



# Series 2260B

## Programmable DC Power Supplies

USER'S MANUAL



Series 2260B  
Programmable DC Power Supplies  
User's Manual

© 2024, Keithley Instruments, LLC

Cleveland, Ohio, U.S.A.

All rights reserved.

Any unauthorized reproduction, photocopy, or use of the information herein, in whole or in part, without the prior written approval of Keithley Instruments, LLC, is strictly prohibited.

These are the original instructions in English.

All Keithley Instruments product names are trademarks or registered trademarks of Keithley Instruments, LLC. Other brand names are trademarks or registered trademarks of their respective holders.

Microsoft, Visual C++, Excel, and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Document number: 077104603 October 2024

---

The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with nonhazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the user documentation for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product warranty may be impaired.

The types of product users are:

**Responsible body** is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

**Operators** use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

**Maintenance personnel** perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

**Service personnel** are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Keithley products are designed for use with electrical signals that are measurement, control, and data I/O connections, with low transient overvoltages, and must not be directly connected to mains voltage or to voltage sources with high transient overvoltages. Measurement Category II (as referenced in IEC 60664) connections require protection for high transient overvoltages often associated with local AC mains connections. Certain Keithley measuring instruments may be connected to mains. These instruments will be marked as category II or higher.

Unless explicitly allowed in the specifications, operating manual, and instrument labels, do not connect any instrument to mains.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30 V RMS, 42.4 V peak, or 60 VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 V, no conductive part of the circuit may be exposed.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance-limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.


For safety, instruments and accessories must be used in accordance with the operating instructions. If the instruments or accessories are used in a manner not specified in the operating instructions, the protection provided by the equipment may be impaired.


Do not exceed the maximum signal levels of the instruments and accessories. Maximum signal levels are defined in the specifications and operating information and shown on the instrument panels, test fixture panels, and switching cards.


When fuses are used in a product, replace with the same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as protective earth (safety ground) connections.


If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.


If a  screw is present, connect it to protective earth (safety ground) using the wire recommended in the user documentation.

The  symbol on an instrument means caution, risk of hazard. The user must refer to the operating instructions located in the user documentation in all cases where the symbol is marked on the instrument.

The  symbol on an instrument means warning, risk of electric shock. Use standard safety precautions to avoid personal contact with these voltages.


The  symbol on an instrument shows that the surface may be hot. Avoid personal contact to prevent burns.

The  symbol indicates a connection terminal to the equipment frame.

If this  symbol is on a product, it indicates that mercury is present in the display lamp. Please note that the lamp must be properly disposed of according to federal, state, and local laws.

The **WARNING** heading in the user documentation explains hazards that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in the user documentation explains hazards that could damage the instrument. Such damage may invalidate the warranty.

The **CAUTION** heading with the  symbol in the user documentation explains hazards that could result in moderate or minor injury or damage the instrument. Always read the associated information very carefully before performing the indicated procedure. Damage to the instrument may invalidate the warranty.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits — including the power transformer, test leads, and input jacks — must be purchased from Keithley. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. The detachable mains power cord provided with the instrument may only be replaced with a similarly rated power cord. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Keithley to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call a Keithley office for information.

Unless otherwise noted in product-specific literature, Keithley instruments are designed to operate indoors only, in the following environment: Altitude at or below 2,000 m (6,562 ft); temperature 0 °C to 50 °C (32 °F to 122 °F); and pollution degree 1 or 2.

To clean an instrument, use a cloth dampened with deionized water or mild, water-based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., a data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning/servicing.

Safety precaution revision as of June 2018.

# Table of contents

---

<b>Introduction</b> .....	<b>1-1</b>
2260B series overview .....	1-1
About this document .....	1-3
Features .....	1-4
Extended warranty .....	1-4
Contact information .....	1-5
Power and environmental ratings .....	1-5
<b>Installation</b> .....	<b>2-1</b>
Filter installation .....	2-1
Location guidelines .....	2-1
Dimensions .....	2-1
360 W dimensions.....	2-2
720 W dimensions.....	2-3
1080 W dimensions.....	2-5
Instrument power .....	2-6
Line voltage connection for 1080 W models .....	2-6
Line voltage connection for 360 W and 720 W models .....	2-9
Turn the 2260B on or off .....	2-10
<b>Instrument description</b> .....	<b>3-1</b>
Overview .....	3-1
Front panels .....	3-1
360 W front panel (2260B-30-36, -80-13, -250-4, -800-1).....	3-2
720 W front panel (2260B-30-72, -80-27, -250-9, -800-2).....	3-3
1080 W front panel (2260B-30-108, 80-40, 250-13, 800-4) .....	3-4
Rear panels.....	3-5
360 W rear panels.....	3-6
720 W rear panels.....	3-7
1080 W rear panels.....	3-9
<b>Operation</b> .....	<b>4-1</b>
Overview .....	4-1
Operating areas .....	4-1
Constant current and constant voltage modes .....	4-4
Slew rate .....	4-5
Bleed resistor control .....	4-5
Operating considerations .....	4-6
Current peak and pulsed loads .....	4-6
Reverse current and a regenerative load .....	4-6
Reverse current and accumulative energy .....	4-7
Grounding .....	4-7

Floating .....	4-8
Grounded output terminal .....	4-8
Connecting output terminals to a load .....	4-9
Wire gauge considerations.....	4-9
Connecting 2260B-30 and -80 output terminals to load .....	4-10
Connecting 2260B-250 and -800 output terminals to load .....	4-14
Setting parameter values .....	4-23
Reset to the factory default settings.....	4-24
Basic operation .....	4-24
Setting protection mode levels .....	4-24
Set a current limit for operating in CV Mode.....	4-26
Set a voltage limit for operating in CC mode .....	4-28
Display modes.....	4-30
Reading the display.....	4-30
Front-panel lock .....	4-31
Compensating for voltage drop across load cables .....	4-31
Making remote sense connections for a single load.....	4-32
Remote sense connections for parallel 2260B power supplies .....	4-32
Remote sense connections for serial 2260B power supplies .....	4-33
Wire shielding and load line impedance .....	4-34
Parallel and series operation .....	4-34
Master-subordinate parallel overview.....	4-35
Master-subordinate parallel connections.....	4-37
Parallel output connections .....	4-39
Operation of instruments in parallel.....	4-40
Master-subordinate series overview.....	4-41
Test sequence.....	4-45
Test sequence file format .....	4-45
Load a test sequence to the instrument .....	4-47
Running a test sequence .....	4-47
Export a test sequence to a USB flash drive .....	4-48
Remove a test sequence .....	4-48
Test sequence error messages.....	4-49
Analog Control connector.....	4-50
Analog Control connector pin descriptions .....	4-50
External voltage control of voltage output .....	4-52
External voltage control of current output.....	4-54
External resistance control of voltage output.....	4-55
External resistance control of current output.....	4-57
External control of the output .....	4-59
External control of shutdown .....	4-61
Remote monitoring.....	4-63
<b>Configuration .....</b>	<b>5-1</b>
Configuration .....	5-1
Output delay settings .....	5-1
Voltage-current priority settings .....	5-2
Slew rate settings.....	5-2
Internal resistance settings .....	5-3
Bleed resistor control settings.....	5-4

Beeper setting .....	5-4
Measurement average setting .....	5-5
Front-panel lock setting .....	5-5
USB and GPIB settings .....	5-5
LAN settings .....	5-6
Factory set values .....	5-7
Show version .....	5-7
Function settings .....	5-7
Power-on configuration settings .....	5-8
Calibration settings .....	5-8
CV control .....	5-8
CC control .....	5-9
Output at power on .....	5-9
Master and subordinate .....	5-9
External output logic .....	5-9
Power switch trip .....	5-10
Power-on configuration settings .....	5-10
Default settings .....	5-11
<b>Maintenance .....</b>	<b>6-1</b>
Introduction .....	6-1
Replacing the dust filters .....	6-1
Upgrading the firmware .....	6-1
Review the system version and build date .....	6-2
Cleaning the instrument .....	6-3
Fuse replacement .....	6-4
Disposal .....	6-4
<b>Troubleshooting .....</b>	<b>7-1</b>
Introduction .....	7-1
Errors and messages .....	7-1
<b>Frequently asked questions .....</b>	<b>8-1</b>
Where can I find the latest drivers? .....	8-1
Why can't I change the CC or CV mode? .....	8-1
Why is the OVP triggering early? .....	8-1
Can I combine more than one cable for the output wiring? .....	8-2
Why doesn't the accuracy meet the specifications? .....	8-2
<b>Next steps .....</b>	<b>9-1</b>
Additional 2260B information .....	9-1



## Introduction

### In this section:

2260B series overview .....	1-1
About this document .....	1-3
Features .....	1-4
Extended warranty .....	1-4
Contact information .....	1-5
Power and environmental ratings .....	1-5

## 2260B series overview

The 2260B series includes power supplies with 360 W, 720 W, and 1080 W power capabilities.

In this document:

- 2260B-30 refers to 2260B models with a maximum voltage rating of 30 V
- 2260B-80 refers to models with a maximum voltage rating of 80 V
- 2260B-250 refers to models with a maximum voltage rating of 250 V
- 2260B-800 refers to models with a maximum voltage rating of 800 V

This document provides information on the 2260B models listed in the following table.

Model name	Type	Voltage rating	Current rating	Power
2260B-30-36	360 W models	0 V to 30 V	0 A to 36 A	360 W
2260B-80-13	360 W models	0 V to 80 V	0 A to 13.5 A	360 W
2260B-250-4	360 W models	0 V to 250 V	0 A to 4.5 A	360 W
2260B-800-1	360 W models	0 V to 800 V	0 A to 1.44 A	360 W
2260B-30-72	720 W models	0 V to 30 V	0 A to 72 A	720 W
2260B-80-27	720 W models	0 V to 80 V	0 A to 27 A	720 W
2260B-250-9	720 W models	0 V to 250 V	0 A to 9 A	720 W
2260B-800-2	720 W models	0 V to 800 V	0 A to 2.88 A	720 W
2260B-30-108	1080 W models	0 V to 30 V	0 A to 108 A	1080 W
2260B-80-40	1080 W models	0 V to 80 V	0 A to 40.5 A	1080 W
2260B-250-13	1080 W models	0 V to 250 V	0 A to 13.5 A	1080 W
2260B-800-4	1080 W models	0 V to 800 V	0 A to 4.32 A	1080 W

Each power supply differs in size. The 720 W and 1080 W models are larger than the 360 W models to accommodate the increase in power.

**Figure 1: 360 W models**



**Figure 2: 720 W models**



**Figure 3: 1080 W models**

## About this document

This manual provides descriptions of the Series 2260B power supplies. Information includes descriptions of the front and rear panels, installation instructions, basic operating instructions, maintenance guidelines, and troubleshooting information.

For unpacking instructions, basic connections, and a quick test procedure to ensure that the instrument is operational, refer to the *Series 2260B Multi-Range Programmable DC Power Supplies Quick Start Guide*.

For comprehensive information about the features, operation, optimization, maintenance, troubleshooting, and programming commands of the instrument, refer to the *Series 2260B Multi-Range Programmable DC Power Supplies Programming Manual*.

These documents and additional information are available at [tek.com/keithley](http://tek.com/keithley).

## Features

The key features include:

- 360 W, 720 W, and 1080 W versions with voltage up to 800 V and currents up to 108 A.
- Programmable voltage or current rise and fall slew rates prevent damage to low impedance loads from inrush current.
- Constant current priority setting reduces voltage and current overshoot when powering LEDs.
- Programmable output resistance allows simulation of the output characteristics of a battery.
- Analog input control supports creating voltage profiles that simulate how a battery responds to a fast changing load current or generating a combined DC output level with an AC signal superimposed on it to test how a circuit responds to noise on its DC power source.
- Internal test sequence mode allows the output of a set of voltage levels for varying time intervals at each level. The test sequence can be stored and used repeatedly to determine DUT performance at different levels.
- Series or parallel configurable, which can deliver up to 3240 W when three units are combined in parallel.
- Fit six 360 W instrument, three 720 W instruments, or two 1080 W instruments in a standard rack width to minimize bench and test system space.
- Fast discharge capability and 1 ms transient recovery time to load changes minimizes test times in automated test systems.

## Extended warranty

Additional years of warranty coverage are available on many products. These valuable contracts protect you from unbudgeted service expenses and provide additional years of protection at a fraction of the price of a repair. Extended warranties are available on new and existing products. Contact your local Keithley Instruments office, sales partner, or distributor for details.

## Contact information

If you have any questions after you review the information in this documentation, please contact your local Keithley Instruments office, sales partner, or distributor. You can also call the Tektronix corporate headquarters (toll-free inside the U.S. and Canada only) at 1-800-833-9200. For worldwide contact numbers, visit [tek.com/contact-tek](https://tek.com/contact-tek).

## Power and environmental ratings

The 2260B power and environmental ratings and connections are listed in the following table.

Category	Specification
<b>Power supply</b>	100 V AC to 240 V AC, 50 Hz to 60 Hz, single phase.
<b>Maximum input power</b>	<p><b>2260B-30-36, 2260B-80-13, 2260B-250-4, 2260B-800-1:</b> 500 VA maximum.</p> <p><b>2260B-30-72, 2260B-80-27, 2260B-250-9, 2260B-800-2:</b> 1000 VA maximum.</p> <p><b>2260B-30-108, 2260B-80-40, 2260B-250-13, 2260B-800-4:</b> 1500 VA maximum.</p>
<b>Input and output connections</b>	See <a href="#">Front panel</a> (on page 3-1) and <a href="#">Rear panel</a> (on page 3-5).
<b>Altitude</b>	Maximum 2000 m (6562 ft ) above sea level.
<b>Environmental conditions</b>	<p>For indoor use only.</p> <p><b>Operating temperature:</b> 0 °C to 50 °C.</p> <p><b>Storage temperature:</b> –15 °C to 70 °C.</p> <p><b>Operating humidity:</b> 20% to 85% relative humidity; no condensation.</p> <p><b>Storage humidity:</b> 90% relative humidity or less; no condensation.</p> <p><b>Pollution degree:</b> 2</p>

**In this section:**

Filter installation ..... 2-1  
Location guidelines ..... 2-1  
Dimensions ..... 2-1  
Instrument power ..... 2-6

## Filter installation

A filter must be inserted under the control panel before operation. The filter must be inserted for all models.

*To install the filter:*

1. Locate the open area below the front panel.
2. Insert the filter in the open area.

## Location guidelines

---

### CAUTION

To prevent damage to the instrument:

- Do not place any heavy objects on the instrument.
  - The 2260B has air vents. Make sure the vents are unobstructed to allow for air flow and to dissipate heat.
  - Excessive heat could damage the 2260B and degrade its performance. Only operate the 2260B in an environment where the ambient temperature does not exceed 50 °C.
- 

## Dimensions

The following figures show the dimensions of the 2260B instruments.

### 360 W dimensions

Figure 4: 2260B-80-13 and 2260B-30-36 (360 W) dimensions

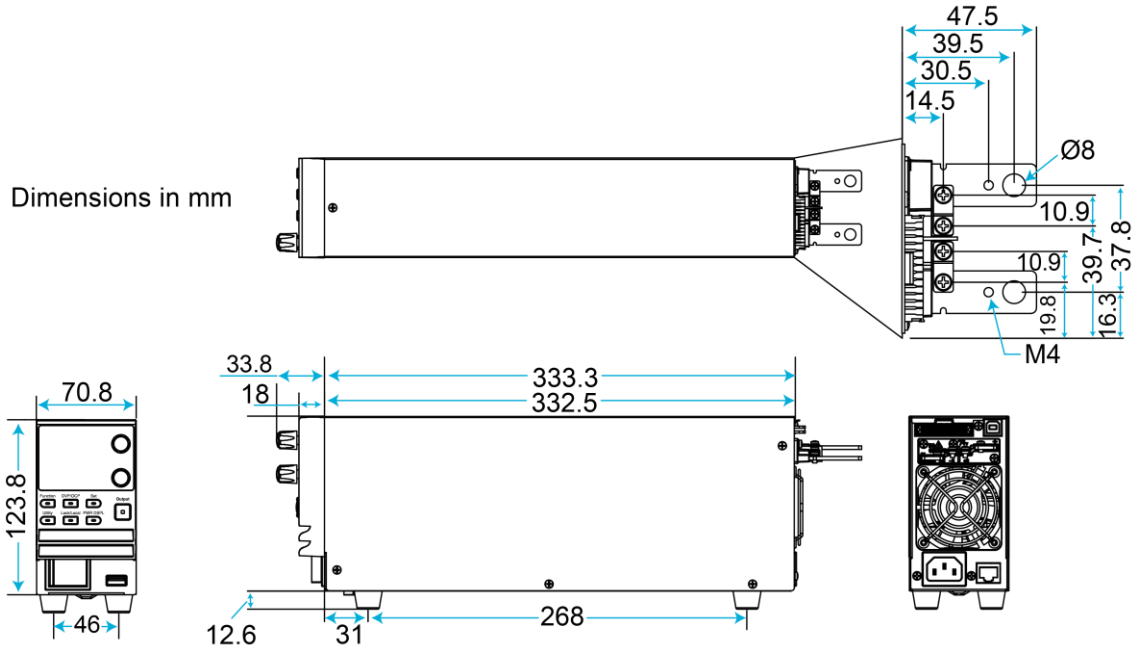
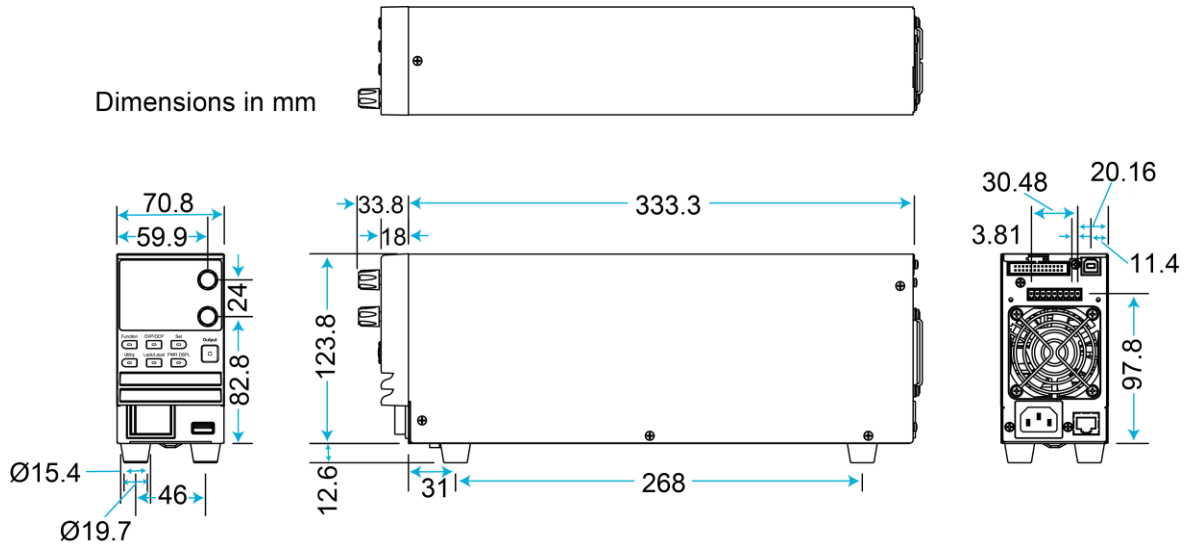
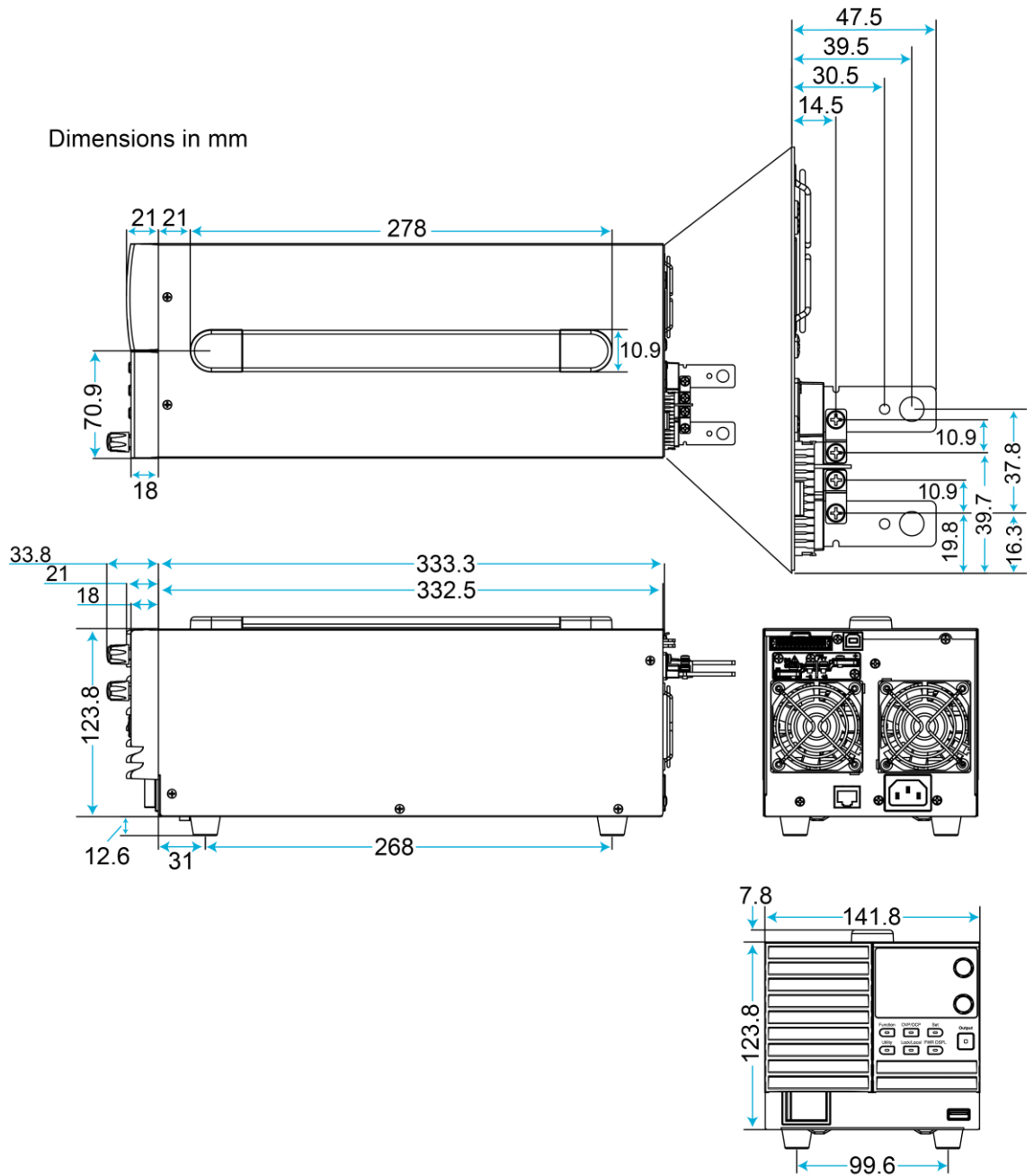


Figure 5: 2260B-250-4 and 2260B-800-1 (360 W) dimensions



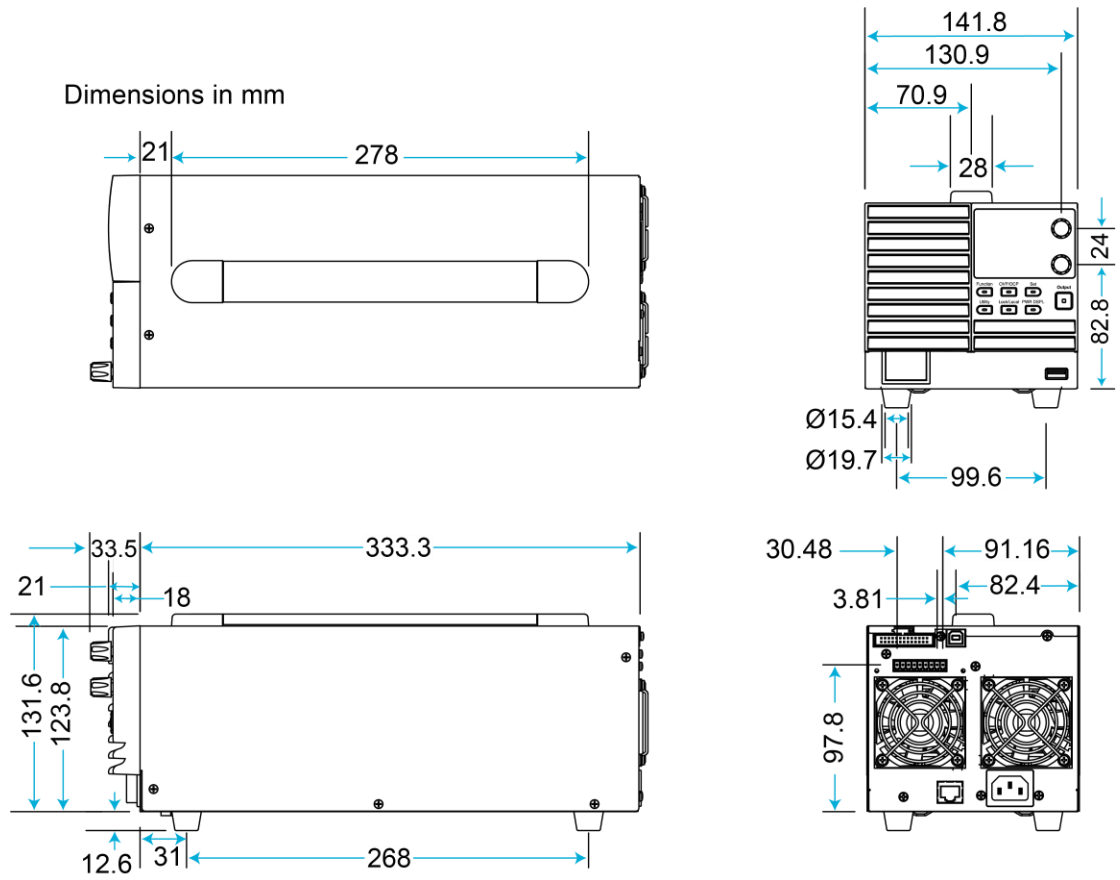
# 720 W dimensions

Figure 6: 2260B-80-27 and 2260B-30-72 (720 W) dimensions



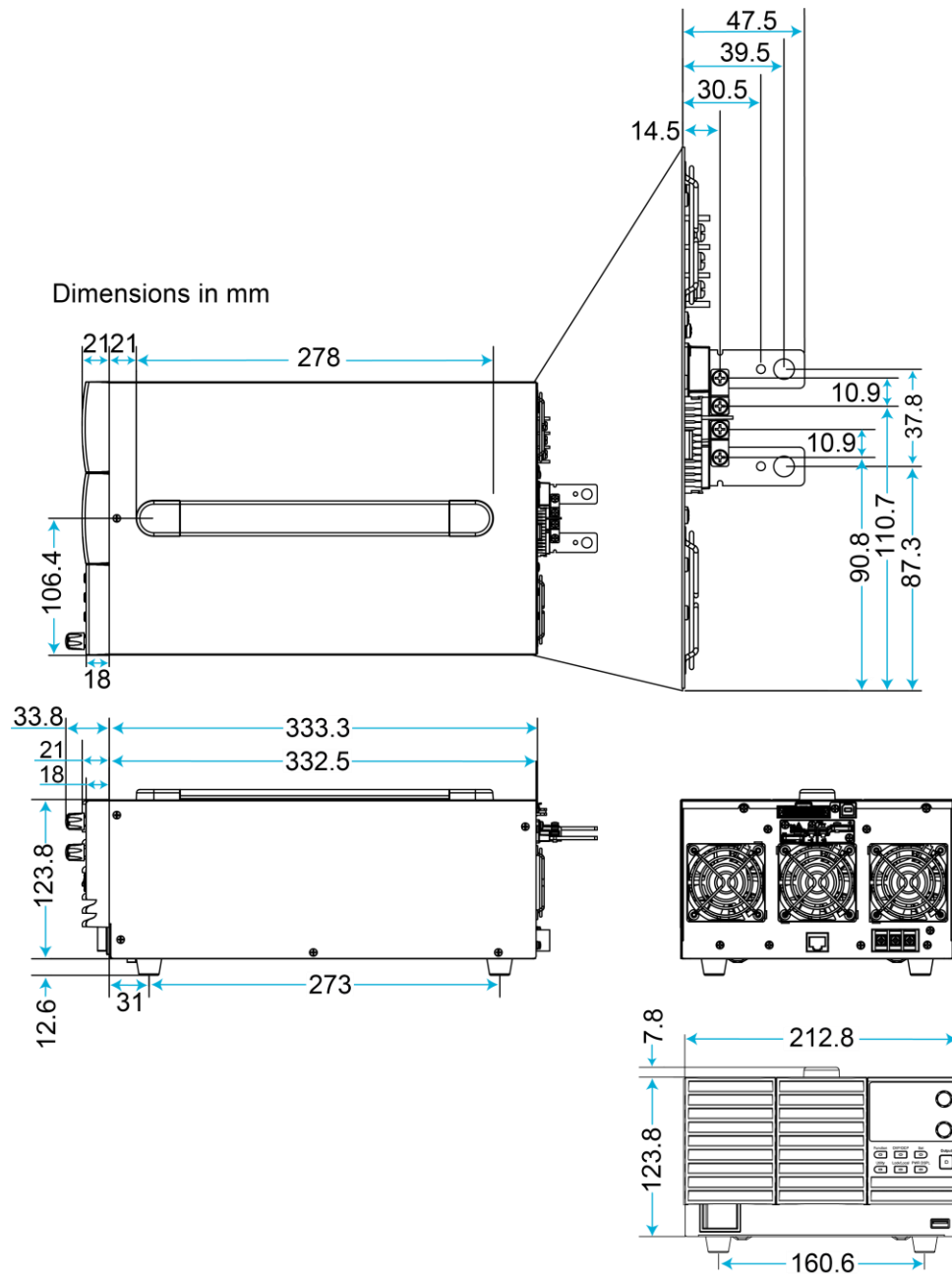


**Figure 7: 2260B-250-9 and 2260B-800-2 (720 W) dimensions**



# 1080 W dimensions

Figure 8: 2260B-80-40 and 2260B-30-108 dimensions



## Instrument power

Follow the steps below to connect the 2260B to line power and turn on the instrument.

---

### CAUTION

Operating the instrument on an incorrect line voltage may cause damage to the instrument, possibly voiding the warranty.

---

---

### WARNING

The power cord supplied with the 2260B contains a separate protective earth (safety ground) wire for use with grounded outlets. When proper connections are made, the instrument chassis is connected to power-line ground through the ground wire in the power cord. In the event of a failure, not using a properly grounded protective earth and grounded outlet may result in personal injury or death due to electric shock.

Do not replace detachable mains supply cords with inadequately rated cords. Failure to use properly rated cords may result in personal injury or death due to electric shock.

---

## Line voltage connection for 1080 W models

The 1080 W models (2260B-30-108, -80-40, -250-13, and -800-4) use a universal power input that can be used with 100 V AC or 200 V AC systems. To connect or replace the power cord, use the following procedure.

---

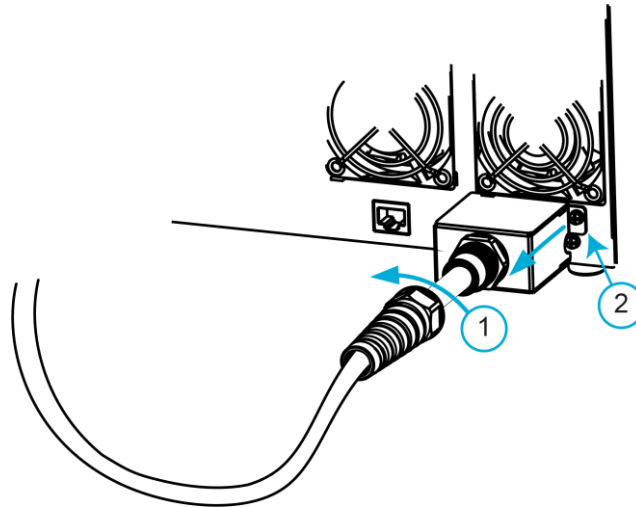
### WARNING

The following information for 2260B is intended for qualified service personnel only, as described by the types of product users in the [Safety precautions](#). Do not attempt to perform this procedure unless qualified to do so.

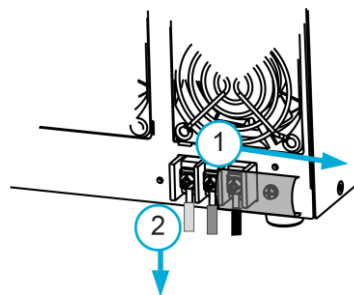
---

**To connect or replace the power cord for 1080 W models:**

1. Ensure that the AC power cord is not connected to power.
2. Turn off the power switch.
3. Unscrew the power cord strain relief, as shown by 1 in the following figure.

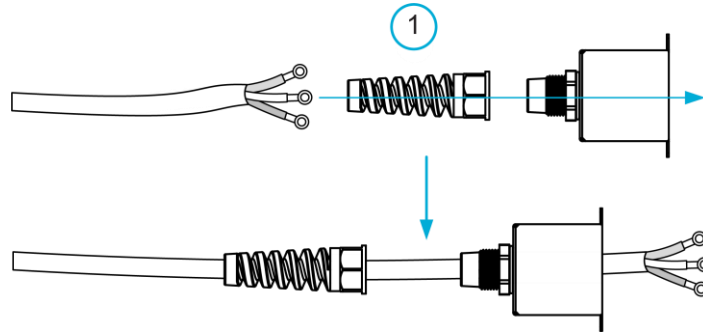
**Figure 9: Line voltage connection for 1080 W models**

4. Remove the two screws (2) that fasten the power cord cover to the 2260B and remove the cover, as shown in the previous figure.
5. Slide the cover (1) off the AC terminals, as shown in the following figure.
6. Remove the AC power cord wires (2), as shown in the following figure.

**Figure 10: Remove terminal cover and remove AC power cord wires**

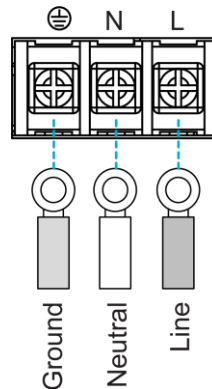
7. Thread the power cord through the strain relief (1) and through the power cord cover, as shown in the following figure.

**Figure 11: Thread the power cord through the strain relief and power cord cover**



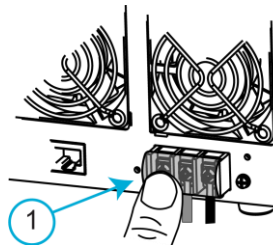
8. Connect the AC power cord wires to the AC input terminals, as shown in the following figure.
  - White, blue, or black (India) to Neutral (N)
  - Green or green-yellow to GND  $\oplus$
  - Black, brown, or red (India) to Line (L)

**Figure 12: Connect the AC power cord wires to the AC input terminals**



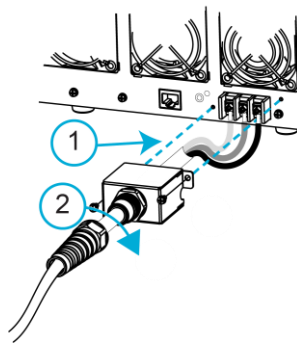
9. Set the cover (1) over the AC terminals, as shown in the following figure.

**Figure 13: Replace the cover over the terminals**



10. Screw the power cord cover (1) onto the rear panel using the supplied screws, as shown in the following figure.
11. Screw the strain relief (2) onto the power cord cover, as shown in the following figure.

**Figure 14: Replace power cord cover and strain relief**



12. Connect the plug of the power cord to a grounded AC outlet.

## Line voltage connection for 360 W and 720 W models

*To connect the power cord on 360 W or 720 W models:*

1. Connect the socket of the supplied power cord to the AC receptacle on the rear panel.
2. Connect the plug of the power cord to a grounded AC outlet.

## Turn the 2260B on or off

The first time the power supply is turned on, the default settings appear on the display. On subsequent power up, the power supply returns to the state it was in when the power was last turned off.

When the power supply switch is turned on, an inrush current is generated. Ensure there is enough power available for the power supply when turned on, especially if more than one power supply is turned on at the same time.

---

### CAUTION

**The power supply takes approximately eight seconds to turn on and shut down. Wait for the display to turn off completely and allow at least 15 seconds between power cycles. Cycling the power on and off quickly can cause the inrush current limiting circuit to fail and will reduce the working life of the input fuse and power switch.**

---

***To turn a 2260B on:***

Press the front-panel **POWER** switch to place it in the on position.

***To turn a 2260B off:***

Press the front-panel **POWER** switch to place it in the off position.

## Instrument description

### In this section:

Overview .....	3-1
Front panels .....	3-1
Rear panels.....	3-5

## Overview

This section provides descriptions of the front-panel and rear-panel controls.

## Front panels

The front panels of the 2260B are shown in the following figures. Descriptions of the controls on the front panels follow the figures.

---

### NOTE

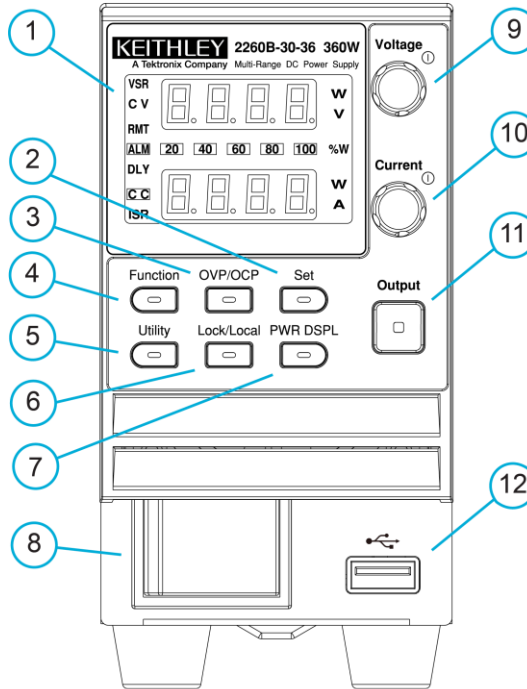
When any key is active, it is lit. If the output is on, the Output key is lit.

---



### 360 W front panel (2260B-30-36, -80-13, -250-4, -800-1)

Figure 15: 360 W front panel (2260B-30-36, -80-13, -250-4, -800-1)

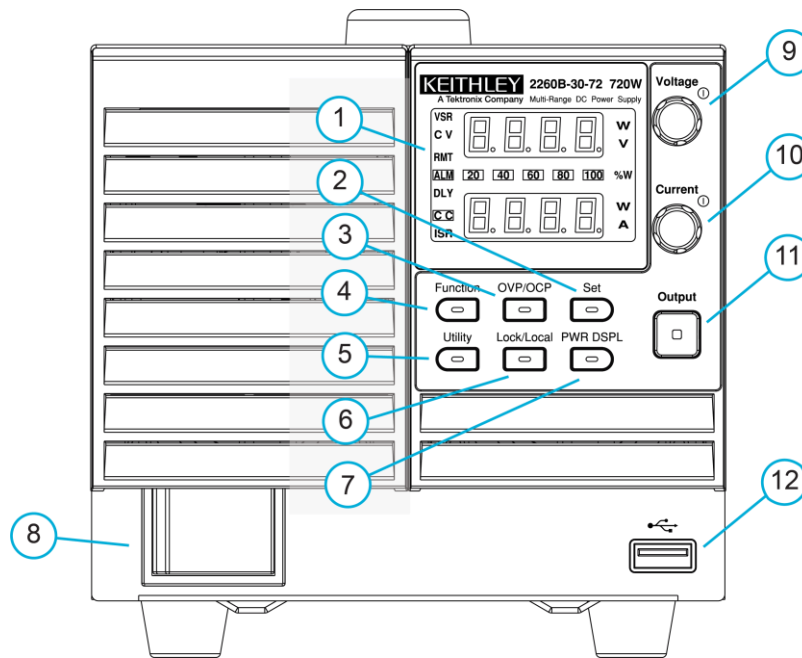


1	<b>Display</b>	<p>The display shows the voltage and current readings and configuration settings. It also includes the following display indicators:</p> <ul style="list-style-type: none"> <li>▪ <b>VSR:</b> Voltage slew rate</li> <li>▪ <b>CV:</b> Constant voltage mode</li> <li>▪ <b>RMT:</b> Remote control mode</li> <li>▪ <b>ALM:</b> Alarm on</li> <li>▪ <b>DLY:</b> Delay output</li> <li>▪ <b>CC:</b> Constant current mode</li> <li>▪ <b>ISR:</b> Current slew rate</li> <li>▪ <b>20 40 60 80 100 % W:</b> Power bar; shows the present power output as a percentage</li> </ul>
2	<b>Set key</b>	Sets the current and voltage limits.
3	<b>OVP/OCF key</b>	Sets the overcurrent protection (OVP) or overvoltage protection (OVP) levels.
4	<b>Function key</b>	Configures the settings of the power supply.
5	<b>Utility key</b>	Runs customized test sequences.
6	<b>Lock/Local key</b>	Locks or unlocks the panel keys. Locking prevents accidental changes to front-panel settings. To unlock the keys, press <b>Lock/Local</b> for three seconds.
7	<b>PWR DSPL key</b>	Toggles the display between viewing V/A, V/W, or A/W. Press the Voltage knob for V/W. Press the Current knob for A/W.

8	<b>POWER switch</b>	Turns the instrument on or off. The type of power switch determines if the power switch trip function (F-95) is available: <ul style="list-style-type: none"> <li>▪ No trip function available: <input type="checkbox"/> -</li> <li>▪ Trip function available: <input type="checkbox"/> I</li> </ul>
9	<b>Voltage knob</b>	Sets the voltage.
10	<b>Current knob</b>	Sets the current.
11	<b>Output key</b>	Press to turn on the output. This key is lit when the output is on.
12	<b>USB port</b>	The USB Type A port. This port can be used to import and export test sequences. It can also be used to update the firmware.

## 720 W front panel (2260B-30-72, -80-27, -250-9, -800-2)

Figure 16: 720 W front panel (2260B-30-72, -80-27, -250-9, -800-2)

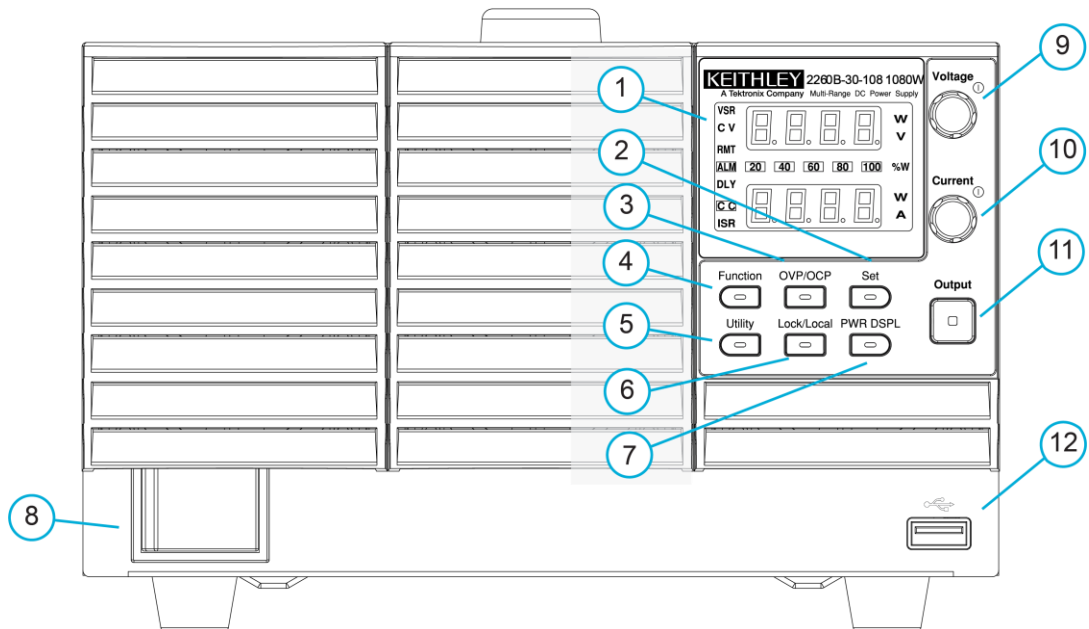




1	<b>Display</b>	The display shows the voltage and current readings and configuration settings. It also includes the following display indicators: <ul style="list-style-type: none"> <li>▪ <b>VSR:</b> Voltage slew rate</li> <li>▪ <b>CV:</b> Constant voltage mode</li> <li>▪ <b>RMT:</b> Remote control mode</li> <li>▪ <b>ALM:</b> Alarm on</li> <li>▪ <b>DLY:</b> Delay output</li> <li>▪ <b>CC:</b> Constant current mode</li> <li>▪ <b>ISR:</b> Current slew rate</li> <li>▪ <b>20 40 60 80 100 % W:</b> Power bar; shows the present power output as a percentage</li> </ul>
---	----------------	--

2	<b>Set key</b>	Sets the current and voltage limits.
3	<b>OVP/OCPL key</b>	Sets the overcurrent protection (OVP) or overvoltage protection (OVP) levels.
4	<b>Function key</b>	Configures the settings of the power supply.
5	<b>Utility key</b>	Runs customized test sequences.
6	<b>Lock/Local key</b>	Locks or unlocks the panel keys. Locking prevents accidental changes to front-panel settings. To unlock the keys, press <b>Lock/Local</b> for three seconds.
7	<b>PWR DSPL key</b>	Toggles the display between viewing V/A, V/W, or A/W. Press the Voltage knob for V/W. Press the Current knob for A/W.
8	<b>POWER switch</b>	Turns the instrument on or off. The type of power switch determines if the power switch trip function (F-95) is available: <ul style="list-style-type: none"> <li>▪ No trip function available: <input type="checkbox"/> -</li> <li>▪ Trip function available: <input type="checkbox"/> I</li> </ul>
9	<b>Voltage knob</b>	Sets the voltage.
10	<b>Current knob</b>	Sets the current.
11	<b>Output key</b>	Press to turn on the output. This key is lit when the output is on.
12	<b>USB port</b>	The USB Type A port. This port can be used to import and export test sequences. It can also be used to update the firmware.

## 1080 W front panel (2260B-30-108, 80-40, 250-13, 800-4)

Figure 17: 1080 W front panel (2260B-30-108, 80-40, 250-13, 800-4)



1	<b>Display</b>	The display shows the voltage and current readings and configuration settings. It also includes the following display indicators: <ul style="list-style-type: none"> <li>▪ <b>VSR:</b> Voltage slew rate</li> <li>▪ <b>CV:</b> Constant voltage mode</li> <li>▪ <b>RMT:</b> Remote control mode</li> <li>▪ <b>ALM:</b> Alarm on</li> <li>▪ <b>DLY:</b> Delay output</li> <li>▪ <b>CC:</b> Constant current mode</li> <li>▪ <b>ISR:</b> Current slew rate</li> <li>▪ <b>20 40 60 80 100 % W:</b> Power bar; shows the present power output as a percentage</li> </ul>
2	<b>Set key</b>	Sets the current and voltage limits.
3	<b>OVP/OCP key</b>	Sets the overcurrent protection (OVP) or overvoltage protection (OVP) levels.
4	<b>Function key</b>	Configures the settings of the power supply.
5	<b>Utility key</b>	Runs customized test sequences.
6	<b>Lock/Local key</b>	Locks or unlocks the panel keys. Locking prevents accidental changes to front-panel settings. To unlock the keys, press <b>Lock/Local</b> for three seconds.
7	<b>PWR DSPL key</b>	Toggles the display between viewing V/A, V/W, or A/W. Press the Voltage knob for V/W. Press the Current knob for A/W.
8	<b>POWER switch</b>	Turns the instrument on or off. The type of power switch determines if the power switch trip function (F-95) is available: <ul style="list-style-type: none"> <li>▪ No trip function available: </li> <li>▪ Trip function available: </li> </ul>
9	<b>Voltage knob</b>	Sets the voltage.
10	<b>Current knob</b>	Sets the current.
11	<b>Output key</b>	Press to turn on the output. This key is lit when the output is on.
12	<b>USB port</b>	The USB Type A port. This port can be used to import and export test sequences. It can also be used to update the firmware.

## Rear panels

The rear panels of the power supplies are shown in the following figures. Descriptions of the options follow the figures.

---

### NOTE

The 250 and 800 volt models use a 9-pin connector and a plug for the output and sense terminal connections. The plug is a MC420-38109Z plug by DECA SwitchLab Inc and is available separately. It contains positive (V+) and negative (V-) output terminals (three of each).

---

### 360 W rear panels

Figure 18: 360 W rear panel for Models 2260B-30-36 and 2260B-80-13

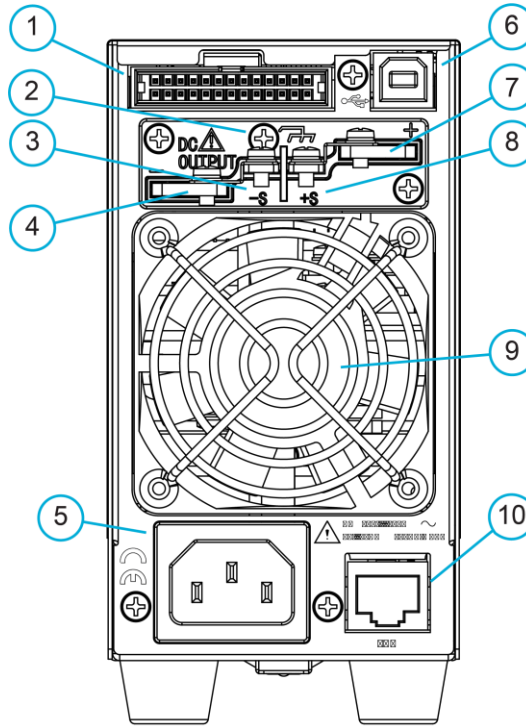
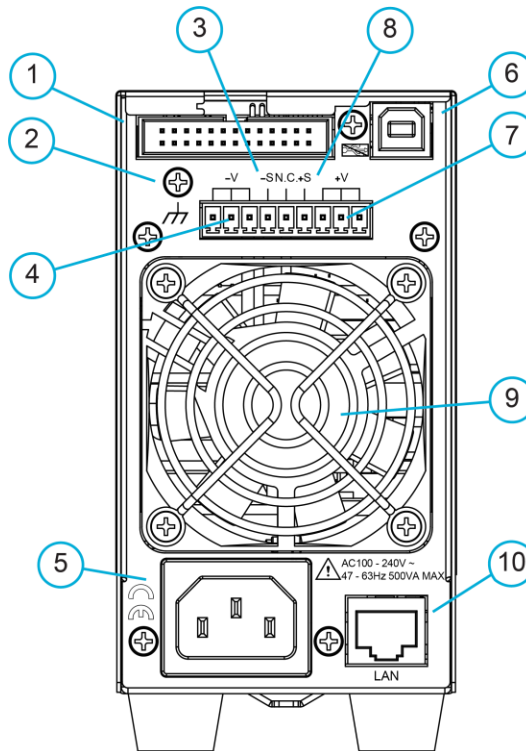




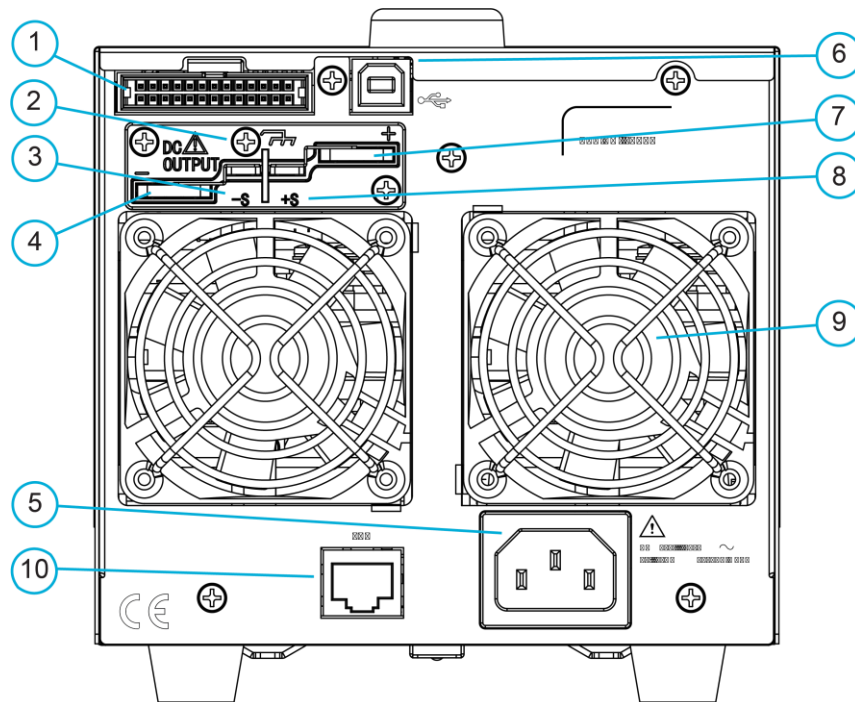
Figure 19: 360 W rear panel for Models 2260B-250-4 and 2260B-800-1



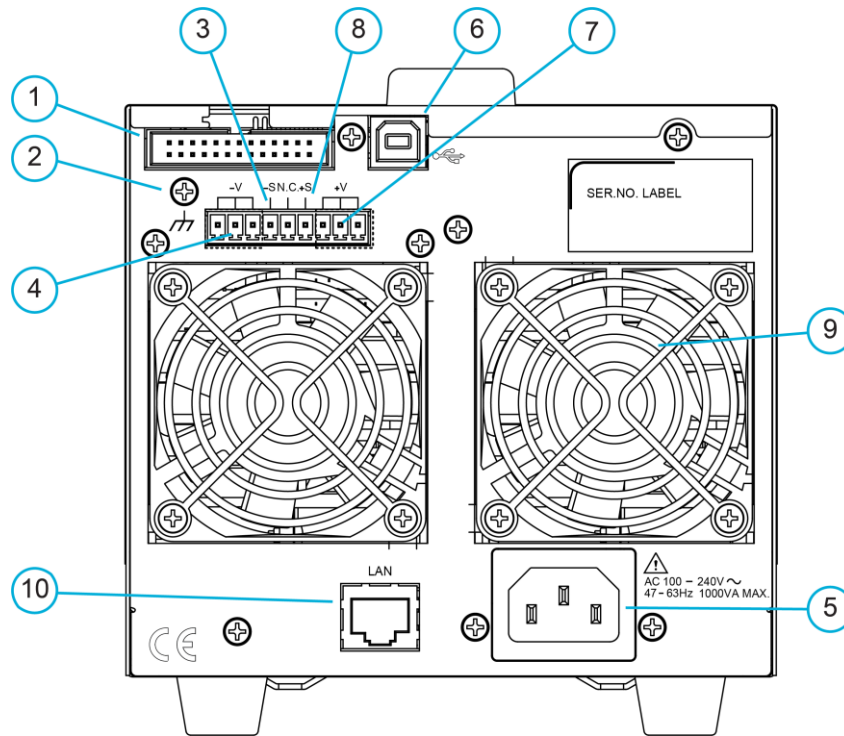
1	<b>Analog control connector</b>	Monitors the current and voltage output and the power supply status (such as OVP, OCP, and OTP). Provides analog control of the current and voltage output. Use an Omron XG5 IDC socket as the mating socket. Standard 26-pin MIL connector (Omron XG4 IDC plug).
2	<b>Chassis ground</b> 	Ground screw for connections to chassis ground. Refer to <a href="#">Grounding</a> (on page 4-7) for detail.
3	<b>Sense - terminal</b>	Negative sense terminal.
4	<b>Output - terminal</b>	Negative output terminal.
5	<b>Line voltage input</b>	<b>Voltage input:</b> 100 V AC to 240 V AC. <b>Line frequency:</b> 50 Hz to 60 Hz. <b>AC input voltage range:</b> 85 V AC to 265 V AC. <b>Frequency:</b> 47 Hz to 63 Hz.
6	<b>USB Type B port</b> 	USB Type B connection for remote control.
7	<b>Output + terminal</b>	Positive output terminal.
8	<b>Sense + terminal</b>	Positive sense terminal.
9	<b>Fan</b>	Temperature-controlled fans.
10	<b>LAN socket</b>	The ethernet port is used for remote control and digital monitoring from a computer. Supports 100BASE-T (100 Mbps).



## 720 W rear panels

Figure 20: 720 W rear panel of Models 2260B-30-72 and 2260B-80-27



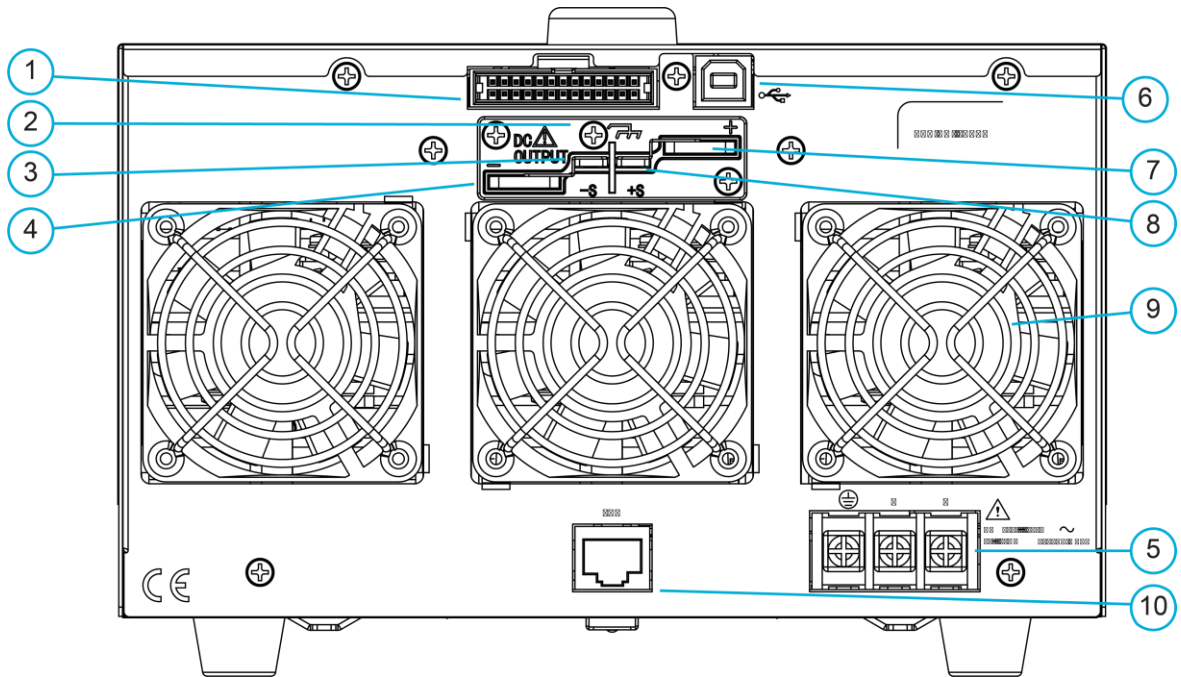
**Figure 21: 720 W rear panel for 2260B-250-9 and 2260B-800-2**



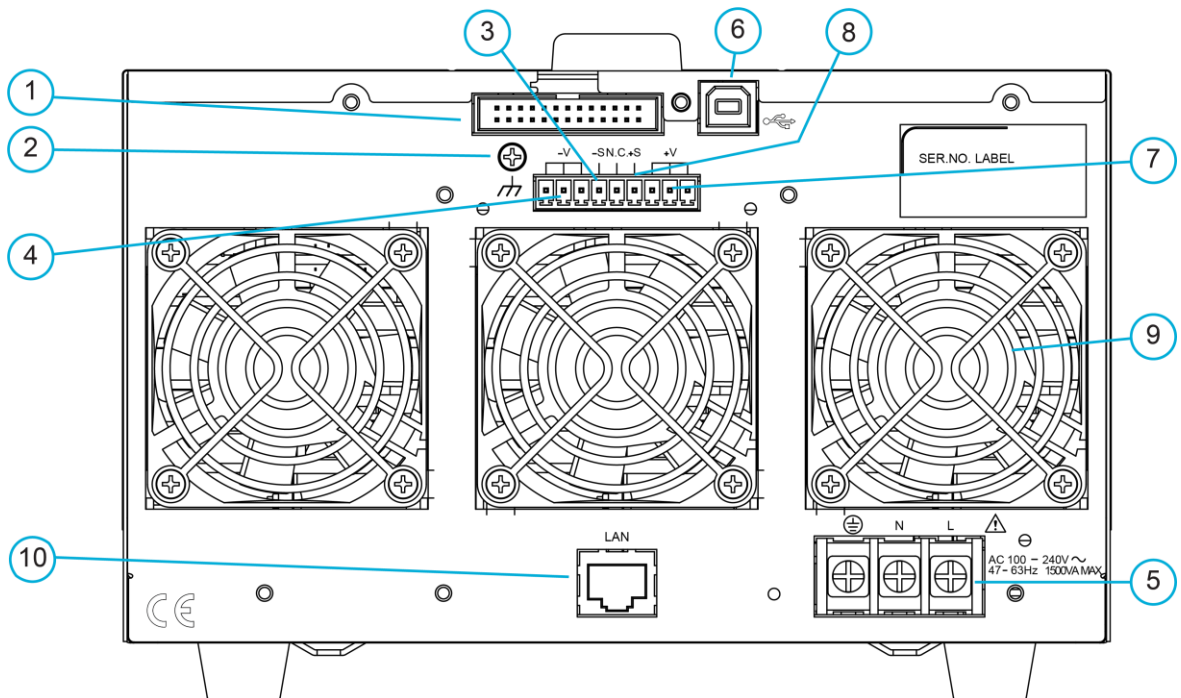
1	<b>Analog control connector</b>	Monitors the current and voltage output and the power supply status (such as OVP, OCP, and OTP). Provides analog control of the current and voltage output. Use an Omron XG5 IDC socket as the mating socket. Standard 26-pin MIL connector (Omron XG4 IDC plug).
2	<b>Chassis ground</b> 	Ground screw for connections to chassis ground. Refer to <a href="#">Grounding</a> (on page 4-7) for detail.
3	<b>Sense - terminal</b>	Negative sense terminal.
4	<b>Output - terminal</b>	Negative output terminal.
5	<b>Line voltage input</b>	<b>Voltage input:</b> 100 V AC to 240 V AC. <b>Line frequency:</b> 50 Hz to 60 Hz. <b>AC input voltage range:</b> 85 V AC to 265 V AC. <b>Frequency:</b> 47 Hz to 63 Hz.
6	<b>USB Type B port</b> 	USB Type B connection for remote control.
7	<b>Output + terminal</b>	Positive output terminal.
8	<b>Sense + terminal</b>	Positive sense terminal.
9	<b>Fan</b>	Temperature-controlled fans.
10	<b>LAN socket</b>	The ethernet port is used for remote control and digital monitoring from a computer. Supports 100BASE-T (100 Mbps).

## 1080 W rear panels



**Figure 22: 1080 W rear panel for Models 2260B-30-108 and 2260B-80-40**



**Figure 23: 1080 W rear panel of Models 2260B-250-13 and 2260B-800-4**





1	<b>Analog control connector</b>	Monitors the current and voltage output and the power supply status (such as OVP, OCP, and OTP). Provides analog control of the current and voltage output. Use an Omron XG5 IDC socket as the mating socket. Standard 26-pin MIL connector (Omron XG4 IDC plug).
2	<b>Chassis ground</b> 	Ground screw for connections to chassis ground. Refer to <a href="#">Grounding</a> (on page 4-7) for detail.
3	<b>Sense - terminal</b>	Negative sense terminal.
4	<b>Output - terminal</b>	Negative output terminal.
5	<b>Line voltage input</b>	<b>Voltage input:</b> 100 V AC to 240 V AC. <b>Line frequency:</b> 50 Hz to 60 Hz. <b>AC input voltage range:</b> 85 V AC to 265 V AC. <b>Frequency:</b> 47 Hz to 63 Hz.
6	<b>USB Type B port</b> 	USB Type B connection for remote control.
7	<b>Output + terminal</b>	Positive output terminal.
8	<b>Sense + terminal</b>	Positive sense terminal.
9	<b>Fan</b>	Temperature-controlled fans.
10	<b>LAN socket</b>	The ethernet port is used for remote control and digital monitoring from a computer. Supports 100BASE-T (100 Mbps).

**In this section:**

Overview .....	4-1
Operating areas .....	4-1
Constant current and constant voltage modes .....	4-4
Slew rate .....	4-5
Bleed resistor control .....	4-5
Operating considerations .....	4-6
Grounding .....	4-7
Connecting output terminals to a load .....	4-9
Setting parameter values .....	4-23
Reset to the factory default settings .....	4-24
Basic operation .....	4-24
Compensating for voltage drop across load cables.....	4-31
Wire shielding and load line impedance.....	4-34
Parallel and series operation.....	4-34
Test sequence.....	4-45
Analog Control connector.....	4-50

**Overview**

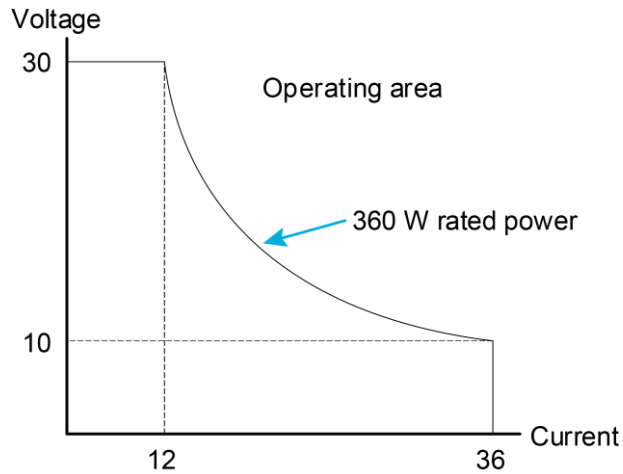
The following topics describe important considerations, basic principles of operation, and protection levels.

**Operating areas**

The 2260B power supplies are regulated DC power supplies with a high voltage and current output. They operate in constant current (CC) or constant voltage (CV) mode in a wide operating range, limited only by the output power.

The operating area of each power supply is determined by the rated output power and the voltage and current rating. For example, the operating area and rated power output for the 2260B-30-36 is shown in the following figure.

**Figure 24: 2260B-30-36 operating area**

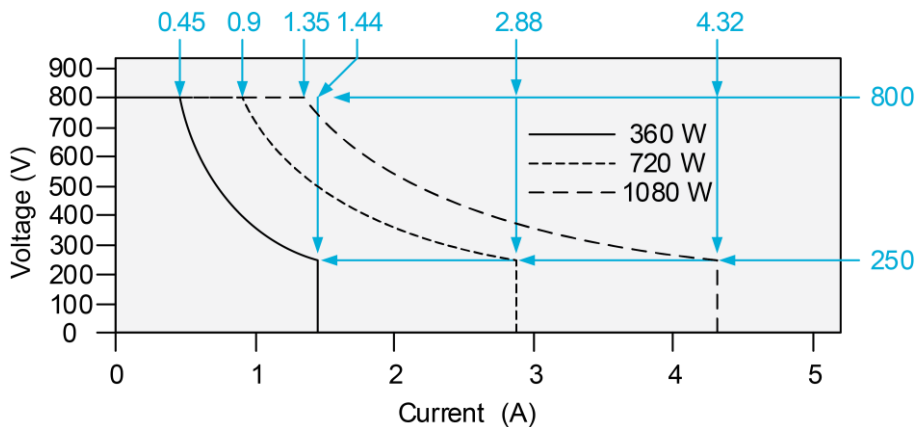


When the power supply is configured so that the total output (current × voltage output) is less than the rated power output, the power supply functions as a constant current, constant voltage power supply.

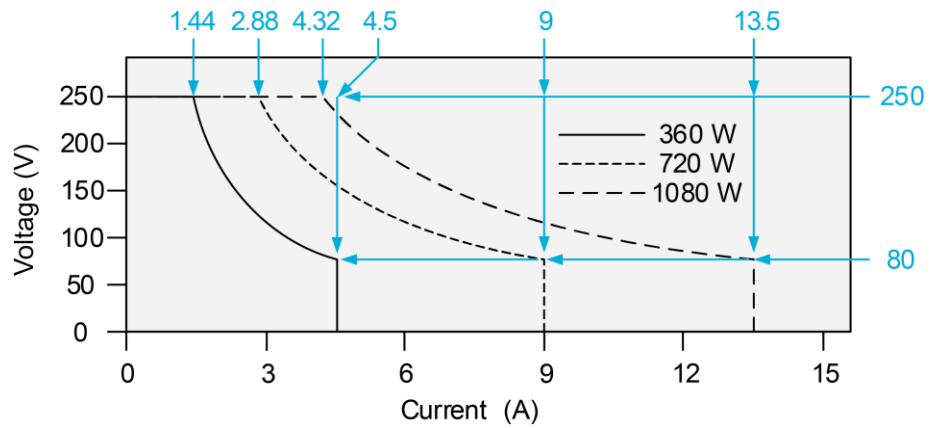
If the power supply is configured so that the total output (current × voltage output) exceeds the rated power output, the effective output is limited to the power limit of the power supply. In this case, the output current and voltage depend on the load value.

The following figures show comparisons of the operating areas of each power supply.

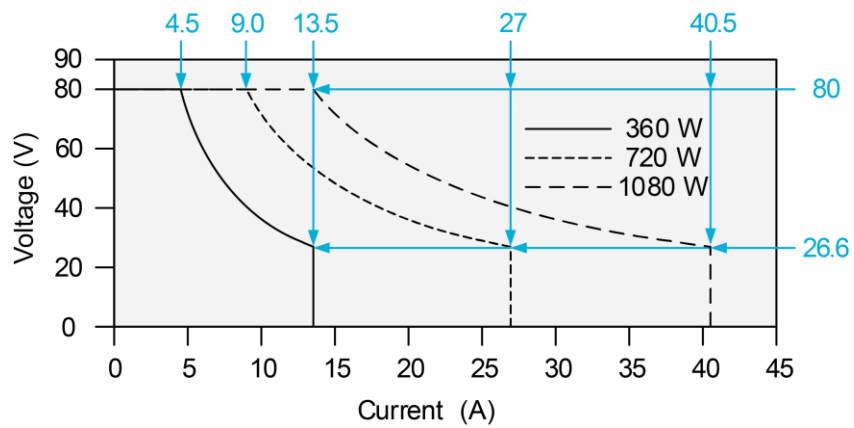
**Figure 25: 2260B 800 V power supply operating area**



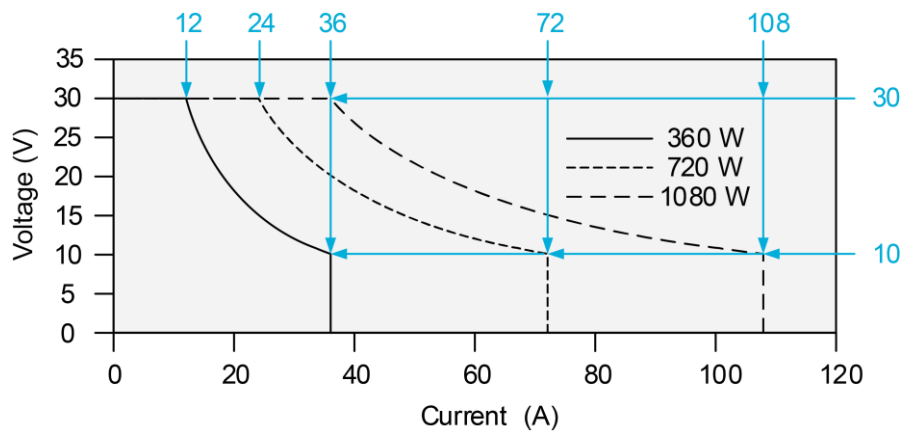
**Figure 26: 2260B 250 V power supply operating area**



**Figure 27: 2260B 80 V power supply operating area**



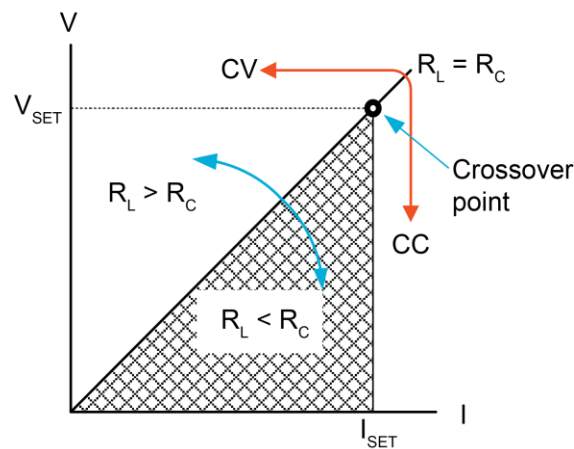
**Figure 28: 2260B 30 V power supply operating area**



## Constant current and constant voltage modes

When the power supply is operating in constant current (CC) mode, a constant current is supplied to the load. In CC mode, the voltage output can vary, but the current remains constant. When the load resistance increases to the point where the set current ( $I_{SET}$ ) can no longer be sustained, the power supply switches to constant voltage (CV) mode. The point where the power supply switches modes is the crossover point, shown in the following figure.

**Figure 29: CC and CV modes crossover**



When the power supply is operating in CV mode, a constant voltage is supplied to the load. In CV mode, the current varies as the load varies. At the point where the load resistance is too low to maintain a constant voltage, the power supply switches to CC mode and maintains the set current limit.

Whether the power supply operates in CC or CV mode depends on the set current ( $I_{SET}$ ), the set voltage ( $V_{SET}$ ), the load resistance ( $R_L$ ), and the critical resistance ( $R_C$ ). The  $R_C$  is determined by  $V_{SET}/I_{SET}$ .

When  $R_L$  is greater than  $R_C$ , the power supply operates in CV mode. This means that the voltage output is equal to the  $V_{SET}$  voltage but the current is less than  $I_{SET}$ . If the load resistance is reduced so that the current output reaches the  $I_{SET}$  level, the power supply switches to CC mode.

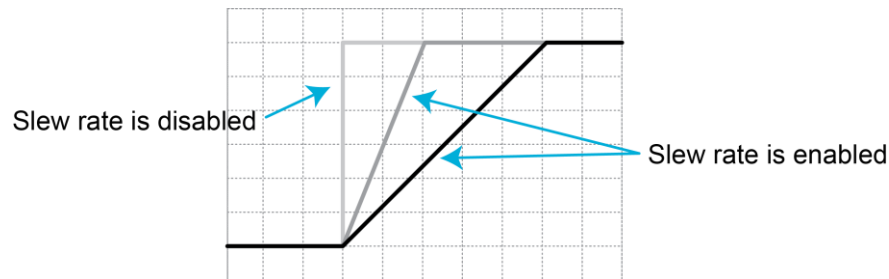
Conversely, when  $R_L$  is less than  $R_C$ , the power supply operates in CC mode. In CC mode, the current output is equal to  $I_{SET}$  and the voltage output is less than  $V_{SET}$ .

## Slew rate

The 2260B has selectable slew rates for the CC and CV modes. This allows the 2260B power supply to limit the current and voltage draw of the power supply. You can select one of the following slew rates:

- **High Speed Priority:** Use the fastest slew rate for the instrument.
- **Slew Rate Priority:** Set a slew rate for CC or CV mode. The rising and falling slew rates can be set independently.

**Figure 30: Slew rate comparison**

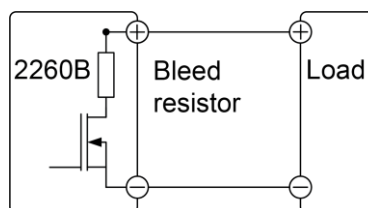


To set the slew rate, refer to [Slew rate settings](#) (on page 5-2).

## Bleed resistor control

The 2260B DC power supplies have a bleed resistor in parallel with the output terminals, as shown in the following figure.

**Figure 31: Bleed resistor**



Bleed resistors dissipate the power from the power supply filter capacitors when power is turned off and the load is disconnected. Without a bleed resistor, power may remain charged on the filter capacitors for some time and be hazardous.

The bleed resistor also acts as a minimum voltage load, which allows for smoother voltage regulation of the power supply.

You can turn the bleed resistance on or off using configuration setting F-09. Refer to [Bleed resistor control settings](#) (on page 5-4) for more information.

---

## CAUTION

By default, the bleed resistance is on. For battery charging applications, be sure to turn the bleed resistance off. The bleed resistor can discharge the connected battery when the power supply is off.

---

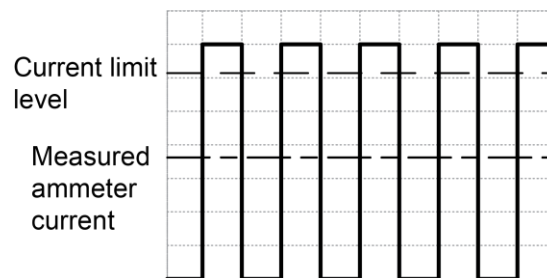
## Operating considerations

Take the following situations into consideration when using the power supply.

### Current peak and pulsed loads

When the load has current peaks or is pulsed, it is possible for the maximum current to exceed the mean current value. The 2260B power supply ammeter only indicates mean current values, so for pulsed current loads, the actual current can exceed the indicated value. For pulsed loads, the current limit must be increased or a power supply with a greater capacity must be used. As shown in the following figure, a pulsed load may exceed the current limit and the indicated current on the power supply ammeter.

**Figure 32: Pulsed or peaked loads**



### Reverse current and a regenerative load

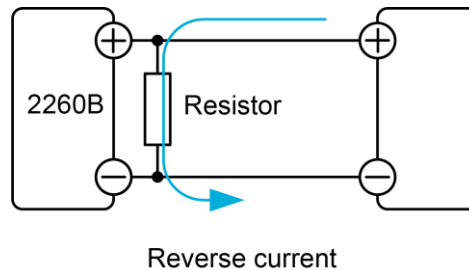
When the power supply is connected to a regenerative load, such as a transformer or inverter, reverse current feeds into the power supply. If the bleed resistor is off, the 2260B power supply cannot absorb the reverse current. For loads that create reverse current, connect a resistor in parallel to the power supply to bypass the reverse current, as shown in the following figure.

---

## NOTE

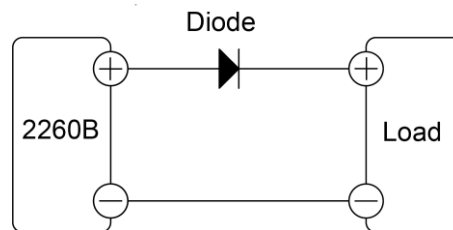
The current output decreases by the amount of current absorbed by the resistor. Ensure that the resistor can withstand the power capacity of the power supply or load.

---

**Figure 33: Reverse current: Regenerative load**

## Reverse current and accumulative energy

When the power supply is connected to a load such as a battery, reverse current may flow to the power supply. To prevent damage to the power supply, use a reverse-current protection diode in series between the power supply and load, as shown in the following figure.

**Figure 34: Reverse current: Accumulative energy**

### CAUTION

Ensure that the reverse-withstand voltage of the diode can withstand 2 times the rated output voltage of the power supply. Ensure that the forward-current capacity can withstand 3 to 10 times the rated output current of the power supply. Ensure that the diode can withstand the heat generated in your test setup.

When a diode is used to limit reverse voltage, remote sensing cannot be used.

## Grounding

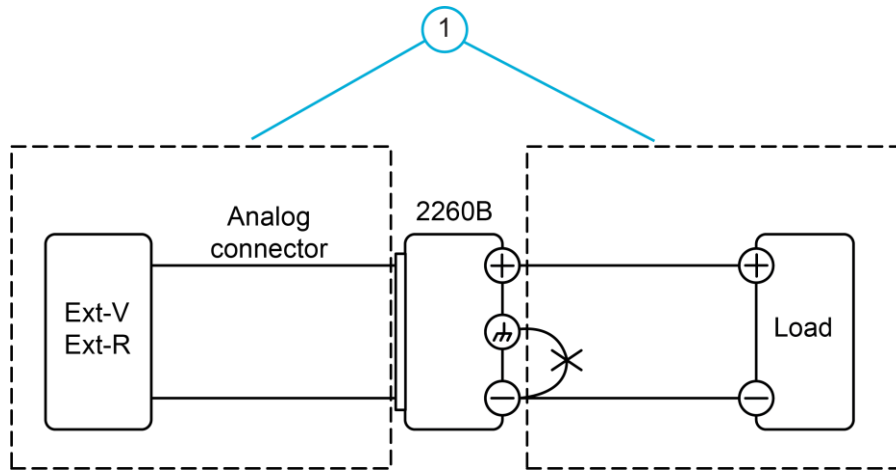
The output terminals of the 2260B power supplies are isolated with respect to the protective grounding terminal. The insulation capacity of the load, the load cables, and other connected devices must be taken into consideration when connected to the protective ground or when floating.



## Floating

The output terminals are floating. Therefore, the load and all load cables must have an insulation capacity that is greater than the isolation voltage of the power supply. The insulation capacity of the components in (1) in the following figure must be greater than or equal to the isolation voltage of the power supply.

**Figure 35: 2260B floating**



### **⚠ WARNING**

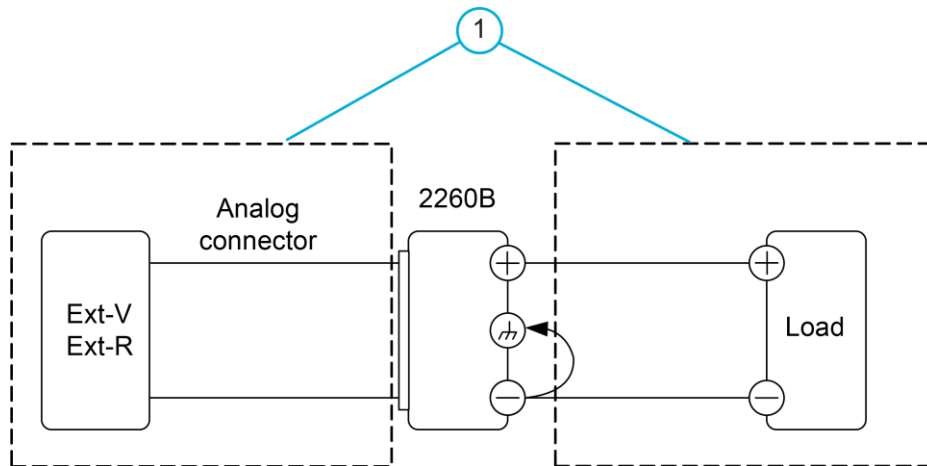
The insulation capacity of the load and load cables must be greater than the isolation voltage of the power supply. Failure to properly insulate the load and load cables can result in injury or death from electrical shock.

## Grounded output terminal

If the positive or negative terminal is connected to the chassis ground terminal, the insulation capacity needed for the load and load cables is greatly reduced. The insulation capacity of the components in (1) in the following figure needs to be greater than the maximum output voltage of the power supply with respect to ground.

### **CAUTION**

If your application is using external voltage control, do not ground the external voltage terminal. Grounding the external voltage terminal in this configuration can create a short circuit.

**Figure 36: Grounded output terminal**

## Connecting output terminals to a load

Before connecting the output terminals to the load, consider whether remote sense will be used, the gauge of the cable wiring, and the withstand voltage of the cables and load.

---

### **⚠ WARNING**

**Hazardous voltages may be present on the output terminals. To prevent electrical shock that could cause injury or death, never make or break connections to the power supply while it is on. Power off the equipment from the front panel or disconnect the main power cord from the rear of the 2260B before handling cables connected to the outputs.**

---

## Wire gauge considerations

Before connecting the output terminals to a load, make sure the current capacity of the load cables is adequate. The rating of the cables must equal or exceed the maximum current-rated output of the instrument.

The recommended wire gauges are shown in the following table

**Recommended wire gauges**

Wire gauge	Nominal cross section	Maximum current
20	0.5	9
18	0.75	11
18	1	13
16	1.5	18
14	2.5	24
12	4	34
10	6	45
8	10	64
6	16	88
4	25	120
2	32	145
1	50	190
0	70	240
0	95	290
0	120	340

The maximum temperature rise allowed is 60 °C above the ambient temperature. The ambient temperature must be less than 30 °C.

**Connecting 2260B-30 and -80 output terminals to load**

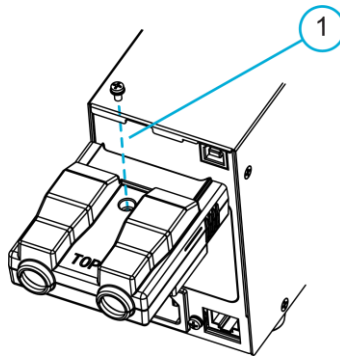
You can connect the output terminals to load cables using M4 screws or M8 bolts.

**Remove the output terminal cover from the 2260B-30 and 2260B-80**

*To remove the output terminal cover:*

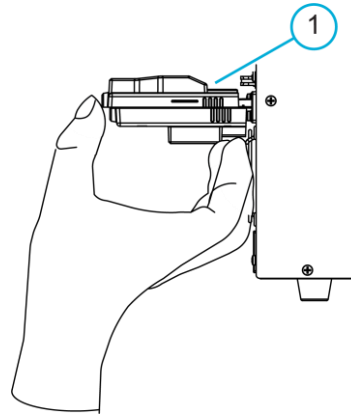
1. Turn the power switch off.
2. Remove the screw (1) holding the top terminal cover to the bottom cover, as shown in the following figure.

**Figure 37: Screw that holds top cover to bottom cover**



3. Use your thumb to slide the terminal covers (1) out, as shown in the following figure.

**Figure 38: Slide terminal covers**



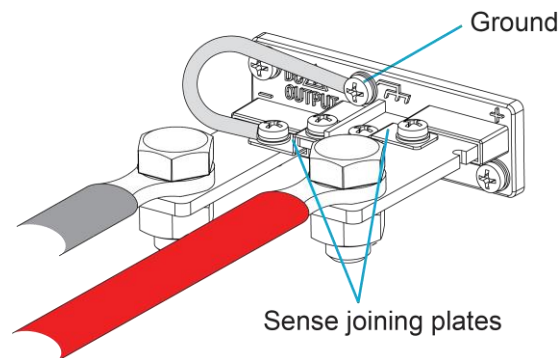
4. Remove the top terminal cover from the bottom cover.

## Connect the output terminals to the load

### *To connect the output terminals to the load:*

1. Turn the power switch off.
2. If necessary, screw the chassis ground terminal to either the positive or negative terminal, as shown in the following figure. Refer to [Grounding](#) (on page 4-7) for details.

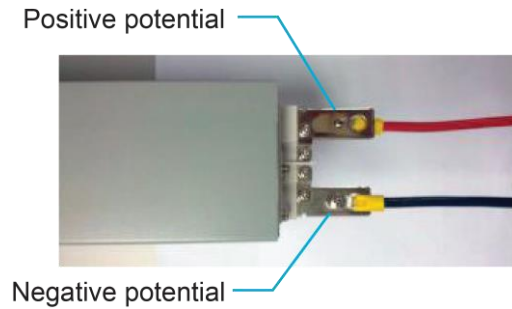
**Figure 39: Screw chassis ground to positive or negative terminal**



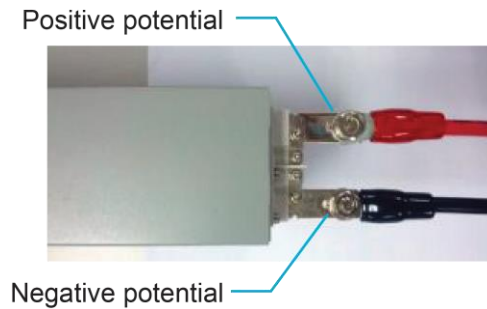
3. Choose a suitable wire gauge for the load cables. Refer to [Wire gauge considerations](#) (on page 4-9) for information.
4. Choose a suitable crimp for the terminals.
5. If you are using remote sense, remove the sense terminal joining plates and connect sensing wires to the loads. Refer to [Compensating for voltage drop across load cables](#) (on page 4-31) for details.

6. Connect the positive load cable to the positive output terminal and the negative cable to the negative output terminal, as shown in the following figures.

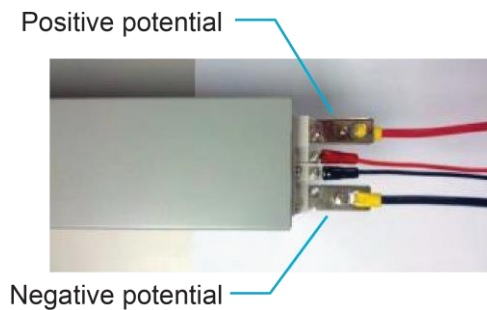
**Figure 40: Local sense output terminal wiring using M4 screws**



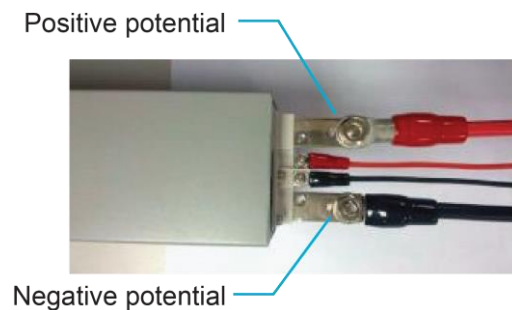
**Figure 41: Local sense output terminal wiring using M8 bolts**



**Figure 42: Remote sense output terminal wiring using M4 screws**



**Figure 43: Remote sense output terminal wiring using M8 bolts**



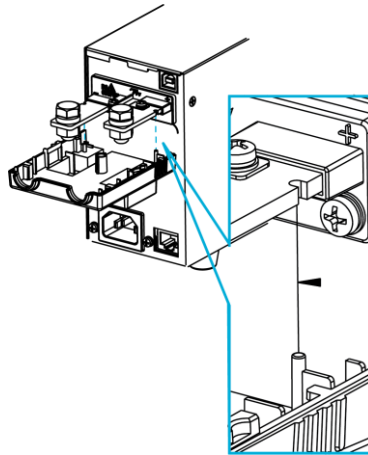
7. Reattach the output terminal cover. Refer to [Install the output terminal cover for the 2260B-30 and -80](#) (on page 4-13).

## Install the output terminal cover for the 2260B-30 and -80

*To install the output terminal cover:*

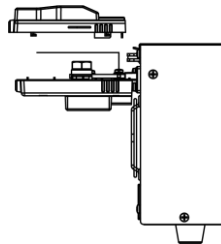
1. Line up the bottom cover with the notches in the output terminals, shown in the following figure.

**Figure 44: Line up the bottom cover with the notches**



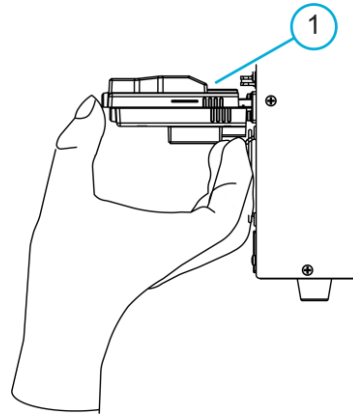
2. Place the top terminal cover over the bottom cover, as shown in the following figure.

**Figure 45: Place the top terminal cover over the bottom cover**



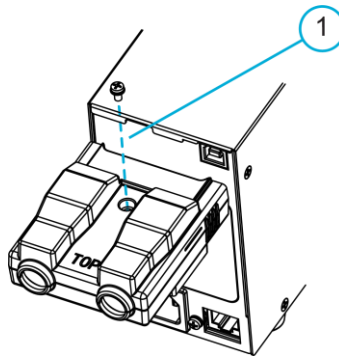
3. Use your thumb to slide the terminal covers (1) shut, as shown in the following figure.

**Figure 46: Slide terminal covers**



4. When the top and bottom covers are flush, insert the screw to hold the top cover to the bottom cover.

**Figure 47: Insert screw to attach top and bottom covers**



## Connecting 2260B-250 and -800 output terminals to load

The high-voltage models (2260B-250 and 2260B-800 models) use a 9-pin socket for the output voltage and sense connections. The corresponding plugs should be used to connect the terminals to the appropriate cable.

---

### **⚠ WARNING**

To prevent electric shock and possible equipment damage, note the wire gauge used and the capacity of the plug and socket. You may need to wire the load to a number of terminals to offset the capacity over a number of terminals.

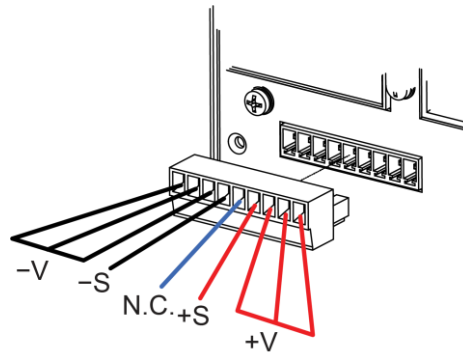
---

Make sure the wires that are used follow these guidelines:

- **Wire gauge:** AWG 26 to AWG 16
- **Strip length:** 7 mm (0.28 in.) minimum
- **Current rating:** 10 A
- **Insulation resistance:** AC 2000 V minimum
- **Insulation withstand voltage:** >2000 M $\Omega$  DC 500 V
- **Operation temperature:** -40°C to +105°C

Output connector pinouts are described in the following figure and table.

**Figure 48: Output connector pinouts for 2260B-250 and 2600B-800**



Pin	Pin description
-V	Three -V terminals
-S	-Sense terminal
N.C.	Not connected
+S	+Sense terminal
+V	Three +V terminals

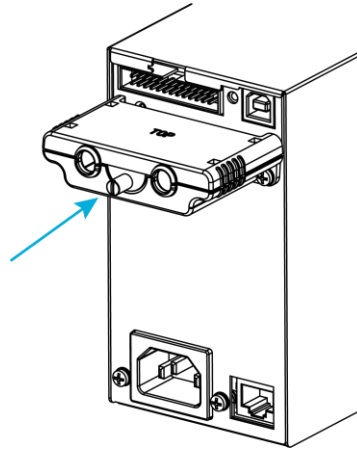


## Remove the output terminal cover from the 2260B-250 or 2260B-800

*To remove the output terminal cover:*

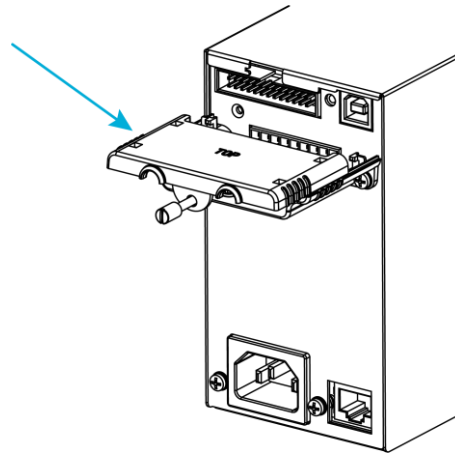
1. Turn the power switch off.
2. Remove the screw from the output terminal cover, as shown in the following figure.

**Figure 49: Screw on 2260B-250 and 2260B-800 output terminal cover**



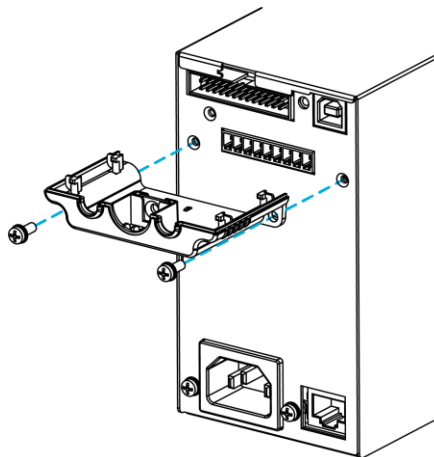
3. Slide the top cover from the bottom cover, as shown in the following figure.

**Figure 50: Top cover of the 2260B-250 or 2260B-800 output terminal cover**



4. Unscrew the bottom cover and remove it from the rear panel, as shown in the following figure.

**Figure 51: Bottom cover screws**

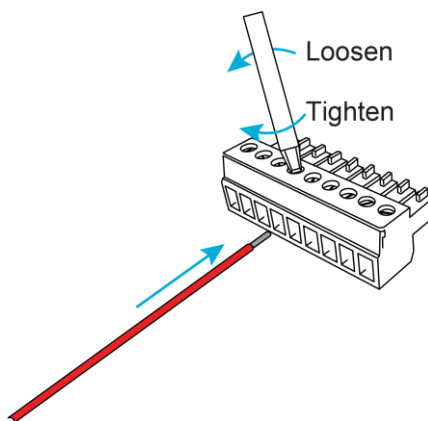


## Making connections to the output terminals

### *To make connections to an output terminal:*

1. Unscrew the appropriate terminal counterclockwise to release the receptacle.
2. Insert a wire that has had at least 7 mm stripped from the insulation.
3. Tighten the receptacle by screwing clockwise, as shown in the following figure.

**Figure 52: Wiring the connector plug**

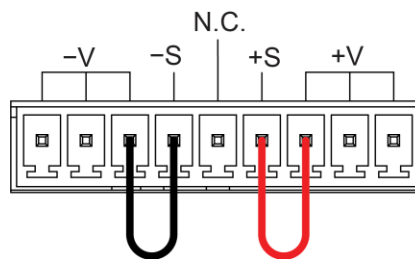


## Connect the output terminals to the load in a local sense application

### To connect the output terminals:

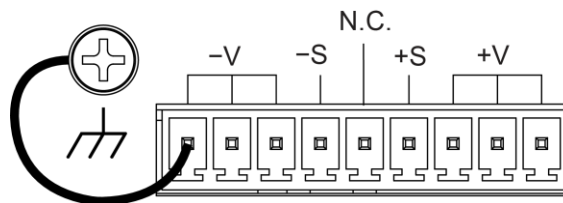
1. Choose a suitable wire gauge for the load cables. Refer to [Wire gauge considerations](#) (on page 4-9).
2. Strip at least 7 mm from one end of each load cable.
3. Connect the  $-S$  pin to a  $-V$  pin and connect the  $+S$  pin to a  $+V$  pin, as shown in the following figure.

**Figure 53: 2260B-250 and -800 local sense connections**



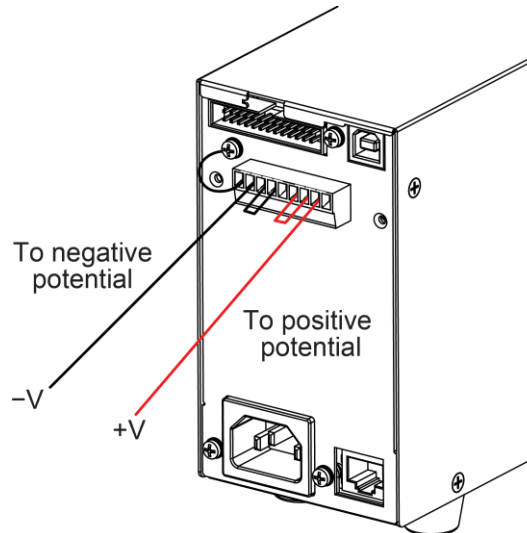
4. If necessary, connect the chassis ground terminal to either the  $-V$  or  $+V$  pin.

**Figure 54: Connect chassis ground for the 2260B-250 or 2260B-800**



5. Connect the negative load cable to one of the  $-V$  pins and the positive load cable to one of the  $+V$  pins, as shown in the following figure.

**Figure 55: 2260B-250 and -800 local sense load connections**



6. Make connections to the load.
7. Reattach the output terminal cover. Refer to [Install the output terminal cover to the 2260B-250 and 2260B-800](#) (on page 4-21).

## Connect the output terminals to the load in a remote sense application

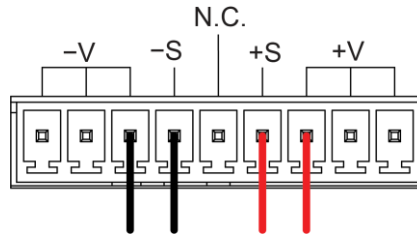
### NOTE

These connections are for a single load configuration. For more detail and other remote sense configurations, refer to [Remote sense](#) (on page 4-31).

#### ***To connect the output terminals in a remote sense application:***

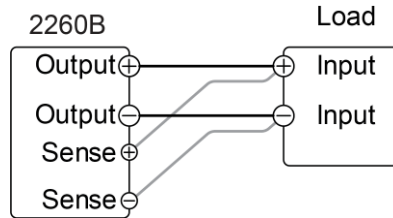
1. Choose a suitable wire gauge for the load cables. Refer to [Wire gauge considerations](#) (on page 4-9).
2. Strip at least 7 mm from one end of each load cable.
3. Connect the sense cables to the  $-S$  and  $+S$  pins, as shown in the following figure.
4. Connect the negative load cable to one of the  $-V$  pins and the positive load cable to one of the  $+V$  pins, as shown in the following figure.

**Figure 56: 2260B-250 and -800 remote sense connections**

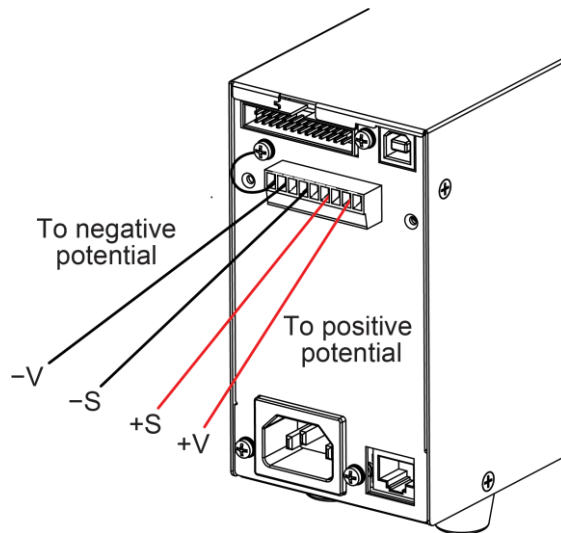


- 5. Connect the -S terminal to the negative potential of the load and the S+ terminal to the positive potential of the load, as shown in the following figures.

**Figure 57: 2260B-250 and -800 remote sense load connections**

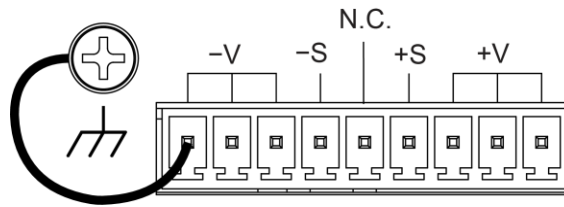


**Figure 58: 2260B-250 and -800 remote sense load connections**



6. If necessary, connect the chassis ground terminal to either the  $-V$  or  $+V$  pin.

**Figure 59: Connect chassis ground for the 2260B-250 or 2260B-800**



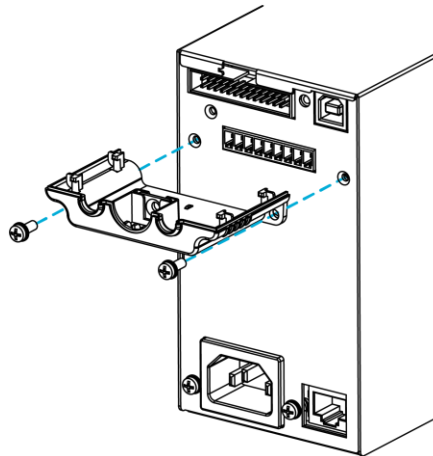
7. Reattach the output terminal cover. Refer to [Install the output terminal cover for the 2260B-250 and 2260B-800](#) (on page 4-21).

## Install the output terminal cover to the 2260B-250 and 2260B-800

*To install the output terminal cover:*

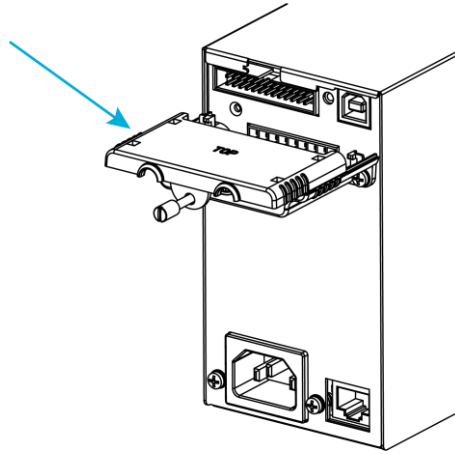
1. Screw the bottom cover onto the rear panel using the two M4 screws, as shown in the following figure.

**Figure 60: Bottom cover screws**



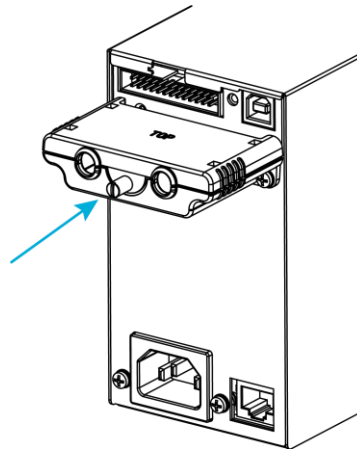
- Slide the top cover over the bottom cover, as shown in the following figure.

**Figure 61: Top cover of the 2260B-250 or 2260B-800 output terminal cover**



- Secure the top cover with the screw in the center of the top cover, as shown in the following figure.

**Figure 62: Screw on 2260B-250 and 2260B-800 output terminal cover**



## Setting parameter values

To set parameter values, use the Voltage and Current knobs on the front panel. You can edit parameter values at 0.01, 0.1, or 1 unit steps.

The following steps set the value to 10.05 V as an example.

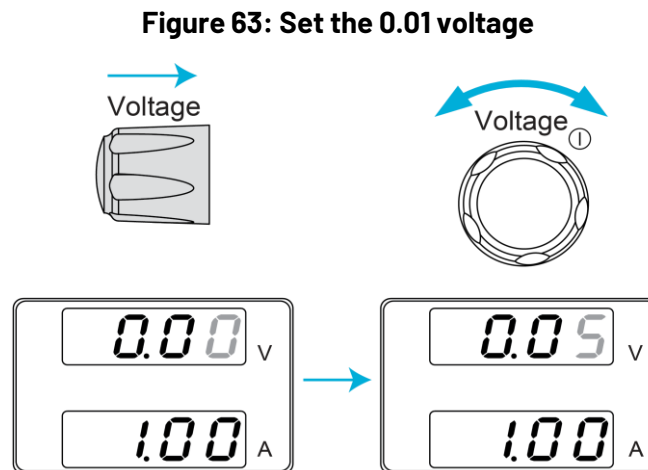
### NOTE

The **Set** key is illuminated when you are setting the current or voltage.

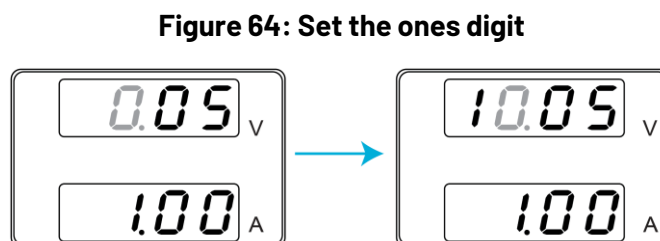
If the Voltage or Current knobs are unresponsive, press the **Set** key.

*To set the value to 10.05:*

1. Press the **Voltage** knob until the last digit is highlighted, as shown in the following figure. This allows the voltage to be edited in 0.01 voltage steps.



2. Turn the **Voltage** knob until 0.05 volts is shown.
3. Press the **Voltage** knob until the ones digit is highlighted, as shown in the following figure.
4. Turn the **Voltage** knob until the voltage value is 10.05.





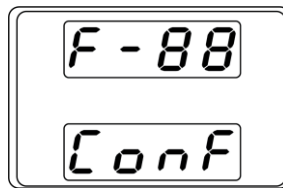
## Reset to the factory default settings

The F-88 configuration setting resets the 2260B to the factory default settings. For a list of the default settings, refer to [2260B default settings](#) (on page 5-11).

**To reset the factory default settings:**

1. Press the **Function** key. The Function key lights. The display shows **F-01** on the top and the configuration setting for F-01 on the bottom.
2. Rotate the Voltage knob to change the F setting to **F-88**.
3. Rotate the Current knob to change the setting on the bottom to **1** (return to factory settings).
4. Press the Voltage knob to confirm. **ConF** is displayed, as shown in the following figure.

**Figure 65: Return to factory settings on display**



5. Press the **Function** key again to exit. The Function key light turns off.

## Basic operation

The following topics describe the basic operations required to operate the power supply.


### Setting protection mode levels


The 2260B provides the following protection modes:

- **Overvoltage protection (OVP):** Prevents a high voltage from damaging the load.
- **Overcurrent protection (OCP):** Prevents high current from damaging the load.
- **Overtemperature protection (OTP):** Protects the instrument from overheating.
- **Power Switch Trip:** When enabled, automatically shuts down the power supply when OVP, OCP, or OTP is tripped. If the trip function is not available, the instrument shuts off the output.

## NOTE

Power Switch Trip is not available on all models. Check the power switch for availability.

If the power switch looks like this, the trip function is available: 

If the power switch looks like this, the trip function is not available: 

When one of the protection measures is active, **ALM** is shown on the left of the display.

Alarms are output through the analog control connector. The alarm output is an isolated open-collector photocoupler output.

The ranges for the OVP and OCP protection levels are provided in the following table.

### Protection level ranges (default is maximum)

<b>2260B (360 W)</b>	<b>30-36</b>	<b>80-13</b>	<b>250-4</b>	<b>800-1</b>
OVP range (V)	3 to 33	8 to 88	20 to 275	20 to 880
OCP range (A)	3.6 to 39.6	1.35 to 14.85	0.45 to 4.95	0.144 to 1.584
<b>2260B (720 W)</b>	<b>30-72</b>	<b>80-27</b>	<b>250-9</b>	<b>800-2</b>
OVP range (V)	3 to 33	8 to 88	20 to 275	20 to 880
OCP range (A)	5 to 79.2	2.7 to 29.7	0.9 to 9.9	0.288 to 3.168
<b>2260B (1080 W)</b>	<b>30-108</b>	<b>80-40</b>	<b>250-13</b>	<b>800-4</b>
OVP range (V)	3 to 33	8 to 88	20 to 275	20 to 880
OCP range (A)	5 to 118.8	4.05 to 44.55	1.35 to 14.85	0.432 to 4.752

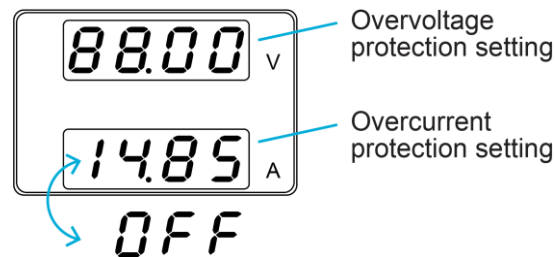
For most models, the overvoltage protection (OVP) level can be set to approximately 0% to 110% of the rated output voltage.

The overcurrent protection (OCP) level for most models can be set to approximately 10% to 110% of the rated output current. The OCP level can be turned off.

The OVP and OCP levels are set to the maximum by default.

**To set the OVP and OCP levels:**

1. Ensure that the load is not connected.
2. Ensure that the output is set to off.
3. Press the **OVP/OCP** key. The OVP/OCP key lights and the OVP setting is displayed on the top and the OCP setting (or OFF) is displayed on the bottom, as shown in the following figure.

**Figure 66: Set OVP and OCP levels**

4. Use the Voltage knob to set the **OVP** level.
5. Use the Current knob to set the **OCP** level. To set OCP off, turn the knob to the top of the range and select **OFF**.
6. Press the **OVP/OCP** key to exit. The OVP/OCP indicator turns off.

**To clear OVP or OCP protection:**

If the power switch trip setting is disabled or your instrument does not have a power switch trip setting, you can clear the OVP or OCP trip by holding the **OVP/OCP** key for two seconds.

**Set a current limit for operating in CV Mode**

When the power supply is set to operate in constant voltage (CV) mode, you must set a current limit to determine the crossover point. For the CC and CV modes, you also set a slew rate.

**NOTE**

For details about CV operation, refer to [Constant current and constant voltage modes](#) (on page 4-4). For details about slew rates, refer to [Slew rate](#) (on page 4-5).

**To set the power supply to operate in CV mode:**

1. Turn the output off.
2. Connect the load.
3. Press the **Function** key. The Function key lights up and the display should show F-01 on the top and the configuration setting for F-01 on the bottom.
4. Turn the Voltage knob to select **F-03** (V-I Mode Slew Rate Select).
5. Turn the Current knob to select the slew rate:
  - **CV High Speed Priority:** 0
  - **CV Slew Rate Priority:** 2
6. Press the **Voltage** knob to save the setting. **ConF** is displayed when the save is successful.
7. If CV Slew Rate Priority was selected, set **F-04** (Rising Voltage Slew Rate) and **F-05** (Falling Voltage Slew Rate). Ranges for the slew rates are provided in the following table.

Slew rate (volts per second)	Model
0.01 to 60.00	2260B-30-xx
0.1 to 160.0	2260B-80-xx
0.1 to 500.0	2260B-250-xx
1 to 1600	2260B-800-xx

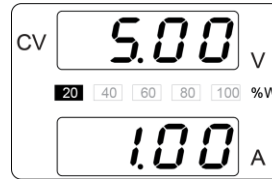
8. Press the **Voltage** knob to save the settings.
9. Press the **Function** key to exit the configuration settings. The Function key light turns off.
10. Turn the **Current** knob to set the current limit (crossover point).
11. Push in the **Current** knob to highlight a digit. Turn the knob to the digit to adjust. Rotate the knob to the current setting.
12. Turn the **Voltage** knob to set the voltage.
13. Push in the **Voltage** knob to highlight a digit. Turn the knob to the digit to adjust. Rotate the knob to the voltage setting.

**NOTE**

The Set key is illuminated when you set the current or voltage. If the Voltage or Current knobs are unresponsive, press the **Set** key.

14. Press the **Output** key. The CV and power bar are illuminated, as shown in the following figure. The Output key is also illuminated.

**Figure 67: Display when CV mode is set and Output is on**



## NOTE

You can only change the voltage level when the output is on. To change the current level, you must press the **Set** key.

## Set a voltage limit for operating in CC mode

When the power supply is set to operate in constant current (CC) mode, you must set a voltage limit to determine the crossover point. For the CC and CV modes, you also set a slew rate.

## NOTE

For details about CC operation, refer to [Constant current and constant voltage modes](#) (on page 4-4). For details about slew rates, refer to [Slew rate](#) (on page 4-5).

### ***To set the power supply to operate in CC mode:***

1. Turn the output off.
2. Connect the load.
3. Press the **Function** key. The Function key lights up and the display should show **F-01** on the top and the configuration setting for F-01 on the bottom.
4. Turn the Voltage knob to select **F-03** (V-I Mode Slew Rate Select).
5. Turn the Current knob to select the slew rate:
  - CC High Speed Priority: **1**
  - CC Slew Rate Priority: **3**
6. Press the **Voltage** knob to save the setting. **ConF** is displayed when the save is successful.
7. If CC Slew Rate Priority was selected, set **F-06** (Rising Current Slew Rate) and **F-07** (Falling Current Slew Rate). Ranges for the slew rates are provided in the following table.

Slew rate (A per second)	Model
0.01 to 72.00	2260B-30-36
0.1 to 144.0	2260B-30-72
0.1 to 216.0	2260B-30-108
0.01 to 27.00	2260B-80-13 2260B-250-13
0.01 to 54.00	2260B-80-27
0.01 to 81.00	2260B-80-40
0.001 to 9.000	2260B-250-4
0.01 to 18.00	2260B-250-9
0.001 to 2.880	2260B-800-1
0.001 to 5.760	2260B-800-2
0.001 to 8.640	2260B-800-4

8. Save the settings.
9. Press the **Function** key to exit the configuration settings. The Function key light turns off.
10. Turn the **Voltage** knob to set the voltage limit (crossover point).
11. Push the **Voltage** knob to highlight a digit. Turn the knob to the digit to adjust. Rotate the knob to the voltage setting.
12. Turn the **Current** knob to set the current. Push in the knob to highlight a digit. Turn the knob to the digit to adjust. Rotate the knob to the current setting.

## NOTE

The Set key is illuminated when you set the current or voltage. If the Voltage or Current knobs are unresponsive, press the **Set** key.

13. Press the **Output** key. The CC and power bar are illuminated, as shown in the following figure. The Output key is also illuminated.

**Figure 68: Display when CC mode is set and Output is on**



## NOTE

You can only change the current level when the output is on. To change the voltage level, you must press the **Set** key.

## Display modes

The 2260B power supplies allow you to view the output as:

- Voltage and current
- Voltage and power
- Current and power

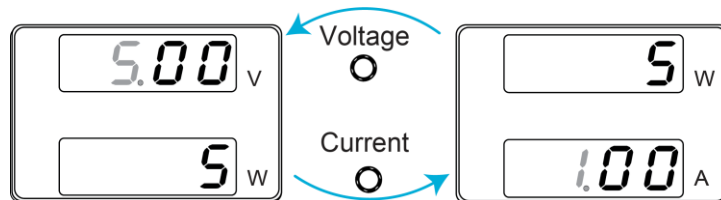
When V and W are displayed, you can use the Voltage knob to change the voltage level.

When A and W are displayed, you can use the Current knob to change the current level.

### To change the view of the output:

1. Press the **PWR DSPL** key. The key lights and the display changes to voltage and power (V and W).
2. To switch between displaying A and W and V and W, press the Voltage or Current knob. For example, if A and W are displayed, press the Voltage knob to display V and W, as shown in the following figure.

**Figure 69: Display modes**



3. To return to the normal display, press the **PWR DSPL** key. The PWR DSPL key is unlit.

## Reading the display

Some characters are truncated to fit the display format. Refer to the following figure for a key to the display characters.

**Figure 70: Display character chart**

0	1	2	3	4	5	6	7	8	9	A	B	C	D
0	1	2	3	4	5	6	7	8	9	A	b	C	d
E	F	G	H	I	J	K	L	M	N	O	P	Q	R
E	F	G	H	I	J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	(	)	+	-	,	
S	T	U	V	W	X	Y	Z	(	)	+	-	,	

## Front-panel lock

The front-panel lock prevents settings from being changed accidentally. When activated, the Lock/Local key is illuminated and all keys and knobs except the Lock/Local key and Output key are disabled.

If the instrument is remotely controlled using a USB or LAN interface, the front-panel lock is automatically enabled.

***To activate the front-panel lock:***

Press the **Lock/Local** key. The light in the key illuminates.

***To disable the front-panel lock:***

Press the **Lock/Local** key for approximately three seconds. The light in the key turns off.

## Compensating for voltage drop across load cables

To compensate for the voltage drop across load cables due to the resistance inherent in the load cables, you can use remote sense. The remote sense terminals are connected to the load terminals to determine the voltage drop across the load cables.

Remote sense can compensate up to 0.6 volts for the 30 V and 80 V models and 1 volt for the 250 V and 800 V models. Load cables should be chosen with a voltage drop that is less than the compensation voltage.

---

### **WARNING**

**Ensure that the output is off before connecting any sense cables. Use sense cables with a voltage rating that exceeds the isolation voltage of the power supply. Never connect sensing cables when the output is on. Electric shock or damage to the power supply could result.**

---

---

### **NOTE**

Be sure to remove the sense joining plates so the power supplies are not using local sensing.

---

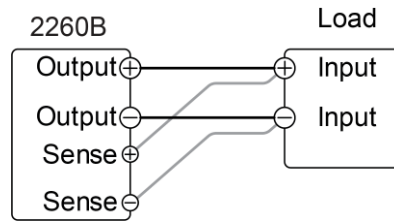


## Making remote sense connections for a single load

*To make remote sense connections for a single load:*

1. Connect the Sense+ terminal to the positive potential of the load.
2. Connect the Sense- terminal to the negative potential of the load.

**Figure 71: 2260B-250 and -800 remote sense load connections**



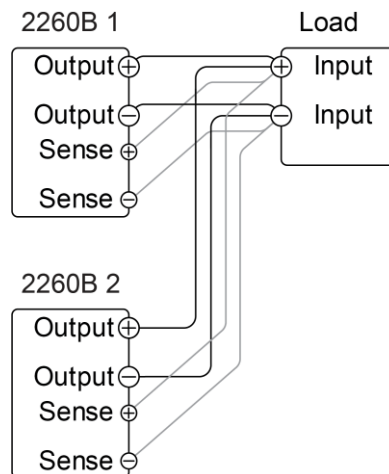
3. Operate the power supply normally.

## Remote sense connections for parallel 2260B power supplies

*To make remote sense connections for parallel 2260B power supplies:*

1. Connect the Sense+ terminals to the positive potential of the load, as shown in the following figure.
2. Connect the Sense- terminals to the negative potential of the load.

**Figure 72: Connections for remote sense for parallel power supplies**



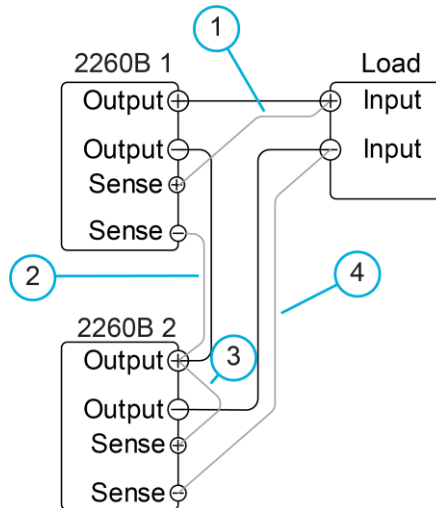
3. Operate the instrument as normal. Refer to [Parallel operation](#) (on page 4-34) for details.

## Remote sense connections for serial 2260B power supplies

*To make remote sense connections for serial 2260B power supplies:*

1. Connect 2260B 1 Sense+ terminals to the positive potential of the load, as shown in the following figure (1).

**Figure 73: Remote sense connections for serial 2260B power supplies**



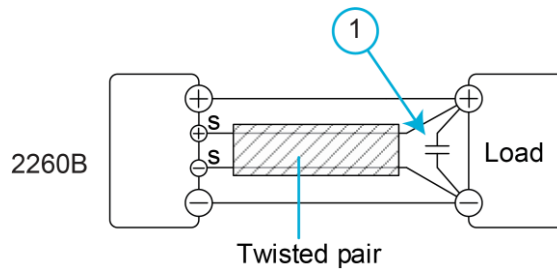
2. Connect the 2260B 1 Sense- terminal to the Output+ terminal of 2600B 2 (2).
3. Connect the 2600B 2 Sense+ terminal to the 2600B 2 Output+ terminal (3).
4. Connect the 2260B 2 Sense- terminal to negative terminal of the load (4).
5. Operate the instrument normally.

## Wire shielding and load line impedance

To help minimize oscillation due to the inductance and capacitance of the load cables, use an electrolytic capacitor in parallel with the load terminals, as shown in the following figure (1).

To minimize the effect of load line impedance, use twisted wire pairing, as shown in the following figure.

**Figure 74: Minimize oscillation**



## Parallel and series operation

The following topics describe the basic operations required to operate the power supply in series or parallel.

When you operate 2260B power supplies in parallel, the total power output of the power supplies is increased. When you operate them in series, the total output voltage of the power supplies can be increased.

The number of the power supplies that can be connected in series or parallel depends on the model and the type of operation:

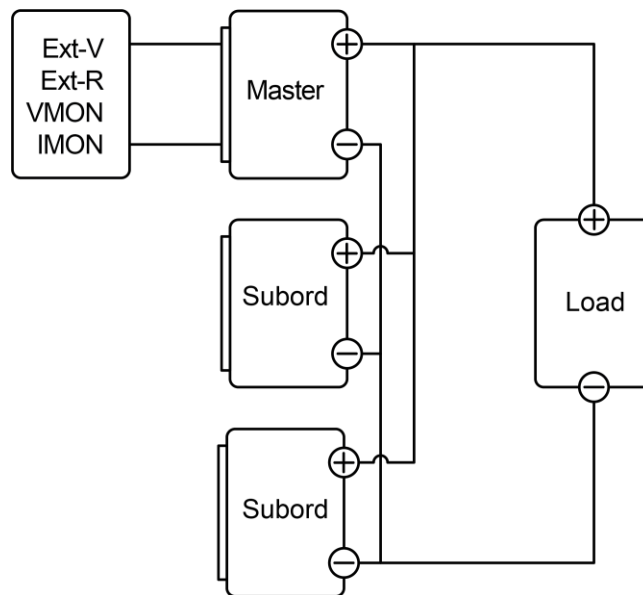
- **Parallel operation:** Three power supplies maximum.
- **Series operation:** Two power supplies maximum; 30 V and 80 V models only.

For series or parallel operation, the power supplies must be used in a master-subordinate configuration. In this configuration, the master power supply controls the subordinate power supplies.

## Master-subordinate parallel overview

You can operate up to three 2260B power supplies in parallel. All instruments must be the same model.

**Figure 75: Master-subordinate parallel overview**



When power supplies are used in parallel, the master instrument is the only power supply that displays the voltage and current. Other precautions and limitations when operating in parallel are described in the following topics.

### OVP, OCP, and OTP

The master power supply can shut down subordinate instruments when OVP or OCP is tripped on the master power supply if the subordinate connector is wired for shut down on alarm.

OVP or OCP can be independently tripped on each subordinate instrument. However, shutdown of the power or output of the subordinate instrument is disabled. Only the alarm is enabled.

OTP works independently for each instrument.

## Remote monitoring

Voltage monitoring (VMON) and current monitoring (IMON) are only supported on the master instrument.

The IMON current represents the total current of all the instruments that are in parallel.

## Remote sense

Refer to [Compensating for voltage drop across load cables](#) (on page 4-31).

## External voltage and resistance control

You can only control voltage and resistance remotely with the master instrument.

## Slew rate

Only the current or voltage slew rates of the master instrument apply.

The settable current slew rate is double or triple that of a single instrument, depending on the number of instruments that are used in parallel.

For example, the 2260B-30-36 has a maximum settable current slew rate of 72 A/s. When two 2260-30-36 instruments are used in parallel, the maximum settable slew rate setting is 144 A/s.

## Internal resistance

Only the internal resistance settings of the master instrument apply.

For two instruments in parallel, the internal resistance is half of the setting value.

For three instruments in parallel, the internal resistance is a third of the setting value.

## Bleed resistor control

The master instrument controls the bleed resistor settings. The bleed resistors in all subordinate instruments are always turned off in parallel mode.

## Output voltage and output current in parallel mode

Model	Single instrument	Two instruments	Three instruments
2260B-30-36	30 V 36 A	30 V 72 A	30 V 108 A
2260B-80-13	80 V 13.5 A	80 V 27 A	80 V 40.5 A
2260B-250-4	250 V 4.5 A	250 V 9 A	250 V 13.5 A
2260B-800-1	800 V 1.44 A	800 V 2.88 A	800 V 4.32 A
2260B-30-72	30 V 72 A	30 V 144 A	30 V 216 A
2260B-80-27	80 V 27 A	80 V 54 A	80 V 81 A
2260B-250-9	250 V 9 A	250 V 18 A	250 V 27 A
2260B-800-2	800 V 2.88 A	800 V 5.76 A	800 V 8.64 A
2260B-30-108	30 V 108 A	30 V 216 A	30 V 324 A
2260B-80-40	80 V 40.5 A	80 V 81 A	80 V 121.5 A
2260B-250-13	250 V 13.5 A	250 V 27 A	250 V 40.5 A
2260B-800-4	800 V 4.32 A	800 V 8.64 A	800 V 12.96 A

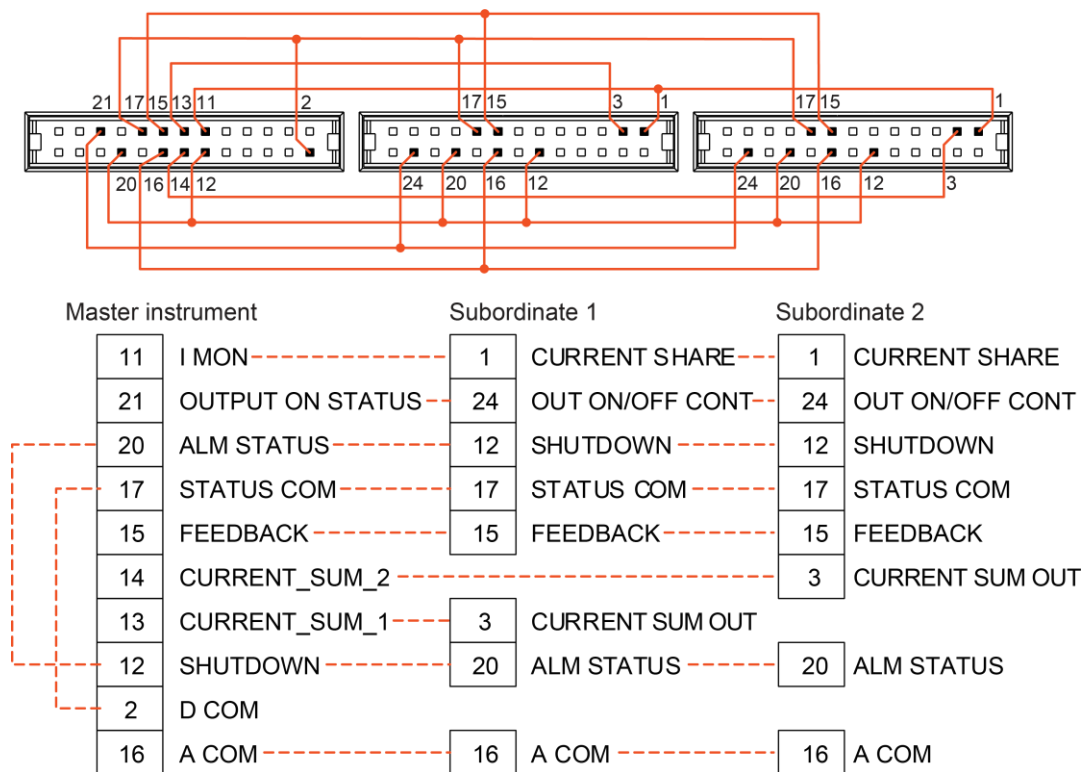
## Master-subordinate parallel connections

The Analog Control connector is used for serial and parallel connections. The configuration of the connector determines the behavior of the master and subordinate instruments.

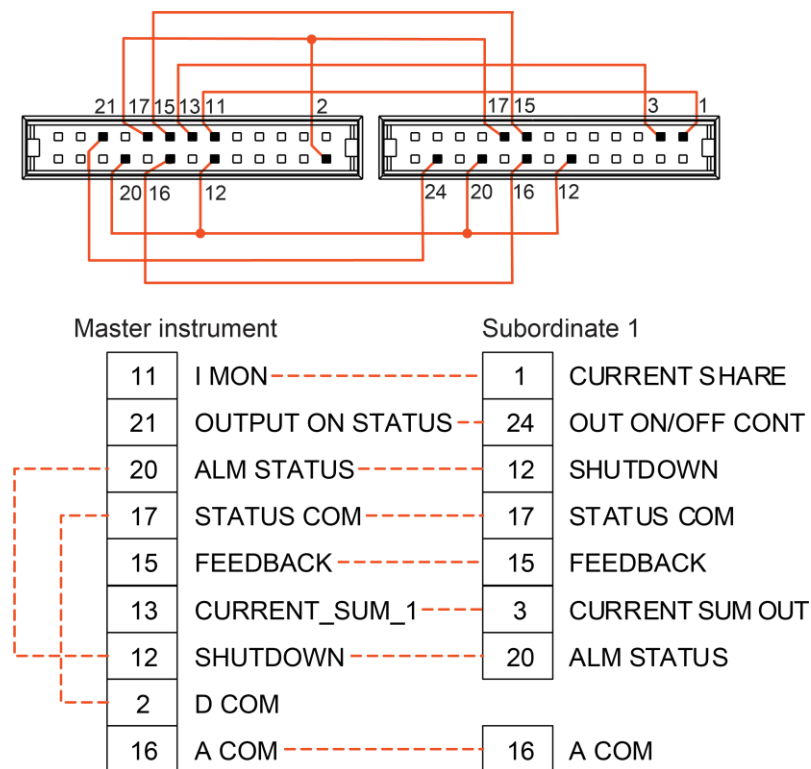
For all connector pin assignments, refer to [Analog Control connector description](#) (on page 4-50).

To operate the power supplies in parallel, connect the analog connectors on the master and subordinate instruments as shown in the following figures.

**Figure 76: Master with two subordinate instruments**



**Figure 77: Master with one subordinate instrument**



## Parallel output connections

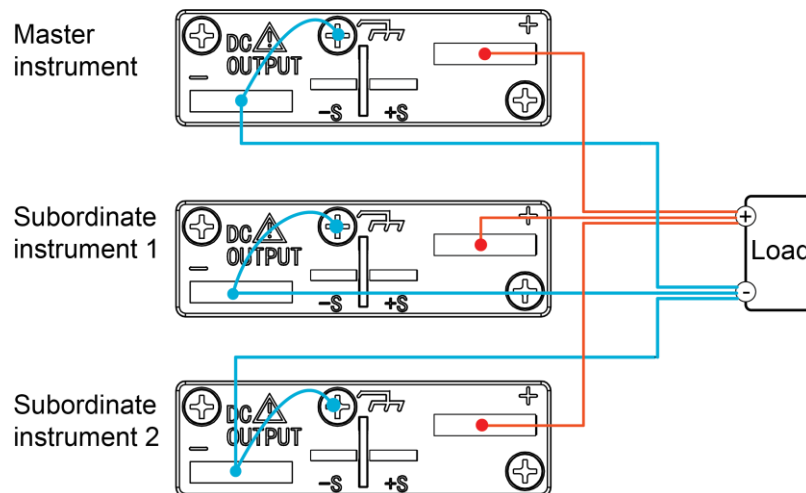
### NOTE

Ensure that the load cables have sufficient current capacity.

#### **To make connections for parallel operation:**

1. Ensure that the power is off on all power supplies.
2. Connect the analog connectors for the master and subordinate instruments as shown in [Master-subordinate parallel connections](#) (on page 4-37).
3. Remove the output terminal covers and the protection dummy plug from the analog control connector. Refer to [Remove the output terminal cover from the 2260B-30 and 2260B-80](#) (on page 4-10) for instructions.
4. Connect the master and subordinate instruments in parallel as shown in the following figure.

**Figure 78: Parallel output connections**



5. Reattach the terminal covers.
6. Reattach the protection dummy plug when not in use.



## Master-subordinate parallel configuration

Before operating the power supplies in parallel, the instruments need to be configured.

### *To configure the instruments for parallel operation:*

1. On the master instrument, configure the OVP and OCP settings. Refer to [Setting protection mode levels](#) (on page 4-24).
2. For each instrument, hold the **Function** key while turning the power on to enter the power-on configuration settings. Refer to [Setting power-on configuration settings](#) (on page 5-10).
3. Configure the F-93 (Master/subordinate) setting for each instrument:
  - For a master with one subordinate in parallel: Select **1**.
  - For a master with two subordinates in parallel: Select **2**.
  - For each subordinate in parallel: Select **3**.
4. Cycle the power on the instruments.

## Operation of instruments in parallel

The panel controls are disabled on subordinate instruments, including the Output key. You can use the Function key on a subordinate instrument to view the present settings.

---

### CAUTION

**Only operate the power supplies in parallel if the instruments have the same model number and if they are configured correctly. A maximum of three instruments can be used in parallel.**

---

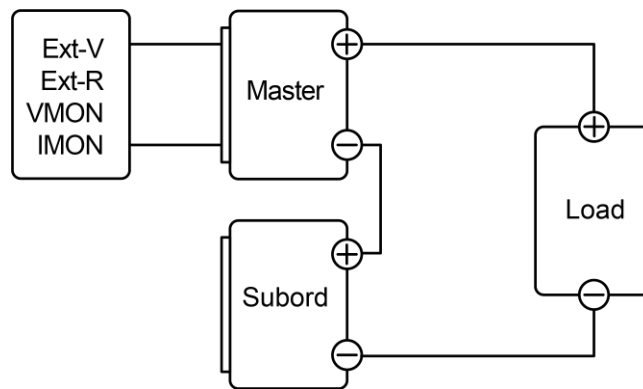
### *To operate instruments in parallel:*

1. Turn on the instruments. The displays on the subordinate instruments display dashes (– – – –).
2. Control the subordinate instruments using the master instrument. Operation of the master instrument is the same as for a single instrument.
3. Press the **Output** key.

## Master-subordinate series overview

You can connect two 2260B power supplies in series if the instruments have the same model number.

**Figure 79: Instruments in series**



When the instruments are used in series, precautions and limitations apply, as described in the following topics.

### Display

During series operation, only the master instrument displays the current. Both instruments display the voltage. The total voltage is the sum of voltage of all instruments.

### OVP and OCP

The master power supply can shut down subordinate instruments when OVP or OCP is tripped on the master power supply if the subordinate connector is wired for shut down on alarm.

The OVP and OCP levels are determined by the OVP or OCP and settings for the master instrument. The OVP and OCP levels on the subordinate instrument are ignored.

### Remote monitoring

Voltage monitoring (VMON) and current monitoring (IMON) are only supported on the master instrument.

The VMON voltage represents the total voltage of the instruments that are in series.

### Remote sense

Refer to [Compensating for voltage drop across load cables](#) (on page 4-31).

## External voltage and resistance control

You can only control voltage and resistance remotely with the master instrument.

## Slew rate

The voltage slew rate is double that of the configured slew rate. For example, a voltage slew rate setting of 60.00 V/s is 120 V/s when instruments are used in series.

## Internal resistance

Only the internal resistance settings of the master instrument apply.

The internal resistance is two times the configured value.

## Bleed resistor control

The master instrument controls the bleed resistor settings. In the subordinate instrument in series, the bleed resistor is always turned on.

## Output voltage and output current for instruments in series

Model	Single instrument	Two instruments
2260B-30-36	30 V 36 A	60 V 36 A
2260B-80-13	80 V 13.5 A	160 V 13.5 A
2260B-30-72	30 V 72 A	60 V 72 A
2260B-80-27	80 V 27 A	160 V 27 A
2260B-30-108	30 V 108 A	60 V 108 A
2260B-80-40	80 V 40.5 A	160 V 40.5 A

## Master-subordinate series connections

The Analog Control connector is used for serial and parallel connections. The configuration of the connector determines the behavior of the master and subordinate instruments.

For all connector pin assignments, refer to [Analog Control connector description](#) (on page 4-50).

To operate the power supplies in series, connect the analog connectors on the master and subordinate instruments as described in the following procedure.

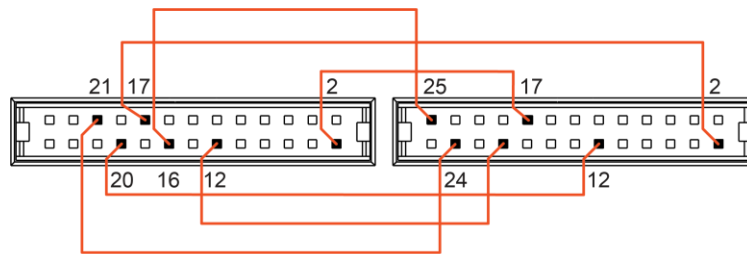
## NOTE

Ensure that the load cables have sufficient current capacity. Refer to [Wire gauge considerations](#) (on page 4-9) for information.

**To make series connections:**

1. Ensure that the power is off on both power supplies.
2. Choose a master and subordinate instrument.
3. Connect the analog connectors for the master and subordinate instruments, as shown in the following figure.

**Figure 80: Analog Control connections for series operation**

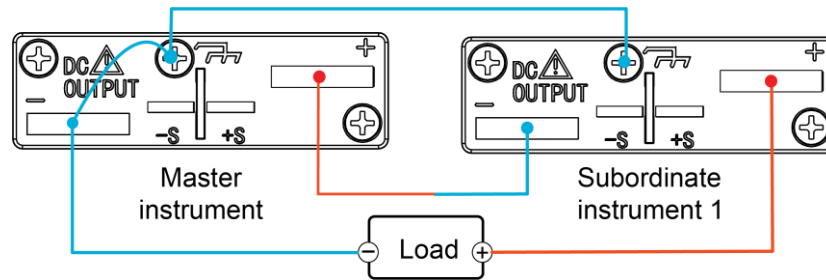


Master instrument		Subordinate 1	
16	A COM	25	SER SUBORD IN
21	OUTPUT ON STATUS	24	OUT ON/OFF CONT
20	ALM STATUS	12	SHUTDOWN
17	STATUS COM	2	D COM
12	SHUTDOWN	20	ALM STATUS
2	D COM	17	STATUS COM

4. **2260B-30 and 2260B-80:** Remove the output terminal covers and the protection dummy plug from the Analog Control connector. Refer to [Remove the output terminal cover from the 2260B-30 and 2260B-80](#) (on page 4-10) for instructions.

- Connect the power supplies in series as shown in the following figure.

**Figure 81: Power supply connections for series operation**



- 2260B-30 and 2260B-80:** Reattach the terminal cover.
- Reattach the protection dummy plug when not in use.

## Master-subordinate series configuration

Before using the power supplies in series, the master and subordinate units need to be configured. Only two instruments can be used in series.

### *To configure the instruments for series operation:*

- On the master instrument, configure the OVP and OCP settings. Refer to [Setting protection mode levels](#) (on page 4-24).
- For each instrument, hold the **Function** key while turning the power on to enter the power-on configuration settings. Refer to [Setting power-on configuration settings](#) (on page 5-10).
- Configure the F-93 (Master/subordinate) setting for each instrument:
  - For a master with one subordinate in series:** Select **0**.
  - For each subordinate in series:** Select **4**.
- Cycle the power on the instruments.

## Master-subordinate series operation

Only operate the power supplies in series if the instruments are configured correctly. Refer to [Master-subordinate series configuration](#) (on page 4-44).

The panel controls are disabled on subordinate instruments, including the Output key.

## CAUTION

Only operate the power supplies in series if the instruments have the same model number and if the instruments are configured correctly. The 250 V and 800 V models do not support series operation.

**To operate the instruments in series:**

1. Turn on the power supplies. The subordinate instrument shows its voltage. The master instrument shows the combined voltage of both units and the current.
2. Control the subordinate instruments using the master instrument. Operation of the master instrument is the same as for a single instrument.
3. Press the **Output** key.

## Test sequence

Test sequences allow you to output a set of voltage levels for varying time intervals at each level. The test sequence can be stored and used repeatedly to determine device under test (DUT) performance.

This section describes how to use the Utility function to run, load, and save test sequences for automated testing.

The 2260B can store ten test sequences.

## Test sequence file format

A test sequence file describes a sequence of steps that are output when the test sequence is run. The test sequence file is created on a computer in comma separated values (.csv) UTF-8 format.

The test sequence .csv files must be saved as tXXX.csv, where XXX is the save file number, 001 to 010. The save file number designates the memory slot of the power supply that the test file is loaded into. For example, a test sequence file named t001.csv can only be saved to memory slot 01 and a file named t002.csv can only be saved to memory number 02.

The following figure shows an example of a simple test sequence file in the spreadsheet.

**Figure 82: Test sequence file format**

	A	B	C	D
1	Cycle	2	3	5
2	Step	Time(sec)	Voltage (V)	Current (A)
3	1	1	MIN	MIN
4	2	1	0.05	0.05
5	3	1	0.1	0.1
6	4	1	0.15	0.15
7	5	1	0.2	0.2
8	6	1	0.25	0.25
9	7	1	0.3	0.3
10	8	1	0.35	0.35
11	9	1	0.4	0.4
12	10	1	0.45	0.45

Cell number	Content	Notes
<b>A1</b>	Cycle header	The first cell of the spreadsheet must contain the word <code>Cycle</code> .
<b>B1</b>	Cycle repeat	Sets the number of times to repeat a sequence of steps. Range: 1 to 999 or 0 or INF (case insensitive). A setting of 1 passes through the cycle once. A setting of 0 or INF repeats the cycle infinitely.
<b>C1</b>	Step start	Sets the starting step for the cycle repeat. Step start must be less than step end. Range: 1 to 999.
<b>D1</b>	Step end	Sets the final step for the cycle repeat. Step end must be more than step start . Range: 2 to 1000.
<b>A2</b>	Step header	This cell must contain the word <code>Step</code> .
<b>B2</b>	Time(sec) header	This cell must contain <code>Time (sec)</code> .
<b>C2</b>	Voltage (V) header	This cell must contain <code>Voltage (V)</code> .
<b>D2</b>	Current (A) header	This cell must contain <code>Current (A)</code> .
<b>A3 and following</b>	Step number	The number for each step in the test function. All steps must be numbered in numerical order. No step number can be bypassed between the first and last step. Range: 1 to 1000.
<b>B3 and following</b>	Time in seconds	The duration of the corresponding step in seconds. It has a step resolution of 50 ms. Range: 0.05 to 1,728,000 (20 days) or set to 0 to bypass the step.
<b>C3 and following</b>	Voltage	The voltage of the corresponding step in volts. MIN or MAX can be used to set the voltage to minimum or maximum, respectively.
<b>D3 and following</b>	Current	The current of the corresponding steps in amperes. MIN or MAX can be used to set the current to minimum or maximum, respectively.

In the following example, there are ten steps in total, with steps 3 to 5 repeated twice. In total, the steps run as follows:

**Step:** 1>2>3>4>5>3>4>5>6>7>8>9>10

Steps 3 through 5 are repeated twice.

In this example, the file `T001.csv` contains the sequence:

```
Cycle,2,3,5
Step,Time(sec),Voltage (V),Current (A)
1,1,MIN,MIN
2,1,0.05,0.05
3,1,0.1,0.1
4,1,0.15,0.15
5,1,0.2,0.2
6,1,0.25,0.25
7,1,0.3,0.3
8,1,0.35,0.35
9,1,0.4,0.4
10,1,0.45,0.45
```

## Load a test sequence to the instrument

This procedure loads a test sequence from a USB flash drive to the designated memory slot. A test sequence must be loaded into internal memory before it can be run.

---

### NOTE

If the USB drive is not recognized, check to see that the function setting for F-20 is set to 1. If not, change the setting and reinsert the USB flash drive. Refer to [USB and GPIB settings](#) (on page 5-5) for more information.

---

#### *To load a test sequence:*

1. Copy the `.CSV` file for the test sequence to a USB flash drive. It must be in the root directory of the flash drive.
2. Turn off the power supply.
3. Insert the USB flash drive into the USB port on the front panel of the 2260B.
4. Turn on the power. MS (mass storage) is displayed on the screen after a few seconds.
5. Press the **Utility** key. The key lights.
6. Use the **Voltage** knob to select **T-02** (Test sequence load).
7. Use the **Current** knob to set the memory slot that contains the test sequence (1 to 10).
8. Press the **Voltage** knob to load the test sequence. The test sequence is now available in the designated memory slot.
9. Press the **Utility** key to exit the test sequence settings. The light turns off.
10. Remove the USB flash drive.

## Running a test sequence

Test sequences are run from internal memory.

---

### NOTE

When a test sequence starts to run, there is no way to abort the test sequence. Pressing the Output key has no effect. To stop a test early, turn the power off.

---

#### *To run a test sequence:*

1. Press the **Utility** key. The key lights.
2. Use the **Voltage** knob to select **T-01** (Run test sequence).
3. Use the **Current** knob to set the memory slot that contains the test sequence (1 to 10).
4. Press the **Voltage** knob to run the test sequence.
5. Press the **Utility** key to exit the test sequence settings. The Utility key light turns off.



## Export a test sequence to a USB flash drive

The Export test sequence function saves a test sequence file from the 2260B to the root directory of a USB flash drive. Test sequence files are saved as `tXXX.csv`, where `XXX` is 001 to 010, corresponding to the memory slot from which the test sequence was exported.

---

### NOTE

If a test sequence file with the same name is on the USB flash drive, it is overwritten.

---

---

### NOTE

If the USB drive is not recognized, check to see that the function setting for F-20 is set to 1. If not, change the setting and reinsert the USB flash drive. Refer to [USB and GPIB settings](#) (on page 5-5) for more information.

---

#### *To export a test:*

1. Turn the power off.
2. Insert the USB flash drive into the USB port on the front panel of the 2260B.
3. Turn the power on. MS (mass storage) is displayed after a few seconds.
4. Press the **Utility** key. The key lights.
5. Use the **Voltage** knob to select **T-03** (test sequence export).
6. Use the **Current** knob to set the memory slot that contains the test sequence (1 to 10).
7. Press the **Voltage** knob to save the test sequence to the USB flash drive. The test sequence is copied to the drive.
8. Press the **Utility** key to exit the test sequence settings. The Utility key light turns off.
9. Remove the USB flash drive.

## Remove a test sequence

The remove test sequence function deletes a test sequence from an internal memory slot.

#### *To remove a test sequence:*

1. Press the **Utility** key. The key lights.
2. Use the **Voltage** knob to select **T-04** (Remove test sequence).
3. Use the **Current** knob to set the memory slot that contains the test sequence (1 to 10).
4. Press the **Voltage** knob to remove the test sequence.
5. Press the **Utility** key to exit the test sequence settings. The Utility key light turns off.

## Test sequence error messages

The following error codes may appear on the display when you run a test sequence. Use the error code numbers to determine the cause of the error.

For example, if `Err -52` is displayed, it indicates that one of the Time(sec) fields is overrange for the test sequence.

Error code	Details
-1	_SEQ_ERR FILE_NOT_FOUND
-2	_SEQ_ERR FILE_IS_TOO_LARGE
-3	_SEQ_ERR ALLOCATE_MEMORY_ERROR
-4	_SEQ_ERR OPEN_THE_FILE_ERROR
-5	_SEQ_ERR READ_DATA_ERROR
-6	_SEQ_ERR USING
-7	_SEQ_ERR FORMAT_ERROR
-8	_SEQ_ERR PARAMETER_DATA_TOO_LONG
-10	_SEQ_ERR CYCLE_START_GREATER_THAN_CYCLE_END
-11	_SEQ_ERR CYCLE_TIMES_ERROR
-12	_SEQ_ERR CYCLE_TIMES_OVER_RANGE
-13	_SEQ_ERR NO_CYCLE_TIMES
-14	_SEQ_ERR CYCLE_START_ERROR
-15	_SEQ_ERR CYCLE_START_OVER_RANGE
-16	_SEQ_ERR NO_CYCLE_START
-17	_SEQ_ERR CYCLE_END_ERROR
-18	_SEQ_ERR CYCLE_END_OVER_RANGE
-19	_SEQ_ERR NO_CYCLE_END
-20	_SEQ_ERR STEP_DATA_ERROR
-21	_SEQ_ERR STEP_DATA_OVER_RANGE
-22	_SEQ_ERR NO_STEP_DATA
-30	_SEQ_ERR POINT_DATA_ERROR
-31	_SEQ_ERR START_POINT_GREATER_THAN_END_POINT
-32	_SEQ_ERR START_POINT_REPEAT
-33	_SEQ_ERR END_POINT_REPEAT
-40	_SEQ_ERR OUTPUT_DATA_ERROR
-50	_SEQ_ERR TIME_DATA_ERROR
-51	_SEQ_ERR NEGATIVE_TIME
-52	_SEQ_ERR TIME_OVER_RANGE
-60	_SEQ_ERR VOLTAGE_DATA_ERROR
-61	_SEQ_ERR NEGATIVE_VOLTAGE
-62	_SEQ_ERR VOLTAGE_TOO_LARGE
-63	_SEQ_ERR VOLTAGE_TOO_SMALL
-70	_SEQ_ERR CURRENT_DATA_ERROR
-71	_SEQ_ERR NEGATIVE_CURRENT
-72	_SEQ_ERR CURRENT_TOO_LARGE
-73	_SEQ_ERR CURRENT_TOO_SMALL

## Analog Control connector

The following topics describe how to use the Analog Control connector. You can connect an external voltage or resistance to this connector to:

- Control the voltage or current output
- Monitor the voltage or current output
- Remotely control the output
- Remotely control the power switch

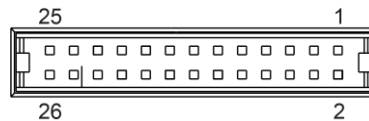
The Analog Control connector is a standard Mil 26-pin connector (Omron XG4 IDC plug). The connector is used for all analog remote control. The pins that are used determine which remote control mode is used.

### **⚠ WARNING**

To prevent electric shock, ensure that the cover for the Analog Control connector is installed when the connector is not in use.

## Analog Control connector pin descriptions

Figure 83: Analog control connector pin assignments



Pin name	Pin number	Description
Current Share	1	Used when operating two or more power supplies in parallel.
D COM	2	Connected to the (–S) sense negative terminal when remote sense is used. Connected to the negative output terminal when remote sense is not used.
CURRENT SUM OUT	3	Current sum output signal when power supplies are connected in parallel.
EXT-V CV CONT	4	External voltage control of the voltage output. A voltage of 0 V to 10 V is used to control the full-scale voltage output (0% to 100%) of the instrument.
EXT-V CC CONT	5	External voltage control of the current output. A voltage of 0 V to 10 V is used to control the full-scale current output (0% to 100%) of the instrument.
EXT-R CV CONT PIN1	6	External resistance control of the voltage output. A resistance of 0 kΩ to 10 kΩ is used to control the full-scale voltage output (0% to 100%) of the instrument.

Pin name	Pin number	Description
EXT-R CV CONT PIN2	7	External resistance control of the voltage output. A resistance of 0 k $\Omega$ to 10 k $\Omega$ is used to control the full-scale voltage output (0% to 100%) of the instrument.
EXT-R CC CONT PIN1	8	External resistance control of the current output. A resistance of 0 k $\Omega$ to 10 k $\Omega$ is used to control the full-scale current output (0% to 100%) of the instrument.
EXT-R CC CONT PIN2	9	External resistance control of the current output. A resistance of 0 k $\Omega$ to 10 k $\Omega$ is used to control the full-scale current output (0% to 100%) of the instrument.
V MON	10	Voltage Monitor Output. Outputs the full-scale voltage (0 to 100%) as a voltage (0 V to 10 V).
I MON	11	Current Monitor Output. Outputs the full-scale current (0 to 100%) as a voltage (0 V to 10 V).
SHUTDOWN	12	The shutdown signal turns off the output or power when a low TTL signal is applied. The shutdown signal is pulled up to 5 V with a 10 k $\Omega$ pull-up resistor.
CURRENT_SUM_1	13	Master unit current sum input signal from first subordinate CURRENT SUM OUT signal. Used with instruments in parallel only.
CURRENT_SUM_2	14	Master unit current sum input signal from second subordinate CURRENT SUM OUT signal. Used with instruments in parallel only.
FEEDBACK	15	Control signal during parallel operation.
A COM	16	Analog signal common. Connected to the sense negative (-) terminal when remote sense is used. Connected to the negative output terminal when remote sense is not used.
STATUS COM	17	Common for status signals 18, 19, 20, 21, and 22.
CV STATUS	18	Turns on when CV mode is active (photocoupled open collector output).
CC STATUS	19	Turns on when CC mode is active (photocoupled open collector output).
ALM STATUS	20	Turns on when any of the protection modes are tripped (OVP, OCP, and OTP) or if a shutdown signal is input (photocoupled open collector output).
OUTPUT ON STATUS	21	Turns on when the output has been turned on (photocoupled open collector output).
POWER OFF STATUS	22	Turns on when the power switch is turned off.
N.C.	23	Not connected.
OUT ON/OFF CONT	24	Turns the output on or off when a low TTL signal is applied. Internally, the circuit is pulled up to +5 V with 10 k $\Omega$ resistance.
SER SUB IN	25	Subordinate input during series operation (30 V and 80 V models only).
N.C.	26	Not connected.

## External voltage control of voltage output

You can control the voltage output using an external voltage by using the Analog Control connector on the rear panel. When connecting the external voltage source to the Analog Control connector, use shielded or twisted pair wiring.

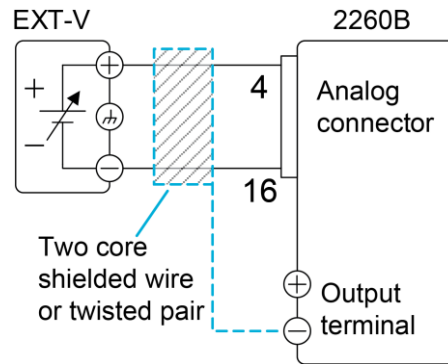
A voltage of 0 V to 10 V is used to control the full-scale voltage of the instrument, where:

$$\text{Output voltage} = \text{full-scale voltage} \times (\text{external voltage}/10)$$

Make the following connections as shown in the following figure.

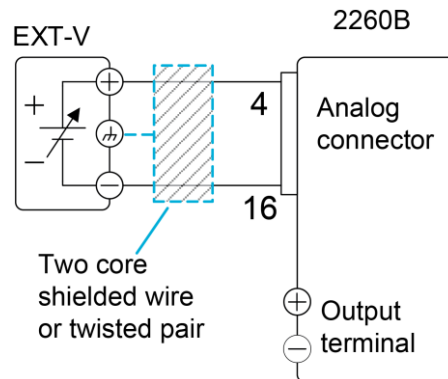
- Pin 16 to EXT-V (-)
- Pin 4 to EXT-V (+)
- Wire shield to negative (-) output terminal

**Figure 84: Connections for external voltage control of the voltage output**



If the wire shield needs to be grounded at the voltage source (EXT-V), the shield cannot also be grounded at the negative (-) terminal output of the 2260B power supply because it would short the output. In this situation, make the connections, as shown in the following figure.

- Pin 16 to EXT-V (-)
- Pin 4 to EXT-V (+)
- Wire shield to EXT-V ground (GND)

**Figure 85: Alternative connections for external voltage control of the voltage output**

## Panel operation

The input impedance for external voltage control is 10 k $\Omega$ .

Use a stable voltage supply for the external voltage control.

When you are using external voltage control, CV and CC Slew Rate Priority are disabled for the V-I mode (F-03). Refer to [Slew rate](#) (on page 4-5) for more information.

## CAUTION

Ensure that no more than 10.5 volts are input into the external voltage input.

Ensure that the voltage polarity is correct when connecting the external voltage.

### *To operate the power supply through a panel:*

1. Ensure that the load is not connected.
2. Ensure that the power supply is off.
3. Connect the external voltage as described in [External voltage control of voltage output](#) (on page 4-52).
4. Hold the **Function** key and turn the power on.
5. Set the F-90 power-on configuration setting to **1** (CV control – Ext voltage).
6. Cycle the power.
7. Press the **Output** key. You can now use the external voltage to control the power supply voltage.

## External voltage control of current output

You can control the current output using an external voltage by using the Analog Control connector on the rear panel. When connecting the external voltage source to the Analog Control connector, use shielded or twisted paired wiring.

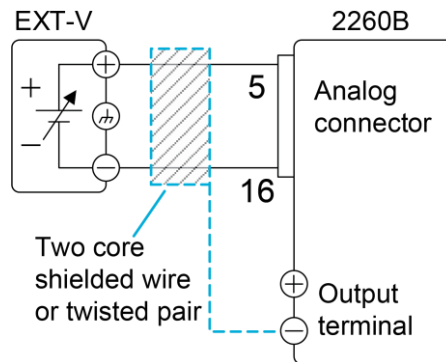
A voltage of 0 V to 10 V is used to control the full-scale current of the instrument, where:

$$\text{Output current} = \text{full-scale current} \times (\text{external voltage}/10)$$

Make the following connections as shown in the following figure.

- Pin 16 to EXT-V (-)
- Pin 5 to EXT-V (+)
- Wire shield to negative (-) output terminal

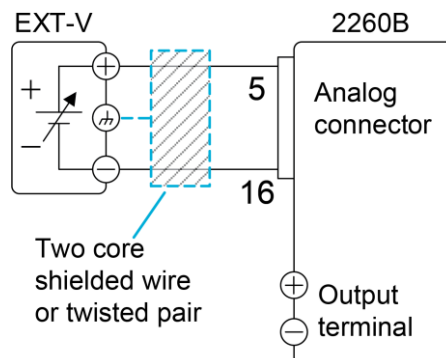
**Figure 86: External voltage control of current output**



If the wire shield needs to be grounded at the voltage source (EXT-V), the shield cannot also be grounded at the negative (-) terminal output of the 2260B power supply because it would short the output. In this situation, make the following connections.

- Pin 16 to EXT-V (-)
- Pin 5 to EXT-V (+)
- Wire shield to EXT-V ground

**Figure 87: Alternative connections for external voltage control of current output**



## Panel operation

The input impedance for external voltage control is 10 k $\Omega$ .

Use a stable voltage supply for the external voltage control.

When you are using external voltage control, CV and CC Slew Rate Priority are disabled for the V-I mode (F-03). Refer to [Slew rate](#) (on page 4-5) for more information.

---

### CAUTION

Ensure that no more than 10.5 volts are input into the external voltage input.

Ensure that the voltage polarity is correct when connecting the external voltage.



---

*To operate the power supply through a panel:*

1. Ensure that the load is not connected.
2. Ensure that the power supply is off.
3. Connect the external voltage as described in [External voltage control of current output](#) (on page 4-54).
4. Hold the **Function** key and turn the power on.
5. Set the F-91 power-on configuration setting to **1** (CC control – Ext voltage).
6. Cycle the power.
7. Press the **Output** key. You can now use the external voltage to control the power supply current.

## External resistance control of voltage output

You can control the voltage output using an external resistance control by using the Analog Control connector on the rear panel. You can use a resistance of 0 k $\Omega$  to 10 k $\Omega$  to control the full-scale voltage of the instrument.

The output voltage (0 to full scale) can be controlled with the external resistance going up (Ext-R ) 0 k $\Omega$  to 10 k $\Omega$  (10 k $\Omega$  =  $V_o$  maximum) or down (Ext-R ) 10 k $\Omega$  to 0 k $\Omega$  (10 k $\Omega$  = 0).

For 0 k $\Omega$  to 10 k $\Omega$ : Output voltage = full-scale voltage  $\times$  (external resistance/10)

For 10 k $\Omega$  to 0 k $\Omega$ : Output voltage = full-scale voltage  $\times$  ([10-external resistance]/10)



## ⚠ WARNING

The Ext-R configuration is recommended for safety reasons. If the cables become disconnected, the voltage output drops to zero. Under similar circumstances using Ext-R, a high voltage is output.

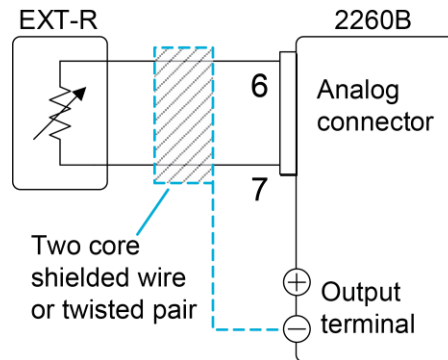
## NOTE

If switches are used to switch between fixed resistances, use short-circuit or continuous resistance switches to avoid creating open circuits.

Make the following connections as shown in the figure:

- Pin 6 to EXT-R
- Pin 7 to EXT-R
- Wire shield to negative (-) output terminal

**Figure 88: External resistance control of voltage output**



## Panel operation

When you are using external resistance control, CV and CC Slew Rate Priority are disabled for the V-I mode (F-03). Refer to [Slew rate](#) (on page 4-5) for more information.

## CAUTION

Ensure that the resistors and cables used exceed the isolation voltage of the power supply. For example, you can use insulation tubes with a withstand voltage higher than the power supply. When choosing an external resistor, ensure that the resistor can withstand a high degree of heat.

**To operate the power supply through a panel:**

1. Ensure that the load is not connected.
2. Ensure that the power supply is off.
3. Connect the external resistance as described in [External resistance control of voltage output](#) (on page 4-55).
4. Hold the **Function** key and turn the power on.
5. Set the F-90 power-on configuration setting to **2** (Ext-R $\swarrow$ ) or **3** (Ext-R $\searrow$ ).
6. Cycle the power.
7. Press the **Output** key. You can now use the external resistance to control the power supply voltage.

## External resistance control of current output

You can control the current output using an external resistance control by using the Analog Control connector on the rear panel. You can use a resistance of 0 k $\Omega$  to 10 k $\Omega$  to control the full-scale current of the instrument.

The output voltage (0 to full scale) can be controlled with the external resistance going up (Ext-R $\swarrow$ ) 0 k $\Omega$  to 10 k $\Omega$  (10 k $\Omega$  =  $V_o$  maximum) or down (Ext-R $\searrow$ ) 10 k $\Omega$  to 0 k $\Omega$  (10 k $\Omega$  = 0).

For 0 k $\Omega$  to 10 k $\Omega$ : Output current = full-scale current  $\times$  (external resistance/10)

For 10 k $\Omega$  to 0 k $\Omega$ : Output current = full-scale current  $\times$  [(10 – external resistance)/10]

---

### **WARNING**

The Ext-R $\searrow$  configuration is recommended for safety reasons. If the cables become disconnected, the current output drops to zero. Under similar circumstances using Ext-R $\swarrow$ , a high current is output.

---

---

### **NOTE**

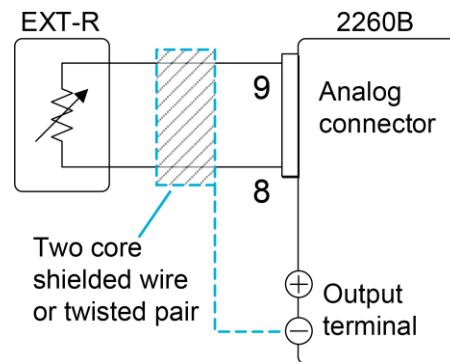
If switches are used to alternate between fixed resistances, use short-circuit or continuous resistance switches to avoid creating open circuits.

---

Make the following connections as shown in the following figure.

- Pin 9 to EXT-R
- Pin 8 to EXT-R
- Wire shield to negative (-) output terminal

**Figure 89: External resistance control of the current output**





## Panel operation

When you are using external resistance control, CV and CC Slew Rate Priority are disabled for the V-I mode (F-03). Refer to [Slew rate](#) (on page 4-5) for more information.

### CAUTION

Ensure that the resistors and cables used exceed the isolation voltage of the power supply. For example, you can use insulation tubes with a withstand voltage higher than the power supply. When choosing an external resistor, ensure that the resistor can withstand a high degree of heat.

#### *To operate the power supply through a panel:*

1. Ensure that the load is not connected.
2. Ensure that the power supply is off.
3. Connect the external resistance as described in [External resistance control of current output](#) (on page 4-57).
4. Hold the **Function** key and turn the power on.
5. Set the F-91 power-on configuration setting to **2** (Ext-R ) or **3** (Ext-R ) .
6. Cycle the power.
7. Press the **Output** key. You can now use the external resistance to control the power supply current.

## External control of the output

You can use an external switch to turn the output on or off. The external switch is connected to the Analog Control connector and uses a high or low signal to control the output.

The voltage across pins 2 and 24 are internally pulled to +5 V  $\pm 5\%$  at 500  $\mu\text{A}$  with a 10 k $\Omega$  pull-up resistor. A short (closed switch) produces a low signal.

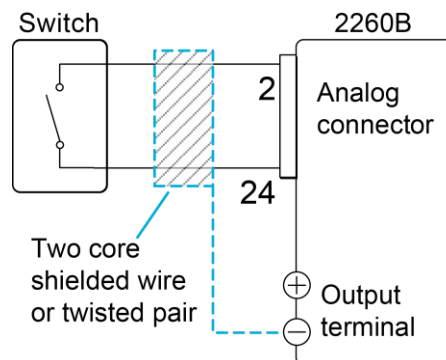
When set to High = On, the output is turned on when the pins 2 and 24 are open.

When Low = On, the output is turned on when pins 2 and 24 are shorted.

Make the following connections as shown in the following figure.

- Pin 2 to switch
- Pin 24 to switch
- Wire shield to negative (-) output terminal

**Figure 90: External control of the output**



### Steps

#### **⚠ WARNING**

Ensure that the cables and switch used exceed the isolation voltage of the power supply. For example, you can use insulation tubes with a withstand voltage higher than the power supply.

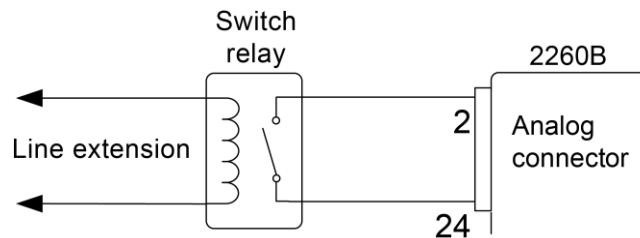
---

## NOTE

When using a switch over long distances, use a switch relay to extend the line from the coil side of the relay, as shown in the following figure.

---

**Figure 91: External output with switch relay**




---

## NOTE

If a single switch control is to be used for multiple units, isolate each instrument. You can use a relay to isolate the instruments.

---



---

## NOTE

Output delay times (F-01 and F-02) are disabled when the output is set to external control. Refer to [Output delay settings](#) (on page 5-1) for details.

---

***To operate the power supply through a panel:***

1. Ensure that the load is not connected.
  2. Ensure that the power supply is off.
  3. Connect the external switch as described in [External control of the output](#) (on page 4-59).
  4. Hold the **Function** key and turn the power on.
  5. Set the **F-94** (External output logic) power-on configuration setting to **0** (high = on) or **1** (low = 0).
  6. Cycle the power. The switch is now ready to set the output on or off.
- 

## NOTE

If F-94 = 0 (High = on) and the pin 24 is low (0), MSG 001 is displayed on the display. If F-94 = 1 (Low = on) and pin 24 is high (1), MSG 002 is displayed on the display.

---

## External control of shutdown

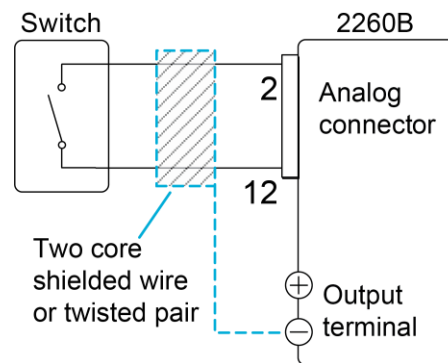
You can configure the output of the power supply to shut down using an external switch.

The voltage across pins 2 and 12 are internally pulled to +5 V  $\pm$ 5% at 500  $\mu$ A with a 10 k $\Omega$  pull-up resistor.

Make the following connections as shown in the following figure.

- Pin 2 to switch
- Pin 12 to switch
- Wire shield to negative (-) output terminal

**Figure 92: External shutdown control connections**



### CAUTION

Ensure that the cables and switch used exceed the isolation voltage of the power supply. For example, you can use insulation tubes with a withstand voltage that is higher than the power supply.

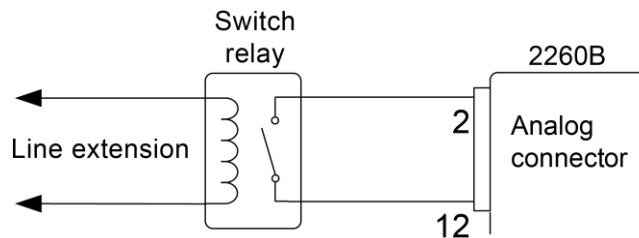
---

## NOTE

When using a switch over long distances, use a switch relay to extend the line from the coil side of the relay, as shown in the following figure.

---

**Figure 93: External shutdown with switch relay**




---

## NOTE

If a single switch control is to be used for multiple units, isolate each instrument. You can use a relay to isolate the instruments.

---

**To configure the power supply to shut down from an external source:**

1. Ensure that the load is not connected.
  2. Ensure that the power supply is off.
  3. Connect the external switches as shown in the previous figure.
  4. Hold the **Function** key and turn the power on.
  5. Set the F-95 power-on configuration setting to **0** (Enable).
- 

## NOTE

Power Switch Trip is not available on all models. Check the power switch for availability.

If the power switch looks like this, the trip function is available:  |

If the power switch looks like this, the trip function is not available:  -

---

6. Cycle the power. The switch will now shut down the power supply when shorted.

## Remote monitoring

You can remotely monitor the current output, voltage output, operation status, and alarm status of the 2260B power supplies.

## External voltage and current monitoring

You can use the Analog Control connector to monitor the current or voltage output. An output of 0 V to 10 V represents the voltage or current output of 0 to the rated current/voltage output.

Current monitor = (current output/full scale) × 10

Voltage monitor = (voltage output/full scale) × 10

The output impedance of the voltage and current monitor pins is 1 kΩ. Maximum current is 10 mA.

The monitor outputs are strictly DC and should not be used to monitor analog components such as transient voltage response or ripple.

### CAUTION

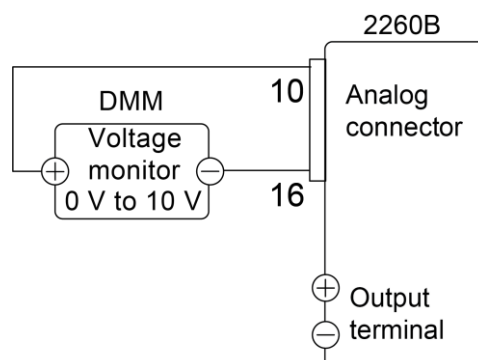
Ensure that the current monitor (pin 11) and voltage monitor (pin 10) pins are not shorted together. This will cause damage to the power supply.

External voltage and current monitoring do not need to be enabled in the configuration settings.

For voltage monitoring, connect the following pins as shown in the following figure.

- Pin 16 to negative (-)
- Pin 10 to positive (+)

**Figure 94: External voltage monitoring connections**

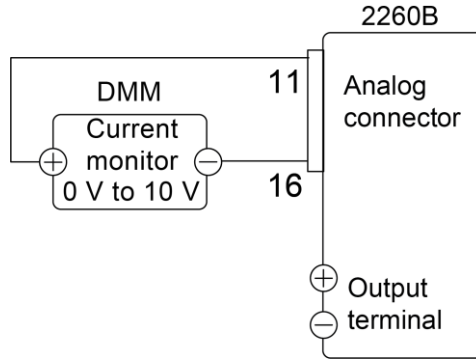




For current monitoring, connect the following pins as shown in the following figure.

- Pin 16 to negative (-)
- Pin 11 to positive (+)

**Figure 95: External current monitoring**

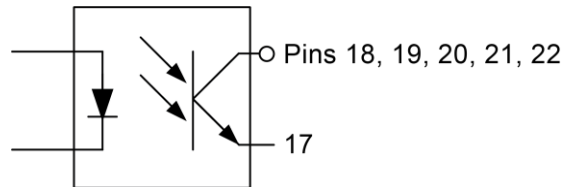


### External monitoring of operation and status

You can use the Analog Control connector to monitor the operation status and alarm status of the instrument.

The pins are isolated from the power supply internal circuitry by photocouplers. Status Com (pin 17) is a photocoupler emitter output and pins 18 to 22 are photocoupler collector outputs.

**Figure 96: External operation and status monitoring**



A maximum of 30 V and 8 mA can be applied to each pin. Descriptions of the pins are provided in the following table.

Terminal name	Terminal pin	Description
STATUS COM	17	Common for status signals 18, 19, 20, 21, and 22.
CV STATUS	18	Turns on (active low) when CV mode is active (photocoupled open collector output).
CC STATUS	19	Turns on (active low) when CC mode is active (photocoupled open collector output).
ALM STATUS	20	Turns on (active low) when any of the protection modes are tripped (OVP, OCP, or OTP) or if a shutdown signal is input (photocoupled open collector output).
OUTPUT ON STATUS	21	Turns on (active low) when the output has been turned on (photocoupled open collector output).
POWER OFF STATUS	22	Turns on (active low) when the power switch is turned off.

### Timing diagrams

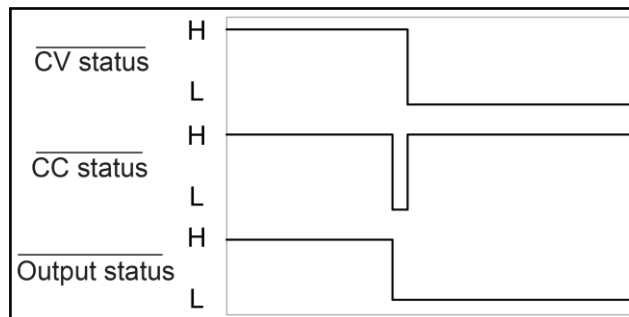
The following figures provide example timing diagrams that show a number of scenarios.

#### NOTE

Pins 18 to 22 are all active low.

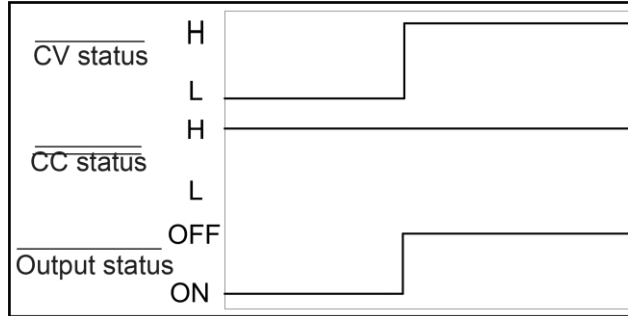
The following figure shows the timing diagram when the output is turned on when the 2260B is set to CV mode.

**Figure 97: Timing diagram: CV mode with output on**



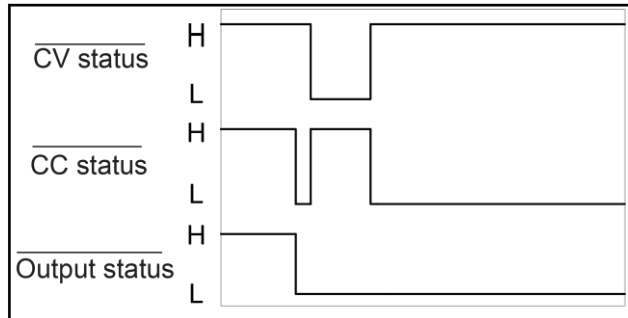
The following figure shows the output status lines when the output is turned off and the 2260B is set to CV mode.

**Figure 98: Timing diagram: CV mode with output off**



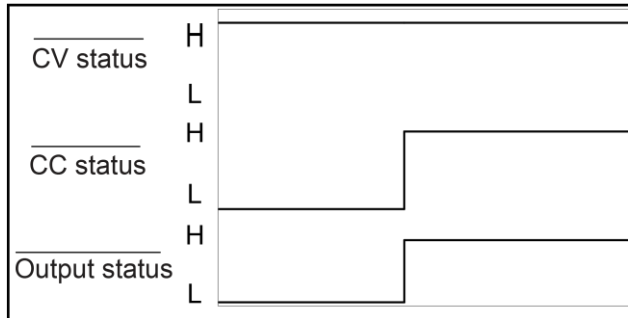
The following figure shows the timing diagram when the output is turned on when the 2260B is set to CC mode.

**Figure 99: Timing diagram: CC mode with the output on**



The following figure shows the output status lines when the output is turned off and the 2260B is set to CC mode.

**Figure 100: Timing diagram: CC mode with the output off**



---

## Configuration

### In this section:

Configuration .....	5-1
Output delay settings .....	5-1
Voltage-current priority settings.....	5-2
Slew rate settings.....	5-2
Internal resistance settings.....	5-3
Bleed resistor control settings .....	5-4
Beeper setting .....	5-4
Measurement average setting.....	5-5
Front-panel lock setting.....	5-5
USB and GPIB settings.....	5-5
LAN settings.....	5-6
Factory set values .....	5-7
Show version.....	5-7
Function settings .....	5-7
Power-on configuration settings .....	5-8
Default settings .....	5-11

## Configuration

The configuration settings of the 2260B power supplies are provided in the following topics.

### Output delay settings

You can set a delay time before turning the output on or off.

When the output on delay is set, the power supply waits the designated time before turning the output on.

When the output off delay is set, the power supply waits the designated time before turning the output off.

When a delay is set to a value other than 0, the Delay indicator lights. Both settings are disabled when the output is set to external control.

The delay time settings have a maximum deviation (error) of 20 ms.

Function	Setting	Range in seconds
Output ON delay time	F-01	0.00 to 99.99
Output OFF delay time	F-02	0.00 to 99.99

## Voltage-current priority settings

The V-I priority selects high speed priority or slew rate priority for CV or CC mode.

You can only change the voltage or current slew rate if the CC or CV slew rate priority is selected. When the CC slew rate priority is selected, the ISR indicator is lit. When the CV slew rate priority is selected, the VSR indicator is lit.

The V-I priority settings are disabled when voltage/current output is set to external control.

Function	Setting	Selections
V-I mode	F-03	CV high speed priority: 0 CC high speed priority: 1 CV slew rate priority: 2 CC slew rate priority: 3

## Slew rate settings

The rising and falling voltage slew rates are only applicable if the voltage-current priority is set to CV Slew Rate Priority.

The rising and falling current slew rates are only applicable if the voltage-current priority is set to CC Slew Rate Priority.

Function	Setting	Range in volts per second	Model
Rising voltage slew rate	F-04	0.01 to 60.00	2260B-30-xx
		0.1 to 160.0	2260B-80-xx
		0.1 to 500.0	2260B-250-xx
		1 to 1600	2260B-800-xx
Falling voltage slew rate	F-05	0.01 to 60.00	2260B-30-xx
		0.1 to 160.0	2260B-80-xx
		0.1 to 500.0	2260B-250-xx
		1 to 1600	2260B-800-xx

Function	Setting	Range in amperes per second	Model
Rising current slew rate	F-06	0.01 to 72.00	2260B-30-36
		0.1 to 144.0	2260B-30-72
		0.1 to 216.0	2260B-30-108
		0.01 to 27.00	2260B-80-13
		0.01 to 54.00	2260B-80-27
		0.01 to 81.00	2260B-80-40
		0.001 to 9.000	2260B-250-4
		0.01 to 18.00	2260B-250-9
		0.01 to 27.00	2260B-250-13
		0.001 to 2.880	2260B-800-1
		0.001 to 5.760	2260B-800-2
		0.001 to 8.640	2260B-800-4
Falling current slew rate	F-07	0.01 to 72.00	2260B-30-36
		0.1 to 144.0	2260B-30-72
		0.1 to 216.0	2260B-30-108
		0.01 to 27.00	2260B-80-13
		0.01 to 54.00	2260B-80-27
		0.01 to 81.00	2260B-80-40
		0.001 to 9.000	2260B-250-4
		0.01 to 18.00	2260B-250-9
		0.01 to 27.00	2260B-250-13
		0.001 to 2.880	2260B-800-1
		0.001 to 5.760	2260B-800-2
		0.001 to 8.640	2260B-800-4

## Internal resistance settings

Set the internal resistance in ohms using F-08.

When the internal resistance is set, it is a resistance in series with the positive output terminal. This allows the power supply to simulate power sources that have internal resistances, such as lead acid batteries. The internal resistance range for each 2260B model is shown in the following table.

**Internal resistance range**

Range in ohms	Model
0.000 to 0.833	2260B-30-36
0.000 to 0.417	2260B-30-72
0.000 to 0.278	2260B-30-108
0.000 to 5.926	2260B-80-13
0.000 to 2.963	2260B-80-27
0.000 to 1.975	2260B-80-40
0.00 to 55.55	2260B-250-4
0.00 to 27.77	2260B-250-9
0.0 to 18.51	2260B-250-13
0.0 to 555.5	2260B-800-1
0.0 to 277.8	2260B-800-2
0.0 to 185.1	2260B-800-4

## Bleed resistor control settings

Bleed resistor control allows you to enable or disable the bleed resistor. Bleed resistors discharge the filter capacitors after power is turned off.

If you select 2, the bleed resistor is automatically turned on when the output is turned on and turned off when the output is turned off. The AUTO setting is only available in firmware version 1.59 or above.

### NOTE

By default, the bleed resistance is on. For battery charging applications, be sure to turn the bleed resistance off. The bleed resistor can discharge the connected battery when the power supply is off. Refer to [Bleed resistor control](#) (on page 4-5) for detail.

Function	Setting	Settings
Bleed resistor control	F-09	Disable the resistor: 0 Enable the resistor: 1 Turn the bleed resistor on or off automatically (AUTO): 2

## Beeper setting

This setting allows you to turn the beeper on or off. The beeper produces alarms and keypad entry sounds.

Function	Setting	Settings
Beeper	F-10	Disable the beeper: 0 Enable the beeper: 1

## Measurement average setting

This setting determines the level of smoothing for the average setting. Only available in firmware version 1.5 or above.

Smoothing affects the measurement time. For example, if the output voltage changes, the time for the measurements to update for the three settings is approximately:

- Low: 0.25 s
- Middle: 1.5 s
- High: 2.5 s

Function	Setting	Settings
Measurement averaging	F-17	Low level: 0 Middle level: 1 High level: 2

## Front-panel lock setting

This setting determines the behavior of the Output key when the front-panel lock is on.

Only available in firmware version 1.54 or above.

Function	Setting	Settings
Front-panel lock	F-19	Allow the output to be turned off: 0 Allow output to be turned on or off: 1

## USB and GPIB settings

These settings display the status of the USB ports on the 2260B and set the mode of the rear-panel USB port.

---

### NOTE

USB mode 3 (USB CDC Full Speed Only) can be used to reduce the data transmission speed when there are sources of interference in the operating environment. This option is only available in firmware version 1.66 and above.

---



---

### NOTE

The 2260B-GPIB-USB accessory is no longer available for purchase. The GPIB-USB adapter information is provided to support customers who have previously purchased this accessory.

---



Function	Setting	Range
Front-panel USB state	F-20	0 = Absent 1 = Mass storage (USB flash drive)
Rear-panel USB state	F-21	0 = Absent 2 = USB-CDC 3 = GPIB-USB adapter
Rear-panel USB mode	F-22	0 = Disable 1 = GPIB-USB adapter for the 2260B-GPIB-USB 2 = USB CDC, auto detect speed 3 = USB CDC, full speed only
GPIB address	F-23	0 to 30

## LAN settings

These functions set the LAN configuration. These settings are applied after the power is cycled.

Setting	Function	Options
MAC address query	F-30 to F-35	Displays the MAC address, 1 to 6. This setting is not configurable. The returns are 0x00 to 0xFF.
LAN disable or enable	F-36	Disable: 0 Enable: 1
DHCP disable or enable	F-37	Disable: 0 Enable: 1
IP addresses 1 to 4	F-39 F-40 F-41 F-42	Sets each section of the IP address. The range for each section is 0 to 255.
Subnet mask 1 to 4	F-43 F-44 F-45 F-46	Sets each section of the subnet mask address. The range for each section is 0 to 255.
Gateway 1 to 4	F-47 F-48 F-49 F-50	Sets each section of the gateway address. The range for each section is 0 to 255.
DNS address 1 to 4	F-51 F-52 F-53 F-54	Sets each section of the DNS address. The range for each section is 0 to 255.
WebSockets disable or enable	F-57	Disable: 0 Enable: 1 Only available in firmware v1.12 and later
Web server control disable or enable	F-59	Disable: 0 Enable: 1
Web password disable or enable	F-60	Disable: 0 Enable: 1
Web password	F-61	Range: 0000 to 9999

## Factory set values

This function restores the 2260B to the factory default settings.

Setting	Function	Options
Restore factory set values	F-88	Disable: 0 Return to factory default settings: 1

### NOTE

You can also restore the factory default settings by sending the `*RST` or `:SYSTEM:PRESet` command. The power needs to be cycled before the factory settings for the USB, GPIB, LAN, and power-on configuration settings can take effect.

## Show version

This function displays the 2260B version number, build date, keyboard version, analog-control version, and kernel build versions.

Setting	Function	Returns
Show version	F-89	0, 1 = Version 2, 3 = Build year 4 = Build month 5 = Build day 6, 7 = Keyboard CPLD version 8, 9 = Analog-Control CPLD version A, B = Reserved C, D = Kernel build year E = Kernel build month F = Kernel build day

## Function settings

The following steps describe how to set and view the function settings F-01 to F-61 and F-88 to F-89.

### NOTE

Function settings F-89 (show version) and F-30 to F-35 (MAC address query) can only be viewed.

Configuration settings F-90 to F-95 cannot be edited using this procedure. Refer to [Setting power-on configuration settings](#) (on page 5-10) for details.

**To set the function settings:**

1. Ensure that the load is not connected.
2. Ensure that the output is off.
3. Press the **Function** key. The function key lights. The display shows  $F-01$  on the top and the configuration setting for F-01 on the bottom.
4. Rotate the **Voltage** knob to select the function.
5. Rotate the **Current** knob to set the parameter for the function.
6. Press the **Voltage** knob to save the setting.  $ConF$  is displayed.
7. Press the **Function** key to exit the configuration settings. The function key light turns off.

## Power-on configuration settings

The power-on configuration settings (F-00 and F-90 to F-95) can only be changed during power up. This prevents inadvertent changes to the configuration settings.

These settings are described in the following topics.

### Calibration settings

Calibration settings can only be set during power up. The calibration password is used to access the local mode calibration or other special functions. The password used determines which function is accessed. For more detail, refer to the *Series 2260B Verification and Adjustment Manual*, available at [tek.com/keithley](http://tek.com/keithley).

Function	Setting	Range
Calibration	F-00	0000 to 9999

### CV control

Sets the constant voltage (CV) control mode between local and external voltage or resistance control. For external voltage control, see [External voltage control of voltage output](#) (on page 4-52) and [External resistance control of voltage output](#) (on page 4-55).

Function	Setting	Range
CV control	F-90	<ul style="list-style-type: none"> <li>■ Local (panel) control: 0</li> <li>■ External voltage control: 1</li> <li>■ External resistance control increasing (10 k<math>\Omega</math> is <math>V_o</math> maximum; 0 k<math>\Omega</math> is the <math>V_o</math> minimum): 2</li> <li>■ External resistance control decreasing (10 k<math>\Omega</math> is <math>V_o</math> minimum; 0 k<math>\Omega</math> is <math>V_o</math> maximum): 3</li> </ul>

## CC control

Sets the constant current (CC) control mode between local and external voltage or resistance control. For external voltage control, see [External voltage control of voltage output](#) (on page 4-54) and [External resistance control of current output](#) (on page 4-57).

Function	Setting	Range
CC control	F-91	<ul style="list-style-type: none"> <li>■ Local (panel) control: 0</li> <li>■ External voltage control: 1</li> <li>■ External resistance increasing control (10 k<math>\Omega</math> is <math>I_o</math> maximum; 0 k<math>\Omega</math> is the <math>I_o</math> minimum): 2</li> <li>■ External resistance decreasing control (10 k<math>\Omega</math> is <math>I_o</math> minimum; 0 k<math>\Omega</math> is <math>I_o</math> maximum): 3</li> </ul>

## Output at power on

Sets the power supply to turn the output on or off at power up.

Description	Function	Settings
Output state at power on	F-92	<ul style="list-style-type: none"> <li>■ Output off at power-up: 0</li> <li>■ Output on at power-up: 1</li> <li>■ T001 to T010 = Run Test Sequence</li> <li>■ TXXX at start up</li> </ul>

## Master and subordinate

Sets the power supply as a master instrument or subordinate instrument for parallel or series operation. Refer to [Parallel and series operation](#) (on page 4-34) for detail.

Description	Function	Settings
Master and subordinate settings	F-93	<ul style="list-style-type: none"> <li>■ Master/Local control: 0</li> <li>■ Master/Parallel 1 (2 units): 1</li> <li>■ Master/Parallel 2 (3 units): 2</li> <li>■ Subordinate/Parallel: 3</li> <li>■ Subordinate/Series (only 30 V and 80 V models): 4</li> </ul>

## External output logic

Sets the external output logic to be active high or active low.


Description	Function	Settings
External output logic	F-94	<ul style="list-style-type: none"> <li>■ Active high: 0</li> <li>■ Active low: 1</li> </ul>


## Power switch trip

This setting enables or disables power off when the overvoltage protection (OVP), overcurrent protection (OCP), or overtemperature protection (OTP) setting is tripped.

### NOTE

Power Switch Trip is not available on all models. Check the power switch for availability.

If the power switch looks like this, the trip function is available: 

If the power switch looks like this, the trip function is not available: 

Description	Function	Settings
Power switch trip	F-95	<ul style="list-style-type: none"> <li>■ Disable the power switch trip for OVP, OCP, or OTP: 1</li> <li>■ Enable the power switch trip for OVP, OCP, or OTP: 0</li> </ul>

## Power-on configuration settings

*To set the power-on configuration settings:*

1. Ensure that the load is not connected.
2. Ensure that the power supply is off.
3. Hold the **Function** key and turn the power on. The display shows F-90 on the top and the configuration setting for F-90 on the bottom.
4. Rotate the **Voltage** knob to select the function.
5. Use the **Current** knob to set the parameter for the function.
6. Press the **Voltage** knob to save the configuration setting. ConF is displayed when the save is complete.
7. Cycle the power to exit and save the configuration settings.

### CAUTION

The power supply takes approximately eight seconds to turn on and shut down. Wait for the display to turn off completely and allow at least 15 seconds between power cycles. Cycling the power on and off quickly can cause the inrush current limiting circuit to fail and will reduce the working life of the input fuse and power switch.

## Default settings

The following default settings are the factory configuration settings for the power supply.

Function	Default setting
Output	Off
LOCK	0 (Disabled)
Voltage	0 V
Current	0 A
OVP	Maximum
OCP	Maximum

Function	Setting	Default setting
Output ON delay time	F-01	0.00 s
Output OFF delay time	F-02	0.00 s
V-I mode slew rate select	F-03	0 = CV high speed priority
Rising voltage slew rate	F-04	60.00 V/s (2260B-30-XX) 160.0 V/s (2260B-80-XX) 500.0 V/s (2260B-250-XX) 1600 V/s (2260B-800-XX)
Falling voltage slew rate	F-05	60.00 V/s (2260B-30-XX) 160.0 V/s (2260B-80-XX) 500.0 V/s (2260B-250-XX) 1600 V/s (2260B-800-XX)
Rising current slew rate	F-06	72.00 A/s (2260B-30-36) 144.0 A/s (2260B-30-72) 216.0 A/s (2260B-30-108) 27.00 A/s (2260B-80-13) 54.00 A/s (2260B-80-27) 81.00 A/s (2260B-80-40) 9.000 A/s (2260B-250-4) 18.00 A/s (2260B-250-9) 27.00 A/s (2260B-250-13) 2.880 A/s (2260B-800-1) 5.760 A/s (2260B-800-2) 8.640 A/s (2260B-800-4)
Falling current slew rate	F-07	72.00 A/s (2260B-30-36) 144.0 A/s (2260B-30-72) 216.0 A/s (2260B-30-108) 27.00 A/s (2260B-80-13) 54.00 A/s (2260B-80-27) 81.00 A/s (2260B-80-40) 9.000 A/s (2260B-250-4) 18.00 A/s (2260B-250-9) 27.00 A/s (2260B-250-13) 2.880 A/s (2260B-800-1) 5.760 A/s (2260B-800-2) 8.640 A/s (2260B-800-4)

Function	Setting	Default setting
Internal resistance	F-08	0.000 $\Omega$
Bleed resistor circuit control	F-09	1 = ON
Beeper control	F-10	1 = ON
Measurement average	F-17	0 = Low
Lock mode	F-19	0 = Front-panel lock: Allow output off

USB/GPIB settings	Setting	Default setting
Rear panel USB mode	F-22	2 = USB CDC, Auto Detect Speed
GPIB address	F-23	8


LAN settings	Setting	Default setting
LAN	F-36	1 = Enable
DHCP	F-37	1 = Enable
Sockets active	F-57	1 = Enable
Web Server active	F-59	1 = Enable
Web password active	F-60	1 = Enable
Web setting password	F-61	0000


The following settings can only be set during power up.

Power-on configuration	Setting	Default setting
CV Control	F-90	0= Panel control (local)
CC Control	F-91	0= Panel control (local)
Power-on Output	F-92	0 = OFF at startup
Master/Subordinate	F-93	0 = Master/Local
External Out Logic	F-94	0= High ON
Power Switch trip	F-95	0 = Enable

## NOTE

Power Switch Trip is not available on all models. Check the power switch for availability.

If the power switch looks like this, the trip function is available: 

If the power switch looks like this, the trip function is not available: 

**In this section:**

Introduction .....	6-1
Replacing the dust filters .....	6-1
Upgrading the firmware .....	6-1
Review the system version and build date .....	6-2
Cleaning the instrument .....	6-3
Fuse replacement .....	6-4
Disposal .....	6-4

## Introduction

This section describes routine maintenance of the instrument that an operator can perform.

## Replacing the dust filters

The dust filter should be replaced at least two times a year. If the filter is not replaced on a regular basis, performance will be reduced and the power supply may overheat.

***To replace the front panel filter (all models):***

1. Turn the instrument off.
2. Pull the filter out from the bottom of the front panel.
3. Replace the filter.

***To replace the side panel filters (720 W and 1080 W only):***

1. Lift the side panel up and away from the case.
2. Remove the filter from the grill and replace with a new filter.

## Upgrading the firmware

Firmware upgrade files are available for download from the tek.com [Product Support and Downloads web page](http://tek.com/support/product-support) ([tek.com/support/product-support](http://tek.com/support/product-support)) in the category "Software."

Refer to the instructions in the release notes to upgrade the firmware.



## Review the system version and build date

The F-89 configuration setting allows you to view the 2260B version number, build date, keyboard version, analog-control version, and kernel build.

### *To view the power supply information:*

1. Press the **Function** key. The Function key lights. The display should show **F-01** on the top and the configuration setting for F-01 on the bottom.
2. Rotate the Voltage knob to change the F setting to **F-89** (show version).
3. Rotate the Current knob to view the version and build date for each item. The items are shown with the following prefixes:
  - **0-XX**: Main program version
  - **1-XX**: Main program version
  - **2-XX**: Main program build year
  - **3-XX**: Main program build year
  - **4-XX**: Main program build month
  - **5-XX**: Main program build day
  - **6-XX**: Keyboard CPLD version
  - **7-XX**: Keyboard CPLD version
  - **8-XX**: Analog CPLD version
  - **9-XX**: Analog CPLD version
  - **A-XX**: Reserved
  - **B-XX**: Reserved
  - **C-XX**: Kernel build year
  - **D-XX**: Kernel build year
  - **E-XX**: Kernel build month
  - **F-XX**: Kernel build day

4. Press the **Function** key to exit. The function key light turns off.

For example, if the main program version is  $v\tau 1.50, 2014/08-03$ , it is displayed as:

- **0-t1**: Main program version
- **1-50**: Main program version
- **2-20**: Main program build year
- **3-14**: Main program build year
- **4-08**: Main program build month
- **5-03**: Main program build day

If the keyboard CPLD version is  $0x030c$ , it is displayed as:

- **6-03**: Keyboard CPLD version
- **7-0c**: Keyboard CPLD version

If the analog CPLD version is  $0x0427$ , it is displayed as:

- **8-04**: Analog CPLD version
- **9-27**: Analog CPLD version

If the kernel version is  $2013/03/22$ , it is displayed as:

- **C-20**: Kernel build year
- **D-13**: Kernel build year
- **E-03**: Kernel build month
- **F-22**: Kernel build day

## Cleaning the instrument

Disconnect the power cord before cleaning.

Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid onto the instrument.

Do not use chemicals containing harsh materials such as benzene, toluene, xylene, or acetone.

## Fuse replacement

The fuse must be replaced by the factory.

When repacking the instrument for shipment, use the original packaging. If the packaging is not available or unfit for use, contact your local Tektronix representative to obtain new packaging.

To return your 2260B for repair or calibration, call 1-800-438-8165 or complete the form at [tek.com/services/repair/rma-request](https://tek.com/services/repair/rma-request). When you request service, you need the serial number and firmware or software version of the instrument.

To see the service status of your instrument or to create an on-demand price estimate, go to [tek.com/service-quote](https://tek.com/service-quote).

## Disposal

Do not dispose of this instrument as unsorted municipal waste. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

---

## Troubleshooting

### In this section:

Introduction .....	7-1
Errors and messages .....	7-1

## Introduction

The following tables provide information on the 2260B errors.

## Errors and messages

The error messages and messages in the following tables may appear on the 2260B display during operation.

Error messages	Description
Err 001	USB flash drive is not present.
Err 002	File not on USB flash drive.
Err 003	Empty memory location.
Err 004	File access error.

---

### NOTE

For error messages other than Err 001 to Err 004, please contact Keithley.

---

Messages	Description
MSG 001	External control of output. Output off (F-94=0, High=on)
MSG 002	External control of output. Output off (F-94=1, Low=on)
MSG 003	F-93 is not zero. Unable to calibrate.

---

## Frequently asked questions

### In this section:

Where can I find the latest drivers? .....	8-1
Why can't I change the CC or CV mode?.....	8-1
Why is the OVP triggering early? .....	8-1
Can I combine more than one cable for the output wiring? .....	8-2
Why doesn't the accuracy meet the specifications? .....	8-2

### Where can I find the latest drivers?

For the latest drivers and additional support information, see [tek.com/support](http://tek.com/support).

*To see what drivers are available for your instrument:*

1. Go to [tek.com/support](http://tek.com/support).
2. Select **Product Support & Downloads**.
3. Enter the model number of your instrument.
4. Select **Software** from the filter list.
5. Select **Driver** from the filter list.

### Why can't I change the CC or CV mode?

To set the power supply to CC or CV mode, you must press and hold the **Function** key when the power is turned on. This enters the power-on configuration mode. Refer to [Setting power-on configuration settings](#) (on page 5-10) for more information.

### Why is the OVP triggering early?

When setting the OVP voltage, take into account the voltage drop from the load cables. The OVP level is set from the output terminals, not the load terminals, so the voltage at the load terminals may be slightly lower.

## **Can I combine more than one cable for the output wiring?**

Yes. You can use cables in parallel if the current capacity of a single cable is insufficient. However, you must take the withstand voltage into account. Ensure that the cables are twisted together and are the same length.

## **Why doesn't the accuracy meet the specifications?**

Make sure the device is powered on for at least 30 minutes within +20 °C to +30 °C. This is necessary to stabilize the power supply to match the specification.

#### In this section:

[Additional 2260B information](#) ..... 9-1

### Additional 2260B information

For additional information about the 2260B, refer to [tek.com/keithley](http://tek.com/keithley), which contains the most up-to-date information. From the website, you can access:

- The *Series 2260B Programmer's Manual*, which contains complete instrument information, including descriptions of the SCPI commands.
- *The Low Level Measurements Handbook: Precision DC Current, Voltage, and Resistance Measurements*
- *Semiconductor Device Test Applications Guide*
- Application notes
- Updated drivers and firmware
- Information about related products, including:
  - Series 2600B System SourceMeter™ Instruments
  - The Model 4200A-SCS Semiconductor Characterization System
  - The 2651A High Power System SourceMeter Instrument
  - The 2657A High Power System SourceMeter Instrument
  - The 2400 Series SMU SourceMeter Instruments

In addition, your local Field Applications Engineer can help you with product selection, configuration, and usage. Check the website for contact information.

Specifications are subject to change without notice.  
All Keithley trademarks and trade names are the property of Keithley Instruments.  
All other trademarks and trade names are the property of their respective companies.

---

Keithley Instruments • 28775 Aurora Road • Cleveland, Ohio 44139 • 1-800-833-9200 • [tek.com/keithley](http://tek.com/keithley)

