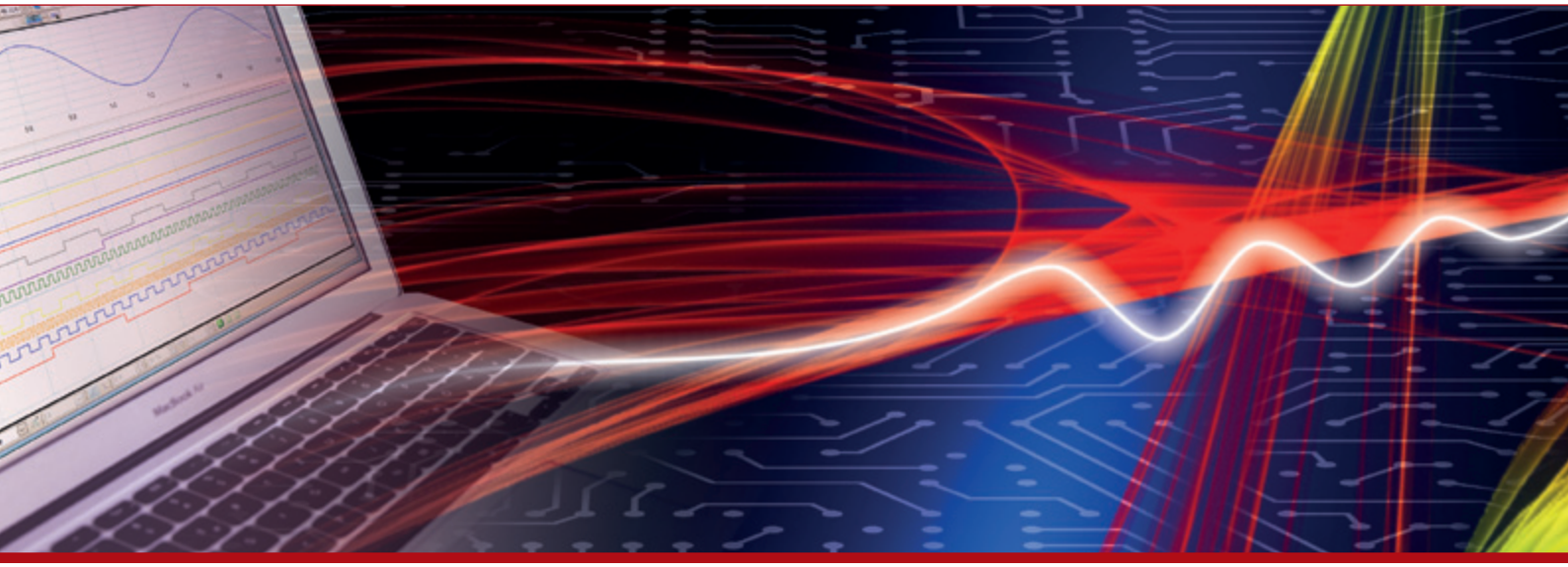
Product Datasheet - Technical Specifications



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Data Sheet

Multi-Range DC Power Supplies
9240 Series

USB | LAN | GPIB model option | LXI

The 9240 Series sets a new standard for general purpose DC power supplies by including many features and capabilities found in high performance instruments as standard. The multi-range operation provides up to 200 W of clean output power in any Volt/Amp combination within the rated voltage and current limits. This series combines an easy-to-use interface with advanced list programming features, battery charge mode, and data logging to serve a wide range of applications including production test, R&D, electronic service, and education.

Intuitive list mode programming makes it easy to set up and execute complex test sequences directly from the front panel. Advanced list mode features include the ability to output multiple user-defined list mode programs in sequence and step triggering for synchronizing the power supply's output with external events.

The 9240 Series battery charge mode provides configurable fail-safe settings to disable the output when a specified energy, capacity, or time threshold is reached protecting both the power supply and battery. Battery charge data including Wh, Ah, and time can be logged directly to a USB flash drive connected to the front panel USB host port. User-configurable battery charge profiles, instrument settings, and list mode programs can also be saved/recalled from the USB host port.

This series offers system integrators with LXI compliant LAN and USB (USBTMC-compliant) interfaces standard for remote control and programming with a GPIB model option. The provided LabVIEW™, IVI-C, and IVI.NET drivers further simplify system development and integration. In addition to OVP, OCP, and OTP protections, these power supplies support remote inhibit and voltage fault features to protect both the power supply and device under test (DUT).

Model*	9240	9241	9242
Voltage Range	0 to 32 V	0 to 60 V	0 to 60 V
Current Range	0 to 8 A	0 to 4 A	0 to 10 A
Maximum Output Power	120 W		200 W

*GPIB models: 9240-GPIB, 9241-GPIB, and 9242-GPIB

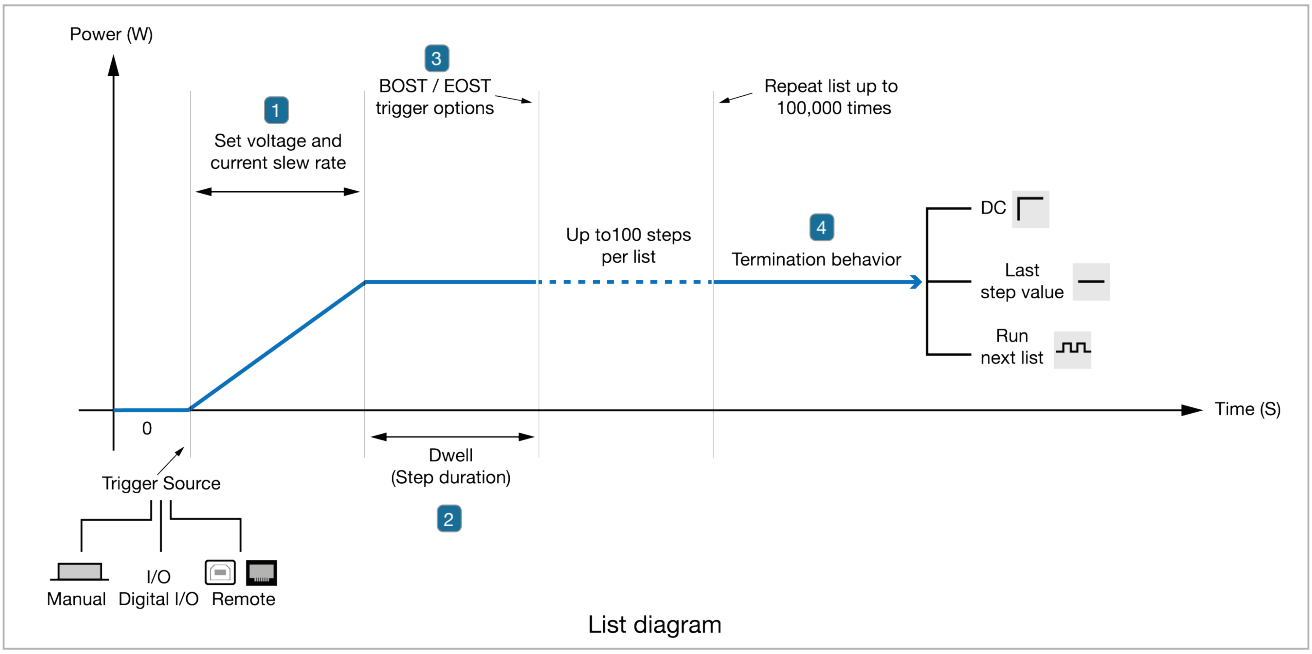
Features and benefits

- Isolated and floating output with front panel remote sense
- Up to 120 W or 200 W of multi-range power in a compact 2U half-rack form factor
- Clean output power with less than 1 mVrms of noise
- Advanced list mode programming with internal storage for 10 list mode programs
- Battery charge mode with fail-safe conditions
- Direct data logging to a USB flash drive
- Thermostatically-controlled fan for quiet operation
- Adjustable voltage and current slew rate
- Built-in web server for control of basic power supply settings
- LED test mode for protecting components from inrush currents
- Oscilloscope-like display mode to graphically monitor voltage and current readings
- Digital I/O terminal offers external triggering, voltage fault and remote inhibit capabilities
- Overvoltage (OVP), overcurrent (OCP), overtemperature (OTP) protection, and key-lock function
- NISPOM sanitization to securely reset to factory settings
- USB (USBTMC-compliant and virtual COM) and LXI compliant LAN interfaces standard, GPIB optional
- LabVIEW™, IVI-C, and IVI.NET drivers provided
- Remote PC control software available
- Convenient front-panel user calibration
- cTUVus certification mark fulfills CSA and UL safety standards

Operation highlights

Advanced list mode

The 9240 Series list mode programming features are useful for repetitive testing or other applications requiring a specific sequence of voltage and current settings. The illustration below highlights some of the configurable options for setting up a list mode program.



List diagram

1 To help control inrush current, the voltage slew rate is adjustable from 0.005 V/ms to 3.2 V/ms. The current slew rate is also adjustable from I mA/ms to 1000 mA/ms.

2 Dwell (step duration) can be set from 0.1 s to 9999 s.

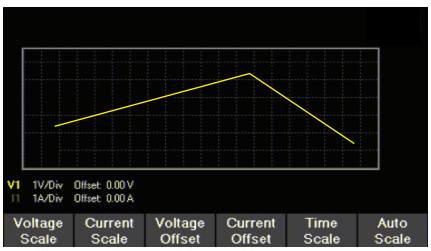
3 BOST / EOST (Beginning / End of Step Trigger) can be enabled for any step in the list to generate output triggers for synchronizing events with other externally connected instruments.

4 At the end of a list program, the termination behavior can be set to a constant DC value, remain at the last programmed list step value, or run another user-configurable list program.

Extended list mode functionality

List mode programs contain up to 100 steps each. Step parameters can be configured from the front panel or on a computer and loaded into the power supply's internal memory.

Output monitoring



These power supplies offer a graphical display mode to visually monitor measured voltage and current data.

Operation highlights

Battery charge mode

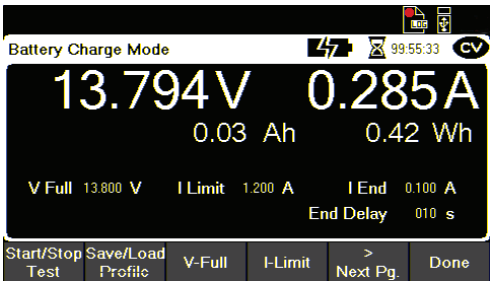
The dedicated battery charge mode offers many user-configurable charge parameters and fail-safe conditions to simplify battery charging.

Charge parameters:

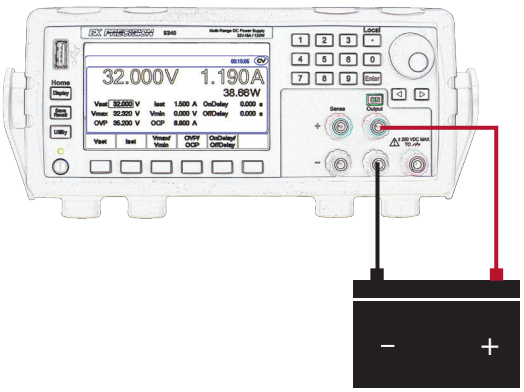
- Charge voltage set (V Full)
- Charge current limit (I Limit)
- Charge termination current (I End)
- Charge end delay (End Delay)

Fail safe settings:

- Stop time
- Stop Ah
- Stop Wh



Battery charge configuration menu



Battery data logging and charge profiles

Log battery charge data directly to a USB in spreadsheet (.csv) format at a specified sampling rate adjustable from every half a second to every 5 minutes.

Charge data:

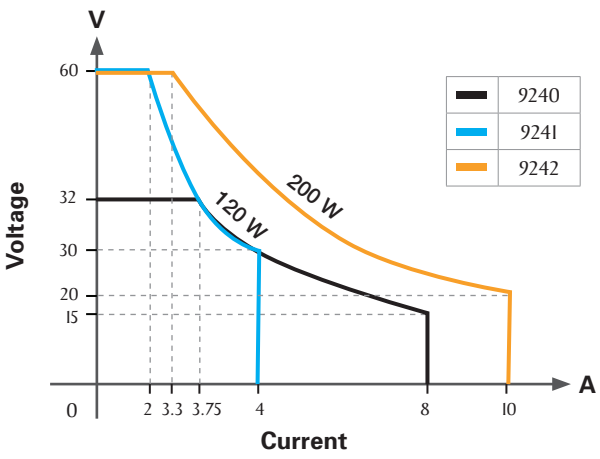
- Charge time elapsed
- Amp-hour (Ah)
- Watt-hour (Wh)
- Voltage
- Current

Save/Recall custom charge profiles for different batteries or battery types.

Battery charge profiles contain all user-configurable settings in battery charge mode including charge parameters, fail safe settings, and data log settings.

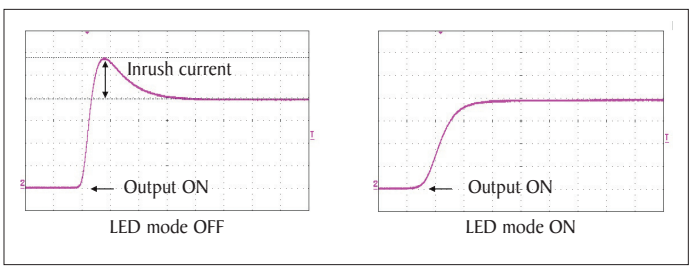
Multi-range operation

Traditional power supplies only output their rated power at one voltage/current point. The 9240 Series multi-range power supplies extend rated power from one point to a curve, delivering up to 200 W across a wider range of voltage/current combinations.



LED mode

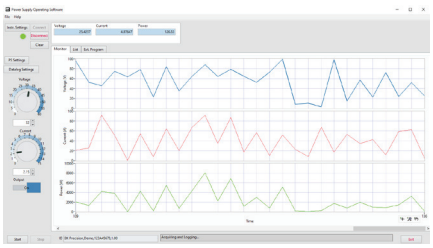
The 9240 series incorporates a special LED test mode for efficient and safe electrical tests of LED panels. When enabled, this mode reduces the inrush current at the output of the power supply during power up.



Current flow during power up with LED mode enabled

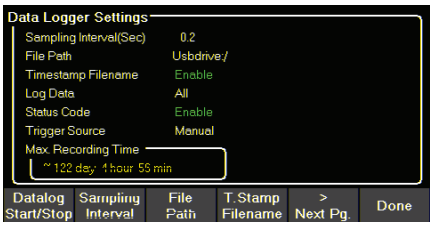
The tools you need: on the bench or in the rack

Operating software



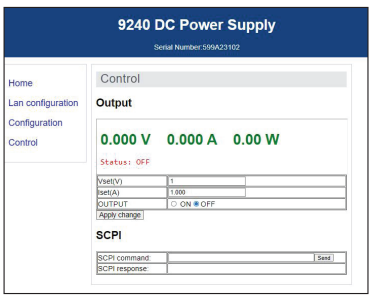
The provided PC software makes it easy to control and monitor the power supply remotely without the need to write source code.

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.

Web server interface



The 9240 Series provides a built-in web server that allows users to configure and control basic power supply settings from a web browser on a computer.

Test system integration

- LXI compliant LAN, USBTMC-compliant/USB Virtual COM Port selectable, and GPIB model option
- LabVIEW™, IVI-C, and IVI.NET drivers simplify system development and integration
- Digital I/O terminal with remote inhibit and voltage fault protection
- Rear panel output terminal with remote sense

NISPOM sanitization

The 9240 Series includes two options for sanitization. The NISPOM option performs a full memory wipe removing all stored user settings, configuration files, help files, and hex files. Selecting the factory reset option acts similarly with the exception of removing the help and hex files.

Comprehensive protection and security

Overvoltage (OVP), overcurrent (OCP), overtemperature (OTW/OTP) features help protect the power supply and DUT. The overtemperature warning (OTW) provides an additional layer of safety before the protection is triggered and the output is disabled. Other protection features include key-lock protection and remote inhibit, allowing the output to be disabled if fault conditions are met. The Kensington security slot on the rear panel helps prevent theft.

Output safety

The output terminals are uniquely designed to accept sheathed banana plugs for increased safety, as well as spade lug connectors, preferred in many industrial settings. The use of sheathed banana plugs is often required by educational institutions.

Front panel

USB host
Save/Recall instrument settings and list mode programs, log data directly to an external flash drive

4.3-inch LCD
Clearly displays set and measured voltage, current, and power parameters

Intuitive control
Numeric keypad and rotary knob for precise control

Output control
Dedicated output on/off button

Mechanical power button
Gives tactical feel and prevents standby power draw

Multi-type output and sense terminals
Isolated and floating output channel supporting sheathed banana plugs and spade lug type connectors

Rear panel

Optional GPIB interface

Chassis ground

Kensington security slot

LXI compliant LAN interface

Rear panel output with remote sense
Internal relays switch between local and remote sensing, eliminating the need for jumpers

Digital I/O terminal
Assign pins for input/output trigger, remote inhibit, or voltage fault conditions

USB interface
USB (USBTMC-compliant) or USBVCP (Virtual COM Port) selectable

Specifications

Note: All specifications apply to the unit after a temperature stabilization time of 15 minutes over an ambient temperature range of 23 °C ± 5 °C. Specifications are valid for front panel operation.

Model		9240	9241	9242
Output Rating				
Voltage		32 V	60 V	60 V
Current		8 A	4 A	10 A
Maximum Output Power		120 W		200 W
Load Regulation[1] ± (% output + offset)				
Voltage		≤ 0.01% + 3 mV		
Current		≤ 0.01% + 3 mA		
Line Regulation[1] ± (% output + offset)				
Voltage		≤ 0.01% + 2 mV		
Current		≤ 0.01% + 3 mA		
Ripple and Noise (20 Hz to 20 MHz)				
Normal Mode Voltage p-p		≤ 5 mV	≤ 10 mV	
Normal Mode Voltage rms		≤ 1 mV	≤ 2 mV	
Normal Mode Current rms		≤ 3 mA		
Programming / Readback Resolution				
Voltage		1 mV		
Current		1 mA		
Programming / Readback Accuracy ± (% output + offset)				
Voltage		0.03% + 4 mV	0.03% + 8 mV	
Current		0.1% + 5 mA	0.1% + 3 mA	
Temperature Coefficient per °C				
Voltage		6.4 mV / °C	12 mV / °C	
Current		1.6 mA / °C	0.8 mA / °C	
Output Response Time [2]				
Rise Time	Full load	10 ms	20 ms	
	No load	10 ms	20 ms	
Fall Time	Full load	10 ms	20 ms	
	No load	250 ms	250 ms	
Transient Response [3]				
Time		0.5 ms		
Protection				
OVP	Range	35.2 V	66 V	
	Accuracy	320 mV	600 mV	
OCP	Range	8.8 A	4.4 A	11 A
	Accuracy	80 mA	40 mA	100 mA

General		
Remote Sense Compensation		1 V
Command Response Time [4]		10 ms
Power Factor		0.98 / 115 VAC 0.94 / 230 VAC
I/O Interfaces		USB (USBTMC-compliant and virtual COM), LAN (1.5 LXI device specification 2016), GPIB (optional)
AC Line Input		100 VAC to 240 VAC ± 10%, 47 Hz to 63 Hz
Maximum Rated Input Power		200 VA
Temperature Ratings	Operation	32 °F to 104 °F (0 °C to 40 °C)
	Storage	14 °F to 158 °F (-10 °C to 70 °C)
Dimensions (W x H x D)		8.4" x 3.5" x 13" (213 x 88 x 330 mm)
Weight		11 lbs (5 kg)
Warranty		3 Years
Standard Accessories		Power cord & certificate of calibration
Optional Accessories		Rack mount kit (RK2US)

Regulatory Compliance	
Safety	Low Voltage Directive (LVD) 2014/35/EU, EN61010-1:2010, cTUVus certification mark[5] 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, EN61326-1:2013

(1) With remote sense terminal connected.
(2) From 10% to 90% or from 90% to 10% of total voltage excursion.
(3) Time for output voltage to recover within 0.5% of its rated output for a load change 50-100% of full load.
(4) Typical time required for output to begin to change following receipt of command data.
(5) Tested and certified by a Nationally Recognized Testing Laboratory (NRTL), accredited by OSHA.

Ordering Information

9240 Series Power Supplies

Model	Description
9240	32 V / 8 A, 120 W
9240-GPIB	32 V / 8 A, 120 W with GPIB
9241	60 V / 4 A, 120 W
9241-GPIB	60 V / 4 A, 120 W with GPIB
9242	60 V / 10 A, 200 W
9242-GPIB	60 V / 10 A, 200 W with GPIB