

## SNAP POWER SUPPLIES

### Features

- > Built-in fuse, ON/OFF power switch, and LED indicator
- > Convenient panel mounting; optional DIN-rail mounting
- > Easy connections
- > Wide input voltage range
- > UL approved

### DESCRIPTION

SNAP power supplies provide the best source of AC or DC power for your Opto 22 SNAP PAC hardware. Packaged in a compact and sturdy housing, SNAP power supplies include a built-in fuse, an LED status indicator, and an ON/OFF power switch for ease of use.

The **SNAP-PS24** and **SNAP-PS24U** power supplies are designed for either of two purposes:

- To provide primary power for a SNAP PAC S-series controller
- To provide 24 volts of DC loop power for SNAP analog modules mounted on a SNAP PAC rack

The **SNAP-PS5**, **SNAP-PS5-24DC**, and **SNAP-PS5U** power supplies are designed to provide 5 VDC power for a SNAP PAC rack with an I/O processor (SNAP PAC brain or R-series controller) and I/O modules mounted on the rack. The combination of a rack, processor, and modules is called an *I/O unit*.

Opto 22 recommends using one SNAP power supply for each I/O unit and for each controller. Choose the power supply based on the load required for the I/O unit. See the power requirements tables starting on [page 12](#) for help in determining the power supplies you need. Additional information on using power supplies can be found in the Opto 22 technical note *Using Power Supplies with Opto 22 Systems* (form #1271, available on our website, [www.opto22.com](http://www.opto22.com)).

All SNAP power supplies except the SNAP-PS5-24DC require AC input power. The SNAP-PS5U and SNAP-PS24U accommodate a wide range of AC input voltages, from 100 to 250 VAC.

The SNAP-PS5-24DC DC-to-DC power supply requires a 24 VDC input and is ideal for systems using DC backup power.

Each SNAP power supply can be mounted in one of two ways: next to the controller or SNAP I/O unit it powers, using the standard panel-mounting base, or directly on a DIN rail using the optional 35mm DIN-rail adapter.

AC or DC input power connections, as required by the model, are made to a removable terminal strip on top of the power supply. DC output power is then ready to be hooked up to the controller or rack using the attached wiring harness.



SNAP-PS5 power supply

SNAP power supplies work with Wired+Wireless™ PACs and I/O units as well as standard wired PACs and I/O.

**Notes for legacy hardware:** SNAP power supplies are also compatible with Ethernet-based SNAP Ultimate, SNAP Ethernet, and SNAP Simple I/O, and with serial-based SNAP I/O units such as those with a B3000, SNAP-HA, or SNAP-B3000-MODBUS brain.

### Part Numbers

Part	Description
SNAP-PS5	SNAP Power Supply 120 VAC input; 5 VDC, 4 A output
SNAP-PS5-24DC	SNAP Power Supply 24 VDC input; 5 VDC, 4 A output
SNAP-PS5U	SNAP Power Supply 100–250 VAC input; 5 VDC, 5 A output
SNAP-PS24	SNAP Power Supply 120 VAC input; 24 VDC, 3/4 A output
SNAP-PS24U	SNAP Power Supply 100–250 VAC input; 24 VDC, 1-1/4 A output
SNAP-PSDIN	35mm DIN-Rail Adapter for SNAP-PS5, SNAP-PS24, or SNAP-PS5-24DC
SNAP-PSUDIN	35mm DIN-Rail Adapter for SNAP-PS5U or SNAP-PS24U

## SPECIFICATIONS

	SNAP-PS5	SNAP-PS5-24DC	SNAP-PS5U
Input Voltage	95–130 VAC, 47–63 Hz	18–32 VDC	100–250 VAC, 47–63 Hz
Output Voltage	5.1 ±0.1 VDC	5.1 ±0.1 VDC	5.1 ±0.1 VDC
Output Current	4.0 A	4.0 A	5.0 A
Maximum Input Current Draw	0.4 Amps at 120 VAC	1.3 Amps at 24 VDC	0.5 Amps at 120 VAC
Dimensions	See the drawings starting on <a href="#">page 8</a> .	See the drawings starting on <a href="#">page 8</a> .	See the drawings on <a href="#">page 10</a> .
Weight	15 oz. (425.25 g)	15 oz. (425.25 g)	1.9 lbs (863.63 g)
Operating Temperature	-20 to 70 °C	-20 to 70 °C	-20 to 70 °C
Storage Temperature	-30 to 85 °C	-30 to 85 °C	-30 to 85 °C
Torque, connector screws	4.5 in-lb (0.51 N-m)	4.5 in-lb (0.51 N-m)	4.5 in-lb (0.51 N-m)
Fuse	Opto 22 PN: SNAP-FUSE1AB Vendor PN: GDC-1A (Bussman)	Opto 22 PN: SNAP-FUSE2AB Vendor PN: GDB-2A (Bussman)	Internal fuse
Agency Approvals	NEBS, UL, CE, ATEX, DFARS; UKCA	UL, CE, ATEX, RoHS, DFARS; UKCA	UL, CE, RoHS, DFARS
Warranty	30 months	30 months	30 months

	SNAP-PS24	SNAP-PS24U
Input Voltage	95–130 VAC, 47–63 Hz	100–250 VAC, 47–63 Hz
Output Voltage	24 ± 0.6 VDC	24 ± 0.1 VDC
Output Current	0.75 A	1.25 A
Maximum Input Current Draw	0.4 Amps @ 120 VAC	0.5 Amps @ 120 VAC
Dimensions	See drawings starting on <a href="#">page 8</a> .	See drawings on <a href="#">page 10</a> .
Weight	2.1 lbs (952.54 g)	1.9 lbs (863.63 g)
Operating Temperature	-20 to 70 °C	-20 to 70 °C
Storage Temperature	-30 to 85 °C	-30 to 85 °C
Torque, connector screws	4.5 in-lb (0.51 N-m)	4.5 in-lb (0.51 N-m)
Fuse	Opto 22 PN: SNAP-FUSE1AB Vendor PN: GDC-1A (Bussman)	Internal fuse
Agency Approvals	UL, CE, RoHS, DFARS	UL, CE, RoHS, DFARS
Warranty	30 months	30 months

## I/O UNIT POWER REQUIREMENTS

The tables starting on [page 12](#) will help you determine the power supply needs for your system. Copy the power requirements worksheet and complete one for each distributed I/O unit.

In addition, keep the following power recommendations in mind. For more help with power supplies, see Opto 22 form #1271, *Using Power Supplies with Opto 22 Systems*.

### Use a single power supply per rack

In general, we recommend you use an independent, isolated, regulated power supply locally with each rack. Local isolated supplies offer these advantages:

- Short supply conductors, which minimize losses
- Power redundancy, so the failure of a single supply causes only a single rack failure, not a total system failure
- Fewer voltage drops and ground loops (Voltage drops and subsequent ground loops may occur when power is distributed over a large system.)

### Always use a separate field supply

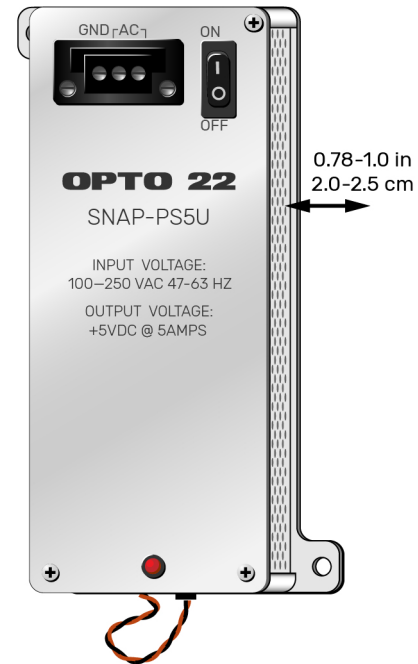
Use a separate power supply for the field side of the I/O. Using the rack supply for field actuation and monitoring defeats the isolation the I/O module offers and therefore increases the chance of a ground loop within the control system. Additionally, a sudden change of current on the field side can cause undesirable voltage fluctuations that may interfere with the controller or I/O unit's operation.

### Power wiring guidelines

- Use one power supply per I/O unit.
- Use one power supply per controller.
- Use 14 AWG wire.
- SNAP power supplies have short wires to minimize voltage drop. Do not extend the length of the wires.
- If you power multiple I/O units or controllers from one power supply, use a star wiring topology. Do not daisy-chain power wiring from one device to the next.

## Clearances

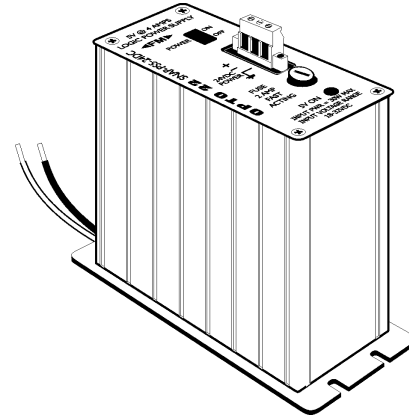
Make sure that there is 0.78-1.0 inches (2.0-2.5 centimeters) on the vent side of the power supply after it is mounted. Compliance with these guidelines helps ensure that the power supply performs as described in the specifications..



## INSTALLATION

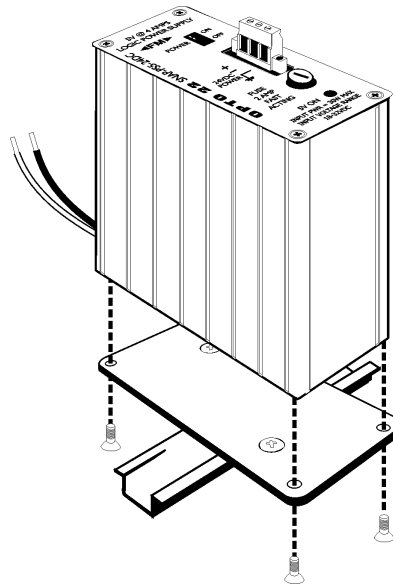
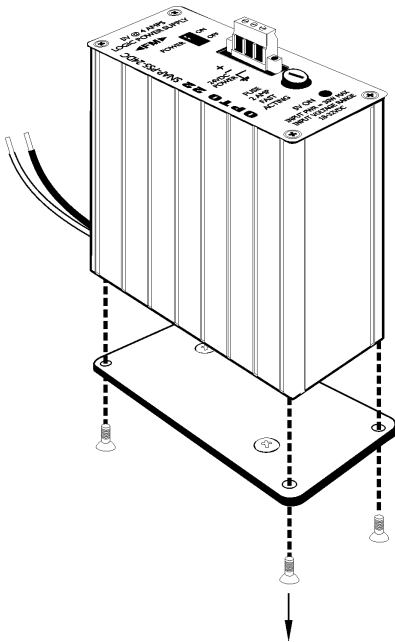
### Panel Mounting (standard)

Mount the SNAP power supply in a location where the attached red and black power wires will reach the "+" and "-" power terminals on the SNAP mounting rack or controller. Do not extend the wires.



### DIN-Rail Mounting (optional)

1. For 35mm DIN-rail mounting, remove the four screws that fasten the panel mounting base plate to the power supply. **Keep screws in a safe place.**
2. Remove panel mounting base plate.
3. In place of the panel mounting base plate, use the four screws removed in step 1 to fasten the DIN-rail adapter (purchased separately) to the power supply.
4. Mount the SNAP power supply on the DIN rail (next to the power connector on the I/O unit).



## WIRING—PRIMARY POWER SUPPLY

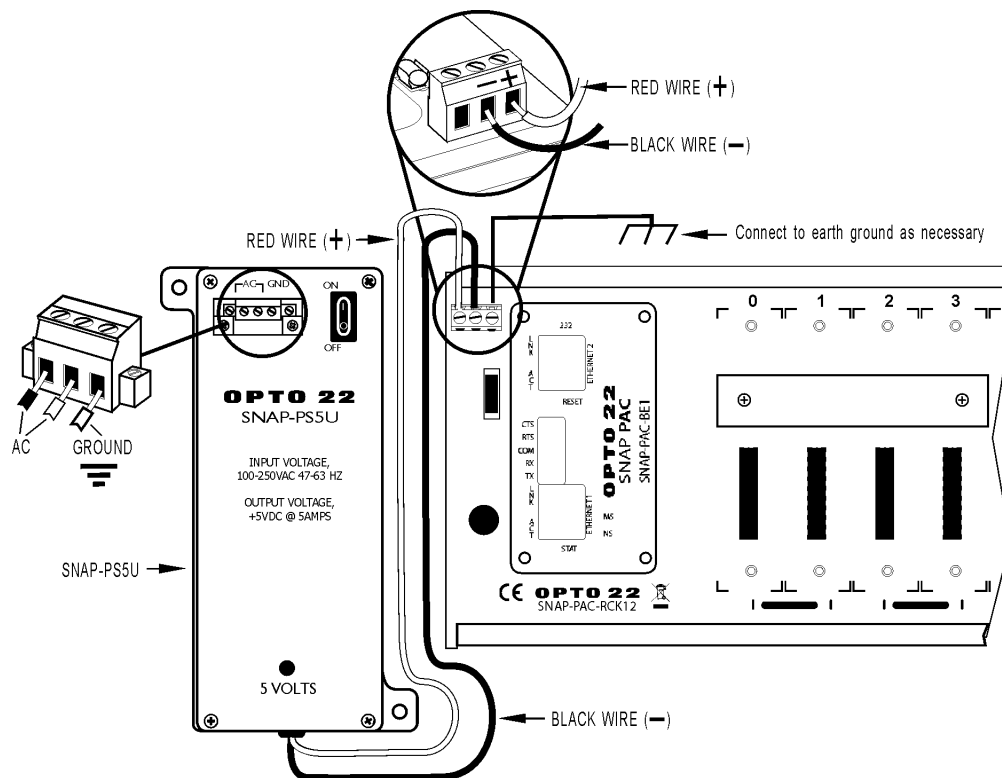
### Wiring to a Standalone Controller

1. For a controller, check the controller's specifications in its data sheet or user's guide to make sure you have the correct power supply for the controller's requirements.
2. Follow directions in the controller's user's guide to wire the power supply to the controller. The power supply's red (or white-and-red) wire is the positive wire; the black (or white-and-black) wire is the negative wire.

### Wiring to a SNAP I/O Unit

1. Using the power terminals on the SNAP mounting rack, attach the red wire to the "+" terminal and the black wire to the "-" terminal.

2. **For the SNAP-PS5 (not illustrated):** Using the removable input power connector on top of the power supply, apply 120 volts AC power between the two terminals marked "AC." The ground terminal should be connected to ground.
3. **For the SNAP-PS5-24DC (not illustrated):** Using the removable input power connector on top of the power supply, apply 24 volts DC power between the two terminals marked "±DC." The ground terminal should be connected to ground.
4. **For the SNAP-PS5U (illustrated below):** Using the removable input power connector on top of the power supply, apply 100–250 volts AC power between the two terminals marked "AC." The ground terminal should be connected to ground.



## WIRING—LOOP POWER SUPPLY

1. Mount the SNAP-PS24 or SNAP-PS24U power supply in a location where the attached output power wires will reach the field connector for SNAP analog modules or the terminal strip on SNAP mounting racks that have the additional field wiring terminal strips.
2. The white-and-red wire is the positive wire (24 VDC). The white-and-black wire is the negative wire (24 VDC return). For specific loop power wiring information, see Opto 22 forms #1065 and #1066 if wiring directly to the field connectors on SNAP analog modules (see Figure 1 below), or refer to form #0784 for SNAP racks that have the additional field wiring terminal strip (see Figure 2). See the next page for similar SNAP-PS24U wiring diagrams.
3. Using the removable input power connector on top of the power supply, apply 120 volts of AC power between the two terminals marked "AC." The ground terminal should be connected to ground.

Figure 1. SNAP-PS24 Used as a Loop Supply with the SNAP PAC System

This diagram shows the SNAP-PS24 used as the loop supply and a SNAP-PS5 used as the primary power supply.

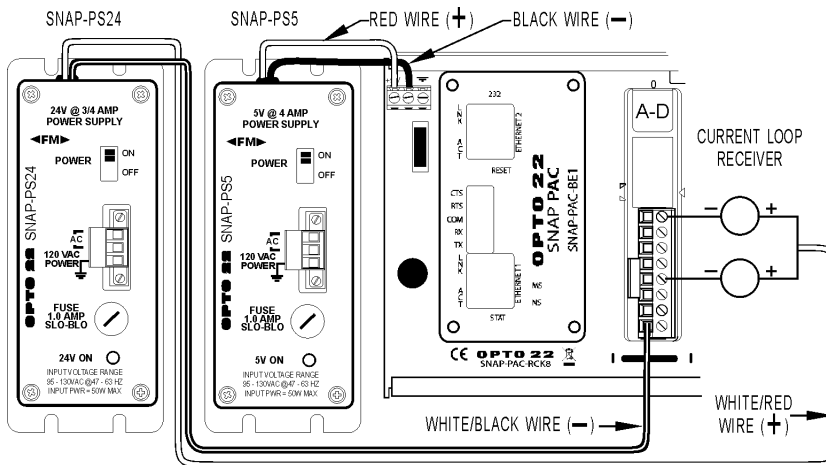
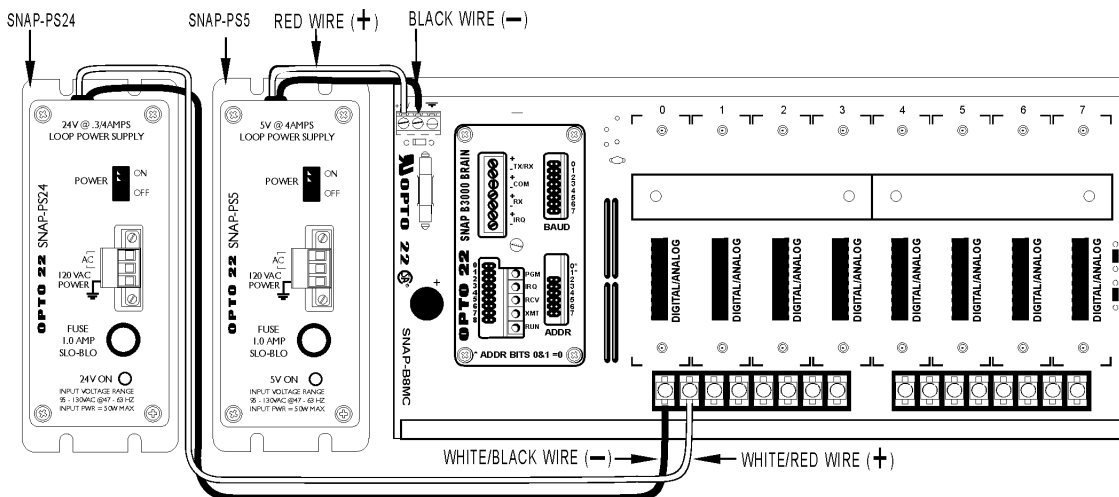


Figure 2. SNAP-PS24 Used as a Loop Supply with Legacy Hardware

The SNAP-PS24 is used as the loop supply; a SNAP-PS5 is used as the primary power supply.



## WIRING—LOOP SUPPLY (CONTINUED)

Figure 1. SNAP-PS24U Used as a Loop Supply with the SNAP PAC System

This diagram shows the SNAP-PS24U used as the loop supply and a SNAP-PS5U used as the primary power supply.

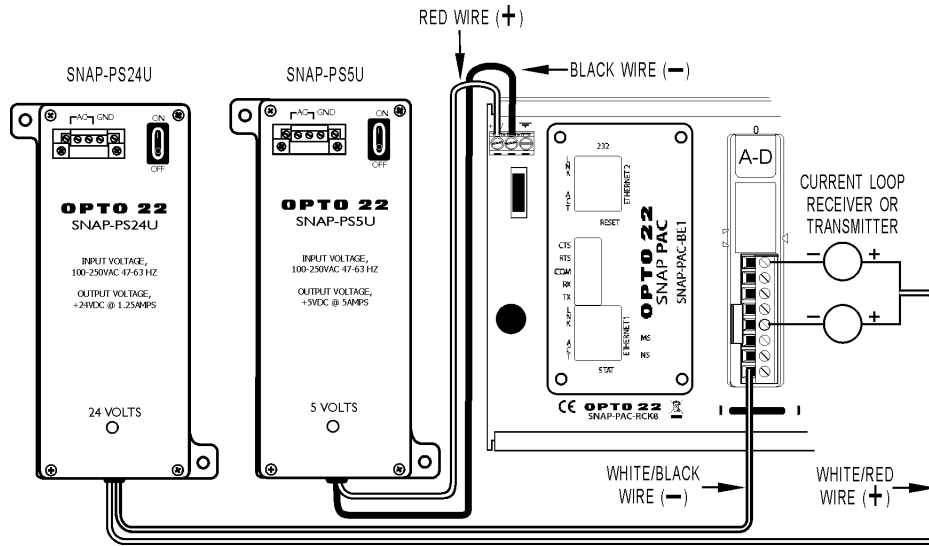
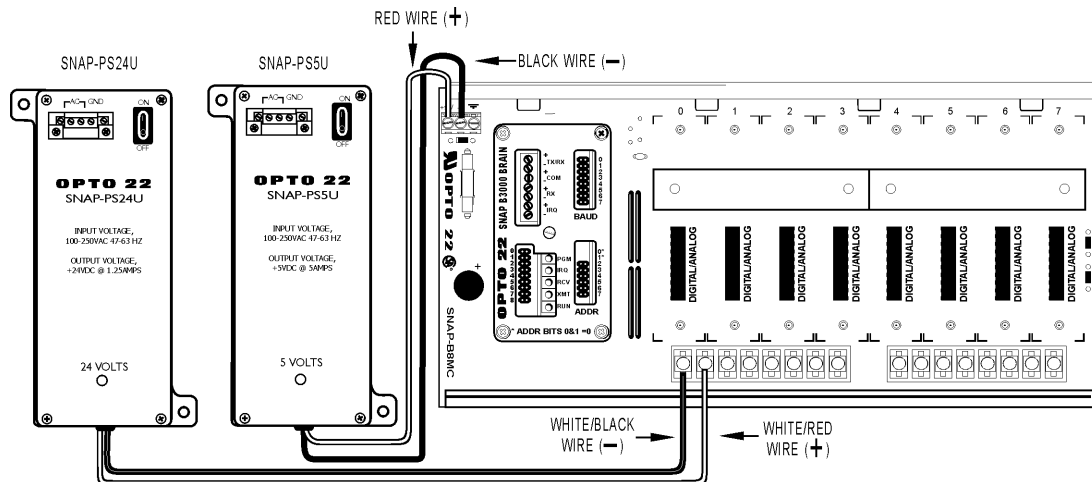


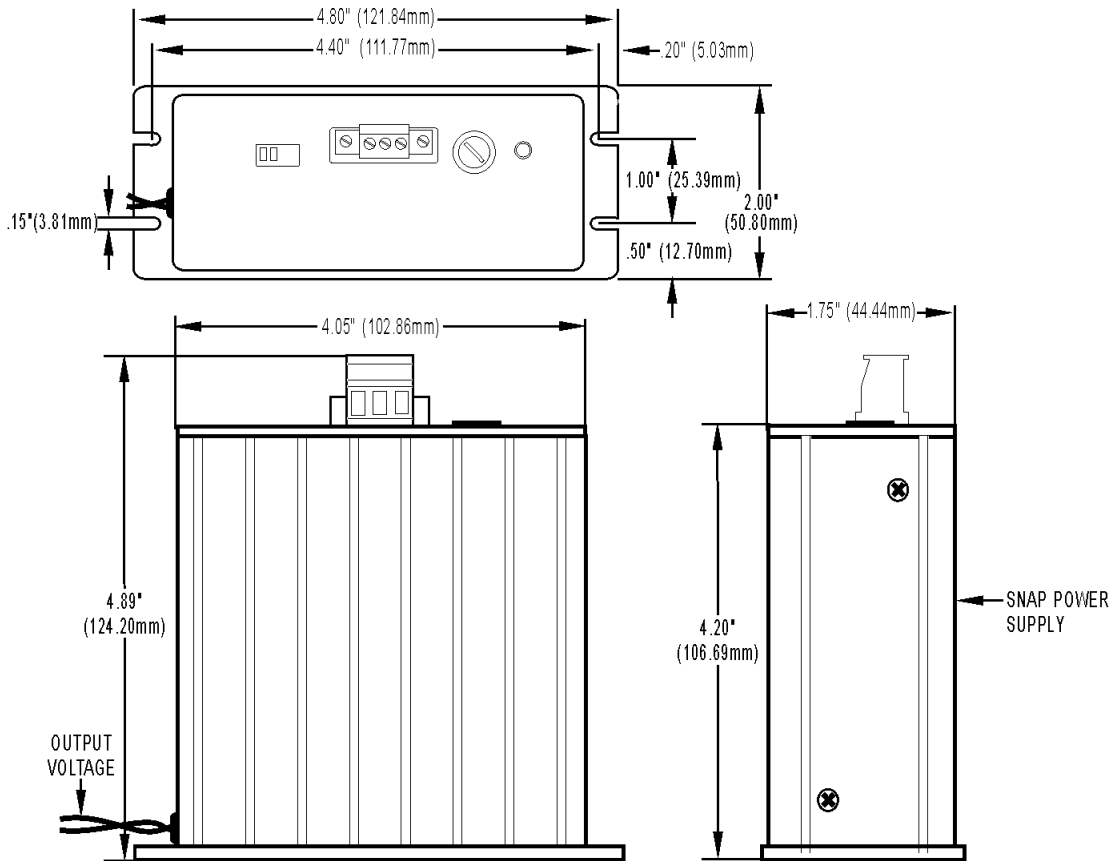
Figure 2. SNAP-PS24U Used as a Loop Supply with Legacy Hardware

The SNAP-PS24U is used as the loop supply; a SNAP-PS5U is used as the primary power supply.



## DIMENSIONS—SNAP-PS5, SNAP-PS24, AND SNAP-PS5-24DC

### Panel Mount

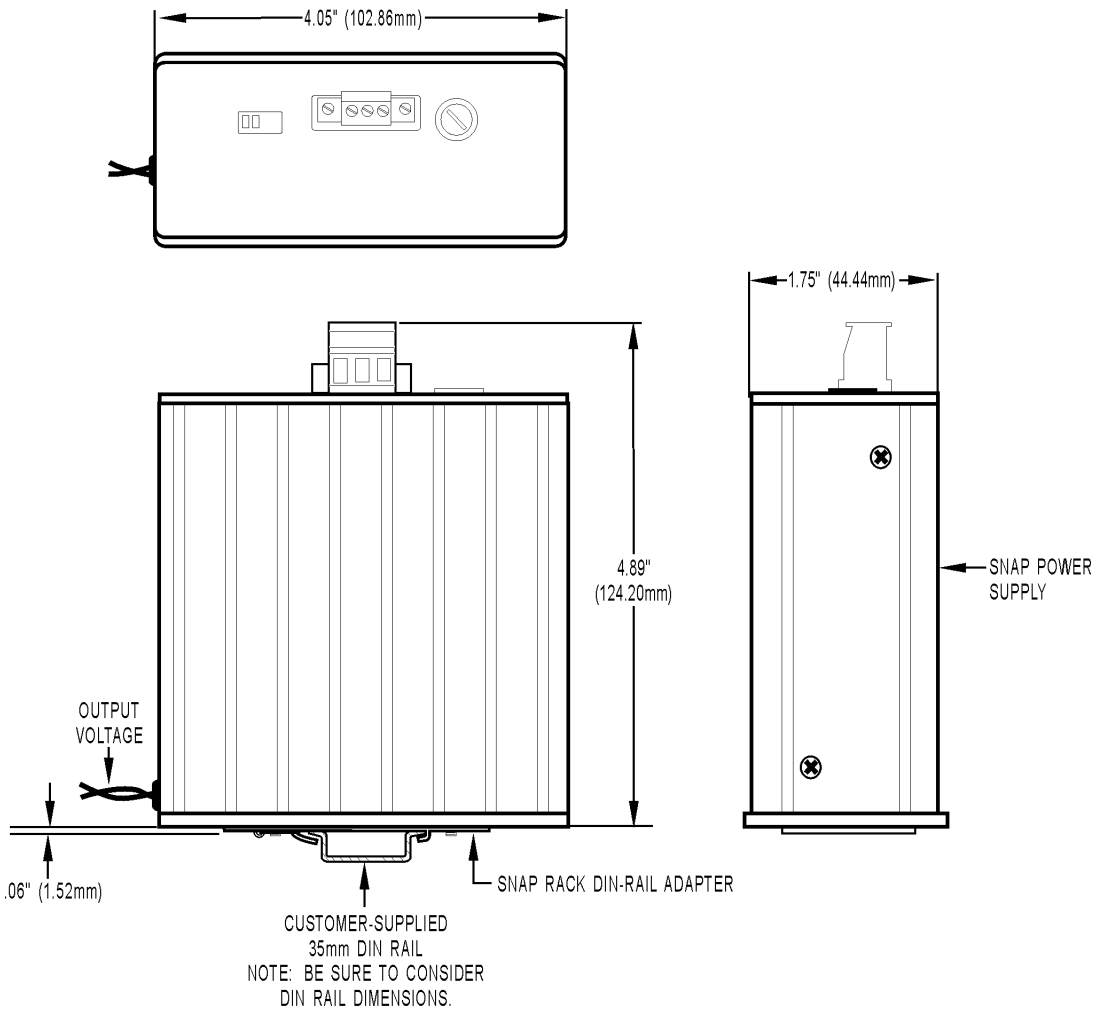


The length of the red and black leads is 8.00 inches +/- .50 inches.



## DIMENSIONS—SNAP-PS5, SNAP-PS24, AND SNAP-PS5-24DC

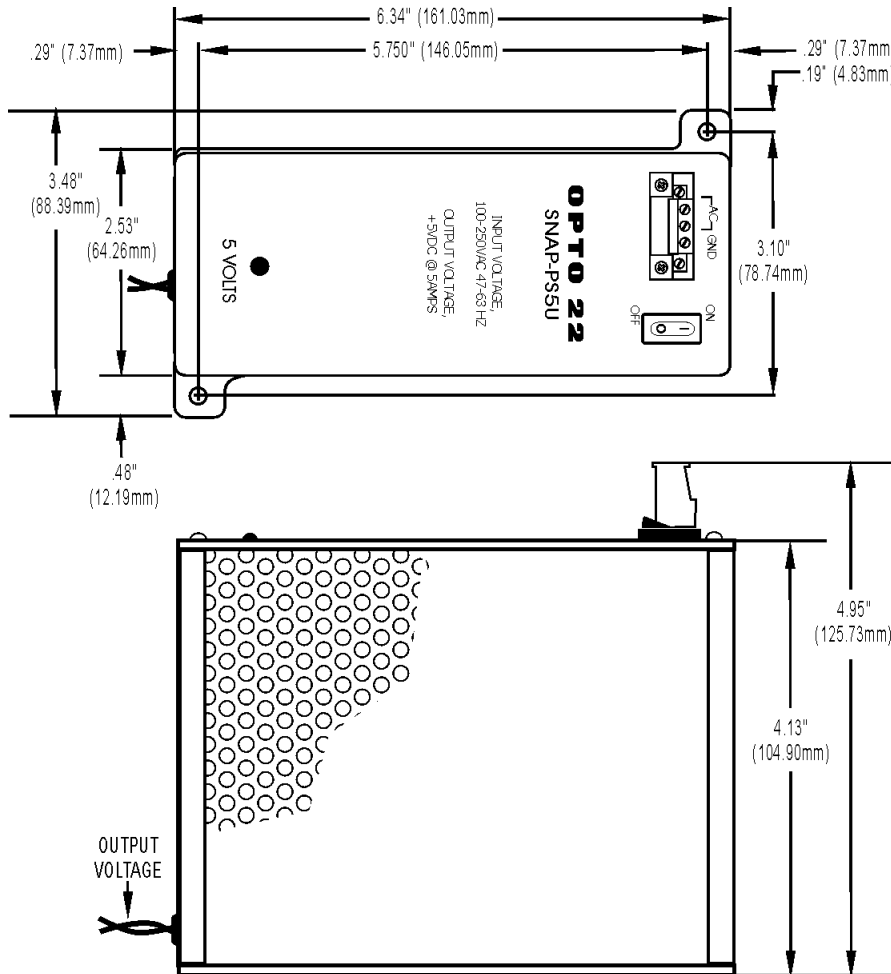
With DIN-Rail Adapter



## DIMENSIONS—SNAP-PS5U AND SNAP-PS24U

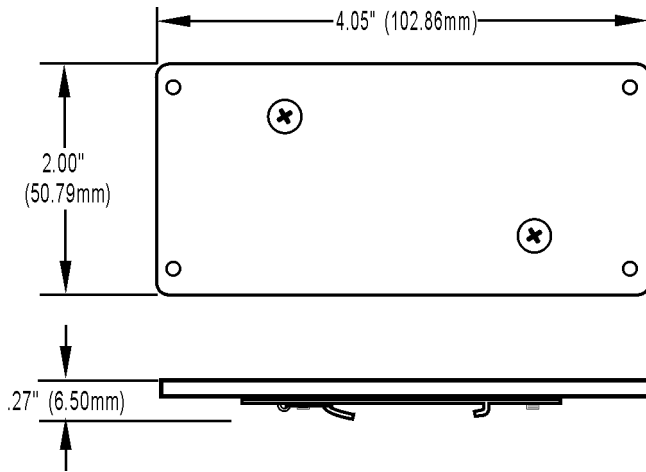
### Panel Mount

SNAP-PS5U is shown; SNAP-PS24U has the same dimensions.

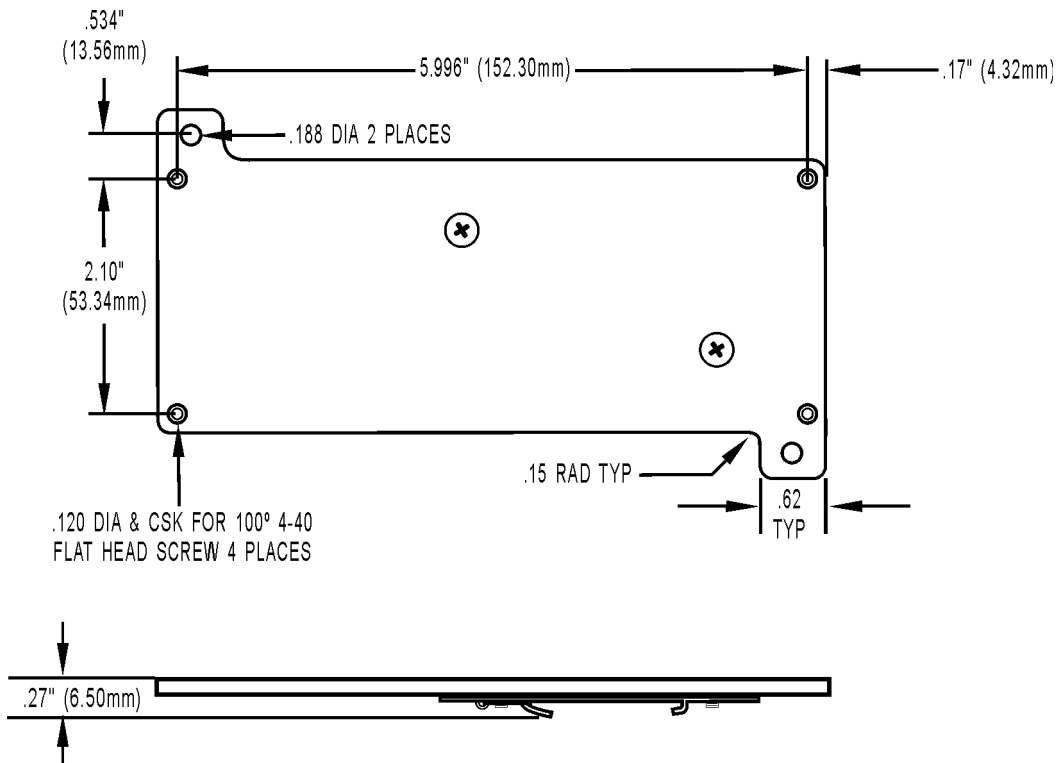


The length of the red and black leads is 9.00 inches +/- .50 inches.

## DIMENSIONS—SNAP-PSDIN



## DIMENSIONS—SNAP-PSUDIN



## POWER REQUIREMENTS TABLES

Opto 22 recommends using one power supply per I/O unit and one power supply per controller. See “I/O Unit Power Requirements” on page 3 for additional information.

To determine power requirements for products not listed in these tables, see the data sheets for the individual products.

**IMPORTANT NOTE:** For a SNAP-PS5 or a SNAP-PS5-24DC power supply, the total power required must not exceed 4 amps. For a SNAP-PS5U, the total power required must not exceed 5 amps.

### Controller Power Requirements

	Standalone Controller or adapter card	Power Req (VDC)	Power Req. (Amps)
	SNAP PAC S-series controllers (wired)	8–32 VDC*	10 VA**
Legacy or obsolete hardware	Wired+Wireless S-series PACs	8–32 VDC	11.3 VA
	SNAP-LCSX or -LCSX-PLUS controller	5 VDC	0.500
	SNAP-LCM4 controller	5 VDC	1.000
	M4-SENET-100 adapter card	5 VDC	1.000
	M4SARC adapter card	5 VDC	0.200
	M4DUALARC adapter card	5 VDC	0.150
	M4SARCF adapter card	5 VDC	0.250
	M4SARCFR adapter card	5 VDC	0.350

\* SNAP-PAC-S1 controllers with serial numbers below 500,000 use 8–24 VDC.

\*\* Uses 1 A if powered at 10V. To determine amps required, divide 10 by the number of volts applied. Example:  $10 / 24 V = 0.417 A$  (24 VDC input requires 0.417 A)

### I/O Processor (Brain or On-the-Rack Controller) Power Requirements

	Processor (Brain or Rack-mounted Controller)	Power Req. (Amps)*
Obsolete	SNAP PAC R-series controllers (all wired models)	1.200
	SNAP PAC SB brains	0.750
	SNAP PAC EB brains (all wired models)	0.750
	SNAP PAC R-series controllers (Wired+Wireless)	1.500
	SNAP PAC EB brains (Wired+Wireless)	1.000
Legacy Hardware	SNAP Ultimate controller/brains (all models)	1.000
	SNAP Ethernet brains	0.800
	SNAP Simple I/O brains	0.500
	B3000 (serial SNAP brain)	0.500
	SNAP-D64RS	
	SNAP-B3000-Modbus	1.000
	SNAP ARCNET brains	
SNAP-B4	1.000	
SNAP-B6	1.500 if terminated	

\*Current from 5-volt supply

(Continued on following page)

## POWER REQUIREMENTS TABLES (CONTINUED)

### I/O Unit (Processor, Rack, I/O Modules) Power Requirements Worksheet

Item	Quantity	X Power Req. (Amps)	Total Power Required (Amps) <sup>1</sup>
SNAP processor (Enter Amps from Processor Power Requirements table)	1		
SNAP-IDC5-SW digital input module			
SNAP-IDC5-SW-NC digital input module			
SNAP-AITM-8 analog input module <sup>4</sup>		0.200	
Isolated analog input and output modules (part numbers ending in -i or iSRC) except SNAP-AITM-4i			
All other 4-channel digital input and output modules except mechanical relay outputs ( <i>not</i> high-density digital modules)		0.050	
SNAP mechanical power relay output modules <sup>4</sup>		0.160	
SNAP-AICTD, AICTD-4 <sup>3</sup> analog input modules			
High-density digital input and output modules <sup>4</sup>			
SNAP-AIMA-32, SNAP-AIMA-iH <sup>4</sup> , SNAP-AIV-32, and SNAP-AITM-4i analog input modules <sup>4</sup>		0.150	
All analog output modules except SNAP-AOA-iSRC and SNAP-AOD-29-HFi			
SNAP-AOD-29-HFi		0.300	
SNAP-AIPM power monitoring module <sup>3</sup>			
SNAP-AIPM-3, SNAP-AIPM-3V power monitoring modules <sup>4</sup>		0.100	
SNAP-AILC and AILC-2 load cell modules <sup>3</sup>		0.120	
SNAP-AIRTD-8U analog input module <sup>4</sup>		0.135	
SNAP-AIARMS analog input module			
SNAP-AIVRMS analog input module			
SNAP-AICTD-8 <sup>4</sup> analog input module			
SNAP-AIMA, AIMA-4 <sup>3</sup> , and AIMA-8 <sup>4</sup> analog input modules		0.170	
SNAP-AITM and AITM-2 analog input modules			
SNAP-AIMV-4 <sup>3</sup> and AIMV2-4 <sup>3</sup> analog input modules			
SNAP-AIV, AIV-4 <sup>3</sup> , and AIV-8 <sup>4</sup> analog input modules			
SNAP-AIRTD analog input module			
SNAP-AIR40K-4 <sup>3</sup> analog input module			
SNAP-AIR400K-8 <sup>4</sup> analog input module		0.190	
SNAP-AIRATE analog input module			
SNAP-AIRATE-HFi analog input module		0.210	
SNAP-SCM-ST2 and SNAP-SCM-SSI serial modules <sup>4</sup>		0.200	
SNAP-SCM-232, SNAP-SCM-485-422, SNAP-SCM-PROFi <sup>3</sup>			
SNAP-SCM-MCH16 <i>not</i> powering a breakout board <sup>2</sup>		0.250	
SNAP-SCM-MCH16 powering a breakout board <sup>2</sup>		0.700	
<b>Total</b>			

1 Current from 5-volt supply

2 Can be used with SNAP PAC R-series controllers and SNAP PAC brains, SNAP Simple, and SNAP Ultimate

3 Can be used with SNAP PAC R-series controllers and SNAP PAC brains, SNAP Simple, SNAP Ethernet, and SNAP Ultimate

4 Can be used with SNAP PAC systems only

## PRODUCTS

Opto 22 develops and manufactures reliable, easy-to-use, open standards-based hardware and software products. Industrial automation, process control, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications worldwide all rely on Opto 22.

### groov RIO®

*groov RIO edge I/O* offers a single, compact, PoE-powered industrial package with web-based configuration and IIoT software built in, support for multiple OT and IT protocols, and security features like a device firewall, data encryption, and user account control.

Standing alone, *groov RIO* connects to sensors, equipment, and legacy systems, collecting and securely publishing data from field to cloud. Choose a universal I/O model with thousands of possible field I/O configurations, with or without Ignition from Inductive Automation®, or a *RIO EMU energy monitoring unit* that reports 64 energy data values from 3-phase loads up to 600 VAC, Delta or Wye.

You can even write an IEC 61131-3 compliant control program to run on *groov RIO*, using CODESYS. You can also use *groov RIO* with a Modbus/TCP master or as remote I/O for a *groov EPIC* system.

### groov EPIC® System

Opto 22's *groov Edge Programmable Industrial Controller (EPIC) system* gives you industrially hardened control with a flexible Linux®-based processor with gateway functions, guaranteed-for-life I/O, and software for your automation and IIoT applications.

#### groov EPIC Processor

The heart of the system is the *groov EPIC* processor. It handles a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

In addition, the EPIC provides secure data communications among physical assets, control systems, software applications, and online services, both on premises and in the cloud. No industrial PC needed.

Configuring and troubleshooting I/O and networking is easier with the EPIC's integrated high-resolution color touchscreen. Authorized users can manage the system locally on the touchscreen, on a monitor connected via the HDMI or USB ports, or on a PC or mobile device with a web browser.

#### groov EPIC I/O

*groov I/O* connects locally to sensors and equipment. Modules have a spring-clamp terminal strip, integrated wireway, swing-away cover, and LEDs indicating module health and discrete channel status. *groov I/O* is hot swappable, UL Hazardous Locations approved, and ATEX compliant.

#### groov EPIC Software

The *groov EPIC* processor comes ready to run the software you need:

- Programming: Choose flowchart-based PAC Control, CODESYS Development System for IEC61131-3 compliant programs, or secure shell access (SSH) to the Linux OS for custom applications
- Node-RED for creating simple IIoT logic flows from pre-built nodes
- Efficient MQTT data communications with string or Sparkplug data formats
- Multiple OPC UA server options
- HMI: *groov View* to build your own HMI viewable on touchscreen, PCs, and mobile devices; PAC Display for a

Windows HMI; Node-RED dashboard UI

- Ignition or Ignition Edge® from Inductive Automation (requires license purchase) with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT communications

#### Older products

From solid state relays, to world-famous G4 and SNAP I/O, to SNAP PAC controllers, older Opto 22 products are still supported and working hard at thousands of installations worldwide. You can count on us for the reliability and service you expect, now and in the future.

## QUALITY

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California.

Because we test each product twice before it leaves our factory rather than testing a sample of each batch, we can afford to guarantee most solid-state relays and optically isolated I/O modules for life.

## FREE PRODUCT SUPPORT

Opto 22's California-based Product Support Group offers free technical support for Opto 22 products from engineers with decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Support is always available on our website, including [free online training](#) at OptoU, how-to [videos](#), [user's guides](#), the Opto 22 KnowledgeBase, and [OptoForums](#).

## PURCHASING OPTO 22 PRODUCTS

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at **800-321-6786** (toll-free in the U.S. and Canada) or **+1-951-695-3000**, or visit our website at [www.opto22.com](http://www.opto22.com).



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