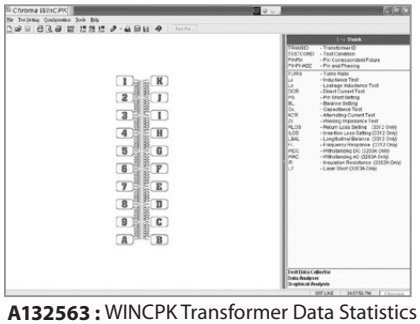
In addition to transformer scanning test function, the 3252/3302 have LCR Meter function, can be used in component incoming/outgoing inspection, analysis and automatic production line.

KEY FEATURES

- Test frequency: 20Hz~200kHz/1MHz, 0.02% accuracy
- Basic accuracy: 0.1%
- Different output impedance modes, measurement results are compatible with other well-known LCR meters
- Enhanced Turn Ratio measurement accuracy for low permeability core
- Fast Inductance/ Turn Ratio measurement speed up to 80 meas./sec
- Fast DCR measurement speed up to 50 meas./sec
- Graphical and tabular display of swept frequency, voltage current and bias current measurements (3252/3302)
- Build-in 8mA bias for RJ45 transmission transformer saturation condition (option)
- Leakage inductance 100 bin sorting and balance of leakage inductance for TV inverter transformer
- ALC (Auto Level Compensation) function for MLCC measurement (3252/3302)
- Test fixture residual capacitance compensation for transformer inductance measurement
- 1320 Bias Current Source directly control capability (3252/3302)
- 320x240 dot-matrix LCD display
- Support versatile standard and custom-design test jigs
- Four-terminal test for accurate, stable DCR, inductance and turn ratio measurements
- Built-in comparator; 10 bin sorting with counter capability (3252/3302)
- Lk standard value with Lx measure value
- 4M SRAM memory card, for setup back-up between units
- Standard RS-232, Handler, and Printer Interface, option GPIB Interface for LCR function only
- 15 internal instrument setups for store/recall capability



A132501 :
Auto Transformer Scanning Box (3001A)



A132563 : WINCPK Transformer Data Statistics & Analysis Software for Model 3250/3252/3302

Model 3302

Test Fixture / Model		3250	3252	3302	3312
A132547	4-4mm Test Fixture	●	●	●	●
A132572	3.5/4mm Test Fixture	●	●	●	●
A132573	3.2/3.5mm Test Fixture	●	●	●	●
A132579	7.5-5mm Test Fixture	●	●	●	●
A132583	3.0-3.0mm Test Fixture	●	●	●	●
A132584	3.5-3.5mm Test Fixture	●	●	●	●
A132585	3.8-3.8 mm Test Fixture	●	●	●	●
A132586	3.0-4.0 mm Test Fixture	●	●	●	●

SPECIFICATIONS				
Model		**3250**	**3252**	**3302**
Main Function		Transformer Scanning Test	Transformer Scanning Test + LCR Meter	
Test Parameter				
Transformer Scanning		Turn Ratio, Phase, Turn, L, Q, Leakage L, Balance, ACR, Cp, DCR, Pin Short		
LCR METER		- -	L, C, R, |Z|, Y, DCR, Q, D, R, X, θ , Ratio (dB)	
Test Signals Information				
Test Level	Turn	10mV~10V, ±10% 10mV/step		
	Others	10mV~2V, ±10% 10mV/step		
Test Frequency	Turn	1kHz~200kHz, ± (0.1% + 0.01Hz), Resolution: 0.01 Hz		1kHz~1MHz, ±(0.1%+0.01Hz), Resolution : 0.01 Hz
	Others	20Hz~200kHz, ± (0.1% + 0.01Hz), Resolution : 0.001 Hz (<1kHz)		20Hz~1MHz, ±(0.1%+0.01Hz), Resolution 0.001 Hz (<1kHz)
Output Impedance Display	Turn	10Ω, when level≦2V / 50Ω, when level > 2V		
	Others	Constant = OFF : Varies as range resistors Constant = 320X : 100Ω ±5% ; Constant = 107X : 25Ω ±5% Constant=106X : 100mA ±5% (1V setting); for inductive load less than 10Ω,10Ω ±10%, for impedance ≧10Ω		
Measurement Display Range				
L, LK		0.00001μH~9999.99H		
C		0.00001pF~999.999mF		
Q, D		0.00001~99999		
Z, X, R		0.00001Ω~99.9999MΩ		
Y		0.01nS~99.9999S		
θ		-90.00°~ +90.00°		
DCR		0.01mΩ~99.999MΩ		
Turn,Ratio		0.01~99999.99 turns (Secondary voltage less than 100 Vrms)		
Ratio (dB)		-39.99dB~+99.99dB (seconding voltage less than 100 Vrms)		
Pin-Short		11 pairs, between pin to pin		
Basic Accuracy				
L, LK, C, Z, X, Y, R		0.1% (1kHz if AC parameter)		
DCR		±0.5%		
θ		0.03°(1kHz)		
Turn, Ratio (dB)		0.5% (1kHz)		
Measurement Speed (Fast)				
L, LK, C, Z, X, Y, R, Q, D, θ		80meas./sec.		
DCR		50meas./sec.		
Turn, Ratio (dB)		10meas./sec.		
Judge				
Transformer Scanning		PASS/FAIL judge of all test parameters output from Handler interface, 100 bin sorting for LK		
LCR METER		--	10 bins for sorting & bin sum count output from Handler interface/PASS/FAIL judge output from Handler interface	
Trigger		Internal, Manual, External		
Display		320x240 dot-matrix LCD display		
Equivalent Circuit Mode		Series, Parallel		
Correction Function		Open/Short Zeroing, Load correction		
Memory		15 instrument setups, expansion is possible via memory card		
General				
Operation Environment		Temperature:10°C~40°C, Humidity: 10%~90% RH		
Power Consumption		140 VA max.		
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz		
Dimension (H x W x D)		177 x 430 x 300 mm / 6.97 x 16.93 x 11.81 inch		
Weight		9.2 kg / 20.26 lbs		

THERMAL/MULTI-FUNCTION DATA LOGGER

MODEL 51101/51101C SERIES

It is a general requirement to record temperatures, voltages, currents, and many physics quantities during research, product development, productions, and quality assurance processes. The number of record channels can be a simple one to several complicated set of hundreds. Thermal/multi-function data loggers are prefect solutions to serve for these measurement and tracking needs.

There are several measurement products in the market to perform such a large-scale and extensive time varying recording. Some are expensive, some are limited in accuracy or resolution, and some have low immunity to interference. thermal/multi-function data loggers are by far the most cost-effective solutions for versatility, accuracy, stability, and interference immunity among this category.

thermal/multi-function data loggers measure temperatures, voltages, and currents with high accuracy and resolutions. For example, they support 8 types of thermal couples measurement with ITS-90 defined temperature range at 0.5˚C accuracy and 0.01˚C resolution*, while most data loggers in the market are at 1 ˚C accuracy and 0.1˚C resolution*. loggers are with 1000VDC channel to channel isolation, which means they can attach thermal couples to objects with high electricity, such as batteries, solar cells, working PCB, etc., and still get correct data. Many competitors are just malfunctioned or even damaged in those cases. Data retrieve in loggers are in a parallel architecture, while most of competitors use a sequential multiplexing method. This means data rate per channel is quick and constant for loggers, while others become much slower when number of channels is bigger.

Using thermal/multi-function data loggers, customers get confidence in measured data and high Performance/Cost ratio. Most of all, we can help in certain cases that our competitors fail, and only succeeds.

*Thermal couple error excluded. Please see specification list for detail.

MODEL 51101/51101C SERIES

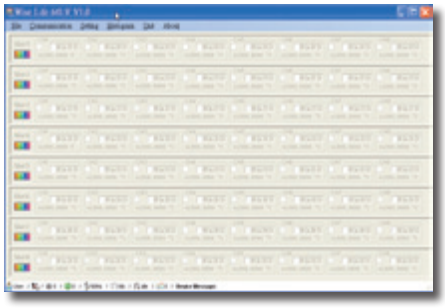
KEY FEATURES

- **Models with 1, 8, and 64 channels on-line data recording. Multi-sets linked to a PC for hundreds of channels are doable**
- **Support B, E, J, K, N, R, S, and T type thermal couples with ITS-90 defined temperature range**
- **Individual channel cold junction compensation with <±0.5˚C accuracy**
- **Temperature resolution up to 0.01˚C, error down to (0.01% of reading+0.5˚C)**
- **VA-480 voltage adaptor : Voltage range ±480VDC ; Resolution 1mV ; Accuracy 0.1% of reading+1mV**
- **VA-10 voltage adaptor : Voltage range ±10VDC ; Resolution 100uV ; Accuracy 0.05% of reading+500uV**
- **1000VDC channel to channel isolation, full protection for testing points with charge and guarantee for accurate measurements**
- **Thermal couple open circuit detection**
- **PC-based operation with powerful software for recording and analyzing data**
- **1 and 8 channel models are USB powered. No battery or external power supply is required**

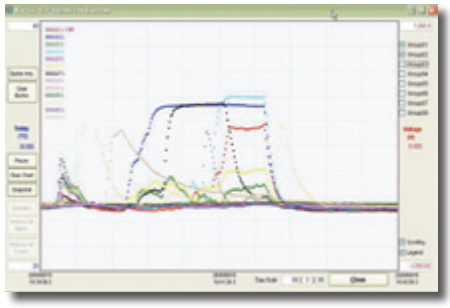
POWERFUL DATA RECORDING AND ANALYZING THROUGH A PC

Personal computers and Notebooks are powerful for their fast calculation and data processing capability, friendly graphic user interface, and huge hard disk storage. While operation of many other data loggers are limited by their small display and memory, data loggers link to PCs or Notebooks for direct display, analyses, and storage.

Using the PC software, one can see the detail of all the curves, change drawing time and range scales, create marks, zoom in selected sections, and perform difference calculations, all in few simple steps. The PC RAM is used as buffer to store every data since the logger is powered on, making data tracking back possible without opening the record file. Size of data recording is determined by hard disk free space, which is almost unlimited.


Main panel


Data panel


Data Histogram

APPLICATIONS


Automotive & Aircraft


Electrical & Electonics


Solar Energy


Power


Machinery


Iron & Steel


Metals & Mining


Oil &Gas


Water & Waste


Chemical


Pharmaceutical & Food


Others

SPECIFICATIONS

Model		51101-1 51101C-1	51101-8 51101C-8	51101-64 51101C-64 *4
Thermalcouple				
Thermocouple T-type	-200 to 400˚C	51101 Series : ±(0.01% of reading +0.5) ˚C *1 51101C Series : ±(0.01% of reading +0.8) ˚C *1		
Thermocouple K-type	-200 to 1372˚C			
Thermocouple B-type	250 to 1820˚C			
Thermocouple E-type	-200 to 1000˚C			
Thermocouple J-type	-210 to 1200˚C			
Thermocouple N-type	-200 to 1300˚C			
Thermocouple S-type	-50 to 1760˚C			
Thermocouple R-type	-50 to 1760˚C			
Thermocouple Jacks		B, E, J, K, N, R, S, or T mini-type		
Thermocouple Connector		B, E, J, K, N, R, S, or T mini-type		
Temperature Reading				
Number of Inputs		1	8	8, 16, 24, 32, 40, 48, 56, 64 channel
Temperature Sensor Type		Thermocouple : B, E, J, K, N, R, S, T		
Temperature Scale		ITS-90		
Temperature Resolution		±0.01 ˚C		
Temperature Accuracy *1*2		51101 Series : ±(0.01% of reading +0.5) ˚C 51101C Series : ±(0.01% of reading +0.8) ˚C		
CJC Error		51101 Series : ± 0.5˚C 51101C Series : ± 0.8˚C		
Maximum Sample Rate		5 sample/sec.		
Channel to Channel Isolation		1000VDC / 750 Vrms		
Input Resistance		5MΩ		
Thermocouple break detection current		100 nA		

SPECIFICATIONS

Digital I/O			
Number of Digital I/O	--	--	4 differential digital inputs and outputs
Digital Input	--	--	1 trigger input(DI0) and 3 general purpose inputs
Digital Input- High Input Voltage	--	--	3 ~ 30 V
Digital Input- Low Input Voltage	--	--	< 0.8 V
Digital Input- High Input Current	--	--	0.8 ~ 13.1 mA
Digital Input- Low Input Current	--	--	<10 μA
Digital Input- Terminal Resistor	--	--	2.2KΩ
Digital Output Configuration	--	--	transistor switch
Digital Output- External Supply Voltage	--	--	<30 V
Digital Output- ON-state Voltage	--	--	<1.5 V
Digital Output- ON-state Current	--	--	<400 mA
Digital Output- OFF-state Current	--	--	<2.1 μA
Digital Output- Power Dissipation per Output	--	--	<0.6 W
Isolation Voltage			±250 V
Communication			
RS-232	--	--	Half Duplex, DB-9 female connector
USB	USB2.0 (full speed device) ; USB A-type connector		USB2.0 (full speed device) ; USB B-type connector
LAN	--	--	10/100 Mbps
Power Specifications			
Power Requirement	4.5~5.5 V		11.4~12.6 V
Maximum Power Consumption	0.22W	1.2W	18 W
Physical Specifications			
Dimensions (WxDxH)	96 x 29 x 14.5mm	135.3 x 186 x 51.7 mm	277 x 200.7 x 233 mm
Weight for Main Frame	30g	1.2 Kg	2.4 Kg
Weight per Sensor Card	--	--	0.15 Kg
Weight (Main Frame + 8 Sensor Card)	--	--	3.6 Kg
Environmental specifications			
Operating Temperature *1*2	0~50˚C		
Humidity	< 80 %RH		
Power Adaptor Input Voltage	--	--	90 to 260 VAC
Power Adaptor Input Frequency	--	--	47 to 63 Hz
Main Frame DC Input	--	--	12.6 V/1.5 A
Thermocouple Differential Input Voltage Limit	±1.2 V	±1.2 V	± 1.2 V
Operating Temperature	0~50˚C		
Storage Temperature	-20~60˚C		
Storage Humidity	80 %RH		

Voltage Reading		
Voltage Input Type	VA-480 Voltage Adaptor	VA-10 Voltage Adaptor
Voltage Resolution	1mV	100uV
Voltage Input Range	±480VDC	±10VDC
Voltage Input Accuracy	±(0.1% of reading + 1mV)*3	±(0.05% of reading + 500uV)*3
Input Resistance	1MΩ	300 KΩ

Current Reading	
Current Input Type	IA-3 Current Adaptor
Current Resolution	1mA
Current Input Range	±3A
Current Input Accuracy	±(1% of reading + 1mA)

Voltage/Current Adaptor

Thermal Coupler

Note *1 : Measure after heat equilibrium is reached and the uncertainty of thermocouple itself is excluded. Operating temperature from 20˚C to 30˚C
Note *2 : For operating temperature out of range from 20˚C to 30˚C, additional error (0.01% of reading + 0.03˚C) / ˚C for that out of operating temperate should be added
Note *3 : Under MV_8 filtering mode
Note *4 : Model 51101-64/51101C-64 with LAN module
All specifications are subject to change without notice.

ADVANCED TEC CONTROLLER
MODEL 54100 SERIES

A thermoelectric cooler (TEC) module is a solid state device which can control heat flux using current. First discovered in the 19th century and called the Peltier effect, TEC's operate by electrical current flow between two dissimilar conductors. Depending on the direction of the flow heat will be either absorbed or released. This technology is very useful for small scale temperature control; providing fast temperature response and ultra-high temperature stability. TEC temperature control equipment is also very compact and energy efficient in comparison to conventional thermal chambers. TECs have the added advantage of control case temperatures directly and have mechanical moving parts.

Chroma's Model 54100 series of advanced TEC Controllers provide an excellent temperature monitoring engine via two thermal couple inputs. The cold junction of the engine is internally stabilized to 0.001˚C, providing 0.01˚C temperature resolution. The TEC driver circuit within the 54100 uses a filtered PWM architecture which provides much higher drive currents over ordinary PWM drivers and provides smooth current modulation which is critical for electro-magnetic sensitive measurements.

Another important feature of Chroma's 54100 TEC Controllers is its true auto tune function providing for optimum control and temperature response. Stability down to the temperature resolution of 0.01˚C is regularly achieved regardless of the size and geometry of thermal platforms.

High TEC driving capability is another merit of Chroma's 54100 controllers. Currently two modles are available (150W and 300W) with 800W under development. More TEC driving power means wider temperature range, faster temperature response, and larger platform applications. For comparable accuracy and stability, offers one of the best TEC driving power-to-price ratio in the market.

* Operation temperature range of platform is independent with TEC controller range, and proper platform design should be considered to obtain certain temperature.

MODEL 54100 SERIES

KEY FEATURES

- Bidirectional driving with 150W (24V 8A), 300W (27V/12A),or 800W (40V/20A) output
- Filtered PWM output with >90% driving power efficiency while maintaining linear driving with current ripples<20 mA
- Temperature reading and setting range -50 to 150˚Cwith 0.01˚Cresolution and 0.3˚C absolute accuracy
- Short term stability (1 hour) ±0.01˚C and long term stability ±0.05˚C with optimal PID control
- Feature true TEC large signal PID auto tune for best control performance
- 2 T-type thermal couple inputs, one for control feedback and the other for monitor and offset, providing versatile control modes
- RS232 serial communication port for PC remote operation and thermal data recording
- Powerful and user-friendly PC program available
- Perfect matching all designed temperature controlled platforms

SPECIFICATIONS

Model		54115-24-8	54130-27-12	54180-40-20
TEC Output Voltage		24VDC	27VDC	40VDC
TEC Output Current		8A	12A	20A
TEC Driving Output Power		150W	300W	800W
Controller Temperature Performance				
Controller Temperature Setting Range		-49 to 149˚C		- 70 to 250˚C *1
Controller Setting Resolution		0.01˚C		
Temperature Control Stability	Short Term	≦0.01˚C		
	Long Term	≦0.05˚C		
Temperature Monitoring				
Monitoring Temperature Range		-49 to 149˚C		- 70 to 250˚C *1
Temperature Sensor Type		T-type thermocouple		Standard : T-type thermocouple Optional : K-type thermocouple
Monitoring Temperature Resolution		0.01˚C		
Monitoring Temperature Relative Accuracy		< ±0.3˚C		
Monitoring Temperature Absolute Accuracy		< ±(0.3+0.002×|T-25|) ˚C		
Environmental				
Working Temperature		5~40˚C		
Humidity		< 80 % RH		
Power Requirement		90 to 240 VAC, 50/60 Hz		
Maximum Power Consumption		330W	550W	1400W
Fuse		3A/250V	5A/250V	12A/250V
PC Communication Port		RS-232 Half Duplex		RS-232 Half Duplex ; USB2.0 ; LAN 10/100Mbps
Storage Temperature		-20~60˚C		
Storage Humidity		80%R H		
Dimensions (WxDxH)		362 x 286 x 131.2 mm / 14.3 x 11.3 x 5.17 inch		241 x 441 x 135 mm / 9.5 x 17.4 x 5.3 inch
Weight		6.3 kg / 13.9 lbs	6.6 kg / 14.6 lbs	9.5 kg / 20.9 lbs

Note *1 : Platform temperature range is highly relating to the structure and design and will need to apply external elements to reach extreme conditions. To reach below -30 degree, it will need extra coolant. To reach beyond 150 degree, other heating material will need to be considered.

Note *2 : The temperature control stability depends on not only the controller but also platform and environment. The PID parameters must be optimized for the platform. Avoid any liquid or air turbulence around the platform. Attach the temperature feedback thermocouple firmly with good thermal conductivity. Shield for electromagnetic interference if necessary. Extremely high control temperature stability can be achieved with all these issue taken care.

Note *3 : Monitoring Temperature Relative Accuracy is defined as the temperature difference between the two thermocouples reading the same thermal point. It is the working ambient temperature, which must be thermal balance within 20~30˚C, and exclude thermocouples error for controller specifications to be guaranteed. If the operation temperature is out of 20~30˚C, the specification will be modified to < ±(0.3+0.002×|T-25|), where T here is the working ambient temperature.

HF LCR METER MODEL 11050 SERIES

The 11050/11050-5M HF LCR Meter is a precision test instrument designed to accurately measure and evaluate passive components at high speeds. Its measurement capabilities cover the primary and secondary parameters required for testing the inductance, capacitance, resistance, quality factor and loss factor of passiv e components. The HF LCR Meter has a broad testing frequency range 1kHz~10MHz/60Hz~5MHz suitable for analyzing the components' characteristics under different frequencies. Its 0.1% basic measurement accuracy provides stable and highly reliable results. A fast 15ms measurement speed effectively increases productivity when working in an automated environment.

In addition to the excellent measurement features found in other LCR Meters, the 11050/11050-5M includes additional useful functions. It has 3 output impedance modes to satisfy demands of measuring and working with other instruments. The versatile digital display can be configured to best fit the current testing resolution; furthermore, the test signal monitoring function displays the voltage and current that is actually carried to the DUT. The timing settings of trigger delay, measure delay and average number of times allow the measurements to transfer seamlessly to an automated test environment providing accurate results within a limited testing time.

The detached design adopted by the 11050/11050-5M provides several advantages. Since test processing and the display use separate CPUs, the testing speed is increased and shorter test leads are needed when integrated into an automated test environment. Shorter test leads improve the accuracy of high frequency measurements.

Chroma's 11050/11050-5M HF LCR Meter has multiple remote interface options. Handler and RS-232C remote interfaces come standard for software or hardware control of test conditions, measurement trigger, judge test results, and collect measured data. The standard USB port saves device settings and controls the output of an external DC bias current source. Optional GPIB and Ethernet remote interfaces are available as well for software control.

Due to the design of modern portable electronic communication devices with thin form factors and low power consumption, required frequency testing of power inductors is increasing. The equivalent series resistance of components has become a critical indicator to identify if it is good or bad. The buffer capacitor plays an important role for overall circuit reliability and must function properly under various voltage transient conditions; the equivalent series resistance must remain at a very low level when operated at high frequencies. The 11050/11050-5M is focused on testing passive components at high frequencies and with enhanced key measurement capabilities during R&D so that it simulates the user’s actual application as closely as possible. The increased accurac y of low impedance measurements demonstrates the usefulness of 11050/11050-5M in high frequency testing applications.

The 11050/11050-5M HF LCR Meter was designed with many enhancements and key features to make it the best choice to meet the demands of modern component characterization analysis and high speed testing for automated production line or incoming/outgoing inspection applications.

RS-232C HANDLER GPIB LAN CE

MODEL 11050 SERIES

Key Features

- Test Parameter: L/C/R/Z/Y/DCR/Q/D/ θ
- Test Frequency:
  1kHz ~ 10MHz (11050)
  60Hz ~ 5MHz (11050-5M)
- Test Level: 10mV ~ 5V
- Basic Accuracy: 0.1%
- 15ms fast speed measurement
- 3 output impedance modes
- Test signal monitoring function
- Compare & bin-sorting function
- Open/short zeroing & load correction function
- Detached measurement & display unit design
- Standard Handler, RS-232C, USB storage & external bias current control interface
- Optional GPIB or LAN interface

SPECIFICATIONS

Model	11050	11050-5M
Test Parameter	L, C, R, Z, Y, DCR, Q, D, θ	
Test Signal		
Test Frequency	1kHz ~ 10MHz ± (0.1% + 0.01Hz)	60Hz ~ 5MHz ± (0.1% + 0.01Hz)
Test Level	≦1MHz: 10mV ~ 5V; ± [(10 + fm)% + 10mV] ; >1MHz: 10mV ~ 1V; ± [(10 + fm)% + 1mV] ; fm: test frequency [MHz]	
Output Impedance	100Ω, 25Ω, OFF	
Measurement Display Range		
L	0.00001uH ~ 99.999MH	
C	0.00001pF ~ 999.999F	
R, Z	0.01mΩ ~ 9999.99MΩ	
DCR	0.01mΩ ~ 999.99MΩ	
Q, D	0.00001 ~ 99999	
θ	-90.00° ~ 90.00°	
Basic Accuracy		
Z	± 0.1%	
DCR	± 0.1%	
θ	± 0.04°	
Measurement Speed	Fast : 15ms ; Medium : 150ms ; Slow : 295ms (1kHz)	
Communication Interface	RS-232C, Handler, USB storage, External bias current control, GPIB (option), LAN (option)	
Measurement Functions		
Trigger Mode	Internal, Manual, External, Bus	
Range Switching Mode	Auto, Hold	
Equivalent Circuit Mode	Series, Parallel	
Judgment	Compare, Bin-sorting	
Correction	Open/Short Zeroing, Load Correction	
Others		
Operating Environment	Temperature : 0°C ~ 40°C ; Humidity : 10% ~ 90%	
Power Consumption	60VA max.	
Power Requirement	100 ~ 240V ±10% , 47Hz ~ 63Hz	
Dimension (H x W x D)	230 x 428 x 290 mm / 9.06 x 16.85 x 11.42 inch	
Weight	Approx. 8 kg / 17.64 lb	

*All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

LCR METER
MODEL 11021/11021-L

The 11021/11021-L are the most cost-effective digital LCR Meters, provide 100Hz, 120Hz, 1kHz, and 10kHz test frequencies for the 11021 and 1kHz, 10kHz, 40kHz, 50kHz test frequencies for the 11021-L. Standard RS232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the 11021/11021-L can be used for both component evaluation on the production line and fundamental impedance testing for bench-top applications.

Bin-sorting Function

The 11021/11021-L provides 8-bins sorting function with bin count statistics. It is very convenient for magnetic core sorting or capacitor sorting. And the bin count statistics can be used to analysis distribution of tested results or production quality.

HI/GO/LO Comparator

The 11021/11021-L has a comparator function to judge HI/GO/LOW of capacitance measured results, and to judge GO/NG of D factor. And an alarming beeper for total GO/NG judge.

Trigger Delay Time

For large capacitance measurement in automatic production, a RC (meter output resistance and unknown capacitance) delay time for test signal transient is necessary. The 11021/11021-L provides trigger delay time for it, and is convenient for automatic equipment timing adjustment.

Input Protection

Un-discharged device (generally, a capacitor) under test is the most general reason causes destroy on a LCR Meter. The 11021/11021-L using an excellent input protection circuit to prevent it from this kind of damage.

Open/Short Zeroing

General low-end LCR meter just provides zero offset to substrate stay capacitance, residual resistance or residual inductance only for C, R, L measurement which can not accurately measure Q (quality factor) for L, R measurement and D (dissipation factor) for C measurement. The 11021/11021-L provides full open/short circuit zeroing function.

GPIB RS-232C HANDLER CE

MODEL 11021/11021-L

Key Features

- Test frequencies: 100Hz, 120Hz, 1kHz and 10kHz (9.6kHz) (11021) 1kHz, 10kHz, 40kHz, 50kHz (11021-L)
- Basic accuracy: 0.1% (11021), 0.2% (11021-L)
- 0.1mΩ~99.99 MΩ measurement range, 4½ digits resolution
- Lower harmonic-distortion affection
- Fast measurement speed (75ms)
- Standard RS-232 interface
- Optional GPIB & Handler interface
- Programmable trigger delay time is convenient for measurement timing adjustment in automatic production
- Bin-sorting function
- Comparator and pass/fail alarming beeper function
- Text mode 40x4 matrixes LCD display
- Friendly user interface
- Open/short zeroing
- On-line fireware refreshable (via RS-232)
- Input protection (1 Joule)

Lower Harmonic-distortion Phase-detection Technology

The 11021/11021-L uses lower harmonic-distortion phase-detection technology to reduce affection of measurement accuracy caused by hysteresis distortion in magnetic component or high dielectric-coefficient capacitor measurement, which is not provided in general low-end LCR meters. General low-end LCR meters use half period integration method as phase detector. The 11021-L is the ideal selection for high frequency coil, core, choke, ect passive components incoming/outgoing material quality inspect and automatic production. The frequency spectrum of half period square wave is shown as figure 1 and 2, which non-ignorable 3rd, 5th order harmonics are included. For non-linear devices under testing, odd-order (3rd, 5th, 7th, etc.) harmonics may occur in measured potential or current signals. Then, this phase-detection method will cause obvious accuracy error because of same low order harmonics are included in both unknown signal and phase-detect signal. The 11021/11021-L uses eight steps sine-wave multiplier as phase detector to reduce low-order harmonics affection to an ignorable level.

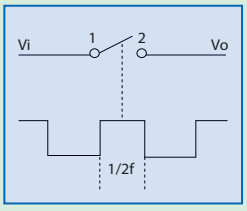


Figure 1 : The frequency spectrum of half period square wave (general low-end LCR meters)

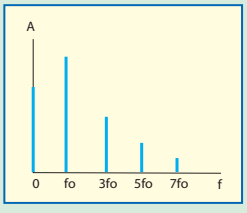


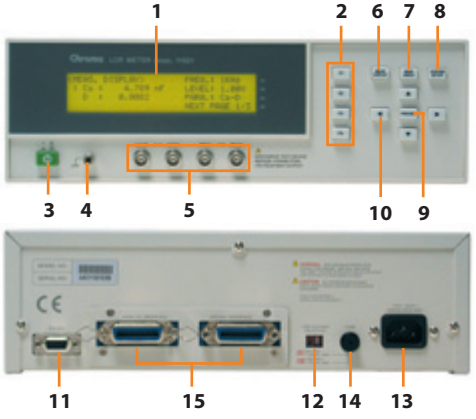
Figure 2 : Non-ignorable 3rd, 5th order harmonics (11021 uses eight steps sin-wave multiplier)

SPECIFICATIONS

Model	11021	11021-L
Measurement Parameter		
Primary Display	L, C, R, |Z|	
Secondary Display	Q, D, ESR, Xs, θ	
Test Signals Information		
Test Level	0.25V / 1V , ±(10% + 3 mV)	50mV/ 1V, ±10%+3mV
Test Frequency	100Hz, 120Hz, 1kHz, 10kHz (9.6kHz)	1kHz, 10kHz, 40kHz, 50kHz
Frequency Accuracy	±0.25%	±0.02%
Output Impedance (Typical)	Varies as range resistors 25, 100, 1k, 10k, 100k	
Measurement Display Range		
Primary Parameter	L: 0.01μH ~ 9.999kH, C: 0.01pF ~ 99.99mF, R,|Z|: 0.1m. ~ 99.99MΩ	
Secondary Parameter	Q: 0.1 ~ 9999.9, D: 0.0001 ~ 9999.9, θ : -180.00°~ +180.00°	
Basic Accuracy *1	±0.1%	±0.2%
Measurement Time (1KHz) *2		
Fast	Freq = 1k/10kHz : 75ms Freq = 100/120Hz: 85ms	Freq = 1kHz/10kHz : 75ms Freq = 40kHz : 105ms Freq = 50kHz : 90ms
Medium	145ms	*3
Slow	325ms	*4
Trigger	Internal, Manual, External, BUS	
Display		
L, C, R, |Z|, Q, D, R, θ	40 x 4 (Character Module) LCD Display	
Function		
Correction	Open/Short zeroing	
Equivalent Circuit Mode	Series, Parallel	
Interface & Input/Output		
Interface	RS-232 (Standard), Handler & GPIB (Optional)	
Output Signal	Bin-sorting & HI/GO/LOW judge	
Comparator	Upper/Lower limits in value	
Bin Sorting	8 bin limits in %	
Trigger Delay	0 ~ 9999mS	
General		
Operation Environment	Temperature : 10°C ~ 40°C, Humidity < 90 % R.H.	
Power Consumption	50VA max.	
Power Requirement	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)	100 x 320 x 206.4 mm / 3.94 x 12.6 x 8.13 inch	
Weight	4 kg / 8.81 lbs	

Note*1 : 23±5°C after OPEN and SHORT correction, slow measurement speed. Refer to operation manual for detail measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judge test parameter measurement.
Note*3 : Freq.=1kHz/10kHz 145ms Freq.=40kHz 185ms Freq.=50kHz 150ms
Note*4 : Freq.=1kHz/10kHz 325ms Freq.=40kHz 415ms Freq.=50kHz 400ms

PANEL DESCRIPTION



1. **LCD Display**
2. **Function Keys**
3. **Power Switch**
4. **Ground Terminal**
5. **Measurement Terminals**
6. **Measurement Display Key**
7. **Main Index Key**
8. **System Setup Key**
9. **Trigger Key**
10. **Cursor Keys**
11. **RS232 Interface**
12. **Power Voltage Selector**
13. **AC Line Input**
14. **Fuse**
15. **GPIB and Handler Interface**

LCR METER
MODEL 11022/11025

The 11022 and 11025 LCR Meters are passive component testers that give you the most cost effective alternative equivalent to other high priced meters. They are designed for the demanding applications of production test, incoming inspection, component design and evaluation. Programmable test signal level settings are from 10mV to 1V in steps of 10mV, and the VM/IM signal level monitor functions allow you to evaluate your devices at the level you specify. Ten test frequencies of 50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, and 100kHz, can be used to evaluate passive components and transformers/ LF coils.

Other low cost LCR meters on the market have shortcomings when used for low impedance component evaluations, such as the large capacitance of electrolytic capacitors and low inductance of coils. As the 11022/11025 are equipped with high resolution (0.01mΩ) in low impedance, and high accuracy (0.3%) untill 100mΩ range, they can be used to evaluate low impedance components to meet measurement requirements.

The 11025 LCR Meter can also measure DC resistance, turn ratio and mutual inductance of transformers. It is suitable for pulse transformer or LF coil evaluation. Chroma's Transformer Test Fixture used with the 11025, can measure both the primary and the secondary parameters automatically by changing the internal relays in the 11025. With this, there is no need to change the connections required for measuring transformer parameters. With an adjustable internal DC bias current source up to 200mA as a standard function, the 11025 is the right tool for inductance inspection of telecom transformers and small power chokes under DC bias current.

The 11022/11025 LCR Meters provide a powerful combination of features designed to maximize productivity in all testing environments. Measurement speed in the SHORT integration time mode is 15mS(≧100Hz). Handler interface, Pin-out, GPIB Interface, and IEEE 488 commands are compatible with 4263B.

Finally, the 11022/11025 have a built in comparator, 8 bin sorting, trigger delay functions, and handler interface trigger functions, making system integration easy, and improving measurement throughput as well as reliability.

GPIB HANDLER RS-232 CE

MODEL 11022/11025

Key Features

- 0.1% basic accuracy
- Transformer test parameters (11025), Turns Ratio, DCR, Mutual Inductance
- 50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz test frequencies
- 21ms measurement time (≧ 100Hz)
- Agilent 4263B LCR Meter commands compatible
- 4 different output resistance modes selectable for non-linear inductor and capacitor measuring
- High resolution in low impedance(0.01mΩ) and high accuracy 0.3% till 100mΩ range
- Adjustable DC bias current up to 200mA (constant 25Ω) (11025)
- 1320 Bias Current Source directly control capability
- 0.01mΩ ~ 99.99MΩ wide measurement range (4 1/2 digits)
- Dual frequency function for automatic production
- BIAS comparator function
- Comparator function and 8/99 bin-sorting function
- Pass/fail judge result for automatic production
- Handler interface trigger edge (rising/falling) programmable
- Test signal level monitor function
- Standard GPIB, RS-232, and handler interface
- Open/short zeroing, load correction
- LabView® Driver

SPECIFICATIONS

Model	11022	11025
Test Parameter	L,C, R,|Z|, Q, D, ESR, X, θ	L,C, R,|Z|, Q, D, ESR, X, θ DCR4, M, Turns Ratio, L2, DCR2
Test Signals		
Level	10 mV~1V , step 10 mV; ±(10% + 3 mV)	
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; ±0.01%	
Output Impedance (Nominal Value)	Constant 107X : 25Ω ; Constant 320X : 100Ω ; Constant 106X : 2Ω ,for Z≧10Ω , 100mA (1V setting) for reactive load≦10Ω ; Constant 102X : 25Ω , for Z<1Ω , 100Ω for else	
DC Bias Current (Freq. ≧ 1kHz)	- -	50mA max. for Constant 100Ω , 200mA max for Constant 25Ω (AC level ≦ 100mV)
Measurement Display Range		
C (Capacitance)	0.001pF ~ 1.9999F	
L, M, L2 (Inductance)	0.001μH ~ 99.99k	
Z (Impedance), ESR	0.01mΩ ~99.99MΩ	
Q (Quality Factor) ; D (Dissipation Factor)	0.0001 ~ 9999	
θ (Phase Angle)	-180.00° ~ +180.00°	
Turns Ratio (Np:Ns)	--	0.9~999.99
DCR	--	0.01mΩ~99.99MΩ
Basic Measurement Accuracy *1	±0.1%	
Measurement Time (Fast) *2	21ms	
Interface & I/O		
Interface	handler (50pin), GPIB, RS-232	
Output Signal	Bin-sorting & HI/GO/LOW judge	
Comparator	Upper/Lower limits in value	
Bin Sorting	8/99 bin limits in %, ABS	
Trigger Delay	0~9999ms	
Display	240 x 64 dot-matrix LCD display	
Function		
Correction	Open/ Short zeroing, load correction	
Averaging	1~256 programmable	
Cable Length	0m, 1m, 2m, 4m	
Test Sig. Level Monitor	Voltage, Current	
Equivalent Circuit mode	Series, Parallel	
Memory (Store/ Recall)	50 instrument setups	
Trigger	Internal, Manual, External, BUS	
General		
Operation Environment	Temperature : 10°C~40°C Humidity : < 90 % R.H.	
Power Consumption	65VA max	
Power Requirements	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)	100 x 320 x 347.25 mm / 3.94 x 12.6 x 13.67 inch	
Weight	5.5 kg / 12.11 lbs	

Note*1 : 23 ± 5°C after OPEN and SHORT correction. Slow measurement speed. Refer to Operation Manual for detailed measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judgment of primary and secondary test parameter measurement.

AUTOMATIC TRANSFORMER TESTER MODEL 13350

Acquired from many years of marketing experiences and cumulative results, 13350 is the newest generation of Automatic Transformer Tester that not only retains the merits of old 3250 model but also has many new functions including the combination of measurement unit and scan box to reduce measurement error caused by long wire, C.T. test fixture and 80/20 channels scan box support, USB interface for test conditions back-up, LAN communication interface, separate setting of test frequency/voltage/speed, Fail Lock function and Auto Test. It solves the performance and quality problems as well as human errors occurred on production line for the transformer industry today.

For instance: To reduce human errors on production line, the13350 Fail Lock function is able to lock the defect DUT (Device Under Test) when the test is done to prevent it from flowing out accidently. In order to cut down the time for placement, the 13350 Auto Test function can conduct test directly without pressing the trigger key. In addition, the 13350 adopts the design of dual CPU to increase the test speed by processing the measurement and display units simultaneously.

The compensation function of 13350 can do OPEN/SHORT for individual channel to solve the errors due to different layout on various fixtures.

13350 provides 20Hz-200kHz test frequency and scan test items to cover low voltage test parameters for various transformers including Inductance (L), Leakage (Lk) , Turn-Ratio, DC Resistance (DCR), Impedance (Z), Stray Capacity (C), Quality Factor (Q), Equivalent Series Resistance (ESR), Pin Short (PS), Winding Phase (PH) and Balance.

Applicable Test Options for Selection

A133502 20 Channels Scan Box

13350 uses split screen that allows the measurement unit to integrate the 20 channels scan box without using any connecting wires to reduce measurement errors. Furthermore, the 20 channels scan box has external standard test function that can perform verification test directly without any act of disassembly.

A133505 80 Channels Scan Box

13350 along with 80 channels scan box can mainly offer three different applications:

1) RJ-45 & LAN Filter test solution that can test up to 80 pins one time.
2) Transformer automation solution that can place 4 transformers on one carrier for scan test simultaneously.
3) Island-type production line planning that provides a time division multiplexing module to increase the equipment utilization rate.

A133506 C.T. (Current Transformer) Test Fixture

When the 13350 works with A133506 C.T. Test Fixture, it can measure the turns, inductance and DC resistance easily and rapidly by putting in the C.T. directly.

CE

MODEL 13350

Key Functions :

- Test frequency 20Hz ~ 200KHz
- Turn Ratio, Phase, L, Q, Lk, ACR, DCR, Cp, Pin short, Balance
- Basic accuracy : 0.1%
- Three different output impedance modes
- Scan unit/box including :
  - 20ch scan test unit
  - 80ch* scan box
  - C.T.* test fixture

Key Features :

- Compensation for individual channel
- *Combined measurement unit and scan box to reduce measurement errors
- *USB storage interface
- *10-100 LAN/ USB-H interface (option)
- *Built-in programmable 100mA bias current (RJ-45)
- *Test frequency, voltage and speed set separately
- *Fail Lock function
- *Auto Test function
- *Equipped with external standard test on 20ch scan test unit
- *Reduce the short-circuit loss in secondary side for leakage (Lk) test (A133502 20ch scan unit)
- *Short-circuit pin selectable for every test item
- *Multiple language: English & Simplified Chinese
- *RS232 interface compatible SCPI commands (option)

*New features compared to 3250 Series

SPECIFICATIONS

Model		**13350**
Main Function		Transformer Scanning Test
Test Parameter		
Transformer Scanning		Turn Ratio, Phase, Turn, L, Q, Leakage L, Balance, ACR, Cp, DCR, Pin Short
Test Signals Information		
Test Level	Turn	10mV~10V, ±10% 10mV/step
	Others	10mV~2V, ±10% 10mV/step
Test Frequency	Turn	20Hz~200kHz, ± (0.1% + 0.01Hz), Resolution: 0.01Hz
	Others	20Hz~200kHz, ± (0.1% + 0.01Hz), Resolution : 0.001Hz (<1kHz)
Output Impedance	Turn	10Ω, when level≦2V / 50Ω, when level > 2V
	Others	Constant = OFF : Varies as range resistors ; Constant = 320X : 100Ω ±5% ; Constant = 107X : 25Ω ±5% Constant=106X : 100mA ±5% (1V setting); for inductive load less than 10Ω,10Ω ±10%, for impedance ≧10Ω
Measurement Display Range		
L, LK		0.00001μH~9999.99H
C		0.001pF~999.999mF
Q, D		0.00001~99999
Z, X, R		0.0001Ω~999.999MΩ
θ		-90.00°~ +90.00°
DCR		0.01mΩ~99.999MΩ
Turn,Ratio		0.01~99999.99 turns (Secondary voltage less than 100 Vrms)
Ratio (dB)		-39.99dB~+99.99dB (secondary voltage less than 100 Vrms)
Pin-Short		11 pairs, between pin to pin
Basic Accuracy		
L, LK, C, Z, X, Y, R, DCR		±0.1% (1kHz if AC parameter)
DCR		±0.5%
θ		±0.04°(1kHz)
Turn, Ratio (dB)		±0.5% (1kHz)
Measurement Speed (Fast)		
L, LK, C, Z, X, Y, R, Q, D, θ		50 meas./sec.
DCR		12 meas./sec.
Turn, Ratio (dB)		10meas./sec.
Judge		
Transformer Scanning		PASS/FAIL judge of all test parameters output from Handler interface, 100 bin sorting for Lk
Trigger		Internal, Manual, External
Display		Color 640x480 LCD panel
Equivalent Circuit Mode		Series, Parallel
Correction Function		Open/Short Zeroing, Load correction
Memory		15 instrument setups, expansion is possible via memory card
General		
Operation Environment		Temperature:10°C~40°C, Humidity: 10%~90% RH
Power Consumption		60 VA max.
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz (Auto Switch)
Dimension (H x W x D)		13350M : 58 x 280 x 300 mm / 2.28 x 11.02 x 11.8 inch ; 13350D : 45 x 140 x 225 mm / 1.77 x 5.51 x 10.03 inch
Weight		13350M : Approx. 3.5 kg / 7.71 lbs ; 13350D : Approx. 1.3 kg / 2.86 lbs

* All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

CAPACITOR LEAKAGE CURRENT/IR METER MODEL 11200

The 11200 Capacitor Leakage Current / IR Meter is Chroma's newest digital leakage current meter. It provides DC 1~650V, 0.5~500mA (150mA for V>100V) or DC1~800V, 0.5~500mA (50mA for V>100V) DC power source with voltage meter and nano-ampere meter. Mainly used for electrolytic capacitor leakage current testing, and aluminum-foil withstand voltage testing (EIAJ RC-2364A). And also can be used for active voltage checking or leakage current testing of absorber, zener diode, neon lamp, etc. Standard RS-232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the 11200 can be used for both component evaluation on the production line and fundamental leakage current or IR testing for bench-top applications.

1~650V, 150mA/500mA or 1~800V, 50mA/500mA Low Noise DC Voltage Source

A low noise linear power supply is designed in the 11200. The DC output voltage range is from 1.0V to 650V/800V, which covers low WV capacitor leakage current testing and aluminum-foil withstand voltage testing range. The maximum charge current is 500mA/100V, 150mA/650V or 50mA/800V, provides quick charge for large capacitor testing.

Precision Low Constant Current Charge Capability (0.5mA ±0.05mA)

In general, the aluminum electrolytic capacitor's anode oxide-foil is using extremely low constant current (0.5mA, 1mA or 2mA ±10% depending on the type of the foil, defined by EIAJ RC-2364A standard) to test foil withstand voltage (Vt) and rise time (Tr). The 11200 provides constant charge current low to 0.5mA with high stability.

0.001μA~20.00mA Leakage Current Test Range with 4 Digits Resolution

A 0.001uA to 20mA test range nano-ampere meter is built in the 11200. It is proper to be used for leakage current or IR testing of electrolytic capacitor and high dielectric ceramic capacitors. And the extremely low input resistance (the lowest is 0 ohm) design enables high speed testing for high capacitance device LC or IR testing.

Output Voltage Monitor

The 11200 always keeps monitoring the real output voltage no matter in the test or setup operation status for safety of the operator. In addition to display the real output voltage in TEST page, an error message shows up in case the output voltage abnormally exceeds 10 volts in other operation pages.

65W/50W Semi-constant Power Discharge Circuit

A 65W/50W semi-constant power discharge circuit is built in the 11200 for high speed and complete discharge after test. It satisfies quick discharge requirement for charged large capacitors.

Built-in RS-232 Interface and Optional GPIB & Handler Interface

The 11200 built-in RS-232 interface can be used in R&D or QC for remote control and tested data fetch. And, GPIB & handler interface (A110235) is optional for automation.

MODEL 11200

KEY FEATURES

- Capacitor leakage current test function
- Insulation resistance (IR) test function
- Basic accuracy: 0.3%
- Constant current DC power source with discharge function
- Forward voltage function for diode, LED, zener diode and varistor
- Surge voltage test function for electrolytic capacitor (JIS C5101/5102/5140/5141)
- Option contact check function to improve test reliability
- Aluminum-foil withstand voltage and rise-time test function (for EIAJ RC-2364A)
- Precision low constant current charge capability (0.5mA ±0.05mA, meet EIAJ RC-2364A requirement for withstand voltage testing of lower WV aluminum-foil)
- Large charge current (500mA) capability to fasten charge speed
- 1.0V~650V/800V DC voltage source
- 0.001uA~20.00mA leakage current test range with 4 digits resolution
- Digital timer inside
- Comparator and pass/fail alarming beeper function
- Standard RS-232 interface
- Optional GPIB & handler interface

APPLICATIONS

- Various electrolytic capacitors, high dielectric ceramic capacitor, etc.
- Aluminum-foil withstand voltage test (for EIAJ RC-2364A)
- Semiconductor component leakage current test or insulation resistance test
- Insulation resistance test of various anti-static electric materials or non-ultra-high insulation materials (IR<100GΩ)

SPECIFICATIONS

Model		11200 (650V)	11200 (800V)
Main Function		Capacitor Leakage Current / IR Meter	
Test Parameter		LC, IR	
Test Signals Information			
Voltage		1.0 V~100 V, step 0.1 V; 101V~650 V,step 1V; ±(0.5% + 0.2V)	1.0 V~100 V, step 0.1 V; 101V~800V,step 1V; ±(0.5% + 0.2V)
Charge Current Limit		V ≦ 100V: 0.5mA~500mA, 50W max. V > 100V: 0.5mA~150mA, 97.5W max. step 0.5mA; ±(3% + 0.05mA)	V ≦ 100V: 0.5mA~500mA, 50W max. V > 100V: 0.5mA~50mA, 40W max. step 0.5mA; ±(3% + 0.05mA)
Measurement Display Range		LC : 0.001μA~20.00mA	
Basic Measurement Accuracy *1		LC Reading : ±(0.3% + 0.005μA)	
Measurement speed (Ext. Trigger, Hold Range, Line Frequency 60Hz)	Fast	77 ms	
	Medium	143 ms	
	Slow	420 ms	
Function			
Correction		Null zeroing	
Test Voltage Monitor		Vm: 0.0 V~660.0V; ±(0.2% of reading + 0.1V)	Vm: 0.0 V~900.0V; ±(0.2% of reading + 0.1V)
Charge Timer		0~999 sec.	
Dwell Timer		0.2~999 sec.	
Foil WV Tester			
Test Parameter		Tr (Rise Time), Vt (Foil Withstand Voltage)	
Test Signals	Voltage Limit	650 V typical	800V typical
	Constant Charge Current	0.5mA~150mA, step 0.5mA; ±(3% of reading + 0.05mA)	0.5mA~50mA, step 0.5mA; ±(3% of reading + 0.05mA)
Test Display Range	Tr (Rise Time)	0.05~600.0 sec.	
	Charge Voltage	0.1V~660.0V	0.1V~900.0V
Test Time		30~600 sec.	
Interface		RS-232(Standard), Handler, GPIB (Optional)	
Display		240 x 64 dot-matrix LCD display	
Trigger		Internal, External, Manual, BUS	
General			
Operation Environment		Temperature : 10˚C~40˚C Humidity : < 90 % RH	
Power Consumption		400 VA max.	
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)		100 x 320 x 346.1 mm / 3.94 x 12.6 x 13.63 inch	
Weight		8 kg / 17.62 lbs	

Note*1 : 23 ± 5˚C after null correction. Refer to Operation Manual for detail measurement accuracy descriptions.
*All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

RIPPLE CURRENT TESTER
MODEL 11800/11801/11810

The 11800/11801/11810 Ripple Current Tester is a precision tester designed for electrolytic capacitors load life testing. It provides constant ripple current output and constant peak voltage (Vpeak = Vdc + Vac_peak) output digital control function. Let load life testing for electrolytic capacitors becomes easier and more reliable. And, the 11800/11801/11810 use excellent output amplifier design technology to reduce power consumption and internal temperature rising. For long time testing requirement, it can reduce electricity cost and perform high stability. The 11800/11801/11810 is a just right test solution for electrolytic capacitors quality evaluation.

The 11800/11801/11810 Ripple Current Tester is the experience and technology accumulation for several years. According to JIS-C-5102 test method to design large LCD display and computer digital programmable precision measurement instrument, which aim at electrolytic capacitor, tantalum capacitor and solid-state capacitor manufacturers to execute life test instead of wasting time and complicated traditional operation method.

To simplify the operation setting procedure and automatic discharge function for ensuring the operational personnel safety, also connect with the computer through RS485 to monitor Ripple Current Tester include test conditions and monitored status.

The precise measurement data and humanization operation is not only to promote reliability of life test but also assure product quality. It is the best choice in measurement.

Four Terminal Contact Test Jig Design

Four terminal contact test jig design, ensure accurate monitoring of voltage dropped on capacitors under test (Patent pending).

Paired Cooper-foil Wiring Test Cable

The 11800/11801/11810 provides the test fixture for series and parallel, and it improves the loss effectively as high frequency testing causes by the test cable and fixture. The paired cooper-foil wiring test cable reduces voltage drop on the current driving loop and ensures accurate monitoring of ac level dropped on capacitors under test (Patent pending). Working voltage or rated voltage measurement specification too low will be result in the manufacturer's verification invalid problem.

Large LCD Display

The 11800/11801/11810 uses large 320x240 dot-matrix display, shows more test information at the same time. Combine with guided operation design, makes the tester easier to operation. Users can operate instrument easily with great view of setting functions and test result.

RS-485

CE

MODEL 11800/11801/11810

Key Features

- Digital constant current output and constant peak voltage output control function
- Four terminal contact test jig design, ensure accurate monitoring of voltage dropped on capacitors under test (patent pending)
- Paired cooper-foil wiring test cable to reduce voltage drop on the current driving loop and to ensure accurate monitoring of ac level dropped on capacitors under test (patent pending)
- 0-500 V DC bias voltage source, 0.3% basic accuracy
- 0.01~30A, 100Hz/120Hz/400Hz/1kHz AC ripple current source, (±0.5% reading+0.1% of range) basic accuracy (Model 11800)
- 0.01~10A, 20kHz~100kHz AC ripple current source, 2% basic accuracy (Model 11801)
- 0.03~10A, 20kHz~1MHz AC ripple current source (Model 11810)
- Monitoring software (option) for multiple Ripple Current Testers
- Lower power consumption and lower electricity cost
- Large LCD display (320 x 240 dot-matrix)
- Alarm for indicating of normal or abnormal test termination, Tested time will be recorded if the test is terminated abnormally.
  An automatic discharge is always performed after test termination
- Standard RS485 interface is provided for computer monitoring
- Optional 20-fixtures Series or Parallel test jigs
- Digital timer inside
- CE marking (Model 11800/11801)

Model 11801

SPECIFICATIONS

Model		11800	11801	11810
Ripple Current Source				
Current Output Range		0.01~30A	0.01~10A	0.03~10A, *3
Frequency		100Hz/120Hz/400Hz/ 1kHz ±0.1%	20kHz~100kHz	20kHz~1MHz
Accuracy *1	0.030A~0.199A	± (0.5% of reading + 0.1% of range)	± (3% + 0.005 A)	0.03~0.39A, ±(3% + 0.01 A), *2
	0.20A~1.99A		± (2.5% + 0.05 A)	
	2.0A~10A		± (2% + 0.2 A)	0.40~10.0A, ±(2% + 0.05 A), *2
	10.0A~30A		--	
Ripple Voltage Output Range		90Vrms / 10Arms, 30Vrms / 30Arms	15Vrms maximum	
DC Bias Voltage Source				
Voltage Output Range		DC 0 ~ 500V, ± (0.3% + 0.05V)		
Charge Current		200mA, 40W Maximum		
Signal Monitor Parameter Accuracy				
Irms (Ripple Current)	0.001A~0.199A	± (0.5% of reading + 0.1% of range)	± (2% + 0.005 A)	0.030A~0.399A: ±(3% +0.01A),*2, *3
	0.20A~1.99A		± (2% + 0.05 A)	
	2.0A~10A		± (2% + 0.2 A)	0.400A~10.00A: ±(2% +0.05A),*2, *3
	10.0A~30A		--	
Vpeak (Normally, set to capacitor rated voltage)		Vpeak =Vdc + Vac_peak		
Vdc (DC Bias Voltage)		± (0.3% + 0.05V)		
Vrms (Ripple Voltage)		0~1.99V, ± (0.3% of reading + 0.5% of range) 2.00~19.99V, ± (0.3% of reading + 0.1%of range) 20.00V~200.0V, ± (0.3% of reading + 0.1%of range)	± (1% + 0.005V)	± (1% + 0.01V) *2
Control Function				
Timer		1 min~10000 hour, 30min error per year		
Interface		RS-485 (Standard)		
Display		320 x 240 dot-matrix LCD display		
Operation		Start, Stop, Continue		
Protection		OCP, OTP, Over Load		
General				
Operation Environment		Temperature : 10˚C~40˚C, Humidity : < 90 % RH		
Power Consumption		3000 VA max.	700 VA max.	1000VA max.
Power Requirement		180 ~ 264Vac, 47 ~ 63Hz		
Dimension (H x W x D)		221.5 x 440 x 609.8 mm / 8.72 x 17.32 x 24.01 inch	353.6 x 440 x 609.8 mm / 13.92 x 17.32 x 24.01 inch	221.5 x 440 x 609.8 mm / 8.72 x 17.32 x 24.01 inch
Weight		54 kg / 118.94 lbs	60 kg / 132.16 lbs	40 kg / 88 lbs

Note*1 : 23 ± 5˚C
Note*2 : Multiple accuracy for test frequency 20~100kHz (x 1), 101~500kHz (x 2.5), 501kHz~1MHz (x 5)
Note*3 : Frequency > 500kHz : 0.10~10.0A only
Note*4 : Frequency > 500kHz : 0.100~10.00A only
All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

PROGRAMMABLE HF AC TESTER
MODEL 11802 SERIES

11802 Series Programmable HF AC Tester is a digital controlled high frequency AC source platform which can be combined with various modules to provide test method with high frequency/high voltage or high frequency mass current. The 11802 series output frequency range is 20kHz~200kHz which covers application frequencies for SMPS, LCD inverter, ballast, etc. The output voltage can coordinate with transformer module to adjust to required range. It also provides programmable output waveform control to simulate the operating condition for DUT, and cycle count or timer mode digital function for load life test. Tracking DC Source is also used inside the 11802 series for output amplifier to reduce power consumption and temperature rising. It decreases electricity cost and remains stability for long time testing.

The comprehensive design is suitable for various electronic components which used under high frequency and high voltage tests such as LCD Inverter transformer secondary coil, high voltage capacitor, SMPS main power primary coil. It is applicable to high frequency mass current tests such as ballast inductor, ballast capacitor, electrolytic capacitor or other electronic components which are operated under environment of high frequency mass current.

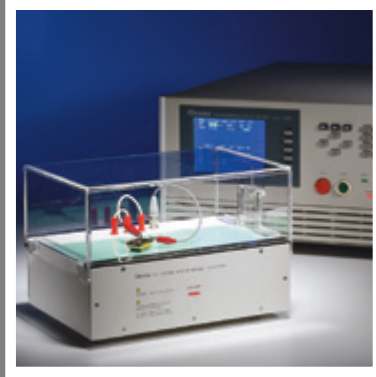
11802 Series Programmable HF AC Tester is an outcome accumulated by years of experience and technology. Control measurement and output accurately with the design of large LCD display to simplify operating procedure as well as support RS485 interface for users monitor test condition and monitoring situation of load life test via PC. The precise measured data and user-friendly operation design can enhance reliability of test. It is the best choice for high frequency test.

MODEL 11802 SERIES

MODEL 11802 : Full Function
MODEL 11805 : Full Function
MODEL 11890 : Withstand Voltage Test
MODEL 11891 : Load Life Test

Key Features:

- Main Frame :
  - 11802 : 167V/3A, 500VA
  - 11805 : 167V/6A, 1000VA
  - 11890 : 167V/3A, 500VA
  - 11891 : 167V/3A, 500VA
- Module Output :
  - A118017 : 8kV/60mA
  - A118013 : 5kV/100mA
  - A118031 : 5kV/100mA+shielding
  - A118014 : 2.5kV/200mA
  - A118016 : 250V/2A
  - A118015 : 33V/30A
  - A118018 : 1kV/1A
- Frequency : 20kHz ~ 200kHz
- Sine wave Output
- Output voltage/current monitoring function
- Programmable output voltage waveform control
- Cycle count or time count test mode
- Lower power consumption and lower temperature rising design
- Large LCD Display
- Built-in digital timer
- RS485 interface



RS-485 CE

APPLICATIONS

Model	Main Function	Option	Application Description
11802	High Frequency High Voltage Test	A118013 Module 5kV/100mA max A118014 Module 2.5kV/200mA max A118016 Module 250V/2A max A118017 Module 8kV/100kHz max A118031 Module 5kV/100mA max	LCD inverter (transformer, ceramic capacitor, cable, PCB) load life test/ withstanding voltage/ breakdown voltage test
			EEFL, backlight load life test/ lamp current test
			SMPS main transformer and active PFC choke load life test and electrical analysis
			Medical equipment high frequency leakage current safety inspection
			Automobile motor corona discharge inspection
		A118022 Single Lamp Module 8kV/100kHz max	CCFL, HCFL, backlight load life/ kick-off voltage and lamp voltage test
11805	High Frequency High Voltage Test	A118018 Module 1kV/1A max + specified resonant inductor / capacitor	Ballast capacitor/ inductor ignition voltage load life test
	High Frequency High Current Test	A118015 Module 33V/30A max	Snubber capacitor load life test
11890 (F3)	High Frequency High Voltage Test	A118013 Module 5kV/100mA max A118014 Module 2.5kV/200mA max A118017 Module 8kV/100kHz max A118031 Module 5kV/100mA max	LCD inverter transformer (ceramic capacitor, cable, PCB) withstanding voltage test for production line
			Medical equipment high frequency leakage current safety inspection
			Automobile motor corona discharge inspection
11891 (F1, F2)	HF, CV Test	HF, Voltage Step-up Module	Constant voltage load life test
	HF, CI Test	HF, Current Step-up Module	Constant current load life test

SPECIFICATIONS

Model		11802/11890/11891	11805
HF AC Source Output			
Frequency		20KHz ~ 200KHz ±0.02%, Programmable	
Basic Maximum Output Power		500VA	1kVA
Output Current Range (rms)		0.01A ~ 3.00A, ±(5% of setting + 10mA)	0.05A ~ 6.00A, ±(5% of setting + 10mA)
Output Voltage Range (rms)		167V maximum	
Output Parameters [Note 1]			
With option A118017/ A118022 (HF HV, 8.0kV/60mA)	Output Voltage Range	0.05kV ~ 8.00kV, ±(5% of setting + 0.02kV) [Note 2]	--
	Output Current Range	60mA maximum (100kHz maximum)	
With option A118013 / A118031 (HF HV, 5.0kV/100mA)	Output Voltage Range	0.05kV - 5.00kV, ±(5% of setting + 0.02kV) [Note 2]	--
	Output Current Range	100mA maximum	
With option A118014 (HF HV, 2.5kV/200mA)	Output Voltage Range	0.05kV - 2.50kV, ±(5% of setting + 0.01kV) [Note 2]	--
	Output Current Range	200mA maximum	
With option A118016 (HF HV, 250V/2A)	Output Voltage Range	5V ~ 250V, ±(5% of setting + 1V) [Note 2]	--
	Output Current Range	2A maximum	
With option A118018 (HF HC, 1kV/1A)	Output Voltage Range	--	0.05kV ~ 1.00kV, ±(5% of setting + 0.01kV) [Note 2]
	Output Current Range		1A maximum
With option A118015 (HF HV, 33V/30A)	Output Voltage Range	--	0.1V ~ 33V, ±(5% of setting + 0.15V) [Note 2]
	Output Current Range		30A maximum
Signal Monitor Parameter Accuracy			
With option A118017/ A118022 (HF HV, 8.0kV/60mA)	Output Voltage Reading	0.05kV ~ 8.00kV, ±(4% of reading + 0.02kV) [Note 2]	--
	Output Current Reading	0.5mA ~ 60.00mA, ±(3% of reading + 0.3mA) [Note 2]	
With option A118013/ A118031 (HF HV, 5.0kV/100mA)	Output Voltage Reading	0.05kV ~ 5.00kV, ±(4% of reading + 0.02kV) [Note 2]	--
	Output Current Reading	0.5mA ~ 100.00mA, ±(3% of reading + 0.3mA) [Note 2]	
With option A118014 (HF HV, 2.5kV/200mA)	Output Voltage Reading	0.05kV ~ 2.50kV, ±(4% of reading + 0.01kV) [Note 2]	--
	Output Current Reading	0.5mA ~ 200.00mA, ±(3% of reading + 0.5mA) [Note 2]	
With option A118016 (HF HV, 250V/2A)	Output Voltage Reading	5.00V ~ 250.0V, ±(4% of reading + 1V) [Note 2]	--
	Output Current Reading	0.02A ~ 2.00A, ±(3% of reading + 0.01A) [Note 2]	
With option A118018 (HF HV, 1kV/1A)	Output Voltage Reading	--	0.05kV - 1.00kV, ±(4% of reading + 0.01kV) [Note 2]
	Output Current Reading		0.01A - 1.00A, ±(3% of reading + 10mA) [Note 2]
With option A118015 (HF HC, 33V/30A)	Output Voltage Reading	--	0.10V - 33.0V, ±(4% of reading + 0.15V) [Note 2]
	Output Current Reading		0.1A – 30.00A, ±(3% of reading + 0.1A) [Note 2]
Control Function			
Timer		1 min ~ 10000 hour, 30min error per year	
		0.1 sec ~ 999.9 sec	
Display		320 X 240 dot-matrix LCD display	
Operation		Start, Stop, Continue	
Protection		OCP, OTP, Over Load	
General			
Operation Environment		Temperature：10˚C~ 40˚C, Humidity：< 90% RH	
Power Consumption		2700 VA max.	3000 VA max.
Power Requirement		220Vac ±10% ; 48 Hz ~ 62 Hz	
Weight		Approx. 32 Kg	
Dimension (W x H x D)		440 x 241.5 x 609.8 mm	

Note 1: Under rated load and voltage correction is well performed.
Note 2: For test frequency above 100kHz, multiply the accuracy error by 2 times.
All specifications are subject to change without notice.

MILLIOHM METER
MODEL 16502

The 16502 Milliohm Meter is Chroma's newest digital Milliohm Meter. With a basic accurac y of 0.05% the instrument offers a 0.001mΩ ~1.9999MΩ wide measurement range. It provides measurement range with 4 1/2 digits resolution. The fast measurement time is 65 ms. It suits component evaluation on production line.

The 16502 Milliohm Meter provides three kinds of mode for the different material applications. Pulsed test current output mode is used to reduce thermal EMFs affection on milliohm measurement. DC test current output mode is used to fasten measurement speed for inductive DUT. Dry-circuit test current output mode is used to measure such contact resistances where the maximum open-circuit voltage must be limited to 20mV. DC, Pulsed, and Dry-circuit test current driving modes, enable the 16502 can be properly used in DC resistance measurement for various inductive components (coil, choke, and transformer winding etc.), cable, metallic contact (connector, relay switch etc.) and conduction materials.

Th e 16502 p rov i d e s temp e r a t u re correction function. Temperature correction (TC function) without regarding to material or temperature. Users usually get different resistance value with different ambient temperature. Conventional units have the temperature correction using a copper wire at 20 °C only, but 16502 provides the converted values regardless of material or temperature.

The 16502 offers temperature conversion function. It is helpful temperature conversion function for motor / coil evaluation. Users usually should not take the motor / coil temperature through touch the surface directly when the motor just stops. The temperature conversion function shows the temperature (t) or increase in temperature (△t) of motor / coil, deriving the values from the measured resistance of the motor / coil and the ambient temperature. It is helpful for user to do the temperature evaluation of motor / coil.

The 16502 provide the menu list on front panel of LCD Display, and the programming assure that low resistance measurements can be made quick and easy. Provides a programmable Hi/Lo comparator function in absolute value or %, as well as 8 sorting bins for categorization of components.

For measurement integrity, contacting to the test device is made via a 4-terminal Kelvin connection that incorporates an automatic zeroing function to compensate for lead errors.

Standard RS232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable 16502 can be used for both component evaluation on the production line and milliohm measurement for bench-top applications.

GPIB RS-232C HANDLER CE

MODEL 16502

Key Features

- Basic accuracy : 0.05%
- Pulsed test current output mode is used to reduce thermal EMFs affection on milliohm measurement
- DC test current output mode is used to fasten measurement speed for inductive DUT
- Dry-circuit test current output mode (limited Max. 20mV) is used to measure such contact resistances where the maximum open-circuit voltage must be limited to 50mV
- Temperature correction (TC function) regardless of material or temperature
- Useful temperature conversion function for motor/ coil evaluation
- 4 channels R scan with balance check function for fan motor (combined with A165017 option)
- 0.001mΩ~1.9999MΩ wide measurement range with 4½ digits resolution
- Standard RS-232 interface
- Optional GPIB & Handler interface
- Bin-sorting function
- Comparator and pass/fail alarming beeper function
- Large LCD display (240 x 64 dot-matrix)
- Friendly user interface
- LabView® Driver

SPECIFICATIONS

Model		16502
Range Basic Measurement Accuracy *1;Test Current		
20mΩ		±(0.1% of reading + 0.03 % of range) ; 1A typical
200mΩ		±(0.05% of reading + 0.03 % of range) ; 100mA typical
2Ω		±(0.05% of reading + 0.03 % of range) ; 10mA typical
20Ω		±(0.05% of reading + 0.03 % of range) ; 1mA typical
200Ω		±(0.05% of reading + 0.02 % of range) ; 1mA typical
2kΩ		±(0.05% of reading + 0.01 % of range) ; 1mA typical
20kΩ		±(0.1% of reading + 0.01% of range) ; 100μA typical
200kΩ		±(0.2% of reading + 0.01 % of range) ; 10μA typical
2MΩ		±(0.3% of reading + 0.01 % of range) ; 1μA typical
Test Signal		
Drive Mode		DC+, DC-,Pulsed+, Pulsed -, Pulsed ±, Stand by
Dry Circuit		Open Circuit Voltage less than 20mV; for 200mΩ, 2Ω, 20Ω ranges only
Measurement Time *2		
Fast		65ms
Medium		150ms
Slow		650ms
Temp. Correction / Conversion Function		
Temp. Measurement Accuracy (Option)	-10.0˚C ~ 39.9˚C	±(0.3% of reading+0.5˚C) *3
	40.0˚C ~99.9˚C	±(0.3% of reading+1.0˚C) *3
Temp. Sensor Type (Option)		PT100/ PT500
Interface & I/O		
Interface		RS-232(Standard) , GPIB, Handler (Optional)
Output Signal		Bin-sorting & Pass/Fail judge
Comparator		Upper/Lower limits in value
Bin Sorting		8 bin limits in %, ABS
Trigger Delay		0~9999ms
Trigger		Internal, Manual, External, BUS
Display		240 x 64 dot-matrix LCD display
Correction Function		Zeroing
General		
Operation Environment		Temperature : 10˚C~40˚C,Humidity : < 90 % R.H.
Power Consumption		80 VA max.
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)		100 x 320 x 346 mm / 3.94 x 12.6 x 13.62 inch
Weight		4.2 kg / 9.25 lbs

Note*1 : 23 ± 5˚C after Zeroing correction. Slow measurement speed. Refer to Operation Manual for detail measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judge test parameter measurement.
Note*3 : Not include temp. sensor accuracy

INDUCTOR TEST AND PACKING MACHINE MODEL 1870D SERIES

The 1870D Series (1870D/1870D-12) are specifically designed automated test equipment for wafer-type power inductors. It comprises various test functions that are required for verifying wafer-type power inductors. In addition, an automated tape packaging machine at the end of production line is equipped to fulfill demand for automated manufacturing.

The standard test functions of 1870D series are inductance (Ls)/quality factor (Q), winding resistance(RDC) measurements and polarity tests, along with optional layer short (IWT), insulation resistance (IR) and BIAS current tests that cover all test items for measuring wafer-type power inductor quality and standard specifications.

As miniature inductors are widely used in the electronic products today, mass production of power inductors is necessary. The production capacity of 1870D/1870D-12 is up to 1,800 ppm, which can satisfy the quantity demanded. Besides testing, the 1870D/1870D-12 is also equipped with an automated packaging machine to tape and pack the inductors mechanically in order to meet the desired style of SMD production lines.

The 1870D/1870D-12 uses a circular vibrating plate that carries thin products at high speed for feeding. The circular vibrating plate uses a guide rail design, fiber detection and blow hole to determine the feed direction. This is fast and space saving when compared to traditional linear reciprocating mechanical feeders.

When moving inductors for testing, the traditional reciprocating or turret-type mechanical structure uses a nozzle to attract the inductor for movement, and the product often drops due to inertial effects or inaccurate positioning making it unable to test. The 1870D/1870D-12 uses an index disc design for testing, so that the equipment is within a closed architecture that can eliminate dropped inductors during high-speed movement. It is faster and more stable when compared to the traditional mechanical structure.

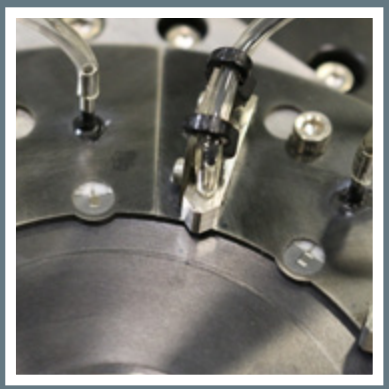
ATE Inc. not only specializes in electronic testing technology but are also masters in fixture design for automated test equipment. The test socket used by the 1870D/1870D-12 test station is a four-wire measurement design that is more accurate and stable than common automatic test equipment. The chip design applied to the connection of the test socket and inductor is easier to contact and has longer product life compared to a probe in use. The chip design is also more stable and easier to maintain than a probe.

The 1870D/1870D-12 has exclusive software for monitoring test status during production in real time, and saving the collected test data for each inductor. Real-time monitoring functions can benefit the production unit by reducing the production risk during manufacturing and cut down unnecessar y working hours. The data collection function is favorable to R&D and QA units for product analysis and quality control.

MODEL 1870D Series

KEY FEATURES

- Test and packing speeds from 80ppm to1,800ppm
- Standard functions
  - Inductance/quality factor test
  - Winding resistance test
  - Polarity test
- Optional functions
  - Layer short test
  - Insulation resistance test
  - Bias current test
- Circular vibrating plate design feeds inductors steadily and rapidly
- Index disc design eliminates dropped inductors
- Four-wire measurement test socket design
- Automatic discharge mechanism when feeding errors occur
- Each test station has an independent NG (No Good) product collection box
- Test without packaging function provided, good products gathered in bulk collection box
- Exclusive data collection software designed for monitoring product quality in real time
- Reserved stations for number spraying and automatic optical inspection
- Switchable Chinese/English/Japanese operating interface
- Equipment is fast, stable and safe



SPECIFICATIONS

1870D Application Size Maximum Productivity										Unit : pcs/min
W x D (mm)	3.2 x 2.5		2.5 x 2.0		2.0 x 1.6 / 2.0 x 1.2			1.6 x 0.8		
H (mm)	1.2	1.0	1.2	1.0	1.2	1.0	0.8	1.0	0.8	0.6
Single-sided electrode	600	600	800	800	800	800	1,000	800	800	1,200
Five-sided electrodes	900	900	1,200	1,200	1,500	1,500	1,500	1,500	1,500	1,800

* The maximum productivity listed above does not include layer short testing, insulation resistance testing, or bias current testing.
* Production efficiency >1,200 pcs/min with paper tape used for packing. Do not use plastic tape.
* Above is the using efficiency of single size. Additional assessment is required for different size.

1870D-12 Application Size Maximum Productivity					Unit : pcs/min
W x D (mm)	4.0x4.0	6.0x6.0	8.0x8.0	10.0x10.0	12.0x12.0
Single-sided electrode	250	200	150	100	80

* Above maximum production efficiency does not include IWT test, IR test and BIAS I test.
* Above is the using efficiency of single size. Additional assessment is required for different size.

General Specifications	
Power requirement	Single phase 220V, frequency 50 Hz / 2.0kW
Air pressure system	CDA pressure 5~6 kg/cm2 ; CDA flow: 150~200 L/min
Operating environment	8~38˚C ; < 70%RH
Weight	approx. 450 kgs
Dimension (W x H x D)	1192 x 1660 x 1000 mm

INDUCTOR LAYER SHORT ATS MODEL 1871

The 1871 is an automatic test system specifically designed for chip inductors in testing layer short for mass production applications. This system inherits all judgment functions from the 19301A impulse winding tester including Area, Laplacian, and two new test functions -ΔPeak Ratio and ΔResonant Area.

As miniature inductors are widely used in the electronic products today, mass production of power inductors is necessary. The production capacity of 1871 is up to 1,500ppm, which can satisfy the quantity demanded. It uses 5 layer short test stations to conduct the testing at one time for fast production. Alternatively, it can select 2 layer short test stations for R&D or QA unit use to run in a cost-effective way.

The 1871 uses a circular vibrating plate that carries thin products at high speed for feeding. The circular vibrating plate uses a guide rail design, fiber detection and blow hole to determine the feed direction. This is fast and space saving when compared to traditional linear reciprocating mechanical feeders.

When moving inductors for testing, the traditional reciprocating or turret-type mechanical structure uses a nozzle to attract the inductor for movement, and the product often drops due to inertial effects or inaccurate positioning making it unable to test. The 1871 uses an index disc design for testing, so that the equipment is within a closed architecture that can eliminate dropped inductors during high-speed movement. It is faster and more stable when compared to the traditional mechanical structure.

ATE Inc. not only specializes in electronic testing technology but also masters in fixture design for automated test equipment. The test socket used by the 1871 is a four-wire measurement design that is more accurate and stable than common automatic test equipment. The chip design applied to the connection of the test socket and inductor is easier to contact and has longer product life compared to a probe in use.

The 1871 has exclusive software for monitoring test status during production in real time, and saving the collected test data for each inductor. Real-time monitoring functions can benefit the production unit by reducing the production risk during manufacturing and cut down unnecessary working hours. The data collection function is favorable to R&D and QA units for product analysis and quality control. The software can perform data analysis to improve the product quality and increase profit.

MODEL 1871

KEY FEATURES

- Applicable size 3.2mm x 2.5mm to 1.6mm x 0.8mm
- Test and packing speeds from 600ppm to 1500ppm
- Layer short judgment functions:
  - Area
  - Laplacian
  - -ΔPeak Ratio
  - -ΔResonant Area
- Equipped with contact check function to extend the fixture lifespan.
- Provides from 2 to 5 test stations for ATS selections based on testing requirements.
- Index disc design eliminates dropped inductors
- Four-wire measurement test socket design.
- Each test station has an independent NG (No Good) product collection box.
- Exclusive data collection software designed for monitoring product quality in real time
- Switchable Chinese/English/Japanese operating interface
- Equipment is fast, stable and safe

SPECIFICATIONS

1871 Application Size Maximum Productivity										Unit : pcs/min
WxD(mm)	3.2 x 2.5		2.5 x 2.0		2.0 x 1.6 / 2.0 x 1.2			1.6 x 0.8		
H(mm)	1.2	1.0	1.2	1.0	1.2	1.0	0.8	1.0	0.8	0.6
Single-sided electrode	600	600	800	800	800	800	800	800	800	800
Five-sided electrodes	900	900	1,200	1,200	1,500	1,500	1,500	1,500	1,500	1,500

* The maximum productivity listed above does not include layer short testing, insulation resistance testing, or bias current testing.

General Specifications	
Power requirement	Single phase 220V ; frequency 60 Hz / 2.0kW
Air pressure system	CDA Pressure 5~6 kg/cm^2 , CDA Flow150~200 L/min
Operating environment	8~38°C , < 70%RH
Weight	Approx. 500 kg
Dimension (W x H x D)	W 1280 x H 1495 x D 900 mm

*All specifications are subject to change without notice.

HIGH PERFORMANCE HARDWARE DEVICES

LCR METER

The 11022 LCR Meters are the measurement instruments for passive components. They are applicable to the automatic manufacturers for passive components in material inspection. With the features of 21ms high-speed measurement and 0.1% accuracy, 11022 LCR Meter fulfills the requirements for fast production. Its functions of 8-level counting, pass/fail judgment, and 50 sets of internal save and recall settings totally meet the production line requirements for easy operation.

The four impedance output modes can measure the results with the LCR Meters of other brands to get a common measurement standard. The measurement results can also be compared with other brand of LCR Meters. Chroma11022 is the ideal selection for passive components quality assurance and automatic production.

Model	**11022**
Test Parameter	L,C, R,|Z|, Q, D, ESR, X, θ
Test Signals	
Level	10 mV~1V , step 10 mV; ±(10% + 3 mV)
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; ±0.01%
Measurement Display Range	
C (Capacitance)	0.001pF ~ 1.9999F
L, M, L2 (Inductance)	0.001 μH ~ 99.99kH
Z (Impedance), ESR	0.01mΩ ~99.99MΩ
Q (Quality Factor) D (Distortion Factor)	0.0001 ~ 9999
θ (Phase Angle)	-180.00° ~ +180.00°
Basic Measurement Accuracy (Note1)	±0.1%
Measurement Time (Fast) (Note2)	21ms

Note 1 : 23±5° C after OPEN and SHORT correction.Slow measurement speed.Refer to Operation Manual for detail measurement accuracy descriptions

Note 2 : Measurement time includes sampling,calculation and judge of primary and secondary test parameter measurement.

CAPACITOR LEAKAGE CURRENT/ IR METER

The 11200 Capacitor Leakage Current/IR Meter is Chroma's newest digital leakage current meter. It provides DC 1~650 V, 0.5mA~500mA (150mA for V>100V) DC power source. It is mainly used for electrolytic capacitor leakage current testing, and aluminum-foil withstand voltage testing (EIAJ RC-2364A). And, it also can be used for active voltage checking or leakage current testing of absorber, Zener diode, and Neon lamp among others. Standard RS232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the 11200 be used for both component evaluation on the production line and fundamental leakage current testing for bench-top applications.

Model		**11200 (650V)**
Main Function		Capacitor Leakage Current / IR Meter
Test Parameter		LC, IR
Test Signals Information		
Voltage		1.0 V~100 V, step 0.1 V; 101V~650 V, step 1V; ±(0.5% + 0.2V)
Charge Current Limit		V ≤ 100V: 0.5mA~500mA V > 100V: 0.5mA~150mA, 65W max. step 0.5mA; ±(3% + 0.05mA)
Measurement Display Range		LC : 0.001 μA~20.00mA
Basic Measurement Accuracy (Note)		LC Reading : ±(0.3% + 0.005 μA)
Measurement speed (Ext. Trigger, Hold Range, Line Frequency 60Hz)	Fast	77 ms
	Medium	143 ms
	Slow	420 ms
Function		
Correction		Null zeroing
Test Voltage Monitor		Vm: 0.0 V~660.0V; ±(0.2% of reading + 0.1V)
Charge Timer		0~999 Sec.
Dwell Timer		0.2~999 Sec

Note : 23 ± 5°C after Null correction. Refer to Operation Manual for detail measurement accuracy descriptions.

COMPONENT TEST SCANNER

13001 component test scanner performs switch and scan tests for L, C, R and other measurements combined with LCR Meter (3302/3252/11022/11025) including turn ratios, if the model has it, and IR test combined with 11200 CLC / IR Meter. It also offers short function for leakage inductance measurement. One unit can accommodate plug-in modules up to 8 slots. It can be up to 320 channels for one unit if combined with 8 optional A1130007 40 channels modules. It provides master and slave designs and up to 8 salve units for a multiple scanner. Users can control the output test circuit through RS232, GPIB or USB interfaces.

Model	**13001 (MASTER & SLAVE)**
Mode	SCAN
Interface (Master only)	RS232 , USB , GPIB
General	
Operation Environment	Temperature: 0˚C ~ 45˚C, Humidity: 15% to 80% R.H@≦ 40˚C
Power Consumption	150VA Max. (with rated load)
Power Requirements	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Weight	Approx.20Kg (13001 main frame only, without module)
Size(WxHxD)	About 430mm x 311mm x 570mm

Magnetic Component Test System Model No. 1810

GPIB RS-232 RS-485

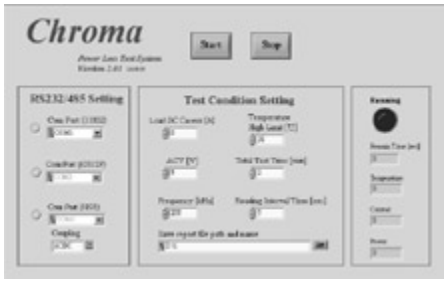
Magnetic component's heat comes from copper loss and iron loss. The copper loss caused by flowing current and wire resistance. The iron loss including Hysteresis Loss and Eddy Current Loss, mainly comes out from AC current. The inductance of magnetic component will drop unexpectedly if the temperature gets too high.

1810 is a test system for detecting the power loss of magnetic component. It provides DC current and AC voltage to the component, and it has a temperature sensor detects the temperature on component. The analysis reports will record the result in computer by using test program. These statistic analysis reports are important for researching and quality control department.

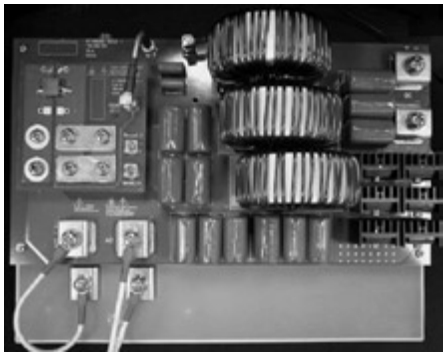
Magnetic Component Test System
Model 1810

KEY FEATURES

- Sine Wave Voltage : 20kHz~500kHz
- High Frequency Current Step-up Module : 30A/16V max., 30A/33V/16V max.
- High Frequency Voltage Step-up Module : 250V/2A max.
- 60A max DC Bias Current
- Power Consumption Detection
- Temperature Detection
- Statistic Report with Software Control



Test program



A118026 + A118019

IMPULSE WINDING TESTER MODEL 19301A

The 19301A impulse Winding Tester combines high & low inductance test technologies, has a maximum impulse voltage of 1000V, and a high speed sampling rate of 200MHz which satisfies most of the test requirements for power inductor products with a wide inductance range from 0.1uH to 100uH. The built-in functions of Area Size Comparison, Differential Area Comparison, FLUTTER Value, LAPLACIAN Value, ΔPEAK or ΔPEAK RATIO, PEAK RATIO and ΔRESONANT AREA functions are able to inspect coils for poor insulation effectively.

The inspection of wound components for production includes the electrical characteristics test and the withstand voltage test of the electrical safety standard. Poor insulation of a coil, which is a common issue that causes layer short and/or short circuit with the output pin during use, can be caused by bad design, bad molding process, or deterioration of the insulation material. Therefore, it is necessary to perform the layer short test on any winding component or coil.

The 19301A, which is specifically designed for wound component tests, utilizes a high voltage & low capacitance capacitor (low test energy) in parallel with a coil to form an RLC resonant, which is called damping. Analyzing the decay of the waveform via an analysis technology with high speed, precise, and accurate sampling can successfully detect poor insulation within a coil. It provides the winding quality test and the withstand voltage test on the cores for power inductors, and also makes the manufacturer and user checks of the quality of winding component products more efficient.

The 19301A can be used to test low inductance winding components with a minimum inductance down to 0.1uH. It provides 4-terminal (4-wire) measurement, contact checks, inductance check and voltage compensation for testing low inductance winding components in order to avoid gross inaccuracies in test voltage caused by the inductance variation of the DUT or the equivalent inductance of wires, which makes it the best impulse winding test instrument for low inductance winding components.

The 19301A has an extremely high test speed that can reduce testing times and increase productivity in automated production. In addition, the voltage compensation function reduces the impact of the equivalent inductance of the wiring in automated machines.

The brand new Human Machine Interface has a colorful display and screen capture function. The screenshot of the waveform, which is not only suitable for the on-site production but also applicable for R&D and Quality Assurance to analyze and compare, can be saved through the USB port on the front side of the instrument. This improves the convenience of operation.

HANDLER LAN USB RS-232 CE

MODEL 19301A

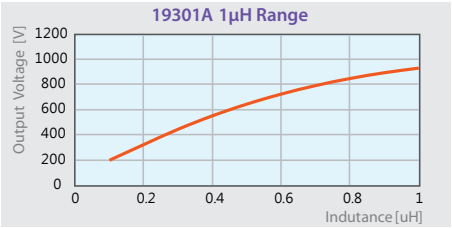
KEY FEATURES

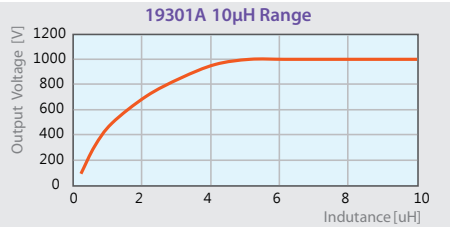
- Apply high/low inductance test (0.1uH~100uH)
- 10V~1000V impulse voltage test, with 0.06V test resolution
- 18mS high speed test (P1.0 for ACQ)
- Inductance contact check function
- Inductance differential voltage compensation function
- High impulse test sampling rate (200MHz),10bits
- Breakdown Voltage Analysis (BDV)
- Low voltage range to increase the sensibility of waveform analysis (25V/50V/100V/200V/400V/800V/1000V)
- Traditional Chinese/Simplified Chinese/ English user interface
- USB port for storing waveform & screen capture
- Graphical color display
- Standard LAN, USB and RS232 interface

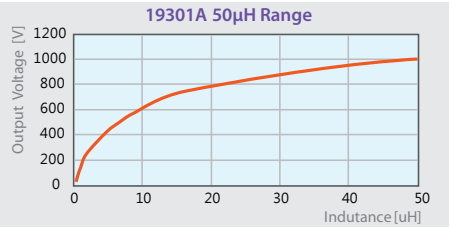
SPECIFICATIONS

Model	19301A
Applied Voltage (Vpeak), Step	10V~1000V, 1V *1, *2
Test Inductance Range	0.1µH ~ 100µH
Voltage Accuracy	±[1% of setting x (1+0.5µH / Lx) + 2% of Range]
Sampling Rate	10bit / 5ns (200MHz)
Sampling Range	8 Ranges : 0, 1, 2, 3, 4, 5, 6, 7
Pulse Number	Pulse Number : 1~32 ; Excitation Pulse Number : 0~9
Screen Display Resolution	640 x 480 dots (VGA)
Waveform Display Range	colors display 512 x 256 dots
Detection Mode	Area / Differential Area / Flutter Value / Laplacian Value / △Peak Ratio /△ Resonant Area
Test Time	Pulse1.0 : 18ms (ACQ)
Electrical Hazard Protection Function	
Key Lock	Yes (password control)
Interlock	Yes
Indication, Alarm	GO : Short sound, Green LED ; NG : Long sound, Red LED
Interface	RS232, Handler, USB, LAN interface
General	
Operation Environment	Temperature : 0˚C ~ 45˚C, Humidity : 15% to 95% R.H @ ≦ 40˚C
Power Consumption	No Load : <150VA ; Rated Load : <1000VA
Power Requirements	100~240Vac, 50 / 60Hz
Dimension (W x H x D)	177 x 428 x 500 mm / 16.85 x 6.97 x 19.69 inch
Weight	26 kg / 57.32 lbs

* All specifications are subject to change without notice.
Note *1 : Using standard test cable shipped along with Chroma's Tester is suggested as long test cable will affect the maximum voltage output.
Note *2 : Use a standard 1 meter test cable to test the maximum voltage spec. as the table shown below.







VIDEO PATTERN GENERATOR MODEL 2238

The 2238 Video Pattern Generator is equipped with various video standards including analog and digital signal output functions. A modular design with built-in high-speed independent graphics core provides standard test signals and patterns for the required resolutions. This unit can be used in a variety of display test requirement for today's multimedia industry. It supports the latest high-definition multimedia interface, HDMI as well as DisplayPort standard with key features listed below.

8K Super Hi-Vision

Full 8K (7680x4320/8192x4320) resolution is provided for testing @30/60Hz (HDMI, Display Port interface).

Modular Signal Interface Design

This VPG supports up to 4 signal modules for various test requirement. The Multi-out function can provide 4 different types of timing and pattern from each of the 4 modules simultaneously. Each module has a built-in high-speed independent graphics core that significantly increase video speed for drawing and data transmission applications. 8K SHV image switch occurs in less than 200ms.

HDMI 2.0a Testing (HDMI module)

This VPG supports HDMI 2.0a highest 6Gbps TMDS signal output (TMDS rate), 24/30/36 bit for color depth (RGB/YCbCr) and YCbCr 4:2:0 signal sampling output formats. It provides high resolution test functions with color standard ITU-R BT2020 and HDCP 2.2 & 1.4/ ARC/CEC/EDID/SCDC (Status & Control Data Channel)/HDR (High Dynamic Range).

DisplayPort 1.3 Testing (DP module)

The 2238 VPG supports the highest HBR3 (High Bit Rate 3, 8.1Gbps bandwidth) output as defined by DisplayPort 1.3 with audio transmission and 3D/EDID/MST/DPCD (Display Port Configuration Data).

Intuitive Touch Panel and Graphical User Interface

Equipped with a 7 inch 1024x600 touch panel and a friendly graphical user interface, this VPG unit has an Instant Pattern View function that allows users to view and edit patterns directly on the device screen. The Program function allows a combination of timing/ pattern/audio as required for testing to increase production efficiency. Its VPG Master software allows users to edit distinctive programs and parameters. Complete test functions and an easy-to-operate interface make it suitable for a variety of R&D and production test as well as quality verification in all video related industries.

Network Management via Ethernet

The 2238 VPG also has a built-in Ethernet high-speed network communication interface that provides remote setting functions, along with uploading and downloading of data such as BMP File/Timing /Pattern/Program /Setting/FW Update. For test security and revision control, the unit is password protected. Its unique serial no. and IP address allows system managers to remotely monitor production throughput, efficiency and yield.

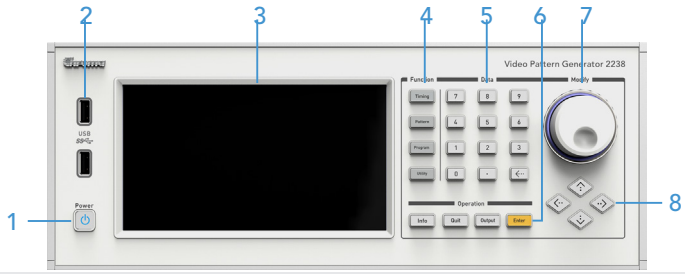
MODEL 2238

KEY FEATURES

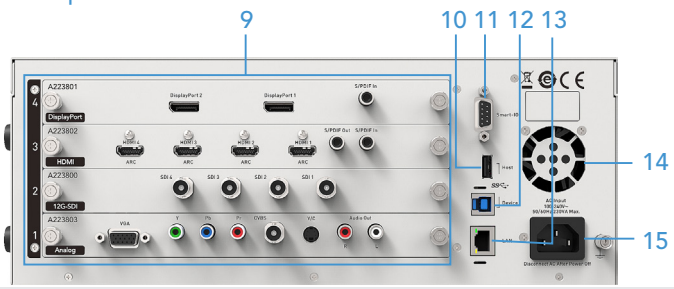
- Support 8K Super Hi-Vision (7680x4320/8192x4320)
- Independent graphics core for 8K Super Hi-Vision pattern with less than 200 ms switch time
- Up to 4 signal modules per unit
- Multi-out function
- 7 inch 1024x 600 high-resolution touch panel, GUI interface
- BMP file format support
- USB 3.0 data access
- Gigabit Ethernet high-speed network interface
- HDMI 2.0a signal module (option)
  - 8K x 4K 60 Hz (4 HDMI port)
  - 4K x 2K 60 Hz (1 HDMI port)
  - Pixel rate up to 600MHz (6Gbps TMDS rate)
  - RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
  - HDCP 2.2 / 1.4
  - Wide color gamut
  - HDR (High Dynamic Range) Testing (HDR infoframe & metadata / EOTF)
  - SCDC (status & control data channel) Reader
- DisplayPort 1.3 signal module (option)
  - 8K x 4K 60 Hz (2 DP port)
  - 8K x 4K 30 Hz (1 DP port)
  - 1.62 / 2.7 / 5.4 / 8.1 Gbps per lane
  - HDCP 2.2 / 1.3
  - DPCD (Display Port Configuration Data) Reader
  - MST (Multi-Stream Transport) testing

PANEL DESCRIPTION

Front panel



Real panel



1. Power Switch
2. USB Port
3. 7" Touch Panel
4. Function Group
5. Data Group
6. Operation Group
7. Rotary Selector
8. Cursor
9. Modules
10. Host USB Port
11. SMART I/O Control
12. Device USB Port
13. Ethernet
14. Fan
15. AC Power Input

SPECIFICATIONS

Model 2238 Main Frame	
SYSTEM	
Display	1024 x 600
Signal Slot	4 signal slot
Data Storage	5000 timings + 5000 patterns + 2000 programs
AC input Voltage Range	100 ~ 240V, 50~60Hz, 1.5 A Max.
Fan Noise	< 65dB (with fan control circuit)
Operating Temperature	+5˚C ~ +40˚C
Storage temperature	-20˚C ~ 60˚C
Humidity	20% ~ 90%
Dimensions	132 x 350 x 350 mm (HxWxD)

A223800 12G-SDI SIGNAL MODULE	
VIDEO OUTPUT	
Signal Compliant	SD/HD/3G/6G/12G - SDI Specification
Video Signal Type	RGB / YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color Depth	8 / 10 / 12 / 16 bits per component
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709
AUDIO OUTPUT	
Channel	8 Channel (L-PCM)
Sample Rate	48KHz

A223801 DISPLAYPORT SIGNAL MODULE	
VIDEO OUTPUT	
Signal Compliant	Display Port v1.3 Specification
Resolution	8Kx4K@30Hz (1Port) ; 8Kx4K@60Hz (2 Port)
Main Link Data Rate	1.62 / 2.7 / 5.4 / 8.1 (HRB3) Gbps per lane
Pixel Rate Range	25 MHz~2.4GHz
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color Depth	6 / 8 / 10 / 12 / 16 bits per component
HDCP	v1.3 / v2.2
MST	4K (3840x2160) x 4 stream max
AUDIO OUTPUT	
Channel	2 Channel (L-PCM)-Internal 8 Channel (AC3/DTS)-External 8 Channel HBR-audio
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz, +/-1000ppm

* All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

A223802 HDMI SIGNAL MODULE	
VIDEO OUTPUT	
Signal Compliant	HDMI v2.0a Specification
Resolution	4Kx2K@60Hz (1Port) ; 8Kx4K@60Hz (4 Port)
Pixel Rate Range	25 ~ 600 MHz (TMDS CLK : Max. 300MHz)
Video Signal Type	RGB / YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color Depth	24 / 30 / 36 / 48* @ RGB & YCbCr (*Max. 150MHz)
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / SYCC/ xvYcc (IEC61966-24) / Adobe RGB / Adobe YCC / ITU-R BT.2020
HDCP	v1.4 / v2.2
AUDIO OUTPUT	
Channel	8 Channel (FL / FR / RL / RR / FC / LFE / RLC / RRC)
Sample Rate	32 , 44.1 , 48 , 88.2 , 96 , 176.4 , 192KHz +/-1000ppm

A223803 ANALOG SIGNAL MODULE									
ANALOG									
Pixel Rate Range	0.5 MHz ~ 300 MHz								
Video Signal	R, G, B (75 ohms)								
Video Level	0~1.0V, 1 mV/step								
TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC), S-Video Burst On/Off (NTSC, PAL) Contrast /Brightness/Saturation/Hue Programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA/FCC/Canada English /Canada French Rating								
Teletext (PAL)	Teletext System B Level 1 , 1.5								
AUDIO OUTPUT									
Channel	2 Channel (R , L)								
Sample Rate	32 , 44.1, 48, 88.2, 96, 176.4, 192KHz								
Frequency	10 Hz ~20 KHz, 1 Hz/ step								

A223806 DVI SIGNAL MODULE	
VIDEO OUTPUT	
Signal Compliant	DVI 1.0 specification
Video Signal Type	RGB
Pixel Rate Range	25 MHz ＜1 link ≦165MHz ; 165＜2 link ≦330MHz
Sampling Mode	4:4:4
EDID	Version 1.3 (Read/Write/Compare/Edit/Analysis)
HDCP	Version 1.0 (with Dual-link mode)

VIDEO PATTERN GENERATOR MODEL 22294-A

22294-A is a programmable video pattern generator that equipped with various standard analog / digital signal output functions. The built-in high speed graphic engine is able to provide standard test signals and patterns for display devices with various resolutions to meet the requirements of multimedia display industries today and in the future for R&D and test applications.

The Video Pattern Generator supports the up-to-date high resolution multimedia digital audio and video transmission interface HDMI V1.4b specification with the following features:

Support up to 4K x 2K ultra high resolution
For digital interface, the HDMI supports 300MHz and DVI supports up to 330MHz (Dual link). For analog interface, the signal supports up to 300MHz. The high bandwidth signal output capability supports the testing for the newest generation of 4K x 2K ultra high resolution displays.

3D standard format signal output
The 3D format defined by HDMI specification is fully supported with abundant 3D test patterns, and provided for the user to download customized 3D patterns (splitting left/right images in Bitmap file format).

Fully support HDMI defined functions
The 22294-A is equipped with HEAC (Ethernet / Audio Return Channel) / Lipsync / HDCP / CEC / EDID functions and supports 24 / 30 / 36 bit color depth (RGB or YCbCr) and newest generation of color standard xvYCC / sYCC601/ Adobe RGB / Adobe YCC601.

Multi-signal port for simultaneous output
The 22294-A has 4 HDMI output ports that can provide multi-signal output simultaneously to meet the test applications for multi-port displays nowadays.

The RGB (BNC / D-Sub) and component (YPbPr / D-Terminal) signals provided by 22294-A are able to output all kinds of standard signal formats to test the displays with traditional analog interface. For digital DVI output signal, the pixel rate is up to 330MHz and supports dual channels HDCP which is most applicable for high resolution display testing.

For TV signals, the 22294-A is able to output the signals that comply with NTSC, PAL and SECAM specifications, also to support CVBS and Y/C separation signal formats for BNC / S-Video / SCART output ports. Special TV function tests such as Closed Caption, V-chip and Teletext are also supported.

22294-A has full color graphic interface and super large capacity of storage memory with lots of special test patterns built-in such as xvYCC, HDCP, E-EDID, Deep color, CEC, Lipsync and high-definition test images defined by China to give the user an easy way to judge the test result and save the time for production improvement as well as to achieve cost effective control. In addition to the panel editing of standalone device, remote control can be applied also the application software VPG Master can be utilized to edit various test programs and parameters. Its easy-to-use interface and complete test functions are most suitable for the applications of R&D, production tests and quality assurance in all video and associate industries.

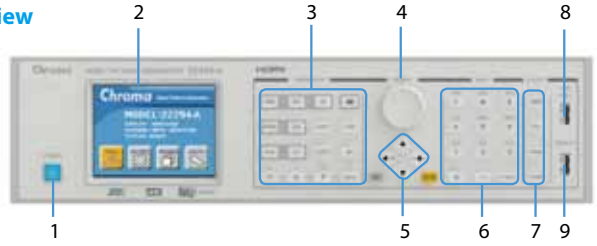
MODEL 22294-A

Key Features

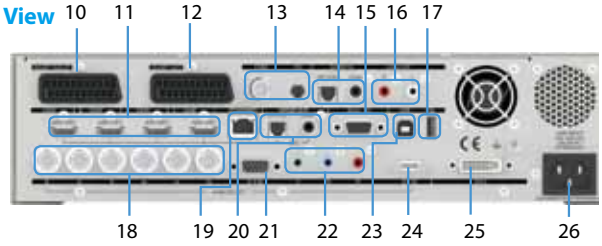
- HDMI TMDS Clock support up to 300MHz
  - 4K x 2K 24/30Hz
  - 1080p 120Hz
  - 3D format with 1080p 60Hz
    (Frame packing / Side-by-Side Full)
- Comply with HDMI 1.4b standard
  - 24 / 30 / 36 bit color depth
  - 3D standard format output
  - ARC (Audio Return Channel)
  - HEC (Ethernet Channel)
  - Color space standard sYCC601 / Adobe RGB / Adobe YCC601 / xvYCC
- 4 HDMI ports output
- Analog support up to 300MHz
- DVI support up to 330MHz
- Support HDCP function
- S-Video / CVBS / SCART / RGB / Component / D-terminal
- NTSC / PAL / SECAM standard
- EDID Read / Write / Compare / Analyze
- Optical / Coaxial audio input (SPDIF)
- Pattern scrolling function
- Built in China high-definition test pattern
- ESD protection circuit
- Front panel USB and control interface
- Graphic operating and editing interface

PANEL DESCRIPTIONS

Front View



Rear View



1. Power Switch
2. 3.5" LCD Display
3. Function Group
4. Selection Rotary
5. Arrow Keys
6. Numeric Keys
7. Function Keys
8. Device USB Interface
9. Remote Control Device Interface
10. SCART Input/Output
11. HDMIx4 Output
12. SCART Output
13. CVBS: BNC, Y/C Output
14. Digital Audio Input: Optical & Coaxial
15. Smart I/O Control
16. Analog Audio Output: R/L
17. Host USB Interface
18. R/G/B/Hs/Vs/Xs BNC Analog Output
19. Ethernet Interface
20. ARC Digital Audio Output: Optical & Coaxial
21. D-SUB Analog Output
22. YPbPr Output
23. Device USB Interface
24. D-Terminal (D1-D5) Output
25. DVI-I Output
26. AC Power Input

SPECIFICATIONS

Analog output	
Display Size	4096 x 2160
Pixel Rate Range	0.5MHz~300MHz
Video Level	R, G, B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE Selectable
Horizontal timing	
Total pixel	32~8192 pixels / 1 pixel resolution
Vertical timing	
Total line	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
Composite sync	
Hs+ Vs, Hs EXOR Vs, Equalization & Serration Pulse	
Separate sync	
BNC : Hs, Vs, Xs / D-SUB : Hs(Xs), Vs	

DVI (TMDS) output	
Pixel Rate Range	25≦1 link≦165MHz/ 165<2 link≦330MHz
EDID	Read / Write / Compare / Edit / Analysis
HDCP	Support HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI video output	
Version	HDMI 1.4b (3D Format / ARC / HEC / CEC / Lip Sync)
Pixel Rate Range	25 ~ 300 MHz
Support HDMI Timing	88 Timing(CEA-861E)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color depth	8 / 10 / 12 @ RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC (IEC61966-2-4) / sYcc601 / Adobe RGB / Adobe sYcc601
HDCP	HDCP V1.2
EDID	Read / Write / Compare / Edit / Analysis

HDMI audio output	
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4,192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	1Hz / Step
External Audio Input	OPTICAL and COAXIAL (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV output									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
	±50 Hz								
Video output mode	Composite (BNC),S-Video								
	Burst On/Off (NTSC,PAL)								
	Contrast / Brightness / Saturation / Hue programmable								
Closed Caption (NTSC)	C1,C2,C3,C4 / T1,T2,T3,T4								
V-Chip (NTSC)	MPAA/FCC / Canada English / Canada French Rating								
Teletext (PAL)	Teletext System B Level 1, 1.5								

SDTV / HDTV format					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate(Hz)		Standard
1920X1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920X1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280X720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

3D video format output	
3D Scanning Mode	Frame packing
	Field alternative
	Line alternative
	Side-by-Side (Full)
	L + depth
	L + depth + graphics + graphics-depth
	Top & Bottom
	Side-by-Side (Half)
	Frame sequential
	Line-by-Line
	Checkerboard

Data storage device	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
Other	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
Dimension & Weight	
22294-A	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch (HxWxD) 5.6 kg / 12.33 lbs

VIDEO PATTERN GENERATOR MODEL 2234

In order to perform motion pictures on the displays nowadays, the 2234 Video Pattern Generator has integrated the Multi-Media playback technology to provide versatile motion pictures for display quality evaluation test. It has high resolution test quality and multiple outputs support that can meet the requirements for multimedia video tests such as LCD Monitor / LCD TV / PDP / Projector of today and in the future.

This Video Pattern Generator provides both analog and digital signals, also supports multiple ports for independent output test and multimedia audio/video formats for play application. For the digital signal, the pixel rate of TMDS output is up to 330MHz and the test screen resolution is able to support beyond WQUXGA. Moreover, to cope with the higher frequency signal test for DVI Dual HDCP tests, it also supports dual link DVI test application.

2234 has built in the up to date high resolution multimedia digital video transmission interface, HDMI V1.3, to provide high speed bandwidth and color depth. It supports 24, 30, 36 bits (RGB or YCbCr) and new color standard xvYCC along with sYCC, Adobe RGB, and Adobe YCC(CEA-861E) to implement the real natural colors and high resolution images.

DisplayPort is the state-of-the-art video output interface defined by VESA. The signal transmission is mainly composed of main channel, AUX CH and hot plug (HPD) 3 types of signals. The main channel is formed by 4 lanes (1, 2, 4 Lane) and each lane can support 2.7Gbps or 1.62Gbps transmission rate. Up to 10.8Gbps can be transmitted by 4 lanes. 2234 supports the DisplayPort standard formats with the following key features:

DPCD (DisplayPort Configuration Data) is the main function of DisplayPort that acted as a communication bridge between source and sink. 2234 is able to adjust the parameters such as Lane, Main link rate and etc. automatically or manually after connection. As the signal attenuation may occur during long distance transmission for DisplayPort, the Pre-emphasis and Swing voltage can also be adjusted.

In addition 2234 supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

For the application of multiple tests, 2234 supports a variety of audio/video and pattern file formats for play with the resolution up to 1080p. Meanwhile, to fulfill the test application for multi ports output, 3 HDMI and 2 DisplayPorts of which the output settings can be executed separately have been built in to reduce a great deal of test time and finish the tests in the fastest way possible.

For operation, 2234 has adopted full color graphic interface and built in memory for storage with the diversified special test patterns like xvYCC, HDCP&E-EDID, 8/10/12bit deep color, CEC, Lipsync and China high definition test patterns embedded for use. Tests can be performed easily and rapidly to save the time and control the cost.

A remote controller (optional) can be used to replace the direct panel editing for flexible practice in a large test area. It is suitable for mass application in the production line. In addition, various timing parameters and test patterns can be edited via the VPG Master application on PC site. The easy operating interface and complete test functions of 2234 are applicable for all video and related industries in R&D, production test and quality assurance.

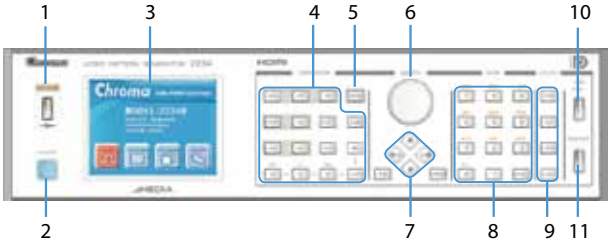
MODEL 2234

Key Features

- Support multimedia audio / video play formats
- Support up to 1080p high definition resolution
- Multi ports independent output test application
  - HDMI port output x 3
  - DisplayPort output x 2
  - SCART port x 2 (output x 1 / input x 1)
- DisplayPort V1.1a pixel rate 270MHz
- DisplayPort supports HDCP V1.3
- Support automatically & manually setting for DisplayPort function
  - 2 Link rate (1.62 / 2.7Gbps) selectable
  - 1, 2, 4 Video lane selectable
  - 0 / 3.5 / 6 / 9.5dB pre-emphasis selectable
  - 400 / 600 / 800 / 1200mV swing level selectable
- Support HDMI V1.3C (with 24, 30, 36bit color depth / xvYCC / CEC / Lip Sync)
- Support dual HDCP in DVI test application
- HDCP supports auto / manual mode
- HDMI and DisplayPort multiplexer function or switching for independent output
- HDCP ON/OFF in DVI, HDMI & DisplayPort interface
- Y, Pb, Pr / Y, Cb, Cr / Y, R-Y, B-Y output
- S-Video / CVBS / SCART / RGB / Color Component / D-terminal
- NTSC / PAL / SECAM signals
- EDID read / write / compare
- Optical / coaxial audio input (SPDIF)
- Scrolling pattern support
- Built-in China HD standard test patterns
- HDMI / DVI hot plug function

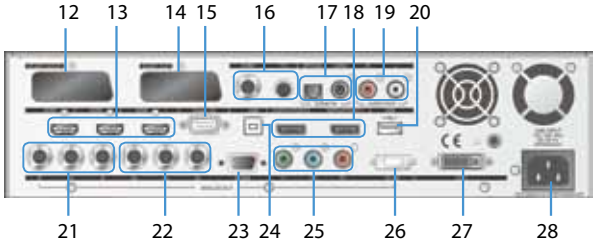
PANEL DESCRIPTIONS

Front View



1. Media USB Port
2. Power Switch
3. 3.5" LCD Display
4. Function Group
5. Media Play
6. Rotary Selector
7. Cursor
8. Data Group
9. Utility
10. Device USB Port
11. Remote for optional
12. SCART Input
13. HDMI Output
14. SCART Output
15. Smart I/O control
16. CVBS : BNC, Y/C

Rear View



17. Digital Audio Input Optical & Coaxial
18. DisplayPort Output
19. Analog Audio output : R/L
20. Device USB port
21. RGB/BNC Analog Output
22. Hs/Vs/Xs Sync Output
23. RGB/D-SUB Analog Output
24. Host USB port
25. YPbPr Component Output
26. D-Terminal (D1-D5)
27. DVI-I Output
28. AC Line Input

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	BNC : Hs,Vs,Xs ; D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	Support HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3c (with 24,30,36 bit deep color/xvYCC/CEC)/Lip sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing (CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @ RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC (IEC61966-2-4)/ SYCC/Adobe RGB/Adobe YCC)
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit

HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/LR/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFs
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPALYPORT OUTPUT	
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10/12 bits per component
HDCP	HDCP V1.3
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing level	400mV/600mV/800mV/1200mV selectable
Audio	2 Channel (L-PCM)-Internal ; 8 Channel (AC3/DTS)-External
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating: G, 8ans+,13 ans+,16 ans+,18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

MULTIMEDIA PLAY	
Video Format	MPEG-1(.mpg, .dat) ; MPEG-2(.vob) MPEG-4(.avi, .mp4) ; Support Up to 40Mbps(1080p)
Audio Format	MPEG-1 Layer-3(.mp3) ; LPCM(.wav) ; AAC(.aac)
Picture Format	BitMap(.bmp) ; JPEG(.jpg)
Interface	USB 2.0
File system	Internal: EXT-3, External: EXT-3 / FAT-32
Storage method	Internal: 16GB Flash Memory, External: Media USB Port

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION & WEIGHT	
2234	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch (HxWxD) 5.6 kg / 12.33 lbs

* All specifications are subject to change without notice.

VIDEO PATTERN GENERATOR MODEL 2235

2235 is a programmable video pattern generator that is equipped with various standard analog/digital signal output functions. The built-in high speed graphic engine is able to provide standard test signals and patterns for display devices with various resolutions to meet the requirements of multimedia display industries today and in the future for R&D and test applications.

The Video Pattern Generator supports the up-to-date high resolution multimedia digital audio and video transmission interface HDMI and DisplayPort specification with the following features:

Support 4Kx2K ultra high resolution

For digital interface, the DisplayPort supports 600MHz, the HDMI supports 300MHz and DVI supports up to 330MHz (Dual link). For analog interface, the signal supports up to 300MHz. The high bandwidth signal output capability supports the testing for the newest generation of 4K ultra high resolution displays.

DP 1.2 standard format signal output

Supports DisplayPort 1.2 standard HBR2(High Bit Rate 2, 5.4Gbps) bandwidth transmission up to 4K x 2K 60Hz resolution. Supports MST(Multi Stream Transport) function, with one DisplayPort output testing 4 Full HD(1080P) monitors at once. The 3D function is fully supported with abundant 3D test patterns, and is provided for the user to download customized 3D patterns (splitting left/ right images in Bitmap file format).

Fully support HDMI defined functions

The 2235 is equipped with HEAC (Ethernet/ Audio Return Channel)/Lipsync/HDCP/CEC/ EDID functions and supports 24/30/36 bit color depth (RGB or YCbCr) and newest generation of color standard xvYCC/ sYCC601/Adobe RGB/Adobe YCC601.

Multi-signal port for simultaneous output

The 2235 has 2 HDMI/DisplayPort output ports that can provide multi-signal output simultaneously to meet the test applications for multi-port displays nowadays.

The RGB (BNC/D-Sub) and component (YPbPr/ D-Terminal) signals provided by 2235 are able to output all kinds of standard signal formats to test the displays with traditional analog interface. The digital DVI output signal supports dual channels HDCP which is most applicable for high resolution display testing.

For TV signals, the 2235 is able to output the signals that comply with NTSC, PAL and SECAM specifications, also to support CVBS and Y/C separation signal formats for BNC/S-Video/SCART output ports. Special TV function tests such as Closed Caption, V-chip and Teletext are also supported.

2235 has a full color graphic interface and super large capacity of storage memory with many special test patterns built-in such as xvYCC, HDCP, E-EDID Deep color, CEC, Lipsync and high-definition test images defined by China to give the user an easy way to judge the test result and save the time for production improvement as well as to achieve cost effective control. In addition to the panel editing of the standalone device, remote control can be applied also the application software VPG Master can be utilized to edit various test programs and parameters. Its easy-to-use interface and complete test functions are most suitable for the applications of R&D, production tests and quality assurance in all video and associated industries.

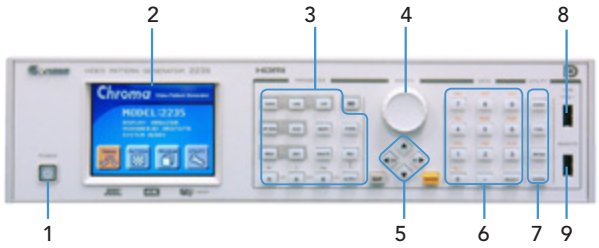
MODEL 2235

KEY FEATURES

- Comply with DisplayPort 1.2a standard
  - 4K x 2K 60/50Hz
  - Pixel rate support up to 600MHz
  - Auto / Manual training mode
  - 1.62 / 2.7 / 5.4Gbps per lane
  - 1 / 2 / 4 Link
  - 0 / 3.5 / 6 / 9.5 dB pre-emphasis
  - 400 / 600 / 800 / 1200mV Swing level
  - MST(Multi Stream Transport)
  - DPCD Analyze
- HDMI support up to 300MHz
  - 4K x 2K 24/30Hz
  - 1080p 120Hz
  - 3D format with 1080p 60Hz (Frame packing / Side-by-Side Full)
- 2 HDMI ports + 2 DisplayPort output
- Analog support up to 300MHz
- Support HDCP function
- S-Video/CVBS/SCART/RGB/Component/ D-terminal NTSC/PAL/SECAM standard
- Dual link DVI support up to 330MHz
- EDID Read/Write/Compare/Analyze
- Support Pattern Scrolling Function
- ESD Protection Circuit
- Front Panel USB Port & Control Interface
- Graphic Operating & Editing Interface

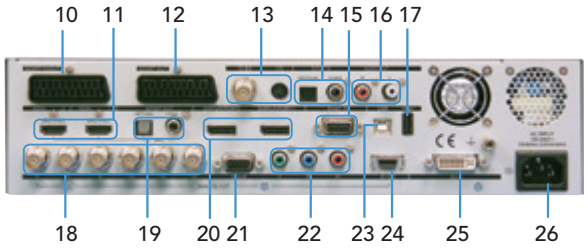
PANEL DESCRIPTION

Front panel



1. Power Switch
2. 3.5" LCD Display
3. Function Group
4. Rotary Selector
5. Cursor
6. Data Group
7. Utility
8. USB Port
9. Remote for optional

Rear panel



10. SCART Input
11. HDMI Output
12. SCART Output
13. CVBS: BNC, Y/C
14. Digital Audio Input : Optical & Coaxial
15. Smart I/O control
16. Analog Audio output : R/L
17. Host USB port
18. R/G/B/Hs/Vs/Xs BNC Analog Output
19. ARC Digital Audio Output : Optical & Coaxial
20. Display port Output
21. D-SUB Analog Output
22. YPbPr Component Output
23. Device USB port
24. D-Terminal (D1-D5)
25. DVI-I Output
26. AC Power Input

SPECIFICATIONS

Analog Output	
Display Size	4096 x 2160
Pixel Rate Range	0.5~300MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
Horizontal Timing	
Total Pixel	32~8192 pixels / 1 pixels resolution
Vertical Timing	
Total Line	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
Composite Sync	
	Hs+ Vs, Hs EXOR Vs, Equalization & Serration Pulse
Separate Sync	
	BNC : Hs,Vs,Xs ; D-SUB : Hs(Xs), Vs

DVI (TMDS) Output	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit / Analysis
HDCP	Support HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI Video Output	
Version	HDMI 1.4b (3D / ARC / HEC / CEC / Lip Sync)
Pixel Rate Range	25 ~ 300 MHz (TMDS rate 300 MHz)
Support HDMI Timing	85 Timing(CEA-861E)
Pixel Repetition	4
Video Signal Type	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color depth	24 / 30 / 36 bits per pixel
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYcc / sYcc601 / Adobe RGB / Adobe sYcc601
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit / Analysis
HDMI Audio Output	
Sample Rate	32, 44.1, 48, 88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/LR/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFs
Frequency Range	10Hz to 20KHz
Frequency Resolution	1Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPLAYPORT Output	
Version	DisplayPort 1.2a (3D)
Pixel Rate Range	25~600 MHz (4K x 2K 60Hz)
Main Link Data Rate	1.62 / 2.7 / 5.4 Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing Level	400mV/600mV/800mV/1200mV selectable
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2

Color Depth	6/8/10/12 bits per component
HDCP	HDCP V1.3
Audio	2 Channel internal (L-PCM)
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Frequency Range	10Hz to 20KHz
MST	FHD (1920 x 1080P @ 60) x 4 max. (Simple/Split mode)

TV Output									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
	±50								Hz
Video Output	Composite (BNC), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast /Brightness/Saturation/Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA/FCC/Canada English /Canada French Rating								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV / HDTV Format					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate(Hz)		Standard
1920X1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920X1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280X720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

Data Storage Device	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
Others	
AC Input	1Ø 100~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
Dimension & Weight	
2235 (HxWxD)	88x350x350 mm / 3.46x13.78x13.78 inch 5.6 kg / 12.33 lbs

* All specifications are subject to change without notice.
Please visit our website for the most up to date specifications.

VIDEO PATTERN GENERATOR MODEL 23294

23294 Video Pattern Generator provides various international standard signals with built-in 3 HDMI and 2 SCART ports that can satisfy the output tests for multiple ports to shorten the test time and improve productivity.

23294 adopts a brand new structure design with a high performance CPU to carry high speed / high density FPGA as the graphic engine. It has highly efficient system control and supports the up-to-date high definition multimedia digital video interface HDMI V1.4 standard to supply the following features:

3D signal standard format output:
It is fully competitable 8 different format of HDMI 1.4 3D standard, included Frame Packing, Field alternative, Line alternative, Side-by-Side(Full), L+depth, L+depth+graphics+graphics-depth, Top-and-Bottom, Side-by-Sdie(Half).

The ARC (Audio Return Channel) function is able to test the external audio source and the Ethernet (HDMI Ethernet Channel) function is able to provide dual data transmission test, higher speed bandwidth & Color Deep. It supports 24, 30, 36 byte (RGB or YCbCr) and the color standards of new generation such as xvYCC, sYCC601, Adobe RGB and Adobe YCC601 to realize the true natural color of 4Kx2K and high definition image with broader color range.

CEC (Consumer Electronics Control) Function: The CEC test parameters can be set via the proprietary software VPG MASTER which also supports the test modes of TX (send)/RX (receive)/MONITOR (monitor) & FEATURE (user's).

23294 has analog/digital/TV control signals as well.

For the analog RGB output, its pixel frequency is up to 250MHz that complies with the RS-343A signal standard and support Y,Pb,Pr / Y,Cb,Cr / Y,R-Y& B-Y. As to the digital signal, it is TMDS pixel frequency up to 330MHz with dual channel DVI output that can support DVI Dual HDCP tests to satisfy the application for testing higher bandwidth display.

In TV output specification, the image and chromaticity signals of 23294 comply with NTSC, PAL and SECAM regulations. The output signals include CVBS composite signals, BNC & Y/C (Luminance/ Chrominance) image/chromaticity separate signals and S-Video/SCART output connector. It can also support special TV test functions such as Closed Caption, V-chip and Teletext.

To supply multiple test applications, is able to play the picture file format up to 4Kx2K resolution. Moreover, 3 HDMI and 2 SCART ports are built in to satisfy the test for multiport independent output and reduce the test time substantially.

23294 has many special test patterns such as xvYCC, HDCP&E-EDID, 8/10/12bit deep color, CEC, Lipsync and China high definition patterns for easy test assessment to save the time and increase productivity efficiently. In addition, the equipped application VPG Master with easy-to-use interface and complete test functions that is capable of editing various kinds of test procedures and parameters makes 23294 suitable for the R&D, production test and quality assurance of all video and related industries.

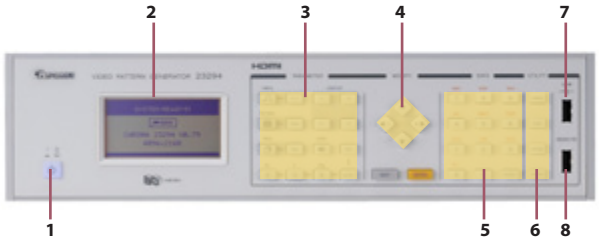
MODEL 23294

Key Features:

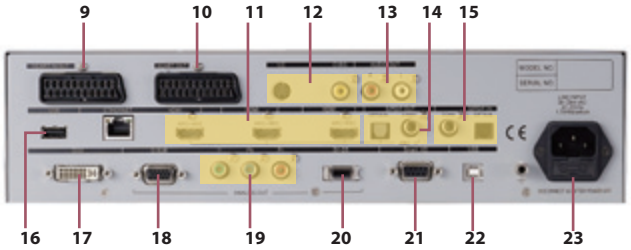
- Multiport independent output test application
  - 3 HDMI port output
  - 2 SCART port (Input/Output x1/Outputx1)
- Analog frequency 250MHz
- Digital (DVI) frequency 330MHz(dual channel)
- DVI Dual HDCP test application support
- HDMI 1.4 standard
  - 3D standard format output
  - ARC audio return function
  - HEC network test function
  - Color space sYCC601 / Adobe RGB / Adobe YCC601
  - CEC / Deep Color / Lip-Sync / xvYCC
- 4Kx2K graphic display capability
- CEC analysis & multi-directional monitor
- Real 30bit deep color output
- DVI & HDMI with HDCP output
- Support HDCP V1.0 (DVI) / V1.2(HDMI)
- Y, Pb, Pr / Y, Cb, Cr / Y,R-Y, B-Y Output
- S-Video / CVBS / SCART / RGB / Color component / D terminal
- NTSC / PAL / SECAM TV signals
- Support Close Caption / V-Chip / Teletext
- EDID read / write / compare
- HDMI supports fiber/coaxial audio input (S/PDIF)
- ARC supports fiber/coaxial audio output (S/PDIF)
- Built-in low distortion audio output (2ch / 8ch)
- Easy to use audio shortcuts
- Support graphic dynamic movement (Scrolling) function
- Built in China high definition standard test patterns / 3D test images
- HDMI / DVI plug and play function
- ESD protective circuit
- Front USB control interface
- User Key (maximum 32 combinations of serial actions)

PANEL DESCRIPTIONS

Front View



Rear View



1. Power Switch
2. 160x80 LCD Display
3. Function Group
4. Cursor
5. Data Group
6. Utility
7. USB Port
8. Remote for Optional
9. SCART Input / Output
10. SCART Output
11. HDMIx3 Output
12. Y/C, RCA Output
13. Analog Audio Output : R/L
14. Digital Audio Output : Optical & Coaxial
15. Digital Audio Input : Optical & Coaxial
16. Host USB Port
17. DVI-I Output
18. D-SUB Analog Output
19. YPbPr Output
20. D-Terminal (D1-D5) Output
21. Smart I/O Control
22. Device USB Port
23. AC Line Input

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 2160 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R、G、B / RS-343A / RS-170 / VESA(VSIS) Y、R-Y、B-Y Y、Cb、Cr / ITU 601 Y、Pb、Pr / ITU 709、RP177、SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	Support HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.4a (3D Format / ARC / HEC / CEC / Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS rate 225MHz)
Support HDMI Timing	85 Timing(CEA-861E)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	Deep Color 8 / 10 / 12 @RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC (IEC61966-2-4) / sYCC601 / Adobe RGB / Adobe YCC601)
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/LR/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
	±50								
Video Output	Composite (BNC),S-Video								
	Burst On/Off (NTSC,PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-Chip (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating: G, 8ans+,13 ans+,16 ans+,18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV / HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

3D VIDEO FORMAT OUTPUT	
3D Scanning Mode	Frame packing
	Field alternative
	Line alternative
	Side-by-Side (Full)
	L + depth
	L + depth + graphics + graphics-depth
	Top & Bottom
	Side-by-Side (Half)

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	100-240V, 50-60Hz, 5A maximum
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION & WEIGHT	
23294 (HxWxD)	88x350x350 mm / 4.5 kg 3.46x13.78x13.78 inch / 9.9 lbs

* All specifications are subject to change without notice.

VIDEO PATTERN GENERATOR MODEL 2333-B

2333-B is a high value-added test equipment that can meet the diversified demands for multi-media displays. It has high resolution test quality and multiple output types that can support comprehensive tests for large-scale application in the field of R&D, quality assurance and mass production.

2333-B combines Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals that can satisfy the needs for testing various signals from multi-media displays.

For digital signal: The TMDS output with pixel rate 25~330MHz that supports the dual channel HDCP test is able to fit in the high bandwidth test requirements under 120Hz screen refresh rate.

For HDMI output: The 2333-B provides higher speed bandwidth and color depth. It supports 24,30 bits (RGB or YCbCr) and the new generation color standards xvYCC, sYCC, Adobe RGB and Adobe YCC to attain truly natural color and high resolution image screen. It also supports complete CEC and Lip Sync tests.

DisplayPort is the new video output interface promoted by Video Electronics Standards Ass ociation; VESA. It is an open and extendable interface standard for display devices. Its maximum transmission bandwidth is up to 10.8Gb/s. With the official certification of VESA, 2333-B is able to provide the consistency and integrity signals in highest standard.

DisplayPort is composed of main channel, auxiliary channel and hot swap (HPD) 3 types of signals. The main channel is made by 4 lanes (1, 2, 4 Lane) and each lane supports 2.7Gbps or 1.62Gbps transmission rate. The parameters can be adjusted automatically via DPCD connection and complete the test procedure in sequential.

For TV output, the image and chromaticity signals are complying with the NTSC, PAL and SECAM standards. Also, the tests for special TV functions such Closed Caption, V-chip and Teletext are supported.

To fulfill the application of multi-port output test, 2333-B has built-in 3 HDMI, 2 DisplayPort and 2 SCART ports that can finish testing the displays with multi-port in the fastest speed and reduce the test time in a great deal.

Various test patterns and timing parameters are built-in 2333-B for operation. Shortcuts are provide for Timing/Pattern/Program/Audio to simplify the settings. The test program edited by the user on PC can be downloaded to 2333-B directly for storage and recall next time.

Moreover, for the function keys used frequently a special User Key is designed to combine these functions. Up to 32 keys can be memorized for continuous actions and executed by a single key. Besides the panel operation, remote control can be enabled with a remote controller for users to operate the device more easily.

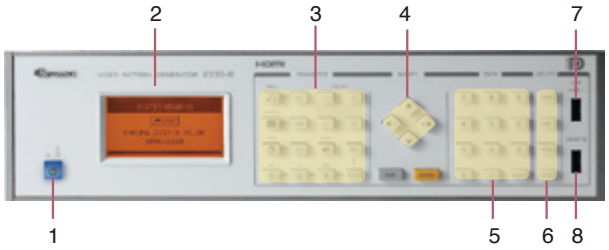
MODEL 2333-B

Key Features:

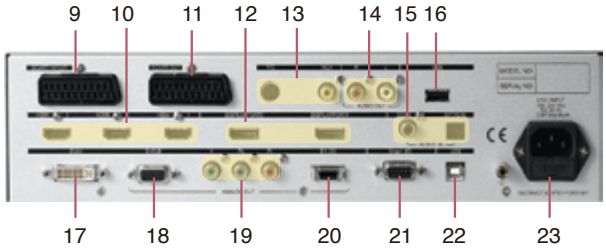
- Multi-port output tests
  - 3 HDMI output ports
  - 2 DisplayPort output ports
  - 2 SCART ports (output x1/ input x1)
- DisplayPort V1.1a pixel rate 270MHz
  - 2 Link Rate (1.62/2.7Gbps)
  - 1,2,4 Video Lane
- HDMI V1.3C
  - True 30 bits color depth output
  - Support xvYCC & sYCC, Adobe RGB, Adobe YCC color space
  - Support CEC Function
  - Built-in Lip Sync test pattern
  - Digital audio output
  - 3 HDMI outputs to provide individual HDCP Enable/Disable
- DVI pixel rate 330MHz (dual channel)
- DVI Dual HDCP test application support
- DVI, HDMI & DisplayPort with HDCP output
- Support HDCP V1.0 (DVI) / V1.2 (HDMI) / V1.3 (DisplayPort)
- Y, Pb, P r / Y, Cb, Cr / Y, R-Y, B-Y output
- S-Video / CVBS / SCART / RGB / color component / D-terminal output
- NTSC/PAL/SECAM TV signal
- Support Closed caption / V-Chip / Teletext
- Built-in low low-distortion audio output (2ch/8ch)
- Easy-to-use audio hot key
- EDID read/write/compare
- USB (Host & Device)
- User key (up to 32 continuous actions can be combined)

PANEL DESCRIPTIONS

Front View



Rear View



1. Power Switch
2. 160*80 LCD Display
3. Function Group
4. Cursor
5. Data Group
6. Utility
7. USB Port
8. Remote for optional
9. SCART Input/Output
10. HDMI Output
11. SCART Output
12. DisplayPort Output
13. Y/C,RCA
14. Analog Audio output : R/L
15. Digital Audio Input Optical & Coaxial
16. Host USB port
17. DVI-I Output
18. D-SUB Analog Output
19. YPbPr Component Output
20. D-Terminal (D1-D5)
21. Smart I/O control
22. Device USB port
23. AC Line Input

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Blank Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A / RS-170 / VESA (VSIS) Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI 1.3C (with 24,30 bit deep color / xvYCC / CEC / Lip sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing (CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 @ RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC (IEC61966-2-4) / SYCC / Adobe RGB / Adobe YCC)
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/LR/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 20 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFs
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPLAYPORT OUTPUT	
Version	DisplayPort 1.1a
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10 bits per component
HDCP	HDCP V1.3
DPCD	Read / Write
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Audio	2 Channel (L-PCM)-Internal
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	S-Video, RCA								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating: G, 8ans+,13 ans+,16 ans+,18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

AUDIO (ANALOG) OUTPUT	
Number of Channel	2 Channel (R / L)
Sample Rate	32, 44.1 , 48 , 88.2 , 96 , 176.4 , 192KHz
Level Resolution	10mV / Step
Level Range	0V to 2V (at 600 Ohms Load)
Frequency Range	10Hz to 20KHz / 10Hz Step
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	100-240V, 50-60Hz, 5A maximum
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION & WEIGHT	
2333-B (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch 4.5 kg / 9.9 lbs

All specifications are subject to change without notice.
Please visit our website for the most up to date specifications.

VIDEO PATTERN GENERATOR MODEL 2401

Along with the rapid development of LCD TV industry, all manufacturers are facing the competition of producing high value added and low cost products; and seeking for a total test solution to meet their needs has become the first priority.

2401 Video Pattern Generator with the features described below is specially designed to fit in the requirements and application of production line for LCD-TV manufacturers.

1. Various Analog TV Signals Support
It has many built-in standard Analog TV signal outputs , such as RGB, YPbPr, CVBS for tests in Multimedia Display, Monitor and TV production.

2. Lightweight Design
The size of 2401 VPG is close to A4 that is portable and handy for various kinds of spaces or locations.

3. Exclusive Signals
The mapped international standard signal sources are provided for diverse Video signals requirements such as the requisite TV and HDTV that are applied in the configuration of production line planning and test workstation.

4. Convenient & Rapid Function
The test programs created in advance increase the production efficiency; in addition for the frequently used function keys, users can edit the USER KEY to work with compound functions in specific test to save the test time.

5. USB Interface
The convenient USB interface can use USB Disk on PC to edit test programs, patterns and even to upload or download the upgrade programs to 2401 to reduce engineer's workload in setup and management.

6. Large Capacity
It has built in large capacity of storage memory that allows users to swap and save for different UUT without backup or download.(1000 TIMINGS and PATTERNS, 500 PROGRAMS)

7. Abundant Test Patterns
It includes standard static, dynamic and pattern screens to check the characteristics response, white balance and residual of UUT. Also it can use PC to create the test patterns required.

8. Extended Control
The default extended function on the front/ rear panel is able to add remote control device or output control device for on-line link automatically.

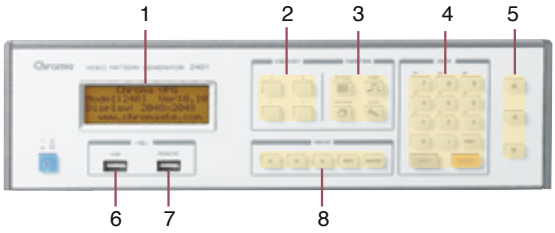
MODEL 2401

Key Features:

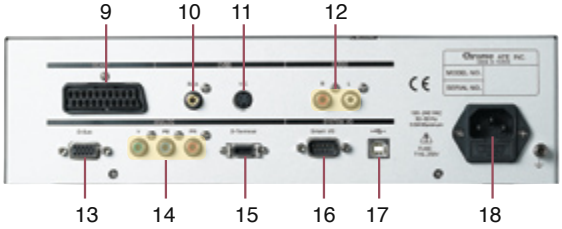
- Analog pixel rate 165MHz
- 2K x 2K Graphic size
- NTSC / PAL / SECAM signal
- S-Video / CVBS / SCART / RGB Color Component / D-Terminal
- Bi-level SDTV format
- Tri-level HDTV Format
- Closed Caption function (NTSC)
- V-Chip function (NTSC)
- Teletext function (PAL)
- Y, Pb, Pr/ Y, Cb, Cr / Y, R-Y, B-Y output
- PC remote control
- User Define Key
- Built-in variety of video timings & patterns
- Scrolling Pattern
- USB interface
- ESD protection circuit
- Economy

PANEL DESCRIPTIONS

Front View



Rear View



1. LCD Display
2. User Key
3. Function Group
4. Data Group
5. Direction Key
6. USB Port
7. Remote for optional
8. Image Group for signal on/off select
9. SCART output
10. CVBS output
11. S-Video output
12. Analog Audio output: R/L
13. RGB/D-sub Analog output
14. YPbPr Component output
15. D-Terminal output
16. Smart I/O for control
17. Host USB port
18. AC Line Input

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	2048 x 2048
Pixel Rate Range	0.5~165MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Blank Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	64~8192 pixels / 2 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	Hs(Xs), Vs
VIDEO FORMAT	
Video Output (D-SUB)	R, G, B Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B

TV OUTPUT										
Output Mode	NTSC		PAL					SECAM		
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz	
Subcarrier Stability	±50								Hz	
Video Output	Composite (RCA), S-Video									
	Burst On/Off (NTSC, PAL)									
	Contrast programmable									
	Brightness programmable									
	Saturation programmable									
	Hue programmable									
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4									
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X									
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA									
	Canada English Rating : C, C8+, G, PG, 14+, 18+									
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+									
Teletext (PAL)	Teletext System B Level 1, 1.5									

* All specifications are subject to change without notice.

SDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
720x483	59.94P	60/1.001			SMPTE 293
			59.94I	59.94/2	ITU 601 SMPTE 170M
720x576	50P	50			ITU 1382
			50I	25	ITU 601

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920x1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920x1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280x720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

AUDIO (ANALOG) OUTPUT	
Frequency Range	50Hz ~ 20KHz
Waveform	Sine wave
Number of Channel	2 Channel (R / L)
Level Range	0V to 2V (at 600 Ohms Load)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DATA STORAGE DEVICE	
Default	1000 timings + 1000 patterns
Internal Memory	1000 timings + 1000 patterns + 500 programs
External Memory	USB Host interface
OTHERS	
AC Input	100~240 VAC, 50~60Hz, 0.8A Maximum
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION / WEIGHT	
2401	320(W)x88(H)x240(D)mm / 3.2kg

VIDEO PATTERN GENERATOR
MODEL 2402

Along with the development of display products moving toward multi-function composite and evolving to digital era, all manufacturers are facing the competition of producing high value added and low cost products to meet the diversified applications and quality demands. Seeking for a total test solution to meet those needs has become the first priority.

2402 Video Pattern Generator with the features described below is specially designed to fit in the requirements and application of production line for LCD-TV/PDP/Monitor manufacturers.

Support HDMI Function
I n order to meet the test requirement for multimedia display, 2402 suppor ts the state of the art HDMI V1.3 (High Definition Multimedia Interface) with video signal resolutions up to 1080p and xvYCC color standard.

Exclusive Digital Signals
It supports the digital signals of DVI, HDMI and HDTV that meet the video interface requirements of most up-to-date. The mapped international standard signal sources are provided and applied in the configuration of production line planning and test workstation. The enlarged screen is able to browse the data of production test.

Convenient & Rapid Function
The test programs built-in or created in advance by users increase the production efficiency. Users can edit the USER KEY to work with compound functions in specific test to save the test time.

Friendly USB Interface
2402 is equipped with a convenient and automatic operation inter face that all parameters can be easily set via panel or remote controlled PC through USB interface to control or save the downloaded settings or data. The data download and upload can also be done by flash disk to reduce engineer's workload in setup and management.

Large Capacity
It has built in large capacity of storage memory that allows users to swap different UUT without doing backup or download (1000 TIMINGS and PATTERNS, 500 PROGRAMS.) and save the customized test programs.

Multiple Outputs
2402 provides 2048x2048 Graphic Size that is qualified for the HDTV high quality image output. The standard signal interfaces HDMI, DVI-I, VGA D-Sub are built in for industry application.

Rich Timing & Pattern Database
Rich timings and diversified patterns are built in for selection including standard static, dynamic and pattern scroll screens to check the characteristics response and white balance of UUT with auto and manual operation process. It can also use the default front/rear panel expanded mechanism to add remote or output control devices to support the application of automatic production.

CE

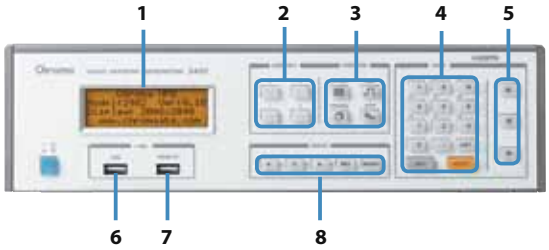
MODEL 2402

Key Features

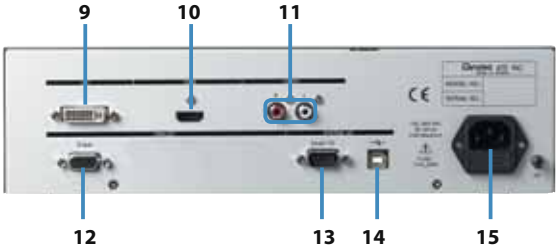
- Analog pixel rate 165MHz
- Analog output with DDC
- 2K x 2K Graphic size
- DVI pixel rate 165MHz
- HDMI V 1.3b (with xvYCC)
- DVI & HDMI with HDCP output
- Support Color Space (RGB / ITU601,70P / XvYCC)
- Audio output (Analog 2ch / Digital 8ch)
- PC remote control
- User Define Key
- Built-in variety of video timings & patterns
- High Capacity Memory
- Scrolling Pattern
- USB interface
- ESD protection circuit
- Economy

PANEL DESCRIPTIONS

Front View



Rear View



1. LCD Display
2. User Key
3. Function Group
4. Data Group
5. Direction Key
6. USB Port
7. Remote for optional
8. Image Group for signal on/off select
9. DVI output
10. HDMI output
11. Analog Audio output: R/L
12. RGB/D-Sub Analog output
13. Smart I/O control
14. Host USB port
15. AC Line Input

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	2048 x 2048
Pixel Rate Range	0.5~165MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Blank Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	64~8192 pixels / 2 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	Hs(Xs), Vs
VIDEO FORMAT	
Video Output (D-SUB)	R, G, B Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B

AUDIO (ANALOG) OUTPUT	
Frequency Range	50Hz/100Hz/200Hz/500Hz/1KHz/2KHz/5KHz/10KHz /15KHz/20KHz
Waveform	Sine wave
Number of Channel	2 Channel (R / L)
Level Range	0V to 2V (at 600 Ohms Load)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DVI (TMDS) OUTPUT	
Pixel Rate Range	25< 1 link< 165MHz (256 color)
EDID	Read / Write / Compare / Edit
HDCP	Support HDCP V.1.0 Production-Key
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

HDMI VIDEO OUTPUT	
Version	HDMI V1.3b (with xvYCC)
Pixel Rate Range	25MHz~165MHz
Support HDMI Timing	77 Timing (CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 bits (1024 color)
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC
HDCP Support	HDCP V1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

SYSTEM	
Display	20x4 Character
USB Port	For Extend Device (Data/Firmware Download/Upload)
Remote Port	For optional remote controller
User Key	Marco Function for operation
Function Key	Fast Hot Key for setting
DATA STORAGE DEVICE	
Default	1000 timings + 1000 patterns
Internal Memory	1000 timings + 1000 patterns + 500 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
Dimension(HxWxD)	88x320x240mm / 3.46x12.6x9.45inch
Weight	3.1kg / 6.83 lbs

VIDEO PATTERN GENERATOR MODEL 2403

2403 programmable video pattern generator is the perfect instrument for digital video signal interface testing. It provides users with a high performance low-cost test solution. The built-in high speed graphic engine is able to provide standard test signals and patterns for display devices, with various resolutions to meet the requirements of multimedia display industries today, and in the future for R&D and test applications.

The Video Pattern Generator supports the up to date high resolution multimedia digital audio and video transmission inter face HDMI and DisplayPort specification with the following features:

Supports 4K x 2K 60Hz

2403 is built-in with a high speed graphic engine. The output signal can reach up to 600MHz. It supports UHD(Ultra High Definition) 4K x 2K@60Hz ultra high resolution display testing.

Modulized Signal Interface Design

The modulized design output interface has 2 signal module terminals for users to choose from based on their testing needs. The modules support multi-signal terminal synchronized output capability which meet the multi-input terminals displays testing.

HDMI 2.0 Testing Function (HDMI module)

The 2403 supports HDMI 2.0 standard 6Gbps TMDS signal output (TMDS rate), 24 / 30 / 36 bits color depth (RGB / YCbCr), HDMI 2.0 standard YCbCr 4:2:0 sampling format output and at the same time provides high resolution color standard ITU-R BT2020 and HDCP 2.2 & 1.4 / ARC / CEC / EDID / SCDC (Status & Control Data Channel) / HDR (High Dynamic Range) testing functions.

DisplayPort 1.2a Testing Function (DP module)

Supports DisplayPort 1.2 standard HBR2 (High Bit Rate 2, 5.4Gbps) bandwidth transmission up to 4Kx2K 60Hz. Also supports audio transmission and 3D/EDID/DPCD (Display Port Configuration Data) testing functions

Hot Key Function

The default or user-defined testing program can help to increase manufacturing efficiency. The 2403 is built with abundant timing and pattern, including standard static, motion and scrolling pattern. It supports the testing of the displays' performance. The modulized signal interface design allows flexibility of choice based on the testing application. The VPG Master supports programmable timing, pattern and program. Its user-friendly interface is suitable for R&D, production and QA verification.

CE

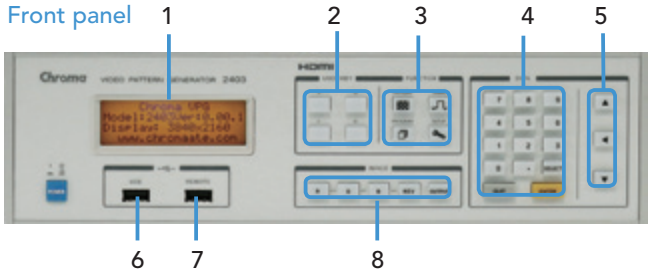
MODEL 2403

KEY FEATURES

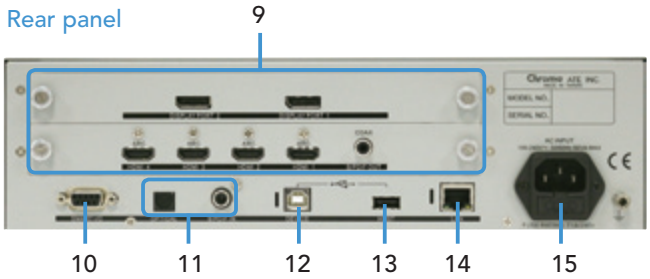
- Modular design
- HDMI 2.0 Signal module (Option)
  - Comply with HDMI 2.0 standard
  - 4K x 2K 60/50Hz
  - Pixel rate support up to 600MHz (6Gbps TMDS rate)
  - RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
  - HDCP 1.4 / 2.2
  - CEA-861-F timing
  - 24 / 30 / 36 color depth
  - ARC (Audio Return Channel)
  - sYCC601 / Adobe RGB / Adobe YCC601 / xvYCC / ITU-R BT.2020
  - HDR (High Dynamic Range) Test Function (HDR Infoframe & Metadata / EOTF/ Wide Color Gamut)
  - SCDC (Status & Control Data Channel) Read Function
- DisplayPort Signal module (Option)
  - Comply with DisplayPort 1.2a standard
  - 4K x 2K 60/50Hz
  - Pixel rate support up to 600MHz
  - 1.62 / 2.7 / 5.4Gbps per lane
  - 1 / 2 / 4 Link
  - 2 Channel (L-PCM)
  - DPCD (Display Port Configuration Data) Read Function
- EDID Read / Write / Compare / Analyze
- Scrolling function
- Built in 4K/HDR/3D/China high-definition test patterns
- User Define Key(32 Key max.)
- One-touch function keys
- Front panel USB and control interface
- Graphical software user interface
- ESD protection circuit
- BMP file format support

PANEL DESCRIPTION

Front panel

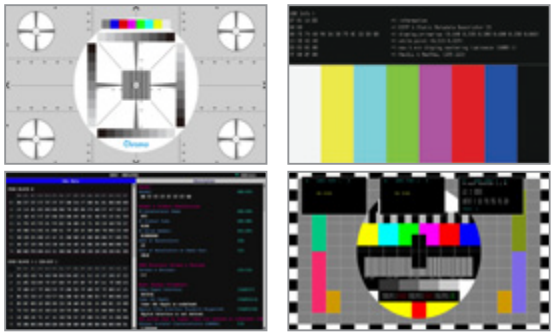


Rear panel

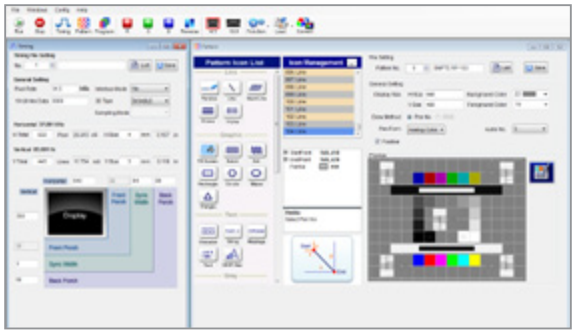


1. LCD Display
2. User Key
3. Function Group
4. Data Group
5. Direction Key
6. USB Port
7. Remote for optional
8. Image Group for signal on/off select
9. Video Signal Module
10. Smart I/O Control
11. Digital Audio Input (Optical & Coaxial)
12. Device USB Interface
13. Host USB Interface
14. Ethernet Interface
15. AC Power Input

PATTERNS AND VPG MASTER SOFEWARE



All Kinds of Test Pattern Support
- 4K/HDR/3D/China High Definition TV test pattern
- EDID/HDCP/DPCD INFO test pattern
- BMP filename can be imported



VPG Master Software
- Easy for Timing/Pattern/Program Editing
- Graphic User Interface
- Support Font/Audio/EDID/InfoFrame/HEAC Function

SPECIFICATIONS

2403 Main Frame	
Display Size	4096 x 2160
Horizontal Timing	
Total pixel	32~8192 pixels / 1 pixels resolution
Vertical Timing	
Total line	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable

Data Storage Device	
Default	1000 timings+1000 patterns (depend on signal module)
Internal Memory	1000 timings + 1000 patterns + 500 programs
External Memory	USB Host interface
Others	
AC Input	100-240V, 50~60Hz, 1A Maximum
Operation/Storage Temprature	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
2403 (HxWxD)	320x240mm / 3.46x12.6x9.45inch
Weight	3.1kg / 6.83 lbs

HDMI Signal Module A240301	
Version	HDMI 2.0 x 4ch (3D/ARC/CEC/HDR/SCDC)
Pixel Rate Range	25 ~ 600 MHz (TMDS rate 600 MHz)
Support HDMI Timing	125 Timing (CEA-861F)
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color depth	24 / 30 / 36 bits per pixel
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYcc / sYcc601 / Adobe RGB / Adobe sYcc601 / ITU-R BT.2020
EDID	Read / Write / Compare / Edit / Analysis
HDCP	HDCP 2.2 / 1.4 (Automatic selection)
Audio	8 Channel (16 / 24 bit)

DisplayPort Signal Module A240302	
Version	DisplayPort 1.2a x 2ch (3D/DPCD)
Pixel Rate Range	25 ~ 600 MHz
Main Link Data Rate	1.62 / 2.7 / 5.4Gbps per lane
Lane Count	1 / 2 / 4 Lanes
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color depth	6 / 8 / 10 / 12 bits per component
HDCP	HDCP 1.3
Audio	2 Channel (16 / 24 bit)
MST	FHD (1920 x 1080P @ 60) x 4 max. (Simple/Split mode)

* All specifications are subject to change without notice.
Please visit our website for the most up to date specifications.

DISPLAY COLOR ANALYZER
MODEL 7123

7123 Display Color Analyzer adopts the design of contact and non-contact type measurements based on the probe selected to measure the luminance and chromaticity of display panels. Developed with the most advanced digital signal processor and the technology of optoelectronic transfer as well as precision optical parts and circuit design, the 7123 Display Color Analyzer is capable of performing high speed, accurate and stable color tests.

The configuration of 7123 complies with the color matching function sensor of CIE 1931 and CIE1976 UCS that can measure the luminance and chromaticity of display panel accurately. Users can switch to various types of chromaticity coordinates freely including xyY, TΔuvY, u'v'Y, RGB, XYZ, FMA (A712200), FLVL (A712200), Contrast and Program 9 modes in total. The A712301 that is designed to test the LCD characteristics with LED backlight is able to meet the low luminance test requirements of 0.005cd/m². In addition, the A712302, designed for small size display in particular can solve the problem of color analyzer measurement area larger than the display area with its Ø5mm measurement area.

To satisfy the needs for automation, the 7123 is equipped with the function to control the video pattern generator and the UUT without using a personal computer to cut down the acquisition and management cost. The 7123 also has the functions of contrast measurement, result judgment and programmable test items that can fulfill the auto test requirements to enhance the production efficiency.

The Optical Measurement Software incorporated by 7123 is able to do chromaticity, luminance, Flicker (A712200) and Gamma measurements on PC, and then show the measured data on CIE 1931 and CIE1976 UCS chromaticity coordinate chart directly. Besides the function of drawing Gamma curve, the measured data can also be stored on PC and exported to EXCEL® for process. The example programs enclosed in optical measurement software allow users to develop the test programs that suit their needs.

7123 Display Color Analyzer has 100 channels of built-in memory for storing the value of standard colors and calibrated data. In addition, 7123 also provides many friendly user interfaces for operation such as the way test data shows, the position set for push buttons, the positioning projector, USB and RS-232 interfaces for data transmission, calibration period setting as well as reminding function and etc. to satisfy the requirements for actual measures. Using the USB flash disk, the test procedures can be copied to other stations for use and reduce the time for repeated editing considerably.

As the technology and products of flat displays have become the mainstream in the market today, every manufacturer is seeking for high value-added and low cost measurement solutions to raise its competitiveness ; 7123 Display Color Analyzer is the excellent tool to assist in achieving that purpose.

USB Flash Disk | IIC | USB 2.0 | RS-232C | CE

MODEL 7123

Key Features:

- Luminance and chromaticity measurement of Color Display
- Support LED backlights display
- 0.005 cd/m² low luminance measurement (A712301)
- Wide luminance display range : (Option)
  0.0001 to 25,000 cd/m² (A712301)
  0.01 to 200,000 cd/m² (A712302)
  0.01 to 6,000 cd/m² (A712200)
- High accuracy measurement
- Maximum 9 display modes:
  xyY, TΔuvY, u' v' Y, RGB, XYZ, FMA(A712200), FLVL(A712200), Contrast, Program
- Support contrast, JEITA and VESA for flicker measurements (A712200)
- Able to control Video Pattern Generator and UUT (Unit Under Test)
- Built-in contrast measurement function to calculate the contrast ratio directly
- Equipped with programmable test items that can complete the planned tests with one single button
- Support USB flash disk that can copy the test procedures to other station for use
- Judgment function embedded to judge the test result automatically with one single button
- Calibration period setting and reminding function
- Memory for storing 100 channels of standard color data and calibration data
- Built-in flat display calibration data LCD-D65 & LED-D65 to be applied for chromaticity measurement instantly
- Optional display white balance alignment system can be used to integrate all optical test stations to one single station

SPECIFICATIONS

Model		7123		
Probe				
Probe Model		A712301 (Ultra Low luminance measuring probe)	A717002 (Small size high lvminace measuring probe)	A712200 (Flicker measuring probe)
Measurement Area		Ø27 mm / Ø1.06 inch	Ø5 mm / Ø0.20 inch	Ø27 mm / Ø1.06 inch
Measurement Distance		30±10mm	0~10mm	30±10mm
Acceptance Angle		± 2.5°	± 5°	± 2.5°
Display Range	Luminance	0.0001 to 25,000 cd/m²	0.01 to 200,000 cd/m²	0.01 to 6,000 cd/m²
	Chromaticity	4 or 3 digits display		
Luminance unit		cd/m² or fL, selectable via button on the front panel		
Display Mode	Digital	xyY ; TΔuvY; u' v' Y ; RGB ; XYZ ; Contrast; Program		xyY; TΔuvY; u' v' Y; RGB; XYZ; FMA; FLVL; Contrast; Program
	Analog	Δx Δy ΔY; ΔR ΔG ΔB; ΔR G/R B/R; R/G ΔG B/G		Δx Δy ΔY; ΔR ΔG ΔB; ΔR G/R B/R; R/G ΔG B/G;FMA
Luminance *1	Meas. Range	0.0050 to 6,000cd/m² (0.001 to 1751fL)	0.30 to 6,000 cd/m²(0.09 to 1751fL)	0.10 to 6,000 cd/m²(0.03 to 1751 fL)
	Accuracy	0.0050 to 0.0199 cd/m²: ± 0.0005 cd/m² 0.020 to 0.099 cd/m² : ±4% ±2 digits 0.100 cd/m² to 6,000cd/m²: ±2% ±1 digit	0.30 to 6,000 cd/m²:±2%±1 digit	0.10 to 6,000 cd/m²:±2%±1 digit
	Repeatability	0.0050 to 0.0199 cd/m²: ± 0.0003 cd/m² 0.020 to 0.099 cd/m² : 1% + 2 digits(2 σ) 0.100 to 0.999 cd/m² : 0.2% + 1 digit(2 σ) 1.00 cd/m² to 6,000 cd/m²: 0.1% + 1 digit (2 σ)	0.30 to 2.99cd/m²: 0.2% +1 digit(2 σ) 3.00 to 6,000cd/m²:0.1%+1 digit(2 σ)	0.10 to 0.99 cd/m² : 0.2% + 1 digit (2 σ) 1.00 to 6,000cd/m²: 0.1% + 1 digit (2 σ)
Chromaticity *1	Accuracy	0.100 to 2.99cd/m² : ±0.008 3.00 to 4.99cd/m² : ±0.005 5.00 to 9.99 cd/m² : ± 0.003 10.00 to 6,000 cd/m² : ± 0.002	0.30 to 14.99 cd/m²: ± 0.008 15.00 to 119.9 cd/m²: ± 0.005 120.0 to 6,000 cd/m²: ± 0.003	0.1 to 2.99 cd/m²: ± 0.008 3.00 to 4.99 cd/m²: ± 0.005 5.00 to 9.99 cd/m²: ± 0.003 10.00 to 6,000 cd/m²: ± 0.002
	Repeatability	0.100 to 0.199cd/m² : 0.015(2 σ) 0.200 to 0.499cd/m² : 0.008(2 σ) 0.500 to 1.99cd/m² : 0.003(2 σ) 2.00 to 6,000cd/m² : 0.001(2 σ)	0.30 to 0.59 cd/m²: 0.015 (2 σ) 0.60 to 1.49 cd/m²: 0.008 (2 σ) 1.50 to 7.99 cd/m²: 0.003 (2 σ) 8.00 to 6,000 cd/m²: 0.001 (2 σ)	0.10 to 0.19 cd/m²: 0.015 (2 σ) 0.20 to 0.49 cd/m²: 0.008 (2 σ) 0.50 to 1.99 cd/m²: 0.003 (2 σ) 2.00 to 6,000 cd/m²: 0.001 (2 σ)
Flicker -Contrast Method(FMA)	Range	---	---	5 cd/m² or higher
	Display Range	---	---	0.0 to 100%
	Accuracy	---	---	±1% (Flicker frequency:30 Hz AC/DC 10 % sine wave) ±2% (Flicker frequency:60 Hz AC/DC 10 % sine wave)
	Repeatability	---	---	1% (2 σ) (Flicker frequency:20 to 65 Hz AC/DC 10 % sine wave)
Flicker -JEITA/ VESA Method	Range	---	---	5 cd/m² or higher
	Display Range	---	---	6~240Hz
	Accuracy	---	---	±0.5dB (Flicker frequency:30 Hz AC/DC 10 % sine wave)
	Repeatability	---	---	0.3dB (2 σ) (Flicker frequency:30 Hz AC/DC 10 % sine wave)
Measurement Speed	xyY	Y:0.0050 to 0.0199 cd/m² : 1 times/sec. (Low luminance mode) ; Y:0.020 to 1.99 cd/m² :4 times/sec.(Auto mode) 2.00 cd/m² and above: 15 times/sec.	0.3 to 7.99 cd/m²:1 time/sec. 8.00 cd/m²: and above:15 times/sec.	0.1 to 3.99 cd/m²: 5 times/sec. ; 4.00 cd/m² and above: 15 times/sec.
	FMA	---	---	6 times/sec. (UNIV) ; 20 time/sec.(NTSC); 16 times/sec. (PAL)
	FLVL	---	---	0.5 time/sec.
Dimension		Ø 46 x 234.9(D) mm / Ø 1.81 x 9.25(D) inch	Ø 46 x 221.9(D) mm / Ø 1.81 x 8.74 (D) inch	Ø 46 x 234.9(D) mm / Ø 1.81 x 9.25(D) inch
Weight		0.5 kg / 1.1 lbs	0.5 kg / 1.1 lbs	0.5 kg / 1.1 lbs
Cord Length		2.5m / 98.43 inch		
Optical System		LED positioning function		
Main unit				
Memory Channel		100 Channels		
Sync Mode		NTSC, PAL, EXT, UNIV, INT		
Object Under Measurement		10~240 Hz		
Interface		USB(2.0), USB flash disk port, RS232C (Baud rate max. 115200)		
Input Voltage Range		AC 100~240V, 50/60 Hz, 50VA		
Operating Temperature/Humidity Range		10°C to 30°C (50°F to 86°F); less than 75% relative humidity (with no condensation)		
Storage Temperature /Humidity Range		0°C to 40°C (32°F to 104°F); less than 75% relative humidity (with no condensation)		
Dimension (H x W x D)		115x320x260 mm / 4.5x12.6x10.2 inch		
Weight		2.7 Kg / 5.95lbs		
Other Functions		Customized light source calibration, memory channel ID storage, variable analog display range, display pause, remote control, comparison, video pattern generator and UUT control, programmable test item, test result judgment, calibration period setting and reminding function, USB flash disk supported. *2		
Certification		CE		

All specifications are subject to change without prior notices. Please visit our website for the most up to date specifications.

*Reference standards: IEC 61747-6, EIAJ ED-2522, ASTM E455-03, VESA Standard

*1: Standard illuminant A is used for test according to Chroma's test condition.

*2: Only the USB f ash disks certified by are supported.

LED Chip Level Tester

Model 58173-TC

The LED Test System Model 58173-TC focuses on LED wafer/chip characteristics analysis and provides optimized test performance. Its test items include a variety of voltage/current output measurement, optical power measurement, and spectrum analysis. On measurement, several electrical and optical characteristics analysis can be achieved at a time within 25 ms, and its electrical measurement supports high-voltage LED and high-brightness LED applications.

On system integration, the 58173-TC can easily integrate various Probers and Handlers for wafer probing and chip sorting. In addition, optional switch module allows test system to perform multi-channel and multi-chip measurements.

Key Features

- ☑ High test speed: complete whole test within 25ms (selected test items)
- ☑ Super statble of temperature variation
- ☑ Support high voltage and high power LED test requirement
- ☑ Support multi-die test (option)
- ☑ Support ESD test (option)

SPECIFICATIONS		
Model		**58173-TC**
Parameters		
Electiral Test Items		Forward Voltage(Vf), Reverse Leakage Current (Ir), Reverse Breakdown Voltage (Vrb), SCR
Optical Test Items		Luminous Intensity (mcd), Lumen (lm), Radiant power (mw), Dominant Wavelength (Wd), Peak Wavelength (Wp), FWHM, CIE Chromaticity, CCT, CRI
Electrical Parameter Measurements		
Power Range		≦ 20W, as the figure shows on next page
Voltage	Source Range	±10V / ±100V / ±200V
	Source Accuracy	0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. *1
	Measurement Range	±10V / ±100V / ±200V
	Measurement Accuracy	0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. /0.03% + 0.02%F.S. *1
Current	Source Range	±20uA / ±500uA / ±20mA / ±500mA / ±2°
	Source Accuracy	0.08% + 0.06%F.S. / 0.08% + 0.05%F.S. / 0.08% + 0.05%F.S. / 0.3% + 0.1%F.S. / 0.3% + 0.3%F.S *1
	Measurement Range	±20uA / ±500uA / ±20mA / ±500mA / ±2°
	Measurement Accuracy	0.06% + 0.04%F.S. / 0.06% + 0.03%F.S. / 0.06% + 0.03%F.S. / 0.25% + 0.1%F.S. / 0.25% + 0.3%F.S. *1
Optical Measurements		
Spectrometer	Wavelength Rang	350 ~ 780 nm
	Detector Pixels	2048 pixels
Wp	Repeatability *2	±0.5 nm
Wd (380~780nm)	Repeatability *2	±0.2 nm
Radiant Flux (mW)	Repeatability *2	±1%
Operation Environment	Temperature	20°~ 30°
	Humidity	40% ~ 70%
Facility Requirements		
Power Requirement		800 VA
Dimensions (W x D x H)		Electrical Test Module : 486 mm x 462 mm x 110 mm Optical Test Module : 486 mm x 475 mm x 110 mm
Weight		15 kg

Note *1 : Test condition is under point of sensing

Note *2 : The tested device is blue LED chip

LED Mapping Probe Tester

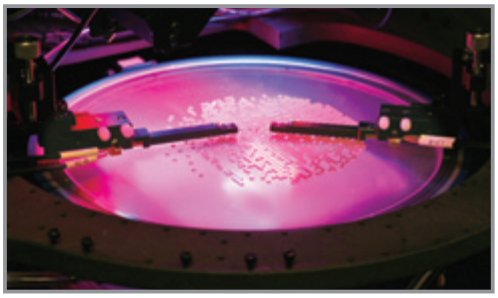
The 58212-C features an automated LED wafer/chip probe tester, delivering fast and accurate LED measurements with test times less than 125ms *1.

The system can be modified to support different LED structures including Lateral, Vertical, and Flip Chip designs. Integrated scanners provide autonomous wafer mapping to guarantee precision testing. The patented probe head prevents device scratches and ensures solid contact with every LED.

Chroma's unique design acquires and analyzes optical data such as the dominant wave length, peak wavelength, and CCT. Additionally, it provides essential electrical data such as forward voltage, leakage current, and reverse breakdown voltage, all in one test step.

The 58212-C includes a user-friendly graphical interface and advanced logic algorithms to significantly increase production efficiency. Comprehensive statistical reports and analysis tools allow for easy control and mass production management.

Note *1 : Test condition: under 300um sample pitch, 5 electrical test parameters and 1 optical parameter. Due to differences in LED characteristics, the measurement results may vary.



Key Features

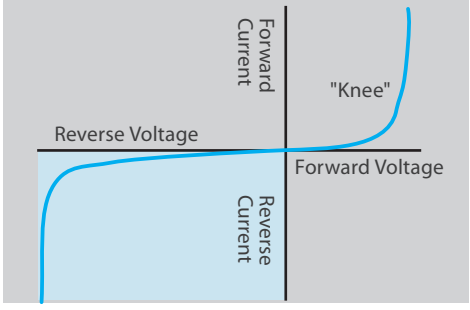
- ☑ High speed and accuracy
- ☑ Lateral, vertical, and flip chip
- ☑ Wide power test range (up to 200V/2A)
- ☑ Up to 8 inch wafers
- ☑ ® Huge Photo Detector
- ☑ Unique edge sensor
- ☑ Patented probe head
- ☑ Robust Z-Axis stage
- ☑ Wafer mapping algorithm
- ☑ External light shielding enclosure
- ☑ Analysis tools and statistical reports

Hardwares

- ☑ Automatic LED wafer/Chip prober
- ☑ Electrical test module
- ☑ Optical test module
- ☑ Optional ESD test module

Test Items

- ☑ Electrical parameters:
  - Forward Voltage Measurement (Vf)
  - Reverse Breakdown Voltage Measurement (Vrb)
  - Reverse Leakage Current (Ir)
  - SCR detection
- ☑ Optical parameters:
  - Optical power (mw, lm, mcd)
  - Dominant Wavelength (Wd)
  - Peak Wavelength (Wp)
  - Full Width at Half Maximum (FWHM)
  - CIExy - CCT - CRI



LED I-V curve

SPECIFICATIONS		
Model		**58212-C**
Application		
Test Area		ψ 8 inch wafer
Supported Device (Chuck is device selected)		Chip on wafer : 2", 4", 6", 8" Chip on tape : 2", 4", 6"
Chuck Type		Lateral type, Vertical type, and Flip Chip type (Select one of them)
Die Size		7 ~ 120 mil
Pad Size		≧ 70 μm
Electrical Parameter Measurements		
Power Range		≦ 20W
Voltage	Source Range	±10V / ±100V / ±200V
	Source Accuracy	0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. / 0.05% + 0.03%F.S. *2
	Measure Range	±10V / ±100V / ±200V
	Measure Accuracy	0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. / 0.03% + 0.02%F.S. *2
Current	Source Range	±20uA / ±500uA / ±20mA / ±500mA / ±2A
	Source Accuracy	0.08% + 0.06%F.S. / 0.08% + 0.05%F.S. / 0.08% + 0.05%F.S. / 0.3% + 0.1%F.S. / 0.3% + 0.3%F.S *2
	Measure Range	±20uA / ±500uA / ±20mA / ±500mA / ±2A
	Measure Accuracy	0.06% + 0.04%F.S. / 0.06% + 0.03%F.S. / 0.06% + 0.03%F.S. / 0.25% + 0.1%F.S. / 0.25% + 0.3%F.S. *1
Optical Measurements		
Spectrometer	Wavelength Rang	350 ~ 780 nm
	Wp Repeatability	±0.5 nm
	Wd Repeatability (380~780nm)	±0.3 nm
Optical Power	Repeatability	±1%
Operation Environment	Temperature	20˚ ~ 30˚
	Humidity	40% ~ 70%
Facility Requirements		
Machine Dimension		980 mmx1160mmx1500 mm (does not include monitor and signal)
Power Requirement		Single phase, 220VAC ±10%, 50/60Hz, 20A
Input Air		-0.2 Mpa / ψ 6 mm
Weight		750 kg

Note *1 : Test condition is under point of sensing
Note *2 : The tested device is blue LED chip

LASER DIODE CHARACTERIZATION SYSTEM
MODEL 58620

Laser Diodes are becoming more ubiquitous. Current applications range from medical and defense, to being the critical back bone of the world's fiber optic communication networks. There are several highly precise processes involved in the production of Laser Diodes. These processes are all quite cost intensive ranging from wafer growth all the way to fibre alignment and package high speed testing.

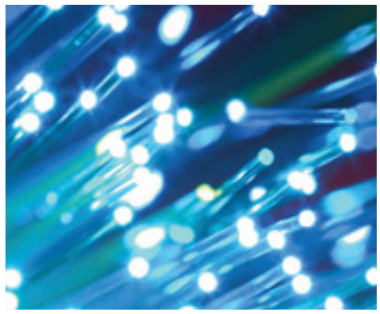
The Chroma 58620 Laser Diode Characterization Station is a state-of-the-art full turnkey system designed specifically for Laser Diodes. Its features range from macro inspection of the facette or aperture active area to a full suite of electro-optical parametric tests. When Chroma's high capacity carrier is used, multiple devices can be rapidly repeatably indexed improving not only test times but the reliability of the tests themselves.

The 58620 is equipped with a highly stable, large scale, temperature control platform to provide the ability to incorporate R&D style tests in a production environment. This enables the ability to study correlation between laser diode forward current and temperature.

MODEL 58620

KEY FEATURES

- Full Turn-Key Automated Test for edge-emitting laser diodes
- High precision and large capacity carrier, interchangeable with other automated equipment
- Fully automated alignment for fiber-coupled tests
- Automated optical inspection to decrease mechanical positioning delays
- Highly accurate TEC temperature controller with stability up to ±0.01˚C
- PXI-Based SMU and power meter for fast test times
- Full suite of software analysis tools for laser diode characterization (Ith, Rs, Vf, slope efficiency, λp, SMSR and etc.)



SPECIFICATIONS

Model	58620
Device Under Test	
Form Factor	CoC, CoS
Channels in Carrier	80 Channels per cycle *1
Current Ranges (Model 52401)	
Current Range (Source & Measurement)	±200nA / 2μA / 20μA / 200μA /2mA / 20mA / 200mA
Current Resolution	±1.6pA/±16pA/±160pA/±1.6nA/±16nA/ ±160nA/±1.6μA
Current Accuracy (Source & Measurement)	I range ≥ 1mA : 0.1% + 0.1% FS ; I range < 1mA : 0.05%+0.2% FS
Voltage Ranges	
Compliance Voltage Range	± 0.5V/1V/2.5V/5V/10V/25V
Compliance Voltage Accuracy	≥ 1V: 0.05% + 0.01%FS ; <1V: 0.05% + 0.1%FS
Voltage Measurement	± 3.8nV~ ± 25V
Voltage Measurement Accuracy	0.05% + 38nV @0.5V to 0.05% + 1.9mV @25V
Test Parameters	
Electrical	L-I-V Curves, Ith, Vf, Rs, Linearity (Kink)
Spectral	Peak wavelength, SMSR, etc.
Optical Spectrum Analyzer*(Optional)	
Wavelength Range	700 nm to 1700 nm
Resolution Bandwidth	< 0.1 nm
SMSR Measurement	> 40 dB
Wavelength Accuracy	±0.03 nm
Optical Power Meter (Model 52962)	
Channel	Dual channels
Wavelength Range (InGaAs Based)	900 to 1700nm
Minimum Power / Current	-70 dBm
Maximum Power / Current	+10 dBm
Resolution	0.01dB
Dynamic Range	80dB
Accuracy	±5%
Linearity	0.1dB
Measurements per Second	>5000
Fibre Types Supported	50/125um, 62.6/125um multimode and single mode fiber
Form Factor	3U PXI
Thermal-Electrical Controller (Model 54130)	
Output Power	300W
Temperature Range	0 ˚C ~80˚C
Temperature Accuracy	0.3 ˚C
Temperature Uniformity *3	±0.5˚C
Cooling System	External chiller
Mechanical Specification	
Motion Stage Travel Distance	400 mm
Minima Fine Stage Resolution	20 nm
System Size (W x D x H)	1000 mm x 1200 mm x 1350 mm
System Weight	400 ± 20 Kg
Power Input	220V single phase，50/60 Hz
Water flow Rate	<3~5 lpm
Operating Environment	Temperature : 20˚C ~25 ˚C ; Humidity : <70%
Software	
Operating System Supported	Microsoft Windows® 2000, XP or 7

Note *1 : Capacity of carrier depends on the DUT size and form factor
Note *2 : 58620 is compatible with multiple Optical Spectrum Analyzers.
Please inquire for further details.
Note *3 : Temperature uniformity is dependent on operating temperature ±(0.5˚C+ 1%ΔT)

TO-CAN/CoC Burn In System

Model 58603

Burn-in, Reliability & Life Test

The 58603 is a high density, multifunction, and temperature controlled module for laser diode burn-in and lifetime tests. Each module has up to 128 discrete channels which can source current and measure voltage in various control modes as described below.

Auto Current Control Mode (ACC)

In auto current control (ACC) mode, the control circuit will provide the preset current to each laser diode with high stability. No matter how the device resistance and temperature change, the current will be kept constant over the test period. The device voltage will be recorded as a quality reference parameter.

Auto Power Control Mode (APC)

With feedback signal from the optional external Photo Diode PCB, the control circuit can adjust the laser diode current automatically to keep constant feedback signal strength, which means the optical output of the laser diode is maintained constant over the test period. The device voltage and current are recorded as quality parameters for reference.

Temperature Control

A proprietary designed heat plat will control the laser diode case temperature with high accuracy, excellent stability, and good uniformity. Compared with oven or chamber types of laser diode burn-in systems, our solution is much more compact, easier to operate, better performance, and energy saving. Customers gain benefit for small footprint, versatile usage, and easy maintenance.

Individual Module Operation

Modules are mounted in a 19" rack to form a system. Each module is a 3U height drawer to fit in the rack. Customers can set different modules in different temperatures, operated in different control modes, and with different start and stop times. This provides great flexibility in operation.

Protection and Individual Channel Shotdown

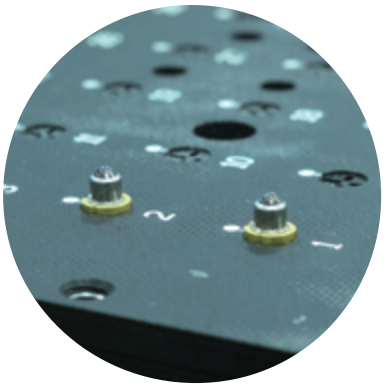
The control circuit is specially designed for protecting laser diodes. No rush current or voltage will occur to hurt the devices. High/Low limits of current and voltage can be set to perform shutdown protection. When abnormality happens, only the particular channel will be shutdown while others are running normally. Besides the protection functions implemented in the control circuit, isolation and ESD protection are also taken care in system design.

Auto Data Recovery afterCommunication Interruption

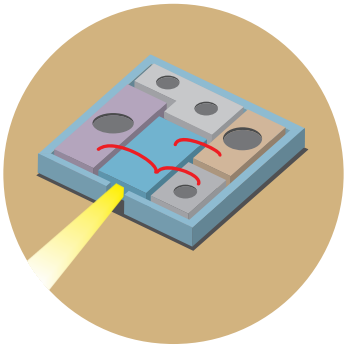
The burn-in data are stored in system PC and optional remote servers.
If the communication between the module and PC is broken temporarily, the data will be buffered in the module up to 8 hours or even longer.
After the communication is restored, the buffered data will be dumped to the PC/server without loss.

Key Features

- ☑ For Burn-In, Reliability and Life Testing
- ☑ Up to 128 laser diodes per module
- ☑ Up to 10 modules (1280 laser diodes) per systems
- ☑ ACC and APC control modes
- ☑ Individual channel driving and measurement
- ☑ Driving current 500 mA per channel and up
- ☑ Precise temperature control up to 120 ˚C
- ☑ Individual module operation
- ☑ Customization for device form factor upon request



TO-CAN carrier



CoC carrier

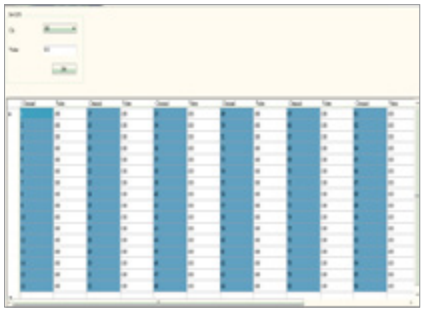
Optical module

Half height rack

Full height rack

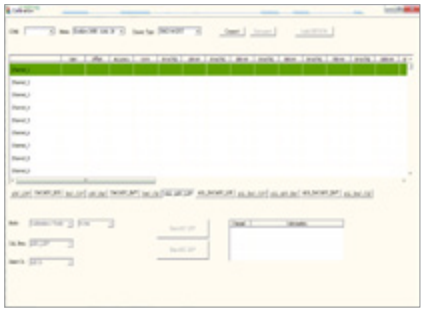
USER FRIENDLY SOFT PANEL

The soft panel provides an intuitive visual interface that one can check certain device at certain module with some simple mouse-clicks anytime during the tests. The burn-in raw data are stored in Microsoft Excel compatible format for further analyses. Optional barcode system can be cooperated for test management.



Flexible to choose condition

Comprehensive test data



GUI calibration interface

SPECIFICATIONS		
Model		**58603**
Module		
Channel Number		up to 128
Laser Diode Type		TO-46, TO-56, CoC, CoS
Test Function		ACC, APC (optional)
Burn-in Record Time		1 min to 5000 hours
Communication Port		RS232
Change Kit		DUT carrier board
Auto Current Control Mode		
Current Range		0~500 mA *1
Currnt Setting Resolution		0.02 mA
Current Accuracy		1%+1mA
Compliant Voltage		4 V
Voltage Measurement Range		4 V
Voltage Measurement Resolution		200uV
Voltage Measurement Accuracy		1%+10mV
Auto Power Control Mode (Optional)		
External PD type		Si or InGaAs *2
Wavelength Range		390 to 1700 nm
PD Current Stability		1%
LD Current Range		0~500 mA
LD Current Measurement Accuracy		1%+1mA
LD Compliant Voltage		4 V
LD Voltage Measurement Accuracy		1% + 10mV
Temperature Control		
Temperature Measuring Range		0~150 ˚C
Temperature Setting Range		40~120 ˚C
Temperature Setting/Reading Resolution		0.1 ˚C
Temperature Stability		0.2 ˚C
Temperature Accuracy		1 ˚C
Temperature Uniformity		±(1 ˚C + 1.2% ΔT)
System		
Configuration		23" rack, half or full height
Number of Modules		up to 10 (For full height rack)
DUTs per system		up to 1280 (For full height rack)
CommunicationPort		Ethernet to server
Dimensions (H x W x D)	Half height rack , 3 modules	1600 x 600 x 900 mm
	Full height rack , 10 modules	2000 x 600 x 900 mm
Weights	Half height rack , 3 modules	230kg
	Full height rack , 10 modules	500kg
Power Requirements	Half height rack , 3 modules	AC 220V±10%, 50/60Hz, 11.4A, 2.5KW
	Full height rack , 10 modules	AC 220V±10%, 50/60Hz, 20A, 4.4KW
Environment Temperature		20~30˚C
Humidity		<80% RH, non-condensing

Note *1 : Can be customized for other specifications
Note *2 : Wavelength dependent, customized PD types upon request
Note *3 : Thermal platform temperature without DUT loading, ΔT = | ambient temperature - setting temperature |

SPECIFICATIONS	
Model	**58604**
SMU Module	
Channel Number	up to 256
Laser Diode Type	TO-46, TO-56, CoC
Test Function	ACC (standard) APC, LIV (optional)
Burn-in Record Time	1 min to 5000 hours
Auto Current Control Mode	
Current Range	±500 mA
Current Accuracy	0.2% F.S.
Compliant Voltage	±7 V
Voltage Measurement Range	±7 V
Voltage Measurement Accuracy	0.2% F.S.
Auto Power Control Mode (Optional)	
External PD type	Si or InGaAs *1
Wavelength Range	400 ~ 1600 nm *1
LD Current Range	±500 mA
LD Current Measurement Accuracy	0.2% F.S.
LD Compliant Voltage	±7V
LD Voltage Measurement Accuracy	0.2% F.S.
Temperature Control	
Temperature Measuring Range	Ambient ~ 125 ˚C
Temperature Setting Range	45~125 ˚C
Temperature Setting/Reading Resolution	0.1 ˚C
Temperature Stability *3	1 ˚C
Temperature Uniformity	±(1 ˚C + 1.2% ΔT) *2
System	
CommunicationPort	Ethernet to server
Dimensions (D x W x H)	1,300 mm x 900 mm x 1,900 mm
Weights	500±50 kg
Power Requirements	187 ~ 250 Vac (3 Phase 4 Wire, Δ Connection) or 323 ~ 437 Vac (3 Phase 5 Wire, Y Connection) / 45 ~ 65 Hz
Environment Temperature	20~30˚C
Humidity	<80% RH, non-condensing
Compressed Air	5 kgf/cm^3, 30 L/min. ; 0.5 Mpa

Note *1 : Wavelength dependent, customized PD types upon request
Note *2 : Thermal platform temperature without DUT loading, ΔT = | ambient temperature - setting temperature |
Note *3 : 1 ˚C = (Max T - Min T) within 48 hrs burn-in time