Programmable DC Electronic Loads

HVL Series

The HVL Series DC electronic loads offer a wide operating voltage up to 1000 V and high power density providing 6 kW in a 5U form factor. Suitable for ATE system applications, this series supports a variety of dynamic loading conditions for evaluating DC-DC converters, batteries, battery chargers, photovoltaic arrays, and other high power DC sources.

In addition to CC/CV/CR/CW operating modes, the HVL Series features continuous, pulse, and toggle transient operations to precisely switch between two load levels. Advanced list mode programming makes it easy to set up and execute complex load sequences from the front panel. For applications requiring more power, up to 10 identical HVL Series models can be combined in parallel to increase total sink capabilities to 60 kW.

Operating software provides remote instrument control and monitoring from a PC. Separate battery test software simplifies battery discharge testing with data logging. Built-in remote PC interfaces include USB (USBTMC-compliant), LAN, RS232, and GPIB supporting SCPI commands. The front panel USB host port enables data logging directly to a connected flash drive.

Special Applications

The HVL Series wide operating voltage range and high power capabilities make it a comprehensive solution for electric vehicle (EV) batteries, on-board EV charger, and charging station test applications.

Power	2 kW	3 kW			6 kW		
Model	**HVL150250**	**HVL600150**	**HVL80075**	**HVL100025**	**HVL600300**	**HVL800150**	**HVL100050**
Rated Voltage	150 V	600 V	800 V	1000 V	600 V	800 V	1000 V
Rated Current	250 A	150 A	75 A	25 A	300 A	150 A	50 A
Form Factor	3U				5U		

USB LAN RS232 GPIB

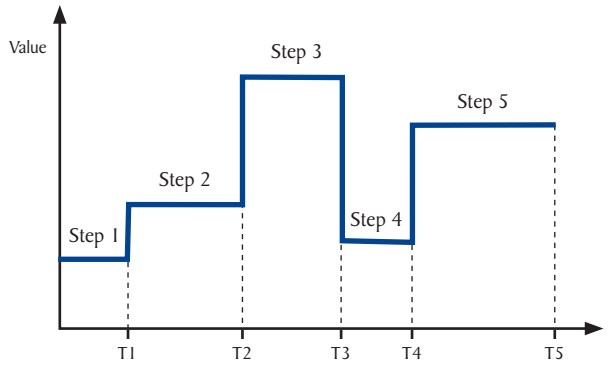
Features and benefits

- High power density up to 6 kW in a 5U form factor
- CC/CV/CR/CW operating modes
- Continuous, pulse, and toggle transient operation
- Transient mode speed up to 10 kHz in CC mode
- Thermostatically-controlled fans for quiet operation
- Advanced list mode programming
- Adjustable loop response speed
- Overvoltage (OVP), overcurrent (OCP), overpower (OPP) protection, reverse voltage, and key lock function
- Short-circuit test
- Adjustable voltage/current slew rate
- Soft start function to prevent sudden voltage/current spikes
- Oscillation protection
- Front panel USB host port for logging measurement data
- Save/recall instrument settings to internal memory
- External analog control and monitoring
- Operating software and battery test software provided
- 4.3-inch LCD screen
- USB, LAN, RS232, and GPIB interfaces standard
- LabVIEW™ driver provided
- Remote sense
- Rack-mount brackets with handles included
- cTUVus certification mark fulfills CSA and UL safety standards

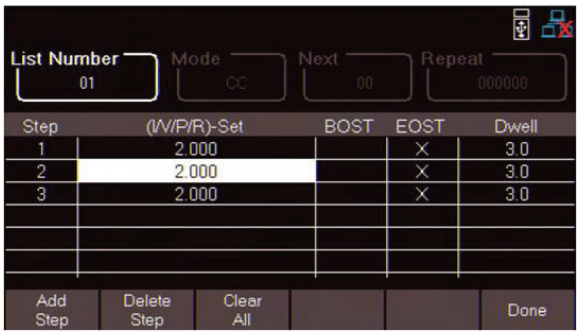
Operation highlights

Advanced list mode

The HVL Series list mode is highly configurable for generating precise load sequences.



Each list mode program contains up to 100 user programmable steps. Save up to 10 list mode programs directly to internal memory for quick recall. Step parameters include level value, step duration, and step triggers. List mode programs can be set to repeat a maximum of 100,000 times. BOST / EOST (Beginning / End of step Trigger) can be enabled for any step in the list to generate output triggers for synchronizing events with other externally connected instruments. List mode programs can be configured and run from the front panel or remotely using the provided application software.



List mode configuration menu

Direct data logging

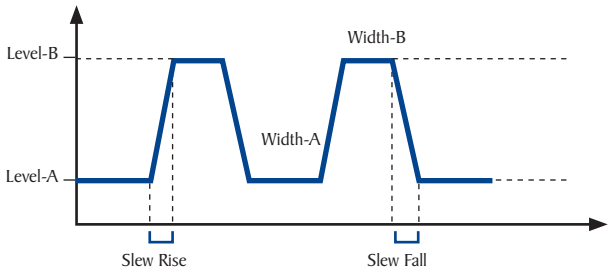
Log voltage, current, or both at a user-defined sampling interval adjustable from 0.2 seconds to 5 minutes directly to an external USB flash drive. Data points are saved as a CSV file with date and time stamp.

Transient operation

Transient operation enables the DC load to periodically switch between two load levels.

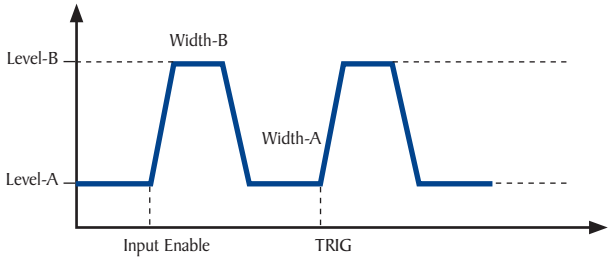
Transient - continuous

Switch continuously between A and B load current levels where rise/fall slew rates and level width can be adjusted.



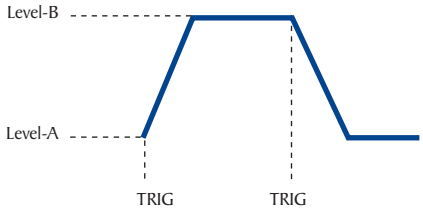
Transient - pulse

Upon enabling the input, the load executes one pulse cycle returning to Level-A, and waits to receive a trigger signal before executing another pulse.



Transient - toggle

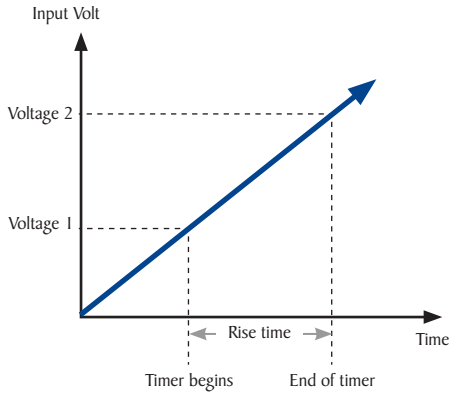
The DC load current will switch between Level-A and Level-B following receipt of a trigger signal.



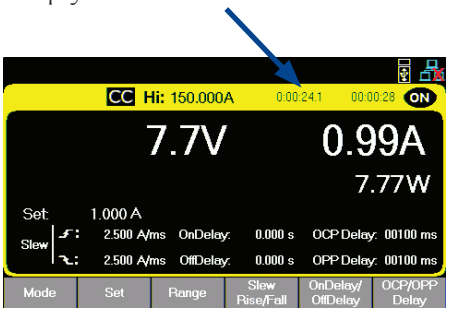
Operation highlights

Rise and fall time measurement

The HVL Series can measure the rise or fall time from a specified start and stop voltage level of the measured input without the need for an external oscilloscope. The figure below illustrates how rise time is measured based on the two user-configured voltages.

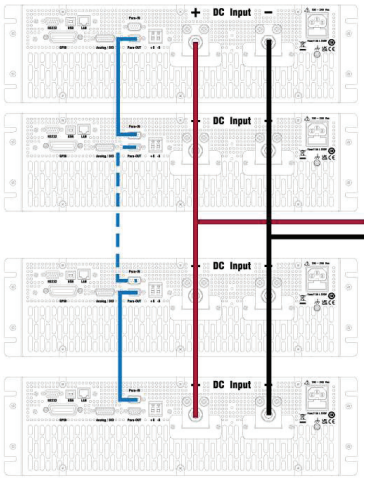


The resulting rise/fall time measurement is displayed on screen with 0.1 s resolution.



Parallel operation

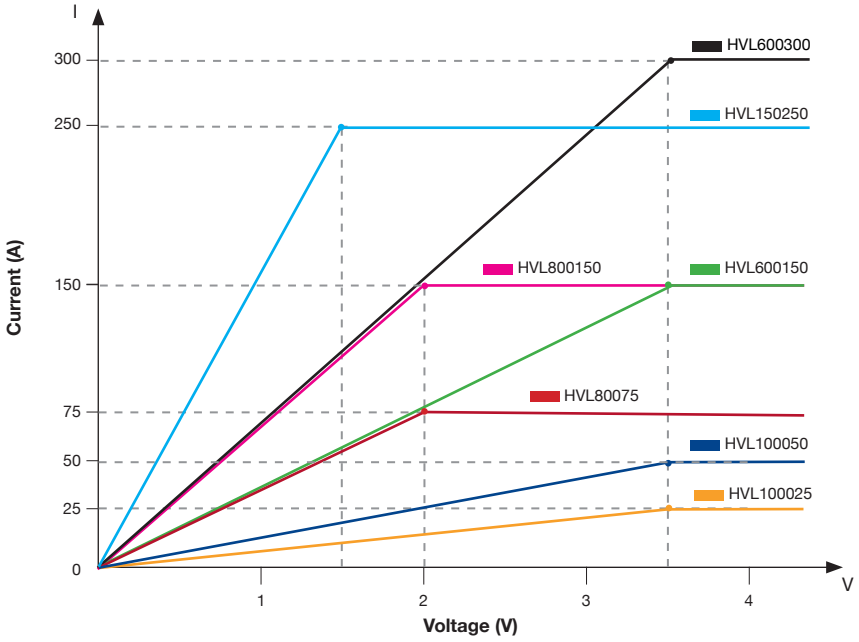
For applications requiring more power, up to 10 identical HVL Series dc load models can be connected in parallel to increase the maximum sink power to 60 kW. Once configured, the connected units will display voltage and current of the complete system.



Sink up to 60 kW with 10 instruments connected in parallel.

Low voltage operation

The HVL Series can operate at low voltages for applications in fuel cell and solar cell testing.



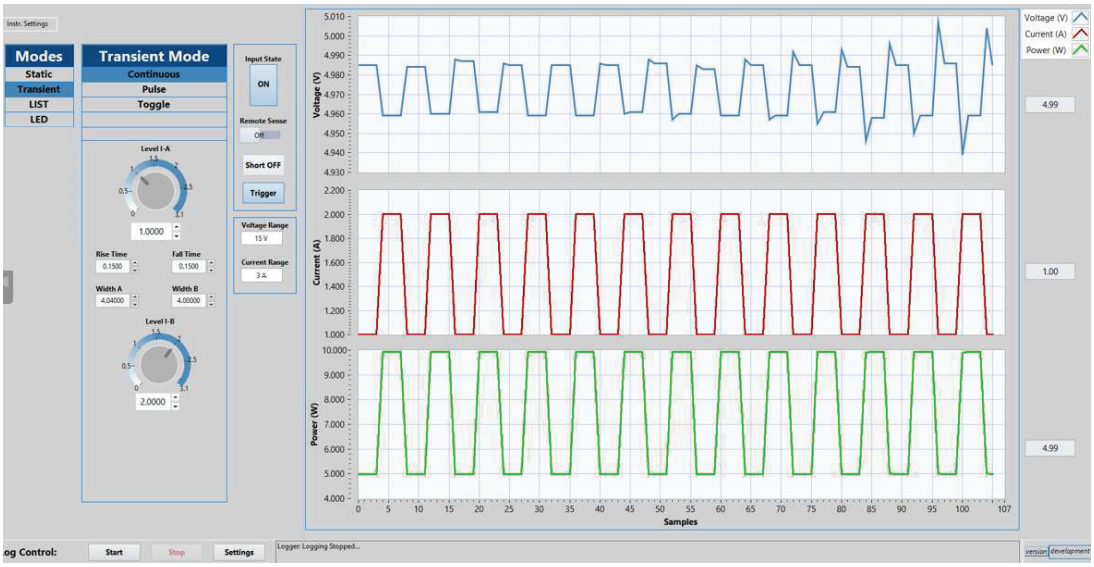
Typical minimum operating voltage at full scale current						
HVL150250	**HVL600150**	**HVL80075**	**HVL100025**	**HVL600300**	**HVL800150**	**HVL100050**
1.5 V	3.5 V	2.0 V	3.5 V	3.5 V	2.0 V	3.5 V

Operation highlights

Application software

PC software is provided for generating and executing test sequences and measurement data logging without the need to write source code.

- Log voltage, current, power measurements and export data in spreadsheet format for further analysis
- Configure and run transient operation, list mode, and more



HVL Series Operating Software

Battery test software

Supplementary PC software available at bkprecision.com simplifies battery testing with the ability to create discharge sequences and log data. Couple the HVL Series with a compatible external power supply, to perform battery charge/discharge cycle tests on batteries.

Log charge and discharge data

Front panel

USB host
Save/Recall instrument settings, save screenshots, and log measurement data to an external flash drive

4.3-inch LCD
The bright display is easy to read

Multiple Display Modes
Toggle between detailed view and enlarged screen view

Programmable keys
Three user-programmable keys provide seamless switching between instrument setups for quick access to frequently used configurations and functions

Rear panel

RS232 interface

USB interface

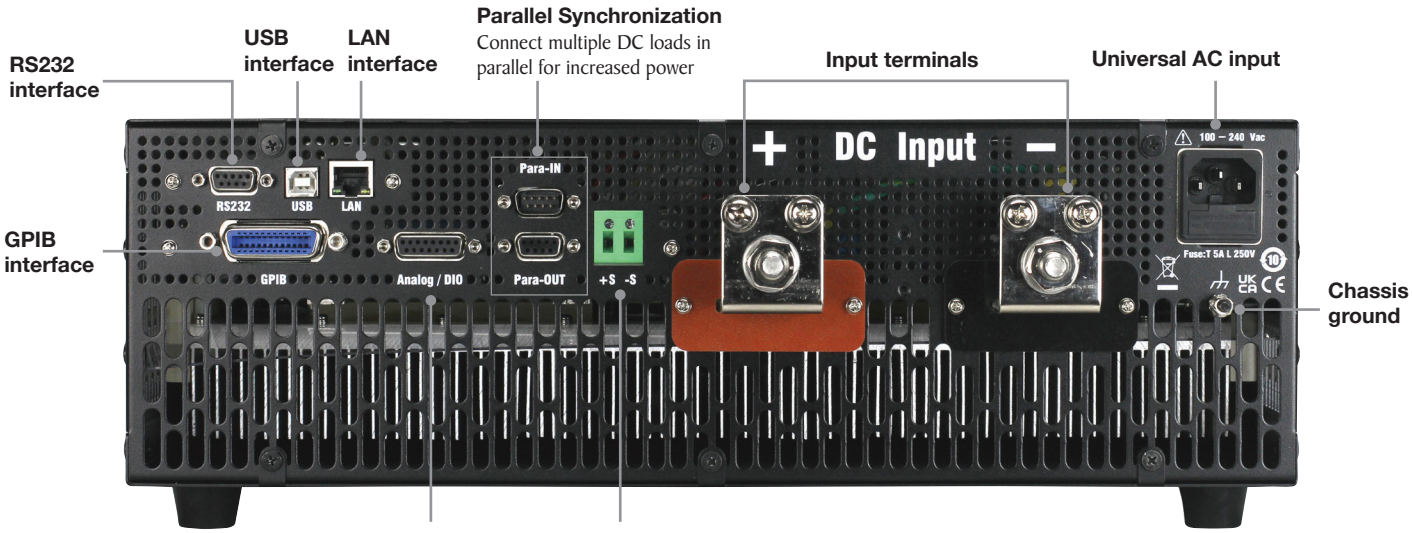
LAN interface

Parallel Synchronization
Connect multiple DC loads in parallel for increased power

Input terminals

Universal AC input

GPIB interface



Chassis ground

Analog / DIO connector
External trigger, digital output, external analog control, voltage and current monitoring, external input on/off control

Remote sense terminals

3U model shown

Specifications

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

Model		HVL150250	HVL600150	HVL80075	HVL100025
Input Ratings					
Input Voltage		0 to 150 V	0 to 600 V	0 to 800 V	0 to 1000 V
Input Current		0 to 250 A	0 to 150 A	0 to 75 A	0 to 25 A
Input Power		2000 W	3000 W		
Minimum Operating Voltage		1.5 V	3.5 V	2.0 V	3.5 V
CV Mode					
Range	Low	0.15 V to 15 V	0.5 V to 60 V	0.5 V to 80 V	0.5 V to 100 V
	High	0.15 V to 150 V	0.5 V to 600 V	0.5 V to 800 V	0.5 V to 1000 V
Programming Readback / Accuracy		±(0.05% + 0.05% FS)(1)			
Resolution		10 mV		100 mV	
CC Mode					
Range	Low	0.25 A to 25 A	0 to 15 A	0 to 7.5 A	0 to 2.5 A
	High	0.25 A to 250 A	0 to 150 A	0 to 75 A	0 to 25 A
Programming Readback / Accuracy		±(0.05% + 0.05% FS)(1)			
Resolution		10 mA			1 mA
CR Mode					
Range		6 mΩ to 480 Ω	Low	High	Low	High	Low	High
			0.03 Ω to 4 Ω	4 Ω to 3.2 kΩ	0.03 Ω to 10.66 Ω	10.66 Ω to 5 kΩ	0.2 Ω to 40 Ω	40 Ω to 10 kΩ
Programming Accuracy(2)		Vin > 4.5 V, Iin > 0.5 A	Iin > 15 A, Rin > 40 mΩ	Vin > 60 V, Gin > 2.6 mS	Iin > 7.5 A, Rin > 110 mΩ	Vin > 80 V, Gin > 1.1 mS	Iin > 2.5 A, Rin > 400 mΩ	Vin > 100 V, Gin > 0.4 mS
		±(0.2% / Rset + 0.2% x 250 A / Vin)	0.1% + 40 mΩ	0.1% + 2.6 mS	0.1% + 110 mΩ	0.1% + 1.1 mS	0.1% + 400 mΩ	0.1% + 0.4 mS
CW Mode								
Range	Low	4 W to 2000 W	0 to 300 W					
	High		0 to 3000 W					
Programming Accuracy(3)		±(0.2% + 1% FS)						
Resolution		10 mW						
Transient Mode (CC Mode)								
T1 & T2		100 µs to 10 s						
Accuracy		5 µs + 100 ppm						
Slew Rate(4)	Low	90 µA/µs to12 A/µs	0.05 A/ms to 3000 A/ms		0.025 A/ms to 1500 A/ms		0.008 A/ms to 500 A/ms	
	High							
Min. Rise Time(5)		25 µs	100 µs					
External Analog Programming								
VMON Accuracy		± 20 mV						
IMON Accuracy		± 20 mA						
Isolation Voltage		1500 V						
Input Impedance		> 200 kΩ ± 5%						

(1) Applies when set voltage in CV mode or set current in CC mode is greater than 0.2% of full scale.
(2) Accuracy for Low range is specified in resistance (Ω). Accuracy for High range or no range is specified in conductance (S).
(3) Valid when load current > 0.2% and Pin > 1% of full scale rating.
(4) The slew rate specifications are not warranted, but are descriptions of typical performance. The actual transition time is defined as the time for the input to change from 10% to 90%, or vice versa, of the programmed current values. In case of very large load changes, e.g. from no load to full load, the actual transition time will be larger than the expected time. The load will automatically adjust the slew rate to fit within the range (high or low) that is closest to the programmed value.
(5) Valid when load current > 4% of full scale and Loop response is set to "Fast."

Specifications

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

Model		HVL600300	HVL800150	HVL100050
Input Ratings				
Input Voltage		0 to 600 V	0 to 800 V	0 to 1000 V
Input Current		0 to 300 A	0 to 150 A	0 to 50 A
Input Power		6000 W		
Minimum Operating Voltage		3.5 V	2.0 V	3.5 V
CV Mode				
Range	Low	0.5 V to 60 V	0.5 V to 80 V	0.5 V to 100 V
	High	0.5 V to 600 V	0.5 V to 800 V	0.5 V to 1000 V
Programming Readback / Accuracy		±(0.05% + 0.05% FS)[1]		
CC Mode				
Range	Low	0 to 30 A	0 to 15 A	0 to 5 A
	High	0 to 300 A	0 to 150 A	0 to 50 A
Programming Readback / Accuracy		±(0.05% + 0.05% FS)[1]		

CR Mode							
Range	Low	High	Low	High	Low	High
	0.015 Ω to 2 Ω	2 Ω to 1.6 kΩ	0.015 Ω to 5.33 Ω	5.33 Ω to 4 kΩ	0.1 Ω to 20 Ω	20 Ω to 5 kΩ
Programming Accuracy[2]	Iin > 30 A, Rin > 20 mΩ	Vin > 60 V, Gin > 5.1 mS	Iin > 15 A, Rin > 55 mΩ	Vin > 80 V, Gin > 2 mS	Iin > 5 A, Rin > 200 mΩ	Vin > 100 V, Gin > 0.6 mS
	0.1% + 20 mΩ	0.1% + 5.1 mS	0.1% + 55 mΩ	0.1% + 2 mS	0.1% + 200 mΩ	0.1% + 0.6 mS

CW Mode				
Range	Low	0 to 600 W		
	High	0 to 6000 W		
Programming Accuracy[3]		±(0.2% + 1% FS)		
Transient Mode (CC Mode)				
T1 & T2		100 μs to 10 s		
Accuracy		5 μs + 100 ppm		
Slew Rate[4]	Low	0.1 A/ms to 6000 A/ms	0.05 A/ms to 3000 A/ms	0.017 A/ms to 1000 A/ms
	High			
Min. Rise Time[5]		100 μs		
External Analog Programming				
VMON Accuracy		± 20 mV		
IMON Accuracy		± 20 mA		
Isolation Voltage		1500 V		
Input Impedance		> 200 kΩ ± 5%		

(1) Applies when set voltage in CV mode or set current in CC mode is greater than 0.2% of full scale.
(2) Accuracy for Low range is specified in resistance (Ω). Accuracy for High range or no range is specified in conductance (S).
(3) Valid when load current > 0.2% and Pin > 1% of full scale rating.
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(5) Valid when load current > 4% of full scale and Loop response is set to "Fast."

Specifications

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

Model	HVL150250	HVL600150	HVL80075	HVL100025	HVL600300	HVL800150	HVL100050
Protection							
Voltage (OVP)							
Range	1.5 V to 160 V	0.394 V to 630 V	0.525 V to 840 V	0.656 V to 1050 V	0.394 V to 630 V	0.525 V to 840 V	0.656 V to 1050 V
Accuracy	± 0.3 V	0.2% + 0.788 V	0.2% + 1.05 V	0.2% + 1.313 V	0.2% + 0.788 V	0.2% + 1.05 V	0.2% + 1.313 V
Current (OCP)							
Range	3 A to 275 A	0.098 A to 157.5 A	0.049 A to 78.75 A	0.016 A to 26.25 A	0.197 A to 315 A	0.098 A to 157.5 A	0.033 A to 52.5 A
Accuracy	± 0.5 A	0.2% + 0.197 A	0.2% + 0.098 A	0.2% + 0.033 A	0.2% + 0.394 A	0.2% + 0.197 A	0.2% + 0.066 A
Under Voltage Lockout (UVL)							
Range	0.15 V to 135 V	0.45 V to 600 V	0.6 V to 800 V	0.75 V to 1000 V	0.45 V to 600 V	0.6 V to 800 V	0.75 V to 1000 V
Accuracy	± 0.3 V	2.5% + 0.75 V	2.5% + 1 V	2.5% + 1.25 V	2.5% + 0.75 V	2.5% + 1 V	2.5% + 1.25 V
Reverse Connection (RCP)	Reverse current > 2.5 A	-					
General							
Input Resistance (Load off)	> 50 kΩ						
AC Input	100 VAC to 240 VAC ± 10%, 47 to 63 Hz						
Temperature – Operating	41 °F to 104 °F (5 °C to 40 °C)						
Temperature – Storage	14 °F to 140 °F (-10 °C to 60 °C)						
Dimensions (H x W x D)	5.24" x 16.87" x 26.18" (133 x 428.4 x 665 mm)				8.74" x 16.87" x 24.21" (222 x 428.4 x 615 mm)		
Weight	51.6 lbs (23.4 kg)	48.5 lbs (22 kg)			73.8 lbs (33.5 kg)		
Warranty	3 Years						
Standard Accessories	Power cord, removable input protection cover, rack-mount brackets with handles and certificate of calibration						
Regulatory Compliance							
Safety	Low Voltage Directive (LVD) 2014/35/EU, EN61010-1:2010+A1:2019, cTUVus certification mark[6] fulfills US (UL 61010-1:2012) and Canadian (CAN/CSA-C22.2 NO. 61010-1-12) safety standards						
Electromagnetic Compatibility	EMC Directive 2014/30/EU, EN61326-1:2021						

(6) Tested and certified by a Nationally Recognized Testing Laboratory (NRTL), accredited by OSHA.

About B&K Precision

For more than 70 years, B&K Precision has provided reliable and value-priced test and measurement instruments worldwide.

Our headquarters in Yorba Linda, California houses our administrative and executive functions as well as sales and marketing, design, service, and repair. Our European customers are most familiar with B&K through our French subsidiary, Sefram. Engineers in Asia know us through our B+K Precision Taiwan operation. The independent service centers in Singapore and Brasil service customers in Singapore, Malaysia, Vietnam, Indonesia and South America, respectively.

B&K Precision group member Independent service center Service center location

Quality Management System

B&K Precision Corporation is an ISO9001 registered company employing traceable quality management practices for all processes including product development, service, and calibration.

ISO9001:2015

Certification body NSF-ISR
Certificate number 6Z241-IS8

NSF-ISR
Registered to ISO 9001

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