

S600 SERIES MULTI-CHANNEL TESTERS

*High-Speed Parallel Testing of Adapters, Chargers,
LED Power Drivers, DC Converters, Voltage Regulator
Modules, Point-of-Load Converters & AC-DC Power Supplies*

S600 Series Multi-Channel Testers

- Configurable to test 1 to 16 devices in parallel
- Chassis will accept any combination of loads and power analyzers
- Both loads and power analyzers have built-in waveform digitizers that yield over 60 different precision measurements
- Time-synchronized multi-output testing
- emPower® Test Executive for rapid program development, troubleshooting and advanced report generation

Application

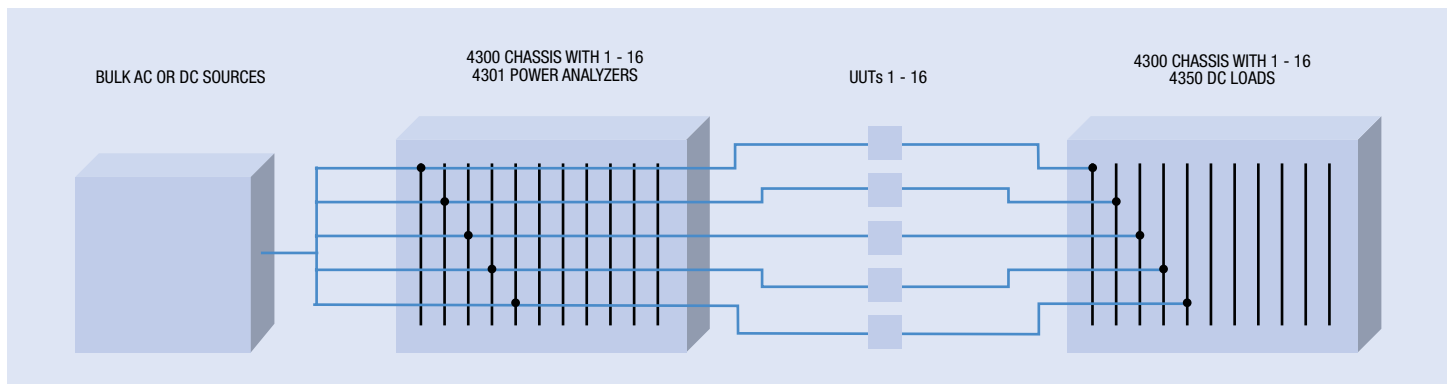
The Model S600 Multi-Channel Tester is a parallel test system optimized for hyper-fast testing of high volume power conversion devices such as those typically found in consumer electronic devices. In addition to the raw speed of the system, all modular instruments make a vast array of precision measurements thereby eliminating the cost and time penalties of using traditional single-purpose measurement instruments. That combination of speed and accuracy equates to a test throughput of greater than 3000 units per hour for basic power conversion devices.

Another application of the S600 parallel testing capability is the ability to more comprehensively test multi-output power supplies. By being able to measure and display time-synchronized waveforms on all outputs simultaneously, output-to-output inter-relational behavior can now be fully analyzed and documented.

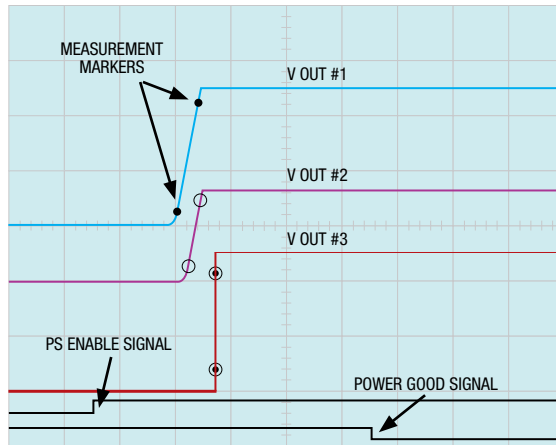


Model S650 configured with four loads & four power analyzers

Connection Diagram for Testing Up to 16 Power Conversion Devices



The remarkable feature of the loads is their built-in digital measurement system.



Digital Loads with Advanced Measurement Capabilities

The core of the S600 utilizes the Model 4350 load/measurement subsystem. Individual loads are available in three-sizes of 150, 300 and 600 W and can be paralleled in software for higher power. The remarkable feature of the Model 4350 loads is their built-in digital measurement system, which features two isolated channels of 1MS/sec digitizing capability.

Multi Output/Multi UUT Monotonicity & Timing including Digital Logic

The benefit of the Power Analyzer is that it provides precision UUT input measurements, such as efficiency, on each tester channel.

Digital Power Analyzer

The benefit of the Power Analyzer is that it provides precision UUT input measurements on each tester, such as efficiency, on each tester channel. In this manner a bulk AC or DC source can provide the power for all UUTs, while the Power Analyzer in combination with the loads makes critical input-to-output measurements such as efficiency.

Think of the Power Analyzer as a combination of 3 digital instruments: power meter, multimeter and oscilloscope. The analyzer's performance is created by state-of-the-art, dual A/D converters with a 1 MHz sampling rate that provide the data to make practically any power-conversion-related static or dynamic power measurement provided by the 3 types of instruments above.

The single-card Power Analyzer fits within the chassis and is interchangeable with the 150 W Electronic load. With this configuration flexibility, a single chassis can contain any mix of the two types of modular instruments up to the 16-slot limit. Should 16 slots not be sufficient, a second chassis is added to accommodate more test channels or larger, multi-slot loads.

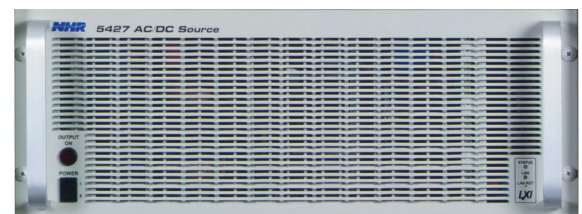


A key core instrument of the S600 Multi-Channel Test System is the Model 4301 Digital Power Analyzer.

Highly versatile AC/DC Source capable of both single-phase AC & DC stimulus.

AC/DC Source

While the S600 Series is configurable with any number of sources appropriate to the type of testing and number of test channels planned, one highly versatile choice is the Model 5427 capable of both single-phase AC and DC stimulus. This particular source will provide 2700 KVA, single phase in the AC mode and 2000 W in the DC mode.



Model 5427 AC/DC Source

The AC/DC Source uses input power factor correction to pull maximum rated power from a single-phase line supply varying from 90 - 265 VAC RMS. In AC mode, the large peak current output capacity allows testing of switching supplies with input current crest factors of up to eight to one. In DC mode, the four quadrant output capability allows discharge of capacitive DC loads much faster than traditional sources. The source has multiple output voltage ranges and a constant power envelope to provide a wide variety of maximum current and voltage capabilities.

emPower® Test Executive

A complete test executive is provided with the S600 for the rapid development of test sequences, full interactive (manual) control for test program development and trouble-shooting plus the ability to embed waveforms in test reports.

Ease of Reconfiguration

The front-loading, card based design of both the Loads and the Power Analyzer make reconfiguration for another type of Device to be tested or removal for repair a straight forward matter. Load and Power Analyzer instruments are removed simply by backing out 2 thumbscrews and sliding the card-instrument out of the chassis.

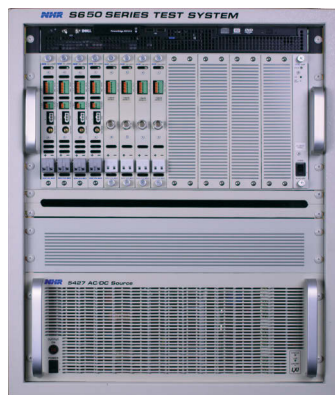


Front loading, card-based design makes removal & reconfiguration easy

The S600 Series of testers comes in 3 sizes of compact cabinets that are determined by the number of test channels, use of the Power Analyzer, plus quantity & size of AC and/or DC sources selected.

Compact Cabinet Choices

The S600 Series of testers comes in 3 sizes of compact cabinets that are determined by the quantity and size of AC and/or DC sources desired. The smallest cabinet is only 27.5" high, making it ideal for under-conveyor, production-line locations as well as portable man-lift ATE uses.



Model S650 Tests 1 to 8 UUTs in parallel. In addition to a single chassis configured with a NHR 5427 AC/DC Source or DC sources for DC-DC only testing



Model S660 Tests up to 8 UUTs in parallel. In addition to a single chassis configured with additional cabinet space for optional DC Sources for testing DC-DC &/or output OVP



Model S670 Tests up to 16 UUTs in parallel. In addition to a second chassis, configured with optional DC Sources for testing DC-DC and/or output OVP

Model 430I Power Analyzer Measurement Specifications

Parameter	Range	Resolution	Accuracy	Waveform		
DC Voltage	±15/30/60/120/250/600VDC	14/15 Bits	0.1% of R _{dg} + 0.1% of R _{ge}	Rise	Voltage Bandwidth	DC to 500kHz
DC Current	±0.01/0.05/0.2/1/5/20 ADC	13 Bits	0.1% of R _{dg} + 0.1% of R _{ge}	Fall	Current Bandwidth	DC to 100kHz
AC, AC+DC Voltage TRMS	17/70/350 VAC 9/35/150 VAC	16 Bits, CF=1.7 15 Bits, CF=3	0.1% of R _{dg} + 0.1% of R _{ge}	Settling	Amplitude Accuracy	2% of DC range
AC, AC+DC Current TRMS	0.01/0.05/0.2/1/5/20 AAC 0.005/0.02/0.1/0.5/2/10 AAC	15 Bits, CF=3 14 Bits, CF=6	0.1% of R _{dg} + 0.1% of R _{ge} 0.1% of R _{dg} + 0.1% of R _{ge}	Turn-On	Time Accuracy	0.5% of rdg + 1/SR
Power Average, True, Apparent, Reactive	Current range times Voltage range	1 Range + V Range	0.1% of R _{dg} + 0.1% of R _{ge}	Hold-Up Time	Record length	256k points
Power Factor	0 to 1	1 Range + V Range	0.5% of R _{dg} + 0.5% of R _{ge}	Event	Trigger	System Trigger, DINs, Voltage
Frequency	10 - 1000 Hz		0.5% of R _{dg}	THD	Range Resolution	Same as Voltage or Current
Peak to Peak Noise	2.5 V, 0.25 V Peak to Peak	12 Bits	3% of range @ 1 MHz			
DIN Timing	7 days	100nanoSeconds	0.05% of R _{dg} ± 100µSeconds			

Model 4350 Digitizing DC Electronic Load Specifications

Overview				(continued)			
Power	150 W	300 W	600 W	Power			
Slots (16 per Mainframe)	1	2	4	Range	IR x VR	IR x VR	IR x VR
Maximum Current	30 A	60 A	120 A	Accuracy	1 Accuracy + V Accuracy		
Maximum Voltage	500 V	500 V	500 V	Resolution	0.0015% R	0.0015% R	0.0015% R
Voltage & Current Measurements	Overshoot, Undershoot, AC RMS, AC+DC RMS, Positive Peak, Negative Peak, Peak-Peak, High-Frequency Peak - Peak (Noise), Rise Time, Fall Time, Settling Time, Hold-Up Time			Resistance			
Other Measurements	Average Power, Peak Power, Resistance, Trigger-In Time, DIN State & Time			Range	0 - Inf	0 - Inf	0 - Inf
Programmable Features	Constant Current Mode, Constant Voltage Mode, Constant Power Mode, Constant Resistance, Auto Mode, LED Driver Mode, Solar PV Panel with MPPT Mode, Slew Rate, Macro, Triggering			Accuracy	1 Accuracy + V Accuracy		
Measurement Instrumentation				Resolution	0.0015% R	0.0015% R	0.0015% R
Current				High-Frequency			
Range (±)	0 - 0.66, 3.0, 30 A	0 - 0.66, 6.0, 60 A	0 - 0.66, 12, 120 A	PK-PK Noise			
Accuracy	0.05% R _{dg} + 0.05% R	0.05% R _{dg} + 0.05% R	0.05% R _{dg} + 0.05% R	Range	0 - 0.25, 2.5 VAC		
Resolution	0.0015% R	0.0015% R	0.0015% R	Bandwidth	10 Hz - 20 MHz		
DC Voltage				Accuracy	3% R @ 1 MHz		
Range (±)	0 - 30, 120, 600 V	0 - 30, 120, 600 V	0 - 30, 120, 600 V	Resolution	0.0015% R		
Frequency	DC - 500 kHz	DC - 500 kHz	DC - 500 kHz	DIN Timing			
Accuracy	0.02% R _{dg} + 0.04% R			Range	100µS to 168 hours	100µS to 168 hours	100µS to 168 hours
Resolution	0.003% R	0.003% R	0.003% R	Accuracy	0.05% R _{dg} ± 100 µS	0.05% R _{dg} ± 100 µS	0.05% R _{dg} ± 100 µS
Waveform				Resolution	100 nano S	100 nano S	100 nano S
Bandwidth				Additional Features			
Voltage	DC - 500 kHz			OVPS Relay	Connects programmable power supply to test UUT for over-voltage protection, relay connected and 5 A limited (Relay only)		
Current	DC - 100 kHz			External Analog Input	0 - 10 V signal input to modulate current		
Accuracy				External Current Monitor	0 - 10 V output signal corresponding to 100% of Range Current		
Analog	1% R			Digital Inputs (DINs) per Load	2 isolated, logic level		
Time	(1/sample rate) + 0.05 % R _{dg}			Digital Outputs (DOUTs) per load	2 isolated, ±100VDC, 300 mA		
Digitizing Rate	1 MS/s			Digital Outputs per Mainframe	12 isolated, ±100VDC, 300 mA		
Record Length	256K points			Calibration	Closed cover; all adjustments are done in software and stored in on-board flash memory		
Trigger	System Trigger, DINs, Voltage						

Model 5427 AC/DC Source Specifications

General					Measurements	Range	Accuracy	Resolution
Power	2700 VA	2700 VA	2700 VA	2000 W	Voltage AC True RMS or AC + DC True RMS or DC avg	0 - 150 VAC, ±212 VDC	0.1% of R _{dg} + 0.1% of R	0.005% of R
Volts	150 VAC	300 VAC	350 VAC	± 212 VDC	Current AC True RMS or AC + DC True RMS or DC avg	0 - 350 VAC, ±500 VDC		
Amps	18 A	9 A	8 A	± 18 A	Current Peak	0 - 20, 2, 0.1, 0.01 A	0.2% of R _{dg} + 0.2% of R	0.005% of R
Amps Peak	90 A	45 A	40 A	90 A	Multi Output Exp Module			
Programming					Current Inrush	0 - ±100, ±10, ±0.5, ±0.05 A	0.5% of R _{dg} + 0.5% of R	0.005% of R
Frequency	40 - 500 Hz				Power, True, Apparent, Reactive, W _{att} - Hour	0 - ±100, 10 A	1.5% of R _{dg} + 1.5% of R	0.005% of R
Voltage	0 - 150 VAC, ±212 VDC				Power Factor		0.3% of R _{dg} + 0.3% of R	0.005% of R
	0 - 300 VAC, ±424 VDC				Crest Factor		0.5% of R _{dg} + 0.5% of R	0.005% of R
	0 - 350 VAC				Waveforms		0.5% of R	
Current Limit & Trip ¹	0 - 18 A, 0 - 9 A						0.5% of R	
Power Limit ¹	0 - 2 kW						0.5% of R	
Phase Angle Turn-On & Turn-Off	0 - 359°						DC - 100 kHz	
Trigger Cycle Count	1 - 4 Million Cycles						DC - 20 kHz	
Waveforms - Steps	720 @ 35 - 70 Hz						Accuracy	0.5% of R
	360 @ 70 - 140 Hz						Sample Rate	to 1.2 MS/sec
	180 @ 140 - 280 Hz						Aperture	0.2 - 10 sec
	90 @ 280 - 560 Hz						Memory	256k Samples
							Resolution	0.005% of R
Additional Features	Trigger Input: Start a measurement, change the output voltage, start a macro with accuracy of 100 microseconds				Protection: Over-Temperature, Over-Current, Over-Power			
	Trigger Output: Programmed with an output voltage change or phase angle				Calibration: All adjustments done in software & stored in FLASH			
	AC Present: True when programmed AC voltage is not zero & output relay is on				Self Test: Power-Up self test reports comprehensive error messages about status of input, output, control & protection mechanisms			
	DC Present: True when programmed DC voltage is not zero & output relay is on				Performance Monitor: Detects measurement ambiguities, over/under range conditions, heat sink temperature limits			
	THD: 1% typical @ 50/60 Hz & unity PF, 3% worst case from 40 to 500Hz & unity PF							

R = Range, S = Set Point, R_{dg} = Readings • Specifications apply at 25±5 °C after a 10 minute warm up & are subject to change without notice. Accuracies apply when settings and/or measurements >10% of R