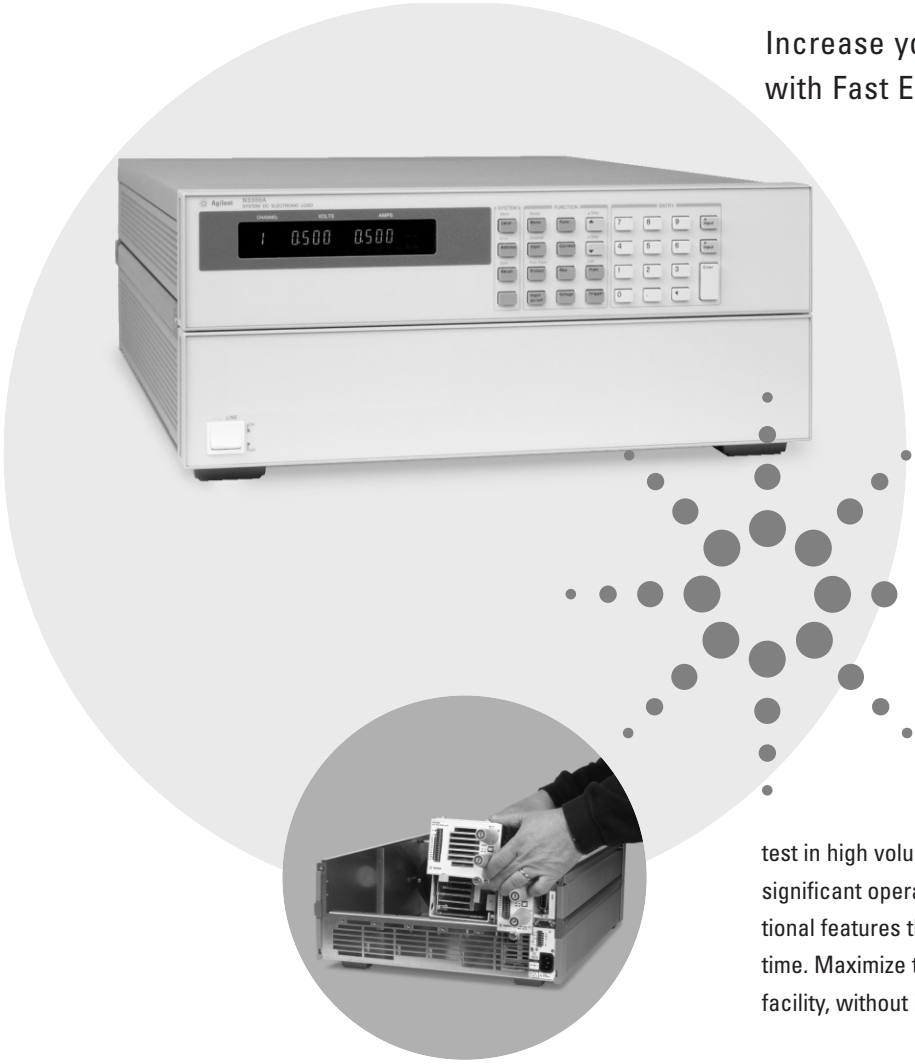
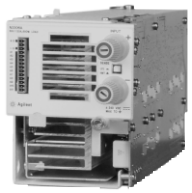
dc Electronic Loads Technical data

Agilent Technologies Models N3300A-N3306A



Increase your Manufacturing Test Throughput with Fast Electronic Loads



These electronic loads have what is needed to test today's dc power supplies. The new N3300A family is optimized for power supply test in high volume manufacturing environments. These loads provide significant operating speed improvements, and also have many additional features that allow the system designer to further reduce test time. Maximize throughput of your product through your manufacturing facility, without increasing floorspace.

The N3300A Series of electronic loads contributes to lower system cost, reduced test system complexity, lower cost of ownership and support, less rack space, and less floor space. They provide measurement functions tailored for the testing of dc sources, which normally would only be achieved via additional equipment in a test system. Using these flexible built-in functions, many system designers will be able to reduce the usage of DMMs, oscilloscopes, and the connecting switches and cabling. A simpler more reliable system will result.

With increased accuracy and resolution, in both programming and measurement, these dc electronic loads provide the precision needed for testing today's dc sources.

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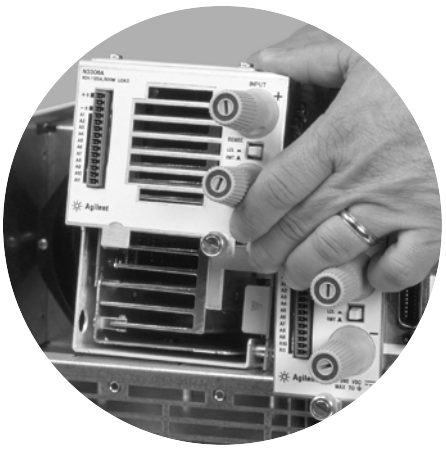
Innovating the HP Way

Features for Increased Test Throughput

- Program load input values more than 10 times faster.
- Load commands can be stored in the instrument, so they can be executed at maximum rate during runtime.
- Triggers can be used to begin preloaded test routines without any computer interaction.
- Multiple load modules can be simultaneously triggered to assume individual preprogrammed levels.
- Measurement data can be buffered in the load, and read back to the computer in one array.
- Rising and falling slew rates are separately controllable.



Features for Increased Measurement Accuracy and Flexibility

- Dual simultaneous voltage and current measurements
- RMS measurements
- Waveform digitization, which is especially valuable for transient response testing.
- Programmable sampling rate and sampling window

Specifications*	N3302A	N3303A	N3304A	N3305A	N3306A
Amperes	0 to 30 A	0 to 10 A	0 to 60 A	0 to 60 A	0 to 120 A
Volts	3 to 60 V	3 to 240 V	3 to 60 V	3 to 150 V	3 to 60 V
Maximum Power (at 40˚C)	150 W	250 W	300 W	500 W	600 W
Constant Current Mode					
Low Range / High Range	3 A / 30 A	1 A / 10 A	6 A / 60 A	6 A / 60 A	12 A / 120 A
Regulation	10mA	8mA	10mA	10mA	10mA
Low Range Accuracy	0.1% + 5mA	0.1% + 4mA	0.1% + 7.5mA	0.1% + 7.5mA	0.1% + 15mA
High Range Accuracy	0.1% + 10mA	0.1% + 7.5mA	0.1% + 15mA	0.1% + 15mA	0.1% + 37.5mA
Constant Voltage Mode					
Low Range / High Range	6 V / 60 V	24 V / 240 V	6 V / 60 V	15 V / 150 V	6 V / 60 V
Regulation	5 mV	10mV	10mV	10mV	20mV
Low Range Accuracy	0.1% + 3mV	0.1% + 10mV	0.1% + 3mV	0.1% + 10mV	0.1% + 3mV
High Range Accuracy	0.1% + 8mV	0.1% + 40mV	0.1% + 8mV	0.1% + 20mV	0.1% + 8mV
Constant Resistance Mode					
Range 1	0-4 Ω	0-24 Ω	0-2 Ω	0-2.5 Ω	0-1 Ω
Range 2	2-40 Ω	24-240 Ω	1-20 Ω	2.5-25 Ω	0.5-10 Ω
Range 3	20-400 Ω	240-2400 Ω	10-200 Ω	25-250 Ω	5-100 Ω
Range 4	200-4000 Ω	N/A	100-2000 Ω	250-2500 Ω	50-1000 Ω

* Special modifications are available to change input voltage, current, and accuracy specifications. Please ask.

Notes: 1. Operating temperature range is 0 to 55˚C. All specifications apply for 25˚C +/-5% unless otherwise noted
2. Maximum continuous power available is derated linearly from 40˚C to 75% of maximum at 55˚C.
3. DC Current Accuracy specifications apply 30 seconds after input is applied.

Specifications continued

	N3302A	N3303A	N3304A	N3305A	N3306A
Transient Generator					
Frequency Range	0.25Hz to10kHz	0.25Hz to10kHz	0.25Hz to10kHz	0.25Hz to10kHz	0.25Hz to10kHz
Accuracy	0.5%	0.5%	0.5%	0.5%	0.5%
Duty Cycle Range					
0.25Hz to1kHz	3% to 97%	3% to 97%	3% to 97%	3% to 97%	3% to 97%
1khz to 10kHz	6% to 94%	6% to 94%	6% to 94%	6% to 94%	6% to 94%
Accuracy*	1%	1%	1%	1%	1%
Measurement					
Current Measurement					
Low Range / High Range	3 A / 30 A	1 A / 10 A	6 A / 60 A	6 A / 60 A	12 A / 120 A
Low Range Accuracy	0.05% + 3mA	0.05% + 2.5mA	0.05% + 5mA	0.05% + 5mA	0.05% + 10mA
High Range Accuracy	0.05% + 6mA	0.05% + 5mA	0.05% + 10mA	0.05% + 10mA	0.05% + 20mA
Voltage Measurement					
Low Range / High Range	6 V / 60 V	24 V / 240 V	6 V / 60 V	15 V / 150 V	6 V / 60 V
Low Range Accuracy	0.05% + 3mV	0.05% + 10mV	0.05% + 3mV	0.05% + 8mV	0.05% + 3mV
High Range Accuracy	0.05% + 8mV	0.05% + 20mV	0.05% + 8mV	0.05% + 16mV	0.05% + 8mV
Power Measurement					
Accuracy	0.1% + 0.5 W	0.1% + 1.2 W	0.1% + 0.5 W	0.1% + 1.5 W	0.1% + 1.2 W

***** Duty cycle accuracy is 1%. For example, if the setting is 40% duty cycle, the actual duty cycle would be in the range of 39%-41%.

Supplemental Characteristics

Programming Resolution					
Constant Current Mode	0.05mA/0.5mA	0.02mA/0.2mA	0.1 mA / 1mA	0.1mA / 1 mA	0.2 mA / 2 mA
Constant Voltage Mode	0.1mV / 1mV	0.4 mV / 4mV	0.1 mV / 1 mV	0.25mV/2.5mV	0.1mV / 1mV
Constant Resistance Mode	0.07/0.7/7/70m Ω	0.82/8.2/82m Ω	0.035/0.35/3.5/35m Ω	0.085/0.85/8.5/85m Ω	0.0175/0.175/1.75/17.5m Ω
Readback Resolution					
Current	0.05mA/0.5mA	0.02mA/0.2mA	0.1 mA / 1mA	0.1mA / 1 mA	0.2 mA / 2 mA
Voltage	0.1mV / 1mV	0.4 mV / 4mV	0.1 mV / 1mV	0.25mV/2.5mV	0.1mV / 1mV
Programmable Slew Rate					
Current	0.2A/ms to	0.017A/ms to	0.1A/ms to	0.1A/ms to	0.2A/ms to
	2.5A/µs	0.83A/µs	5A/µs	5A/µs	10A/µs
Voltage	0.1V/ms to	1V/ms to	0.1V/ms to	1V/ms to	0.1V/ms to
	0.5V/µs	2V/µs	0.5V/µs	1.25V/µs	0.5V/µs
Ripple and Noise					
(20 Hz to 10 MHz)					
Current	2mA rms	1mA rms	4mA rms	4mA rms	6mA rms
	20mA p-p	10mA p-p	40mA p-p	40mA p-p	60mA p-p
Voltage	5 mV rms	12mV rms	6mV rms	10mV rms	8mV rms

Note: Specifications subject to change.

Other Key Features

- Constant current, constant voltage, and constant resistance operating modes
- Transient generator can provide one-time or repetitive pulses.
- GP-IB (IEEE-488.2) and RS-232 standard
- Industry standard SCPI programming commands
- Full control of all operating features from the front panel keypad
- Full rack-width mainframe N3300A can hold up to 6 modules (up to 1800 watts per mainframe)
- Half rack-width mainframe N3301A can hold up to 2 modules (600 watts per mainframe)
- Analog programming allows custom waveforms
- Analog monitoring port
- Parallel modules in constant current mode for more power
- Full protection from overcurrent, overvoltage, overtemperature, overpower, and reverse polarity.
- Remote voltage sense in constant voltage mode.
- Standard 3-year warranty
- Electronic calibration

Supplemental Characteristics Continued

Analog Programming Bandwidth:
10 kHz (-3db frequency)
Analog Programming Voltage:
Voltage: 0-10V Current: 0-10V
Analog Monitor Ports:
Voltage: 0-10V Current: 0-10V
Remote Sensing: 5 V dc between sense and load input
Digital Inputs
Vil=0.9V max at Iil=-1mA
Vih-3.15V min (pull-up resistor on input)
Digital Outputs
Vol=0.72V max at Iol=1mA
Voh=4.4V min at Ioh=-20µA
Net Weight:
N3300A: 11.8kg (26lb); N3301A: 7.8kg (17lb)
N3302A, N3303A or N3304A: 3.2kg (7lb);
N3305A or N3306A: 5.4kg (13lb)
Shipping Weight:
N3300A: 15.9kg (35lb); N3301A:9.8kg (22lb)
N3302A, N3303A, or N3304A: 4.5kg (10lb)
N3305A or N3306A: 7.3kg (16lb)

Option Descriptions

Opt. 800: Rack-mount kit for two N3301A Mainframes mounted side-by-side (p/n 5061-9694 and 5062-3978).

Opt. 908: Rack-mount kit (p/n 5062-3978 for a N3300A, and p/n 5062-3960 for a N3301A)

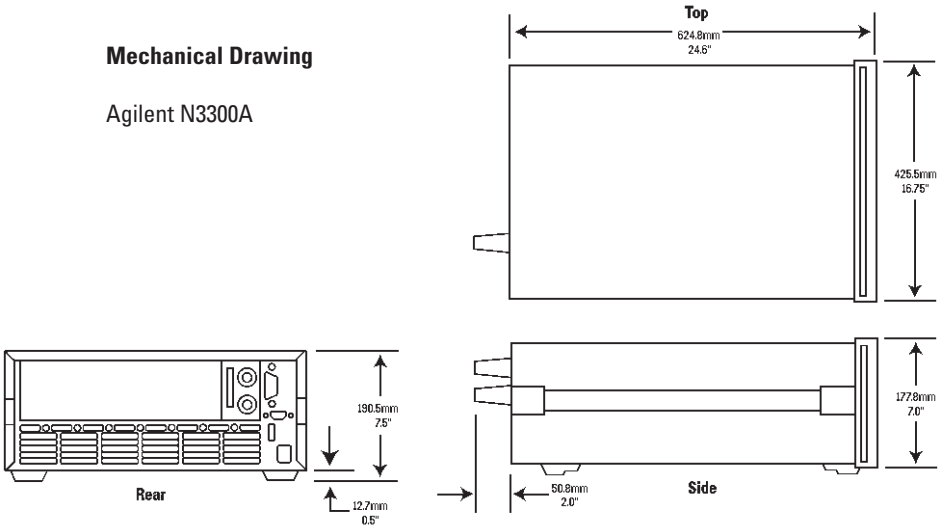
Opt. 909: Rack-mount handles for N3300A (p/n5062-3984)

Opt. 910: Extra manual set, including one each of the operating manual, programming reference manual, and service manual. The programming manual is available with the mainframes, and therefore not the modules.

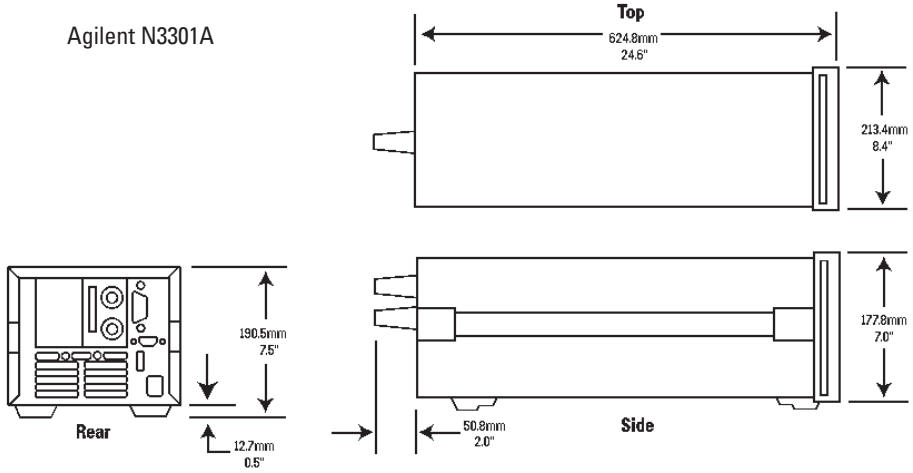
Note: Options 908, 909, and 800 require either the slide kit (p/n 1494-0059) or slide rails to support the weight of the load mainframe.

Mechanical Drawing

Agilent N3300A



Agilent N3301A



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