Data Sheet

Programmable Dual-Range DC Power Supplies

9170 & 9180 series

USB (standard) | LAN | GPIB | RS-485 | RS232 | CE

Outstanding performance combined with unique features

The 9170/9180 series programmable DC power supplies offer industry leading performance, designed to meet the most demanding applications in R&D, design verification, and production test. All nine models deliver clean, stable and precise output power due to their exceptionally low ripple and noise, low temperature coefficient, excellent regulation, and fast transient response time characteristics.

These power supplies are well suited for both bench use and ATE applications. For bench use, these power supplies offer an intuitive user interface with a full numerical keypad for convenient data entry. R&D and design engineers will appreciate front panel output and remote sense terminals (available on select models). Free application software is provided for remote control without the need for any computer programming. USB and optional GPIB/LAN interfaces combined with a fast transient response time, make this series ideal for ATE applications.

Additionally, this series offers unique features not typically found in other power sources on the market, such as versatile LED test modes, modular interface card slots, automatic range selection, and an optional 8-bit bidirectional digital I/O interface.

To protect your DUT (device under test), the 9170/9180 series provides safety options such as OVP, OCP, and a key-lock feature to prevent accidental change of parameters that might damage your DUT. Built for reliability, the supplies are also backed by a 3 year warranty.

Output Rating	No. of Outputs	Model
0-10 V, 0-10 A / 0-20 V, 0-5 A	1	9171
0-35 V, 0-3 A / 0-70 V, 0-1.5 A	1	9172
0-10 V, 0-10 A / 0-20 V, 0-5 A	2	9173
0-35 V, 0-3 A / 0-70 V, 0-1.5 A	2	9174
0-18 V, 0-8 A / 0-36 V, 0-4 A	1	9181
0-10 V, 0-20 A / 0-20 V, 0-10 A	1	9182
0-35 V, 0-6 A / 0-70 V, 0-3 A	1	9183
0-100 V, 0-2 A / 0-200 V, 0-1 A	1	9184
0-400 V, 0-0.5 A / 0-600 V, 0-0.35 A	1	9185

Features & Benefits

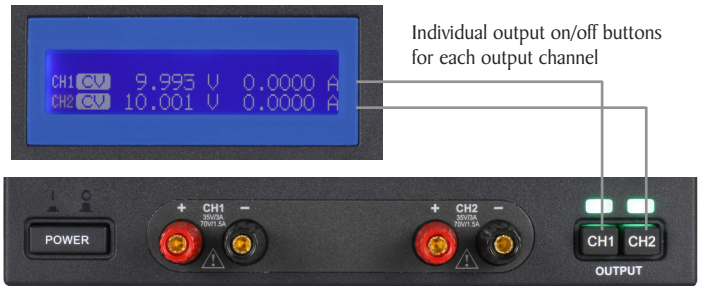
- Single and dual output models with up to 210W output power
- Dual range output with automatic range selection*
- Programmable voltage and current slew rates
- Front and rear panel output terminals for convenient wiring
- Rear panel remote sense terminal (additional front panel remote sense terminal on select single channel models*)
- List mode for executing up to 10 stored test sequences with a maximum of 150 steps in total
- Store and recall up to 10 power settings
- SCPI compliant USB standard interface, RS232, GPIB & LAN, RS485 optional (Installation through modular interface slots)
- Remote analog programming interface (option)
- Unique LED test modes for minimizing inrush current
- Application software for remote control
- Overvoltage (OVP) and overcurrent (OCP) protection, including key-lock function
- Convenient voltage and current calibration via front panel
- LabVIEW™ drivers available for download

* Except for high voltage models 9184 and 9185.

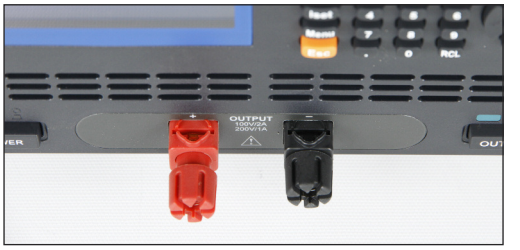
B+K PRECISION
ELECTRONIC TEST INSTRUMENTS

Front panel

Dual channel models

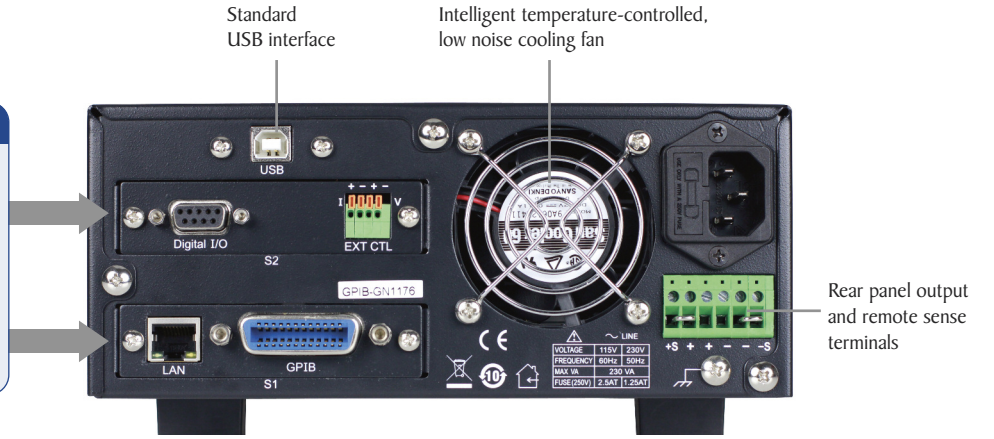


High voltage models



High voltage models come with special binding posts engineered for maximum safety

Rear panel



Modular interface card slots

Only buy what you need, when you need it. Pick and choose from up to 4 different types of interface cards to install at time of purchase or upgrade later. Interface card options include: LAN and GPIB, Digital I/O and Analog Control, RS485, or RS232. Installation is quick and easy and does not require opening the instrument case (does not void warranty).

External control and programming

Versatile connectivity

These power supplies offer SCPI IEEE488.2 compatible standard USB, optional GPIB and LAN interfaces, and an optional 8-bit digital I/O and analog control card to facilitate test system development and integration.

Test sequence execution in list mode

The list mode feature allows users to download a list of commands to the power supply's internal memory and execute them. A total of 150 steps can be allocated to one of 10 internal memory locations. The test sequence can be programmed remotely through the included application software or via the USB, GPIB, or LAN interfaces using SCPI commands. Each step's voltage, current, and duration parameters can be set, with sequences configured for single or repeated execution.

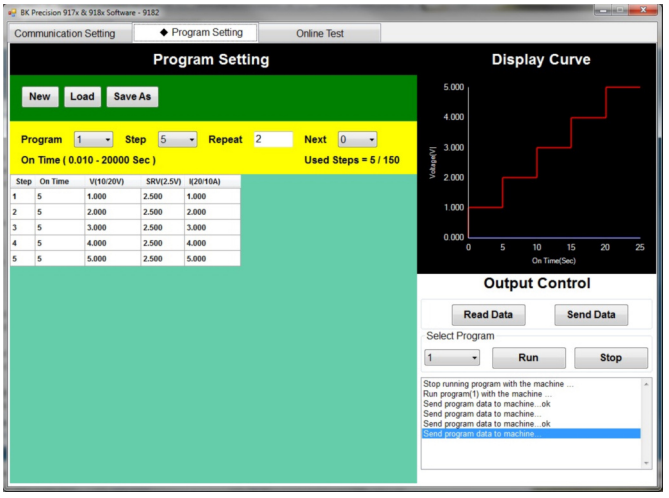
External analog programming interface(1)

The power supplies' output voltage and current can be controlled by either external analog voltage or resistance. Use a 0-5 V or 0-10 V external DC voltage source, or 0-5 kΩ variable resistor to control the output from zero to full scale.

Application software

Create test sequences for execution in list mode via the GPIB or USB interface using the included PC software.

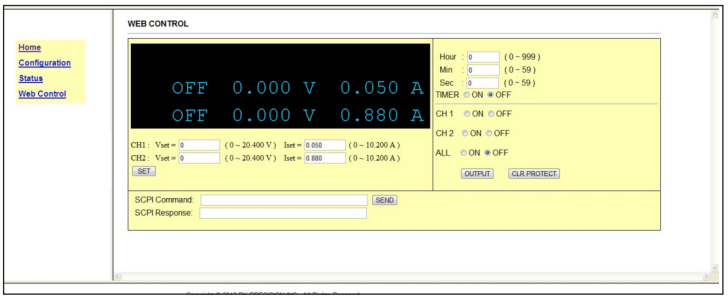
- Create, save, and load program lists
- View output characteristic curves and export data to a file
- Pass/Fail test monitors maximum and minimum voltage and current values over a specified period of time



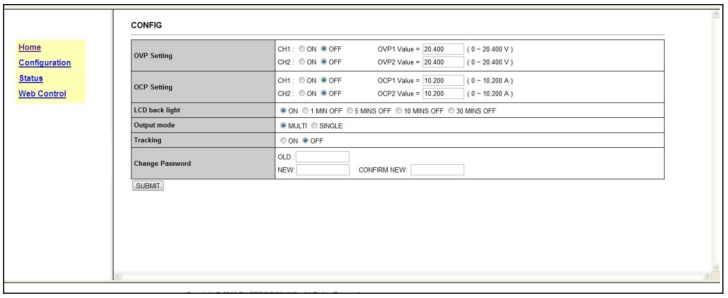
(1) Requires card option DR1DIO or DR2DIO
(2) Requires card option DRGL
(3) Requires card option DRRS485

Web server interface(2)

The 9170/9180 series power supplies with the GPIB/LAN interface installed provide a built-in Web server that allows users to configure, control, or monitor the basic settings of the power supply from a remote computer using a Java-enabled Web browser. Connect to the user-defined IP address to view the web control page. SCPI commands can also be sent through the Web server interface.



Interface for controlling voltage, current, and output state



Control settings page for configuration of protection and password settings for the system

Telnet interface(2)

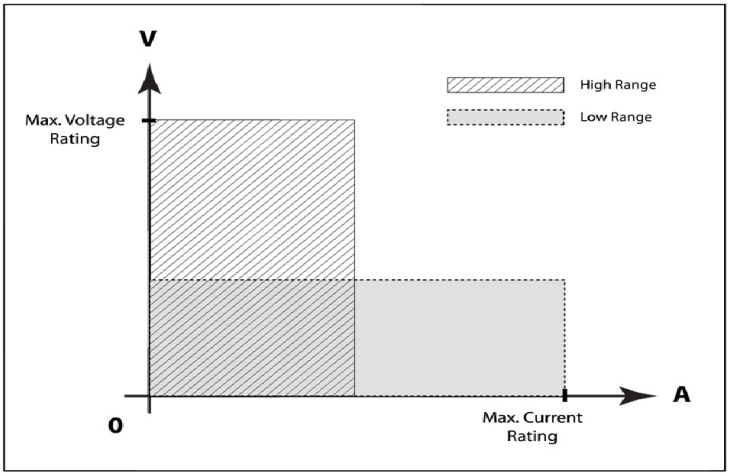
Power supplies can be controlled with SCPI commands via a Telnet connection over the Ethernet interface. Any computer with a Telnet client can be used to control the power supply.

Multi-unit control(3)

In multi-unit control mode, up to 31 units can be daisy chained via the RS485 interface for synchronization purposes and controlled from one master unit via the USB, GPIB, or LAN interface.

Two power supplies in one

The 9170/9180 series provide a unique dual range feature that offers the best of both worlds by supplying two different ranges. Users can select between high and low range operation for either more voltage or more current depending on your application, avoiding the higher cost of buying more power than necessary.



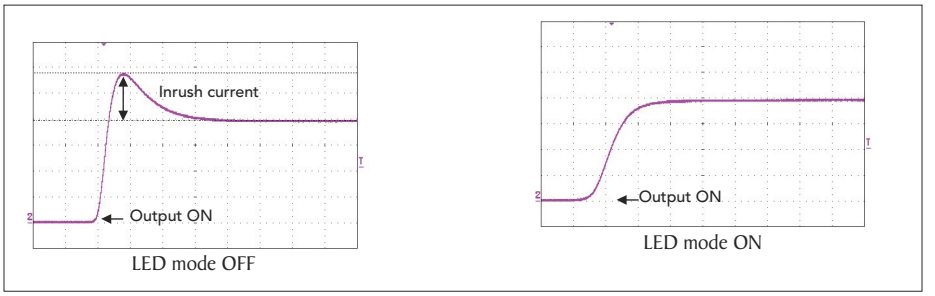
9170/9180 Series Operating Range

Test modes for LED and other special applications

To address the growing LED market, the 9170/9180 series design incorporates special LED test modes for efficient and safe electrical tests of LED panels. Powering LEDs with conventional power supplies will potentially cause permanent damage to the UUT or limit its lifespan due to excessive inrush current at power up and the non-linear characteristics of the LED's I-V curve. These power supplies feature two distinct operating modes suitable for LED testing in a manufacturing or R&D environment and other special applications requiring a controlled rise time at power up without generating any inrush current.

LED mode

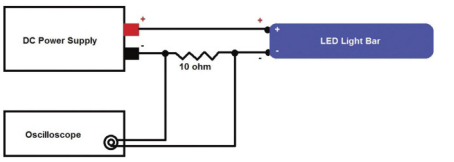
With LED mode active, inrush current will be eliminated or minimized to protect the UUT.



LED mode OFF

LED mode ON

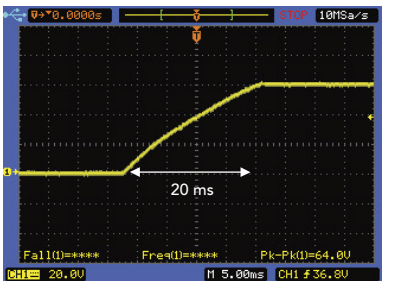
Current flow during power up with LED mode enabled



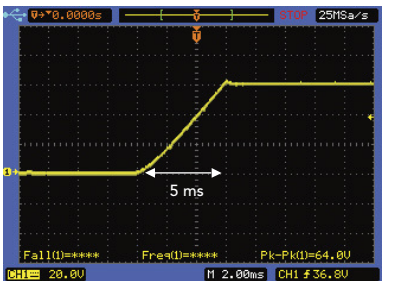
Example LED test setup

Low current mode*

This unique function enables the power supply to minimize the voltage rise time in a controlled manner. This mode is used when operating at a low current (< 1 A) and quick transitions from a high-to-low or low-to-high voltage are needed.



Low current mode OFF



Low current mode ON

Voltage rise time with and without low current mode enabled

* Low current mode for high voltage models 9184 and 9185 only.

Specifications		9171	9172	9173	9174	9181	9182	9183	9184	9185
Output Rating	Low Range	0-10 V, 0-10 A	0-35 V, 0-3 A	0-10 V, 0-10 A	0-35 V, 0-3 A	0-18 V, 0-8 A	0-10 V, 0-20 A	0-35 V, 0-6 A	0-100 V, 0-2 A	0-400 V, 0-0.5 A
	High Range	0-20 V, 0-5 A	0-70 V, 0-1.5 A	0-20 V, 0-5 A	0-70 V, 0-1.5 A	0-36 V, 0-4 A	0-20 V, 0-10 A	0-70 V, 0-3 A	0-200 V, 0-1 A	0-600 V, 0-0.35 A
Number of Channels		1	1	2	2	1	1	1	1	1
Max Output Power		100 W	105 W	200 W	210 W	144 W	200 W	210 W	200 W	210 W
Line Regulation	Voltage	≤ 0.01 %+1 mV								
	Current	≤ 0.01 %+250 uA								
Load Regulation[1]	Voltage	≤ 0.01 %+1 mV								
	Current	≤ 0.01 %+250 uA								
Ripple and Noise (20 Hz – 20 MHz)	Normal Mode Voltage	≤ 0.35 mVrms / ≤ 3 mVpp	≤ 0.5 mVrms / ≤ 5 mVpp	≤ 0.35 mVrms / ≤ 3 mVpp	≤ 0.5 mVrms / ≤ 5 mVpp	≤ 0.35 mVrms / ≤ 3 mVpp		≤ 0.5 mVrms /≤5 mVpp	≤ 1.5 mVrms / ≤ 15 mVpp	≤ 4.5 mVrms / ≤ 45 mVpp
	Normal Mode Current	≤ 2 mA rms								
	Common Mode Current	≤ 1.5 uA rms								
Programming / Readback Resolution	Voltage	1 mV	2 mV	1 mV	2 mV	1 mV		2 mV	10 mV	20 mV
	Current	1 mA	0.1 mA	1 mA	0.1 mA	1 mA		0.2 mA	0.1 mA	0.01 mA
Programming / Readback Accuracy ±(% output+offset)	Voltage	≤ 0.05 % +5 mV	≤ 0.05 % +10 mV	≤ 0.05 % +5 mV	≤ 0.05 % +10 mV	≤ 0.05 % +5 mV		≤ 0.05 % +10 mV	≤ 0.05 % +50 mV	≤ 0.05 % +100 mV
	Current	≤ 0.1 % +2 mA	≤ 0.1 % +1 mA	≤ 0.1 % +2 mA	≤ 0.1 % +1 mA	≤ 0.1 % +2 mA	≤ 0.1 % +5 mA	≤ 0.1 % +2 mA	≤ 0.1 % +1 mA	≤ 0.1 % +0.1 mA
Temperature Coefficient per °C ±(% output+offset)	Voltage	≤ 0.005 %+1 mV							≤ 0.005 % +10 mV	≤ 0.005 % +20 mV
	Current	≤ 0.01 %+3 mA								
Transient Response Time[2]		≤ 50 μs for output to recover to within 15 mV							≤ 100 μs for output to recover to within 50 mV	≤ 100 μs for output to recover to within 120 mV
Settling Time[3]		≤ 30 ms								
Measurement Time		≤ 50 ms								
OVP Accuracy		≤ 0.5 %+0.1 V							≤ 0.5 %+1 V	
OCP Accuracy		≤ 0.5 %+0.1 A								
OVP/OCP Response Time[4]		≤ 1 ms								
Rising Time at Full Load / No Load		≤ 8 ms	≤ 10 ms	≤ 8 ms	≤ 10 ms	≤ 8 ms		≤ 10 ms	≤ 30 ms	≤ 40 ms
Falling Time at Full Load		≤ 8 ms	≤ 10 ms	≤ 8 ms	≤ 10 ms	≤ 8 ms		≤ 10 ms	≤ 30 ms	≤ 40 ms
Falling Time at No Load		≤ 250 ms								
Stability (8 hrs) ±(% output+offset)	Voltage	≤ 0.02 %+2 mV							≤ 0.02 % +10 mV	≤ 0.02 % +20 mV
	Current	0.1 %+1 mA								

Notes:
1 With sense terminal connected.
2 Following a change in output current from full load to half load or vice versa.
3 Maximum time required for the output voltage to change from 1% to 99% or vice versa after receiving a VOLTage or VSET command via GPIB or USB interface.
4 Average time for output to start to drop after OVP/OCP condition occurs.

Specifications (cont.)	9171	9172	9173	9174	9181	9182	9183	9184	9185
Supplemental Characteristics									
Dimensions (W x H x D)	8.3" x 3.4" x 16.3" (210 x 87 x 415 mm)		8.3" x 5.1" x 16.3" (210 x 130.5 x 415 mm)		8.3" x 3.4" x 16.3" (210 x 87 x 415 mm)	8.3" x 5.1" x 16.3" (210 x 130.5 x 415 mm)			
Rack Mount Height	2U		3U		2U	3U			
Weight	17 lbs (7.7 kg)		23.1 lbs (10.5 kg)		17 lbs (7.7 kg)	26.4 lbs (12 kg)	24.2 lbs (11 kg)	23.lbs (10.5 kg)	
Safety	EN61010-1:2001, EU Low Voltage Directive 2006/95/EC								
Electromagnetic Compatibility	Meets EMC Directive 2004/108/EC, EN61326-1:2006								
Standard Interface	USB								
AC Input	115/230 VAC ± 10%, 47 Hz - 63 Hz								
Environmental									
Operating Temperature	0 °C - 40 °C, < 75% R.H.								
Storage Temperature	-10 °C - 70 °C, < 85% R.H.								
Three-Year Warranty									
Accessories Included	AC power cord, USB cable (type A to type B), line fuse, certificate of calibration and test report								

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.

Order information for instrument options

Interface cards	Description
DRGL	GPIB/LAN card
DR1DIO	Single channel digital I/O and analog control card
DR2DIO	Dual channel digital I/O and analog control card
DRRS485	RS485 interface card
DRRS232	RS232 interface card

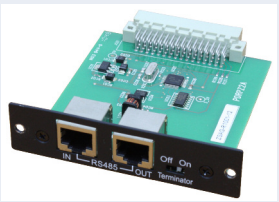
Single channel models: 9171, 9172, 9181, 9182, 9183, 9184, 9185
Dual channel models: 9173, 9174

Rackmount kits	Description
DRRM2U1	Rackmount kit for one 2U instrument
DRRM2U2	Rackmount kit for two 2U instruments mounted side by side
DRRM3U1	Rackmount kit for one 3U instrument
DRRM3U2	Rackmount kit for two 3U instruments mounted side by side

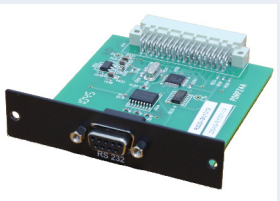
2U size models: 9171, 9172, 9181
3U size models: 9173, 9174, 9182, 9183, 9184, 9185

Interface Card Options

LAN/GPIB card



RS485 card



RS232 card

Single and dual channel digital I/O analog input control cards

Note: All options can be installed by the user and purchased at any time, either together with the instrument or after.