High-Current DC Loads

4700 LXI SERIES

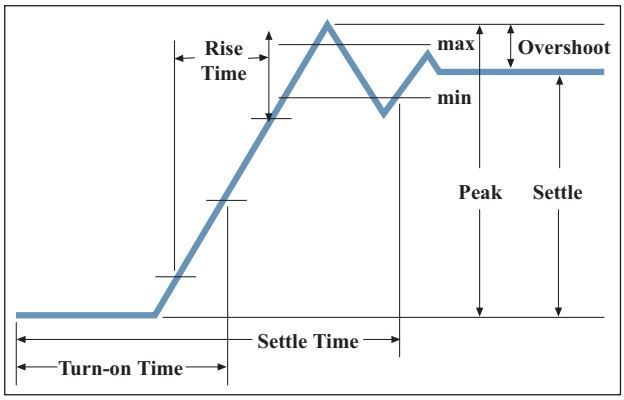
- ❑ 120V, 1kW/200A to 36kW/7200A
- ❑ 18 Voltage, Current, Power and Timing Measurements
- ❑ Complex load profile playback
- ❑ Air cooling
- ❑ Touch-panel manual control

APPLICATION

4700 LXI Series Electronic Loads are designed for testing applications that require high-power and high-current plus measurement of UUT dynamic performance. The Loads provide exceptional reliability combined with the inherent simplicity and safety of air cooling. The 4700 Loads are controlled through either a manual touch-panel, a LabVIEW soft-panel or an emPower™ Test Executive enabled automatic test station. Typical power conversion products to be tested include higher-power DC supplies, telecom rectifiers, fuel cells and batteries.

EXTENDED INTERNAL MEASUREMENTS

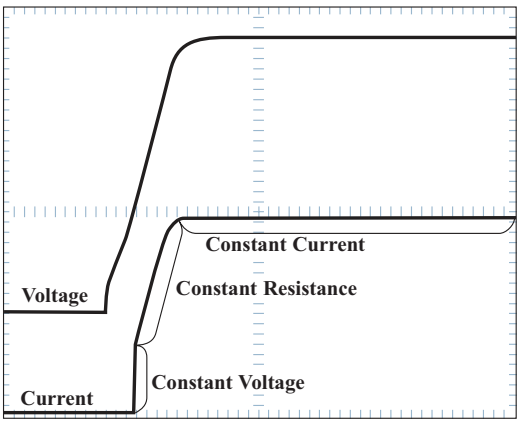
The 4700 Loads eliminate the need for separate external instruments and related switching to capture timing and other dynamic measurements during UUT turn-on and turn-off. This is accomplished by incorporating the task-essential features of a DMM, DSO and Transient Generator. With this built-in capability, the 4700 can rapidly generate engineering-characterization-like test information at faster test speeds with the additional benefit of cost savings from fewer measurement instruments, switches and interconnection wiring.



Turn-on voltage & current measurements

AUTO MODE

The 4700 contains a unique Auto Mode that provides glitchless automatic switching between CR, CC, CV and CP limits. Previously challenging tests that are now made possible include turn-on into a CR load, confirming the complete V-I curve for Lithium-Ion battery chargers, and preventing device-under-test blowup should a protection circuit fail.

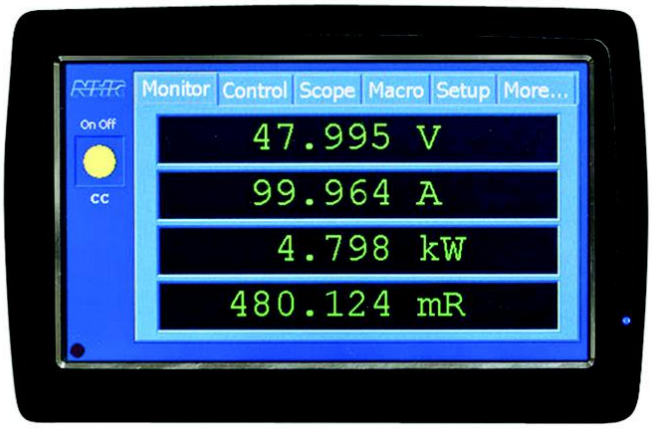


Power supply turn-on voltage & current waveforms in Auto Mode

POWERTOUCH MANUAL CONTROL

Actual Size

Scope Tab



Monitor Tab

Control tab

Just as touch-panels have revolutionized the user interface on mobile phones and GPS navigation devices, they now are about to change electronic power instruments. The old paradigm of controlling electronic loads through knobs, meters and keypads has been lacking for years. There are just too many control & display functions to manage, especially with the latest generation of smart loads that contain digitized measurements for oscilloscope-like waveform displays.

The new NHR PowerTouch panel eliminates those limitations forever. The display is organized through 6 tabs, each providing a full screen with complete control & display of related information. For instance, a Monitor tab displays actual measurements either in the local or remote-control mode. A Control tab provides for setting voltage, current, resistance and power as well as the CC, CV, CR and CP Operating Modes. The unique Scope tab provides the ability to zoom in on specific areas of interest as well as take basic measurements on waveform captures. Those waveform captures can then be saved on a SD card for later review on a PC. Load user interfaces have never been as comprehensive or easier to use as is now possible with this touch-panel technology.

MODEL 4700 LXI DC LOADS

COMPLEX LOAD PROFILE PLAYBACK

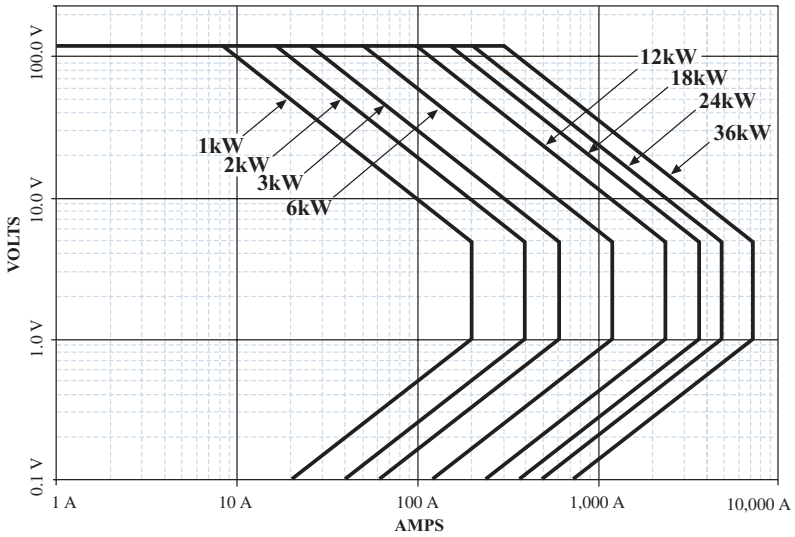
To facilitate ease of re-creating complex, precisely timed, multi-mode load profiles, a 100-step macro-recording capability allows capturing a dynamic sequence for later playback from within the Load. Additional complex profiles can be stored in a system controller library to be downloaded to the Load when required.

FAULT TOLERANT

The 4700 Loads are designed to keep running under just about any condition, even certain internal component failures. Standard for this class of instrument is protection against output over-voltage, over-current, over-power, reverse-voltage, and internal over-temperature. In addition, controller intelligence continuously monitors sub-circuit performance and redistributes the current load as necessary. This fault tolerant technique allows the user to continue testing with proper warning of a fault condition. Further load reliability is assured through extensive startup self-test and real-time monitoring.

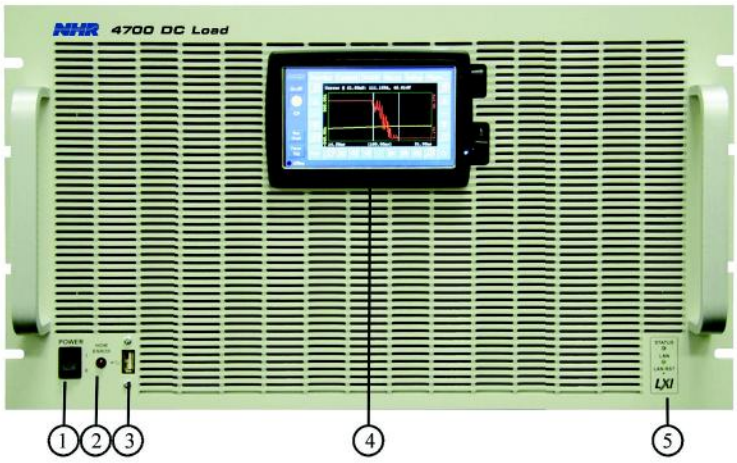
FIELD EXPANDABLE

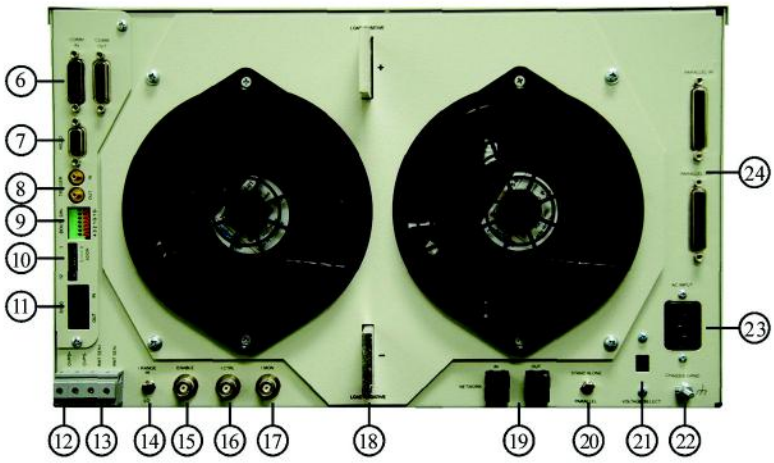
Because the 4700 Loads are modular, synchronously controlled and actively power-balanced, they operate efficiently in parallel as a single load. In this manner the Loads are field expandable with changes only to the input connections. This feature allows selection of only what is currently needed with confidence that future higher power requirements can be accommodated with minimum disruption and cost.



Constant Power operating envelopes

PANEL OVERVIEW





1. Power Switch
2. Hardware error indicator
3. USB connector
4. Touch panel display
5. LXI status indicators
6. COMM In/Out connectors
7. RS232 connector
8. Trig In/Out connectors
9. DIN/DOUT connector
10. Address switch
11. Sync In/Out connectors
12. OVPS connector
13. Remote sense connector
14. I Range switch
15. Enable indicator
16. I Control connector
17. I Monitor connector
18. Load connections
19. Network connectors
20. Parallel switch
21. Voltage select switch
22. Chassis GND stud
23. AC input connector
24. Parallel connectors

SPECIFICATIONS[1]

4700 Ratings	4700-1	4700-2	4700-3	4700-6	4700-12	4700-18	4700-24	4700-36
Power	1 kW	2 kW	3 kW	6 kW	12 kW	18 kW	24 kW	36 kW
Maximum Current[2]	200 A	400 A	600 A	1200 A	2400 A	3600 A	4800 A	7200 A
Voltage Range[3]	1-120 V	1-120 V	1-120 V	1-120 V	1-120 V	1-120 V	1-120 V	1-120 V
Programmable Modes	*Accuracies: % of Set + % of Range, Resolution: % of Range*							
Constant Current								
Ranges[4]	20, 200 A	40, 400 A	60, 600 A	120, 1200 A	240, 1200 A	360, 3600A	480, 4800 A	720, 7200 A
Accuracy	0.12%+0.08%	0.12%+0.08%	0.12%+0.08%	0.12%+0.08%	0.12%+0.08%	0.12%+0.08%	0.12%+0.08%	0.12%+0.08%
Resolution	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%
Constant Voltage								
Ranges	6.6, 20, 66, 120 V	6.6, 20, 66, 120 V	6.6, 20, 66, 120 V	6.6, 20, 66,120 V	6.6, 20, 66, 120 V	6.6, 20, 66, 120 V	6.6, 20, 66, 120 V	6.6, 20, 66, 120 V
Accuracy	0.05%+0.05%	0.05%+0.05%	0.05%+0.05%	0.05%+0.05%	0.05%+0.05%	0.05%+0.05%	0.05%+0.05%	0.05%+0.05%
Resolution	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%
Constant Power								
Range	0 - 1 kW	0 - 2 kW	0 - 3 kW	0 - 6 kW	0 - 12 kW	0 - 18 kW	0 - 24 kW	0 - 36 kW
Accuracy	1% + 1%	1% + 1%	1% + 1%	1% + 1%	1% + 1%	1% + 1%	1% + 1%	1% + 1%
Resolution	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%	0.025%
Constant Resistance								
Range	5 mΩ - 180 Ω	2.5 mΩ - 90 Ω	1.67 mΩ - 60 Ω	833 µΩ - 30 Ω	417 µΩ - 15 Ω	278 µΩ - 10 Ω	208 µΩ -7.5 Ω	136 µΩ - 5 Ω
Accuracy[5]	2%	2%	2%	2%	2%	2%	2%	2%
Slew Rate (10 - 90%)								
Range	1 A/s - 20 A/µs	2 A/s - 40 A/µs	3 A/s - 60 A/µs	6 A/s - 120 A/µs	12 A/s - 240 A/µs	18 A/s - 360 A/µs	24 A/s - 480 A/µs	36 A/s - 720 A/µs
Rise Time	10 µs - 20 s	10 µs - 20 s	10 µs - 20 s	10 µs - 20 s	10 µs - 20 s	10 µs - 20 s	10 µs - 20 s	10 µs - 20 s
Resolution	< 5 µs	< 5 µs	< 5 µs	< 5 µs	< 5 µs	< 5 µs	< 5 µs	< 5 µs
Accuracy	1% +/- 5µs	1% +/- 5µs	1% +/- 5µs	1% +/- 5µs	1% +/- 5µs	1% +/- 5µs	1% +/- 5µs	1% +/- 5µs
Short Circuit								
Resistance	50, 5 mΩ	25, 2.5 mΩ	17, 1.7 mΩ	8.3 mΩ - 833 µΩ	4.17 mΩ - 417 µΩ	2.78 mΩ - 278 µΩ	2.08 mΩ - 208 µΩ	1.39 mΩ - 139 µΩ
Current Max	33, 333 A	67, 667 A	60, 608 A	120, 1200 A	240, 2400 A	360, 3600 A	480, 4800 A	720, 7200 A
Macro								
Modes	Any single Mode							
Repetition	Single Burst or Continuous							
Settings	100							
Period	40 µs - 20 s							
Delay	20 µs - 20 s							
Resolution	10 µs							
Accuracy	1% +/- 5 µs							
Measurements	*Accuracies: % of Measurement + % of Range, Resolution: % of Range*							
Current								
Ranges	20, 200 A	40, 400 A	60, 600 A	120, 1200 A	240, 2400 A	360, 3600 A	480, 4800 A	720, 7200 A
Accuracy	0.12%+0.06%	0.12%+0.06%	0.12%+0.06%	0.12%+0.06%	0.12%+0.06%	0.12%+0.06%	0.12%+0.06%	0.12%+0.06%
Resolution	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%
DC Voltage								
Ranges	6.6, 66, 166 V	6.6, 66, 166 V	6.6, 66, 166 V	6.6, 66, 166 V	6.6, 66, 166 V	6.6, 66, 166 V	6.6, 66, 166 V	6.6, 66, 166 V
Accuracy	0.01%+0.02%	0.01%+0.02%	0.01%+0.02%	0.01%+0.02%	0.01%+0.02%	0.01%+0.02%	0.01%+0.02%	0.01%+0.02%
Resolution	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%	0.0015%
Power								
Ranges	Current Range x Voltage Range							
Accuracy	Current Accuracy + Voltage Accuracy							
Resolution	0.0015% Range							
Waveform Capture								
Bandwidth	25 kHz							
Accuracy	1% R							
Channels	Voltage, Current or both MUX'd							
Digitizing Rate[6]	100 - 100K Samples/s							
Memory	16K Samples							
Timebase	10 µs - 8 s							
Triggering	System or External							
Waveform Analysis	Voltage, Current, Power, Overshoot, Undershoot, Rise/Fall Time, Turn-On Time, Settling Time, Hold-Up Time, AC RMS, AC+DC RMS							
Control								
User Interface	PC soft panel or manual touch-panel							
PC Required	3 GHz µP with 512 MB RAM, SVGA display, 80 GB HD							
OS	Windows XP, Vista							
Test Executive	NI LabVIEW, emPower™ with integrated datalog/test report support							
Communications	Ethernet (LXI), RS232, NHR RS485							
Drivers	Active X							
Physical								
Load Connectors	Bus bars with lugs							
Operating Temperature	0 - 40º C at full power and <75% duty cycle							
Input Power	115/230 ± 10% VAC, 47 - 63 Hz							
Dimensions (HxWxD)	5 1/4 x 19 x 22 in	5 1/4 x 19 x 22 in	10 1/2 x 19 x 22 in	10 1/2 x 19 x 22 in	35 x 23 x 30 in	43 x 23 x 30 in	57 x 23 x 30 in	72 x 23 x 30 in
Weight	40 lbs	50 lbs	75 lbs	100 lbs	250 lbs	400 lbs	570 lbs	815 lbs
Additional Features								
Remote Voltage Sense	2 VDC max drop between sense and load input							
Self Test	Power-up self test of all major functions including status of input, output, control and protection circuits							
Performance Monitoring	Continuous checking of performance parameters and appropriate error messages and/or LED fault indicators when necessary							
Calibration	Closed cover, all adjustments made in software and stored in EEPROM							
Protection	OP, OC, OV, OT, Reverse Voltage and Undervoltage Lockout							
Trigger Output	Synchronizes external device to programmed load step							
Trigger Input	Synchronizes programmed load step to an external device							
Current Monitor	0 - 10 V external signal appropriate to 100% current for the selected range							
Analog Control	0 -10 V external signal appropriate to 100% current for the selected range							
Fan Noise Reduction	Automatic fan speed control							

[1] Specifications apply at 23º +/- 5º C after a 10 minute warm up.
[2] Accuracies apply when Settings and/or Measurements >10% of Range.
[3] Current linearly reduced between 1 and 0.15 V.
[4] Models 2 - 36 kW also have a 20 A /1 KW Range with reduced accuracy.
[5] Set 1000% to 6000% of Range = 10% Accuracy.
[6] Single channel capture. Simultaneous Voltage and Current captures would halve sample rate and memory available.

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