# SNAP PAC S-Series Controllers

## Features

- Up to 32 PAC Control flowcharts running simultaneously
- Two 10/100 Mbps Ethernet interfaces for host and I/O communication over standard Ethernet networks
- Wired+Wireless models add wireless LAN network interface as well
- RS-232 and RS-485 serial ports for connection to serial devices, including Opto 22 serial I/O units and PPP host communication.
- Multiple protocol support: TCP/IP, EtherNet/IP™, Modbus®/TCP, SNMP, SMTP, FTP, and OptoMMP™
- FTP server/client capability; includes file system and removable storage (microSD card)
- Use two identical models for controller redundancy

**SNAP-PAC-S2 controller**

## Description

A SNAP PAC S-series programmable automation controller (PAC) provides powerful, real-time control and communication to meet your industrial control, monitoring, and data acquisition needs. As part of the Opto 22 SNAP PAC System, one of these compact, industrially hardened controllers can handle multiple control, automation, and data acquisition tasks involving digital and analog control, serial string handling, PID, and enterprise connectivity.

Connecting to Opto 22 serial- and Ethernet-based I/O systems, a SNAP PAC S-series controller runs control programs written in Opto 22's PAC Control™ software to monitor and control a wide range of devices and equipment. SNAP PAC S-series controllers are well suited to original equipment manufacturers (OEMs), system integrators, and end-users in process control, discrete manufacturing, or hybrid industries and applications.

A SNAP PAC S-series controller simultaneously runs up to 32 PAC Control flowcharts, although the PAC Control strategy can actually contain a much larger number of charts. The total number of flowcharts is limited only by the controller memory available for strategy storage.

### Ethernet Communication

All SNAP PAC S-series programmable automation controllers communicate over standard 10/100 Mbps Ethernet networks and can be attached to existing wired or wireless Ethernet networks. The controllers can also be used in an independent control network built with standard, off-the-shelf Ethernet hardware.

SNAP PAC S-series controllers include two 10/100 Mbps Ethernet interfaces for networking through an Ethernet switch to Ethernet hosts, as well as SNAP PAC brains and I/O, which provide local intelligence and the connections to digital and analog sensors and actuators as well as serial devices. These independent Ethernet ports have separate IP addresses that can be used with PAC Project™ Professional software to set up redundant network links to safeguard the availability and reliability of an I/O system, or to segment a control system's network from the enterprise LAN.

### Part Numbers

| Part | Description |
|------|-------------|
| SNAP-PAC-S1 | Ethernet-based programmable automation controller with 2 Ethernet interfaces |
| SNAP-PAC-S1-FM | Ethernet-based programmable automation controller with 2 Ethernet interfaces, Factory Mutual approved |
| SNAP-PAC-S1-W | Wired+Wireless Ethernet-based PAC with 2 Ethernet interfaces and a wireless LAN interface |
| SNAP-PAC-S2 | Ethernet-based programmable automation controller with 2 Ethernet interfaces and 4 serial ports |
| SNAP-PAC-S2-W | Wired+Wireless Ethernet-based PAC with 2 Ethernet interfaces, a wireless LAN interface, and 4 serial ports |
| SNAP-PSDIN | SNAP-PAC-S1 controller DIN-rail adapter |
| SNAP-S2DIN | SNAP-PAC-S2 controller DIN-rail adapter |

## Wired+Wireless Communication

**SNAP-PAC-S1-W** and **SNAP-PAC-S2-W** controllers add wireless capability to communications. In addition to the two wired network interfaces, these models have a wireless network interface as well, so each PAC has a total of three separate IP addresses—two wired and one wireless. Wired+Wireless PACs can be used wirelessly or on a wired network, or both at once.

For flexibility in designing your wireless network, wireless communication includes support for 802.11a, b, and g standards. Wired+Wireless PACs can be used with a variety of wireless switches and other infrastructure hardware. For the best security, the 802.11i WPA2/AES standard is supported, while older WPA and WEP security standards are included for backwards compatibility.

Just like a laptop computer with a wireless connection, all functionality remains the same whether the Wired+Wireless PAC is used wirelessly or as part of a wired network. Supported protocols remain the same. Control programs run the same on both networks without reprogramming.

A Wired+Wireless S-series PAC can communicate with both wired and wireless SNAP PAC I/O units. (See "I/O Units Supported" on page 4 for details.) If desired, the PAC can segment a wireless network from a wired one.

## Serial Communication

SNAP PAC S-series controllers provide RS-232 and RS-485 communication as follows:

The **SNAP-PAC-S1** and **SNAP-PAC-S1-FM** have two RS-232 serial ports that support general-purpose communication with serial devices; you can send and receive data from one or two serial devices connected directly to the controller. Port 0 can be connected to a modem using PPP (Point-to-Point Protocol). These controllers also have one pluggable two-wire RS-485 port that can be used for SNAP PAC or *mistic* serial I/O units. For additional serial interfaces, you can add one or more SNAP serial communication modules on SNAP PAC racks connected to the controller.

The **SNAP-PAC-S2** has four serial ports that can each be configured using PAC Manager as either RS-232 or RS-485 (2-

wire or 4-wire). These serial ports can be used for I/O or for general-purpose serial communication. For the default configuration settings of these ports, see form 1592, the *SNAP PAC S-series User's Guide*.

Configured as RS-232, the ports support remote serial device communication, and any one of the ports can be configured as a PPP modem connection for creating a TCP/IP network over PSTN (Public Switched Telephone Network) lines. Configured as RS-485, the serial ports connect to legacy Opto 22 *mistic*™ I/O units, including the serial B3000 brain and remote mistic bricks, and to SNAP PAC SB-series serial brains.

For additional serial host interfaces, you can add one or more SNAP serial communication modules on attached SNAP Ethernet-based I/O units.

## Controller Redundancy

Two identical SNAP PAC S-series controllers can be used to form a redundant system, where one controller actively runs the control program and the other is ready to take over immediately if the first one should fail.

Besides two identical PACs, a redundant system requires PAC Professional 9.0 or newer (see "Software," below), and the SNAP PAC Redundancy Option Kit. For more information, see the *SNAP PAC Redundancy Option Kit Data Sheet* (form 1901) and the *SNAP PAC System Redundancy User's Guide* (form 1831), both available on our website.

## Backward Compatibility

S-series controllers have RS-485 serial interfaces for connecting to Opto 22's legacy *mistic* I/O units. The SNAP-PAC-S1 and SNAP-PAC-S1-FM have one RS-485 port, and the SNAP-PAC-S2 can be configured with up to four.

This connectivity with legacy serial-based I/O systems, combined with PAC Control Professional's ability to import control programs (or *strategies*) written in OptoControl™ software, provides a migration path to integrate older Opto 22 I/O systems into modern control hardware running on Ethernet networks.

For detailed information on updating control strategies and integrating legacy control hardware into modern systems, see the *FactoryFloor to PAC Project Migration Technical Note* (Opto 22 form 1692).

# SNAP PAC S-Series Controllers

## Software

SNAP PAC controllers use Opto 22's **PAC Project** Microsoft® Windows®-compatible automation software for control programming, human-machine-interface (HMI) development, and OPC and database connectivity. Two versions of PAC Project are available:

- **PAC Project Basic** includes PAC Control for developing control programs, PAC Display™ for creating operator interfaces, and PAC Manager™ configuration software.
- **PAC Project Professional** adds expanded versions of PAC Control and PAC Display, plus a SoftPAC™ software-based controller for PC-based control, OptoOPCServer™ software for exchanging data with OPC 2.0-compliant client software applications, and OptoDataLink™ for exchanging SNAP PAC System data with ODBC-compliant databases.

Applications in the PAC Project software suite are described below:

**PAC Control Basic** is a graphical, flowchart-based programming tool for machine control and process applications. Using PAC Control, you create, download, and run strategies on a SNAP PAC controller. In addition to flowchart programming with subroutine capability, PAC Control includes a powerful, built-in scripting language based on C and other procedural languages. **PAC Control Professional** adds capabilities to import OptoControl strategies, to support *mistic* I/O units, and to use a SNAP PAC controller's independent Ethernet ports to segment communication links.

**PAC Display Basic** is an intuitive HMI package for building operator interfaces, or *projects*, for communicating with a SNAP PAC controller. PAC Display offers a full-featured HMI including alarming, trending, and a built-in library of 3,000 industrial automation graphics. **PAC Display Professional** adds the ability to import projects created in OptoDisplay, part of the Opto 22 FactoryFloor® software suite, and to use redundant communication links on SNAP PAC controllers. PAC Display Professional can also connect to Ethernet-based FactoryFloor controllers running OptoControl strategies or ioProject controllers running ioControl strategies.

**SoftPAC** is a software-based programmable automation controller (PAC)designed for PC-based control. Programmed just like an Opto 22 hardware PAC, SoftPAC runs your PAC Control strategy independently on an embedded or standalone PC. SoftPAC takes advantage of a PC's speed and file capabilities for applications requiring extended file storage, frequent access to files, math-intensive processes, or a large number of control flowcharts running at the same time.

**OptoOPCServer** (PAC Project Professional only) is a fast, efficient OPC 2.0-compliant server for communicating with many Opto 22 products, including SNAP PAC controllers running PAC Control strategies, SNAP PAC brains, SNAP Ultimate controller/brains, SNAP Ethernet and SNAP Simple brains, and Ethernet-based FactoryFloor controllers running OptoControl strategies.

Using OptoOPCServer, you can consolidate data from all these Opto 22 systems into the OPC client software of your choice, such as third-party HMI and data acquisition packages, and custom software applications you create with tools such as Visual C++®.

**OptoDataLink** (PAC Project Professional only) transparently provides multiple connections for data exchange with popular databases such as Microsoft SQL Server, Microsoft Access, and MySQL. OptoDataLink connects your SNAP PAC system with the tools used for making business decisions, bringing realtime, accurate data to decision makers.

**PAC Manager** is a utility application for assigning IP addresses to SNAP PAC controllers and brains, reading or changing basic controller configuration, upgrading firmware, and inspecting or testing controllers and I/O.

## Software Availability

PAC Project Basic is included with SNAP PAC controllers and is a free download from the Opto 22 website. PAC Project Professional is available for purchase. You can also separately purchase PAC Control Professional, PAC Display Professional, SoftPAC, OptoOPCServer, and OptoDataLink as needed. For additional information, see the *PAC Project Data Sheet*, Opto 22 form 1699.

## I/O Units Supported

| S-Series Controller | On a Wireless LAN | On a Wired Ethernet Network | On a Serial Network |
|---|---|---|---|
| SNAP-PAC-S1<br>SNAP-PAC-S1-FM<br>SNAP-PAC-S2 | ---none--- | SNAP-PAC-R1<br>SNAP-PAC-R1-FM<br>SNAP-PAC-R2<br>SNAP-PAC-R2-FM<br>SNAP-PAC-EB1<br>SNAP-PAC-EB1-FM<br>SNAP-PAC-EB2<br>SNAP-PAC-EB2-FM<br>G4EB2<br>G4D32EB2<br>G4D32EB2-UPG<br>SNAP-UP1-ADS*<br>SNAP-B3000-ENET*<br>SNAP-ENET-D64*<br>SNAP-ENET-S64*<br>SNAP-ENET-RTC* | SNAP-PAC-SB1<br>SNAP-PAC-SB2<br>B3000*<br>B3000-B*<br>SNAP-BRS*<br>B100*<br>B200*<br>G4D16R*<br>G4D32RS*<br>G4A8R* |
| SNAP-PAC-S1-W<br>SNAP-PAC-S2-W | SNAP-PAC-R1-W<br>SNAP-PAC-R2-W<br>SNAP-PAC-EB1-W<br>SNAP-PAC-EB2-W | | |

\* Legacy I/O processors; not recommended for new development

## Technical Specifications

Specifications are continued on the following page.

| Processor | 266 MHz 32-bit ColdFire® 5475 with integrated floating-point unit (FPU) |
|---|---|
| Memory | SNAP-PAC-S1 and SNAP-PAC-S2<br> Total RAM: 32 MB<br> Total RAM for PAC Control Strategies: 16 MB<br> Battery-backed RAM: 8 MB<br> RAM File Storage: 2.5 MB<br> Flash File Storage: 4 MB<br><br>SNAP-PAC-S1-W and SNAP-PAC-S2-W<br> Total RAM: 128 MB<br> Total RAM for PAC Control Strategies: 64MB<br> Battery-backed RAM: 8 MB<br> RAM File Storage: 16 MB<br> Flash File Storage: 4 MB |
| Removable storage | (Models with manufacture dates of June 2014 and newer. Requires firmware R9.4a or higher and loader R6.1a or higher) MicroSD card slot: supports microSD or microSDHC cards to 32 GB.<br>(Models with manufacture dates of November 2008 through May 2014 with firmware R8.4 or higher) McroSD card slot: supports microSD cards up to 2 GB. |
| Backup battery | SNAP-PAC-S1s with serial number 625654 or higher and all SNAP-PAC-S2s: Rechargeable (recharges whenever the brain has power), 1-year power-off data retention<br>SNAP-PAC-S1s with serial number 625653 or lower: User-replaceable 3.6-volt TL 5242 /W lithium, 10-year minimum power-off data retention (replacement part number: G4BATT32) |
| Ethernet Communication (wired) to host and I/O | Two independent 10/100 Mbps Ethernet network interfaces (RJ-45 connectors). Each interface has a separate IP address (separate subnet). |

# SNAP PAC S-Series Controllers

| | |
|---|---|
| Ethernet Communication (wireless)* | Wireless LAN interface with separate IP address.<br>Topologies: Infrastructure, Ad-Hoc<br>Security: 802.11i; AES - Compatible with WPA2 Personal, TKIP - Compatible with WPA Personal, WEP. Note: TKIP/AES security is not supported in Ad-Hoc mode.<br>Frequency 802.11a: 5.180–5.240 GHz, 5.745–5.825 GHz<br>Frequency 802.11b/g: 2.412–2.472 GHz, 2.484 GHz<br>Transmit Power: 15 dBm maximum<br>Antenna Connector: Reverse polarity SMA (RP-SMA or RSMA)<br>Roaming: Supported within an SSID (Service Set Identifier) only |
| Serial Communication | SNAP-PAC-S1<br>RS-232 serial: Two RS-232 serial ports (one DB-9 and one pluggable connector); one port has full handshaking. PPP is supported only on port 0. Buffer size: 512 bytes each for RX and TX.<br>RS-485 serial: One RS-485 serial port (pluggable connector); two-wire RS-485; optional *mistic* signal interrupts. Range (serial multidrop): 32 stations maximum on a segment (including PC, controller, and I/O units); up to 3000 ft (914 m) on a segment. Buffer size: 512 bytes each for RX and TX.<br><br>SNAP-PAC-S2<br>Four serial ports that can be used as general purpose ports or for serial I/O units; each port is software configurable as either RS-232 (Tx, Rx, COM, DTR, DCD, RTS, CTS) or as RS-485 (2-wire, 4-wire, optional termination, optional biasing); optional *mistic* signal interrupts. Buffer size: 512 bytes each for RX and TX. |
| Power requirements | 8–32 VDC ±0.5, 11.3 VA maximum<br>(SNAP-PAC-S1 controllers with serial numbers below 500,000 use 8–24 VDC) |
| Operating temperature<br>Storage temperature<br>Humidity | -20 °C to 60 °C<br>-40 °C to 85 °C<br>0% to 95% relative humidity, non-condensing |
| Software<br> PAC Project Basic<br><br> PAC Project Professional | Includes programming, HMI software, and configuration software; included with purchase of controller.<br>PAC Project Basic plus OPC 2.0-compliant OPC server, OptoControl strategy and OptoDisplay project importing, support for serial *mistic* I/O units, and Ethernet link redundancy support. |
| Number of charts that can run simultaneously | 32 |
| Other features | Multiple protocol support including TCP/IP, FTP, SNMP v2.0c (with firmware 8.2a), Modbus/TCP, EtherNet/IP™, and OptoMMP™.<br>Real-time clock<br>FTP server/client with file system (in RAM and in removable storage)<br>Ethernet link redundancy or network segmenting |
| Agency certifications | (-W models only) U.S., FCC Part 15 Subpart C; Canada, IC RSS-210<br>(-FM models only) Factory Mutual approved<br>All models: CE, RoHS, DFARS |
| Warranty | 30 months from date of manufacture |

* Requires a Wired+Wireless model (SNAP-PAC-S1-W or SNAP-PAC-S2-W)

Opto 22 • 43044 Business Park Drive • Temecula, CA 92590-3614 • www.opto22.com
SALES 800-321-6786 • 951-695-3000 • FAX 951-695-3095 • sales@opto22.com • SUPPORT 800-835-6786 • 951-695-3080 • FAX 951-695-3017 • support@opto22.com

## System Architecture

### SNAP-PAC-S1 Controller and Serial-based I/O Units

The network shown in this diagram requires PAC Control Professional and PAC Display Professional.



PC running PAC
Display Professional

PC running PAC
Control Professional

Ethernet
switch

SNAP PAC S-series
controller controls
all I/O units.

I/O units are connected via a 2-wire RS-485 serial network
and are controlled by the SNAP PAC S-series controller. Each I/O
unit is connected to its own group of sensors and actuators.

RS-485 serial
network

Sensors and actuators,
location #1

Sensors and actuators,
location #2

Sensors and actuators,
location #3
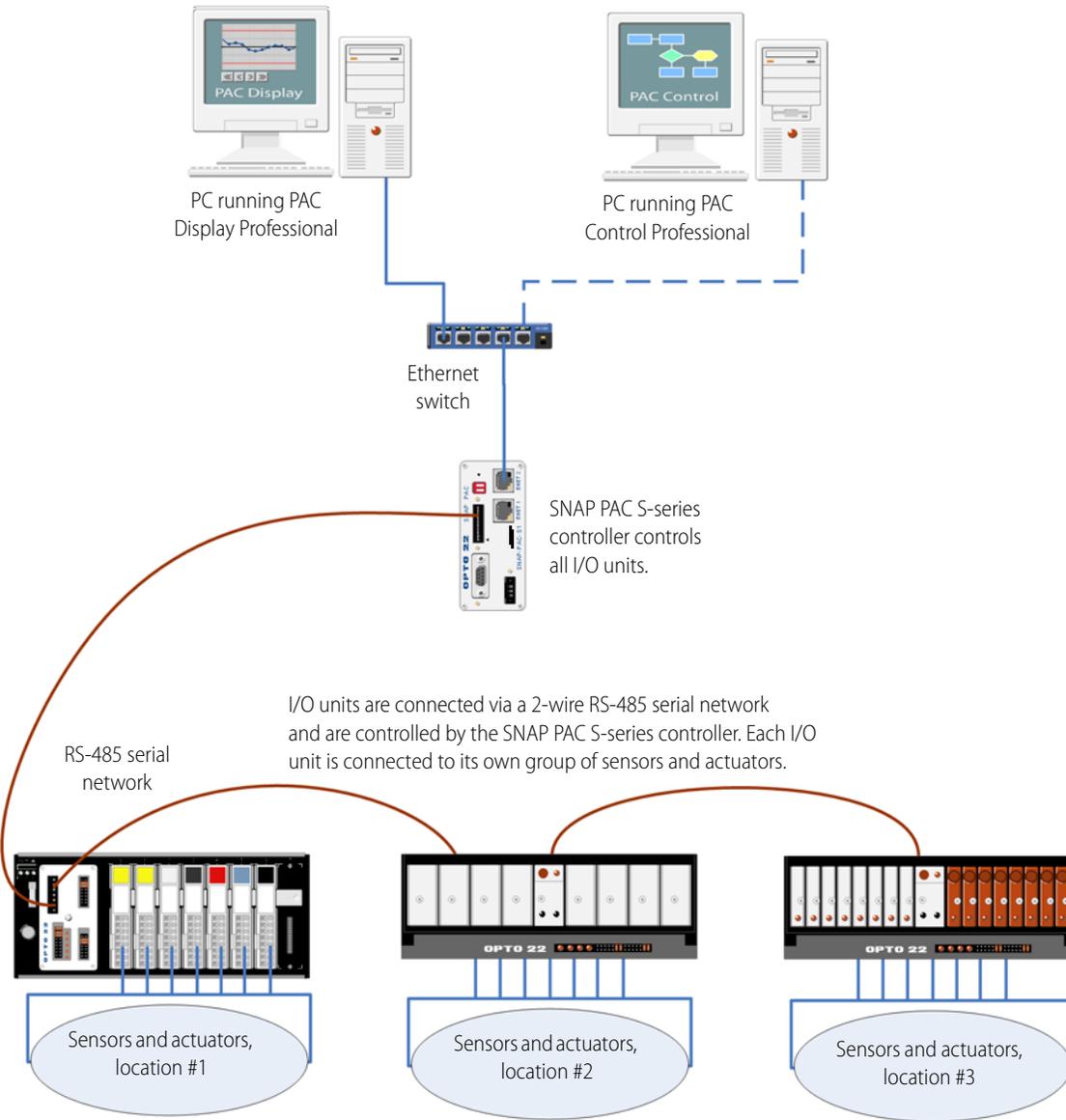
This diagram shows a SNAP PAC S-series controller connected to multiple Opto 22 serial-based I/O units over an RS-485 serial network. The controller is also connected to a larger, separate enterprise Ethernet network to provide process data to a PC running Opto 22's PAC Display HMI software.

The diagram also shows a PC running PAC Control Professional; the control program (or *strategy*) that runs on the SNAP controller was developed in this application. Once developed, the strategy is downloaded to the controller and runs independently.

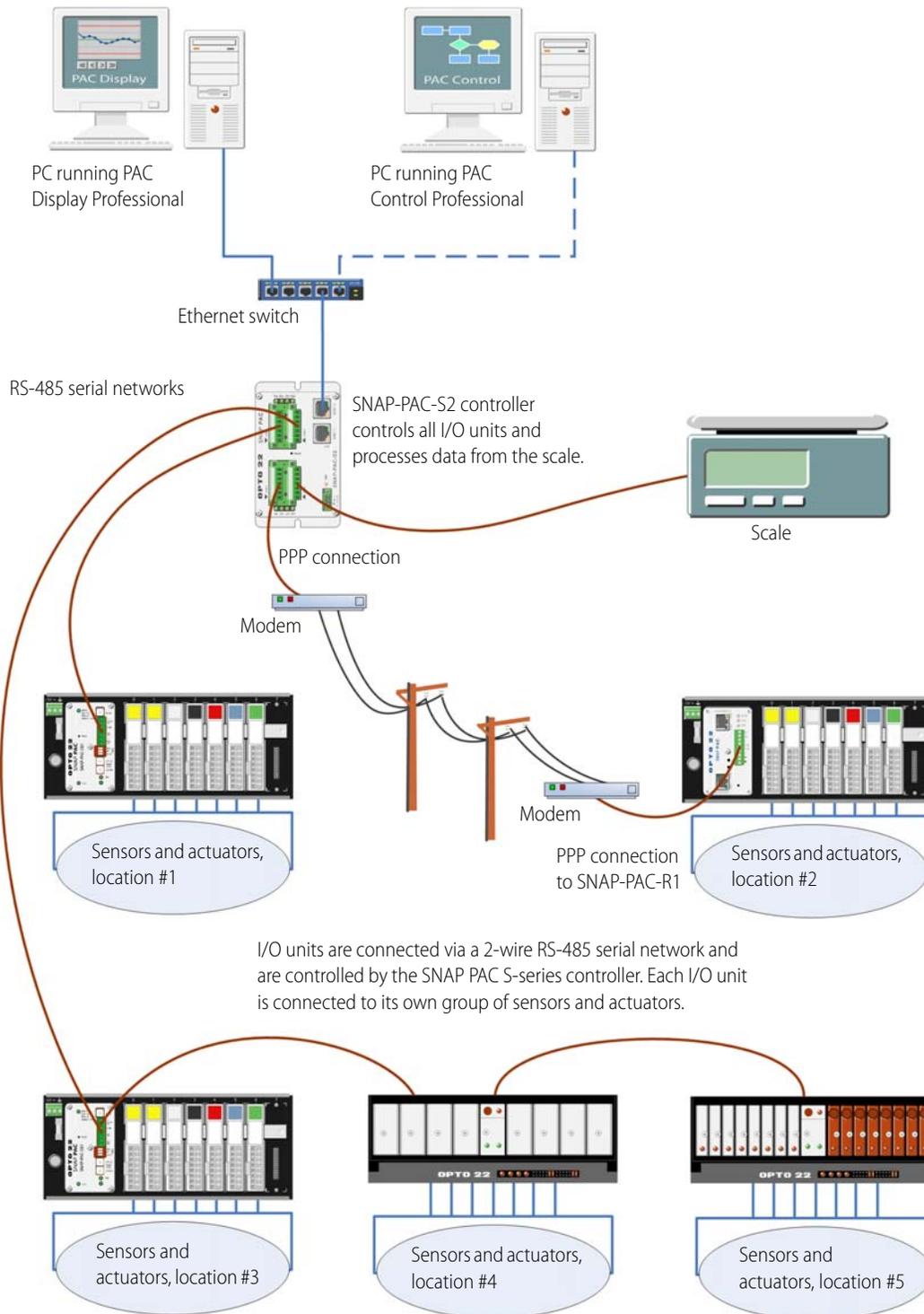# SNAP PAC S-Series Controllers

## System Architecture (continued)

### SNAP-PAC-S2 Controller and Serial-based I/O Units

The network shown in this diagram requires PAC Control Professional and PAC Display Professional.



PC running PAC Display Professional

PC running PAC Control Professional

Ethernet switch

RS-485 serial networks

SNAP-PAC-S2 controller controls all I/O units and processes data from the scale.

Scale

PPP connection

Modem

Modem

Sensors and actuators, location #1

PPP connection to SNAP-PAC-R1

Sensors and actuators, location #2

I/O units are connected via a 2-wire RS-485 serial network and are controlled by the SNAP PAC S-series controller. Each I/O unit is connected to its own group of sensors and actuators.

Sensors and actuators, location #3

Sensors and actuators, location #4

Sensors and actuators, location #5
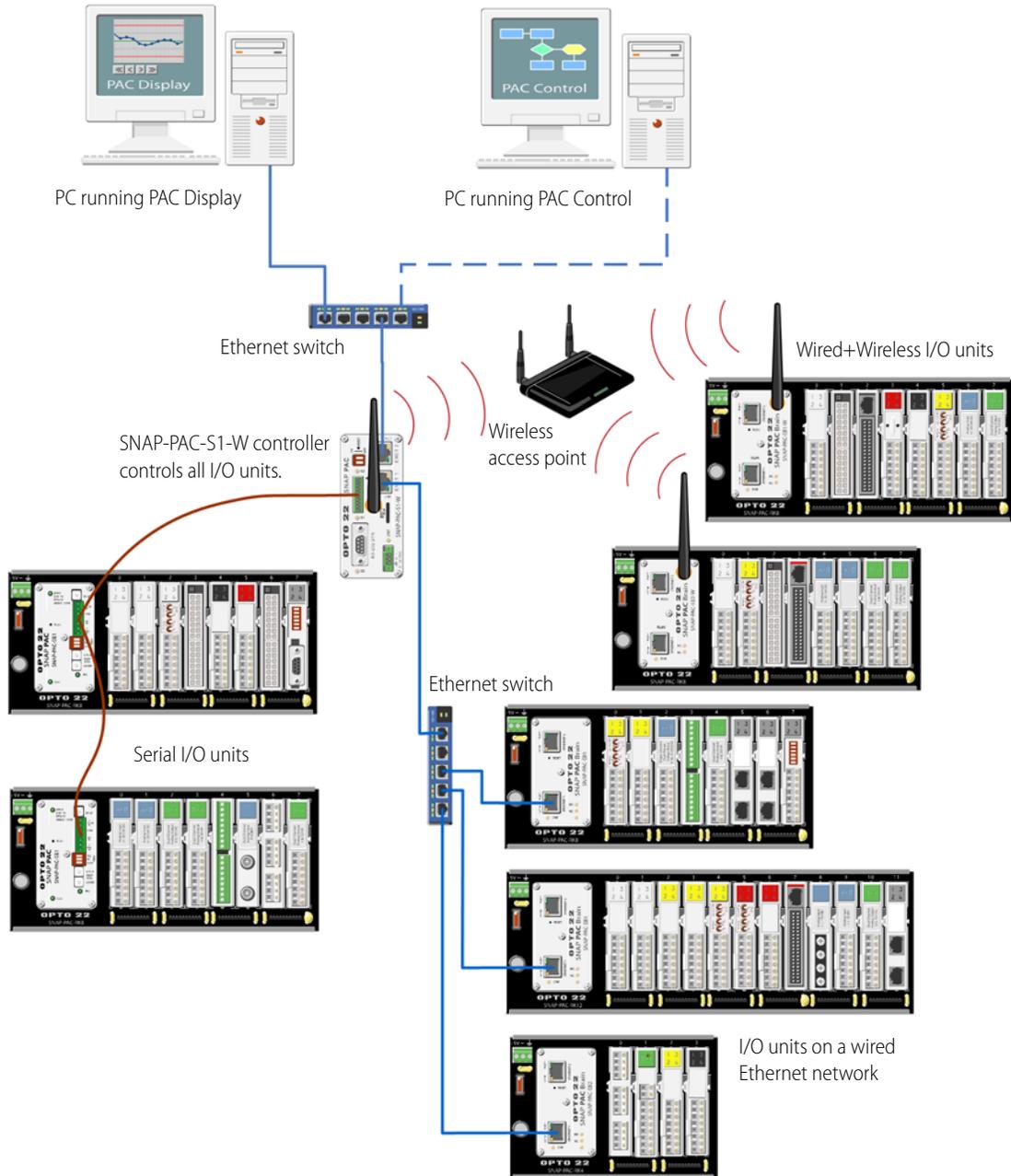
## System Architecture (continued)

### Wired+Wireless SNAP PAC S-series Controller

The Wired+Wireless PAC can communicate with devices on wired networks, on a wireless LAN, or on both at once. It can also simultaneously communicate serially.



PC running PAC Display

PC running PAC Control

Ethernet switch

Wired+Wireless I/O units

SNAP-PAC-S1-W controller controls all I/O units.

Wireless access point

Ethernet switch

Serial I/O units

I/O units on a wired Ethernet network

The Wired+Wireless SNAP PAC S-series controller is controlling three groups of I/O units: one group through its serial port, another through a standard 10/100 Mbps interface, and the third over a wireless LAN.
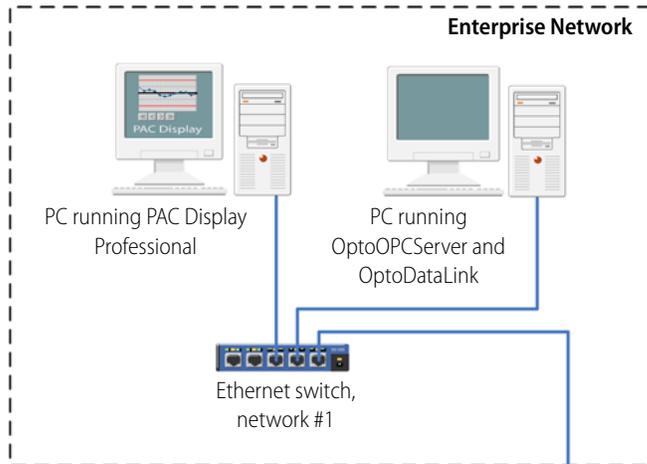
At the same time, the controller is connected to a second wired network for communication with PCs running PAC Control and PAC Display.

# SNAP PAC S-Series Controllers

## System Architecture (continued)

### SNAP PAC S-series Controller Segmenting Wired Ethernet Networks

The network shown in this diagram requires PAC Control Professional and PAC Display Professional.



**Enterprise Network**

PC running PAC Display Professional

PC running OptoOPCServer and OptoDataLink

Ethernet switch, network #1

SNAP PAC S-series controller communicates with host computers through one network interface and controls I/O with other devices through the other interface.

**Control Network**

Ethernet switch, network #2

I/O units are controlled by the controller on an isolated segment.

Sensors and actuators, location #1
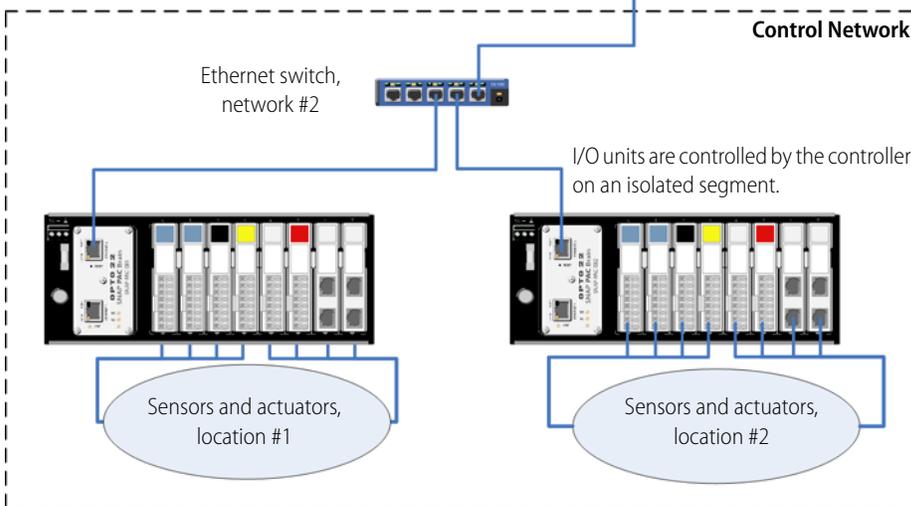
Sensors and actuators, location #2

This diagram shows multiple Opto 22 SNAP I/O units connected together over an Ethernet network and controlled by a SNAP PAC S-series controller running a control strategy. The controller is also connected to a larger, separate enterprise Ethernet network to provide data to two PCs running Opto 22's PAC Display HMI software and OptoOPCServer.

Sitting between the two networks, the SNAP PAC S-series controller isolates I/O and control traffic from the enterprise network, and vice versa.

For this system, PAC Display must be configured to access the I/O through the controller rather than directly from the I/O units, since they are on a separate network.

If you are using a Wired+Wireless PAC, one of these networks could be a wireless LAN.
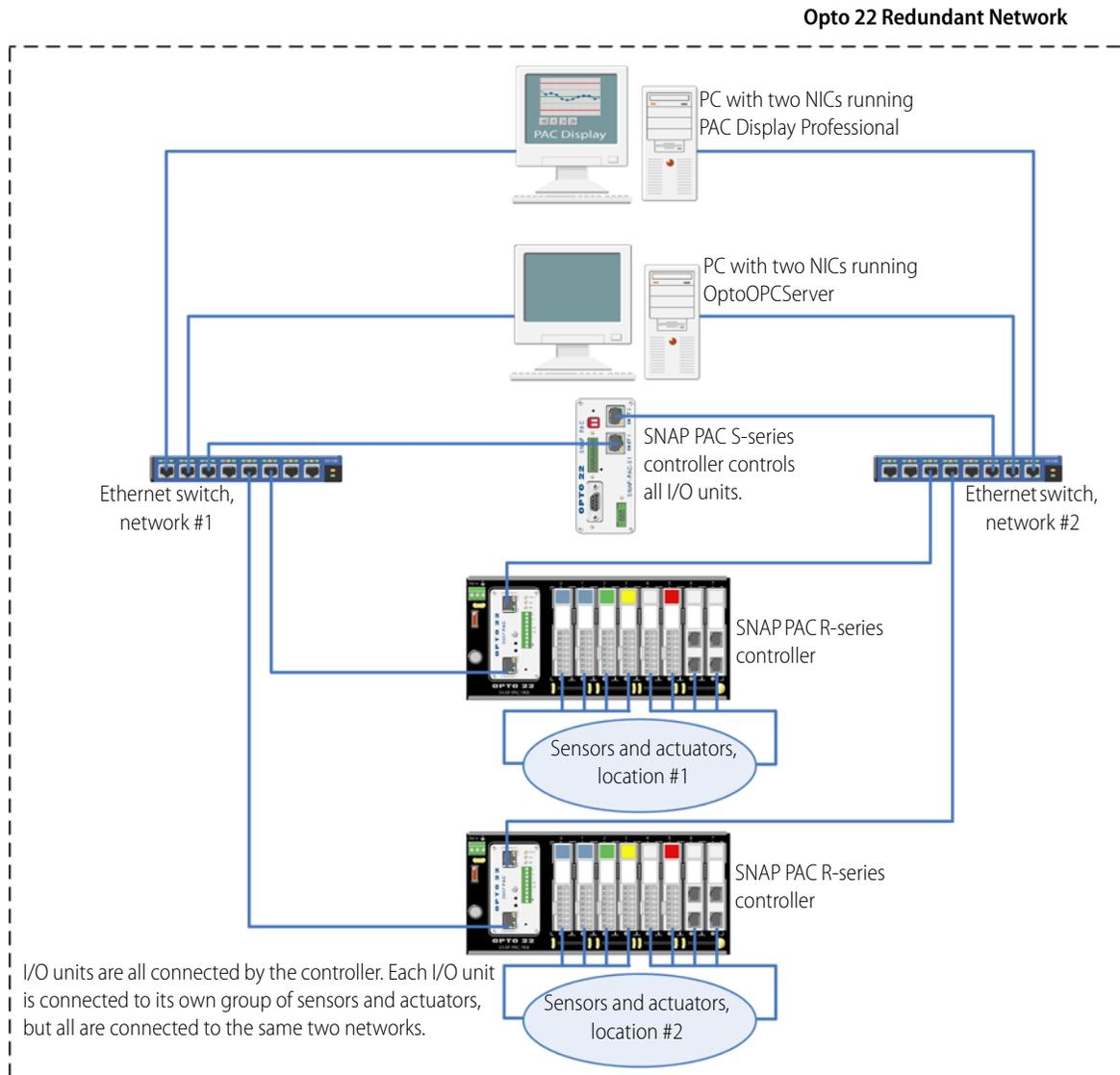
## System Architecture (continued)

### SNAP PAC S-Series Controller in Redundant Network Configuration

The network shown in this diagram requires PAC Control Professional and PAC Display Professional.

**Opto 22 Redundant Network**



PC with two NICs running PAC Display Professional

PC with two NICs running OptoOPCServer

SNAP PAC S-series controller controls all I/O units.

Ethernet switch, network #1

Ethernet switch, network #2

SNAP PAC R-series controller

Sensors and actuators, location #1

SNAP PAC R-series controller

I/O units are all connected by the controller. Each I/O unit is connected to its own group of sensors and actuators, but all are connected to the same two networks.

Sensors and actuators, location #2

This diagram shows a SNAP PAC S-series controller connected to two separate Ethernet networks. This configuration addresses the concern that an Ethernet network may fail or need maintenance, leaving the PC running OptoOPCServer, the PC running PAC Display, the controller, and the I/O units unable to communicate.

In this configuration, if one network goes down, devices can still communicate on the other. Each PC has two network interface cards (NICs), and the SNAP PAC S-series controller and the I/O units (SNAP PAC R-series) have two network interfaces as well.
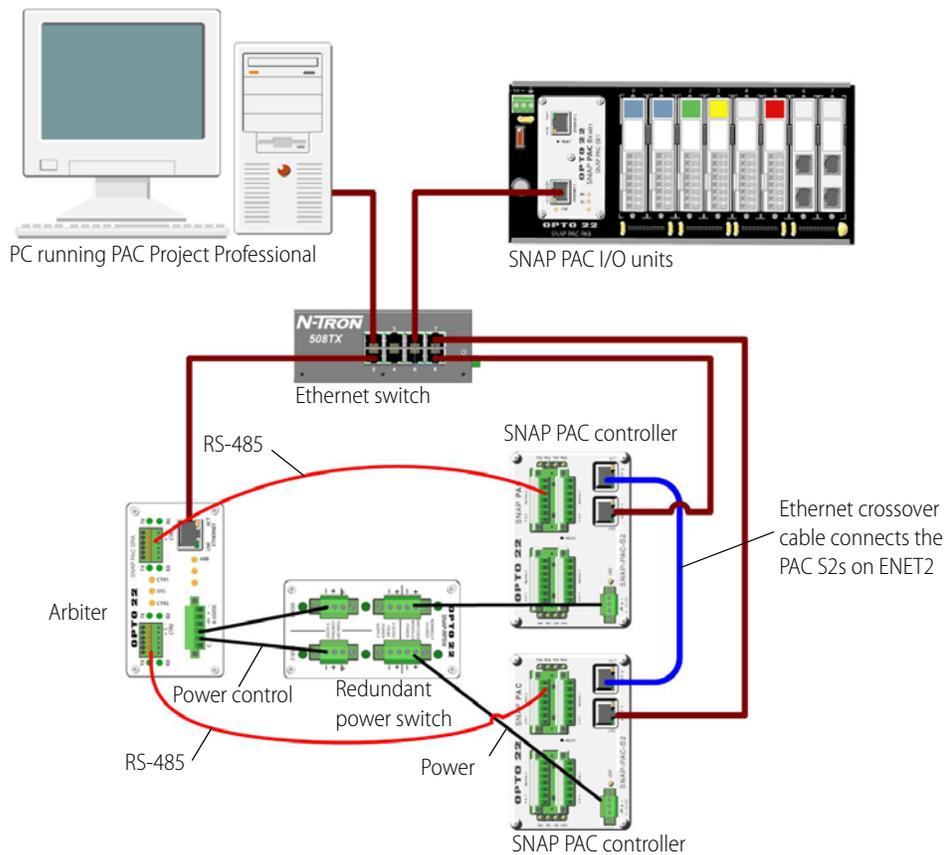
If you are using Wired+Wireless PACs, one of these networks can be a wireless LAN.

# SNAP PAC S-Series Controllers

## System Architecture (continued)

### SNAP PAC S-series Redundant Controllers

Controller redundancy requires PAC Project Professional 9.0 or newer.

PC running PAC Project Professional

SNAP PAC I/O units

Ethernet switch

RS-485

SNAP PAC controller

Ethernet crossover cable connects the PAC S2s on ENET2

Arbiter

Power control

Redundant power switch

RS-485

Power

SNAP PAC controller

In this diagram, two S-series controllers are operating redundantly. One is the active controller, while the other acts as a backup, ready to take over should the first one fail.

Controller redundancy requires PAC Project Professional 9.0 or newer and the Redundancy Option Kit, which includes the arbiter and the redundant power switch in this diagram. PAC Redundancy Manager, a software utility for setting up and maintaining the system, is included in PAC Project Pro.

The two controllers you use must be exactly the same part number (for example, two SNAP-PAC-S2 controllers or two SNAP-PAC-S1-W controllers).
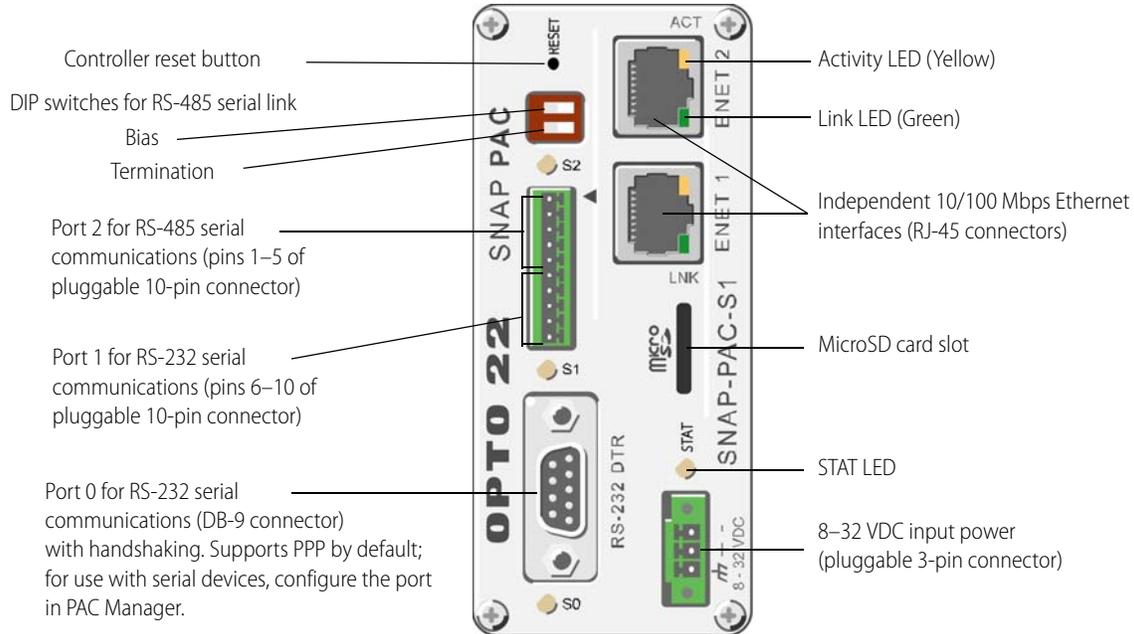
One advantage of an Opto 22 redundant system is that it uses standard PACs, standard cabling, and standard I/O. Another advantage is that either controller can act as the active or backup controller; you can switch their roles at any time for maintenance, for example.

For detailed information on redundancy, see form 1831, the *SNAP PAC System Redundancy User's Guide*.

## SNAP-PAC-S1 Connectors and Indicators

This diagram applies to both the SNAP-PAC-S1 and the SNAP-PAC-S1-FM.



- Controller reset button
- DIP switches for RS-485 serial link
  - Bias
  - Termination
- Port 2 for RS-485 serial communications (pins 1–5 of pluggable 10-pin connector)
- Port 1 for RS-232 serial communications (pins 6–10 of pluggable 10-pin connector)
- Port 0 for RS-232 serial communications (DB-9 connector) with handshaking. Supports PPP by default; for use with serial devices, configure the port in PAC Manager.

- Activity LED (Yellow)
- Link LED (Green)
- Independent 10/100 Mbps Ethernet interfaces (RJ-45 connectors)
- MicroSD card slot
- STAT LED
- 8–32 VDC input power (pluggable 3-pin connector)

### Status and Activity LEDs

| Indicator | Description |
|---|---|
| S0 | RS-232 serial activity on port 0 |
| S1 | RS-232 serial activity on port 1 |
| S2 | RS-485 serial activity |
| STAT | Startup status and control program operational status |
| ACT | Ethernet network activity |
| LINK | Link established with Ethernet network |

### Port 0 for RS-232 serial (DB-9 connector)

| Pin | Description | Signal Direction |
|---|---|---|
| 1 | DCD | In |
| 2 | RX | In |
| 3 | TX | Out |
| 4 | DTR | Out |
| 5 | COM | |
| 6 | DSR | In |
| 7 | RTS | Out |
| 8 | CTS | In |
| 9 | RI* | In |

* RI signal does not occur on PACs with a microSD card slot

### Ports 1 and 2 for RS-485 and RS-232 serial

| | Pin | Description | Signal Direction |
|---|---|---|---|
| Port 2 for RS-485 serial (2-Wire) | 1 | TX/RX+ | In/Out |
| | 2 | TX/RX– | In/Out |
| | 3 | SIG COM* | |
| | 4 | IRQ+ | In |
| | 5 | IRQ– | In |
| Port 1 for RS-232 serial | 6 | TX | Out |
| | 7 | RX | In |
| | 8 | GND | |
| | 9 | RTS | Out |
| | 10 | CTS | In |

* Isolated ground

# SNAP PAC S-Series Controllers

## SNAP-PAC-S1-W Connectors and Indicators (Wired+Wireless)



- Wireless LAN antenna
- Controller reset button
- DIP switches for RS-485 serial link Bias Termination
- Activity LED (Yellow)
- Link LED (Green)
- Independent 10/100 Mbps Ethernet interfaces (RJ-45 connectors)
- Port 2 for RS-485 serial communications (pins 1–5 of pluggable 10-pin connector)
- Port 1 for RS-232 serial communications (pins 6–10 of pluggable 10-pin connector)
- MicroSD card slot
- WLAN LED
- STAT LED
- Port 0 for RS-232 serial communications (DB-9 connector) with handshaking. Supports PPP by default; for use with serial devices, configure the port in PAC Manager.
- 8–32 VDC input power (pluggable 3-pin connector)

### Status and Activity LEDs

| LED | Description |
|-----|-------------|
| S0 | RS-232 serial activity on port 0 |
| S1 | RS-232 serial activity on port 1 |
| S2 | RS-485 serial activity |
| STAT | Startup status and control program operational status |
| ACT | Ethernet network activity |
| LINK | Link established with Ethernet network |
| WLAN | Wireless LAN status |

### Port 0 for RS-232 serial (DB-9 connector)

| Pin | Description | Signal Direction |
|-----|-------------|------------------|
| 1 | DCD | In |
| 2 | RX | In |
| 3 | TX | Out |
| 4 | DTR | Out |
| 5 | COM | |
| 6 | DSR | In |
| 7 | RTS | Out |
| 8 | CTS | In |
| 9 | NC* | |

\* No connection

### Ports 1 and 2 for RS-485 and RS-232 serial

| | Pin | Description | Signal Direction |
|---|-----|-------------|------------------|
| Port 2 for RS-485 serial (2-Wire) | 1 | TX/RX+ | In/Out |
| | 2 | TX/RX– | In/Out |
| | 3 | SIG COM* | |
| | 4 | IRQ+ | In |
| | 5 | IRQ– | In |
| Port 1 for RS-232 serial | 6 | TX | Out |
| | 7 | RX | In |
| | 8 | GND | |
| | 9 | RTS | Out |
| | 10 | CTS | In |

\* Isolated ground

## SNAP-PAC-S2 Connectors and Indicators



Serial activity LEDs

Ports 0 - 3 are each software configurable as either RS-232 (TX, RX, COM, DTR, DCD RTS, CTS), or
RS-485 (2-wire, 4-wire, optional termination, optional biasing). Configure ports in PAC Manager.

Serial activity LEDs

Activity LED (Yellow)

Link LED (Green)

Independent 10/100 Mbps Ethernet interfaces (RJ-45 connectors)

Controller reset button

MicroSD card slot

STAT LED

8–32 VDC input power (pluggable 3-pin connector)

### RS-485 and RS-232 Ports[1]

| Pin | RS-232 | Signal Direction | RS-485 | Signal Direction |
|-----|--------|------------------|--------|------------------|
| 1 | TX | Out | TX/RX+ | In/Out |
| 2 | RX | In | TX/RX– | In/Out |
| 3 | COM[2] | | COM[2] | |
| 4 | RTS | Out | RX+ (4 wire) | In |
| 5 | CTS | In | RX- (4 wire) | In |
| 6 | DTR | Out | IRQ+ | In |
| 7 | DCD | In | IRQ– | In |

**[1] CAUTION**: **Do not use communication port connectors from a legacy OptoControl controller***. Legacy connectors will fit in a SNAP-PAC-S2, but the pin orientation is different. Instead, use the connectors supplied with the SNAP-PAC-S2 controller.

**[2]** Isolated ground. (Each channel is isolated from the others.)
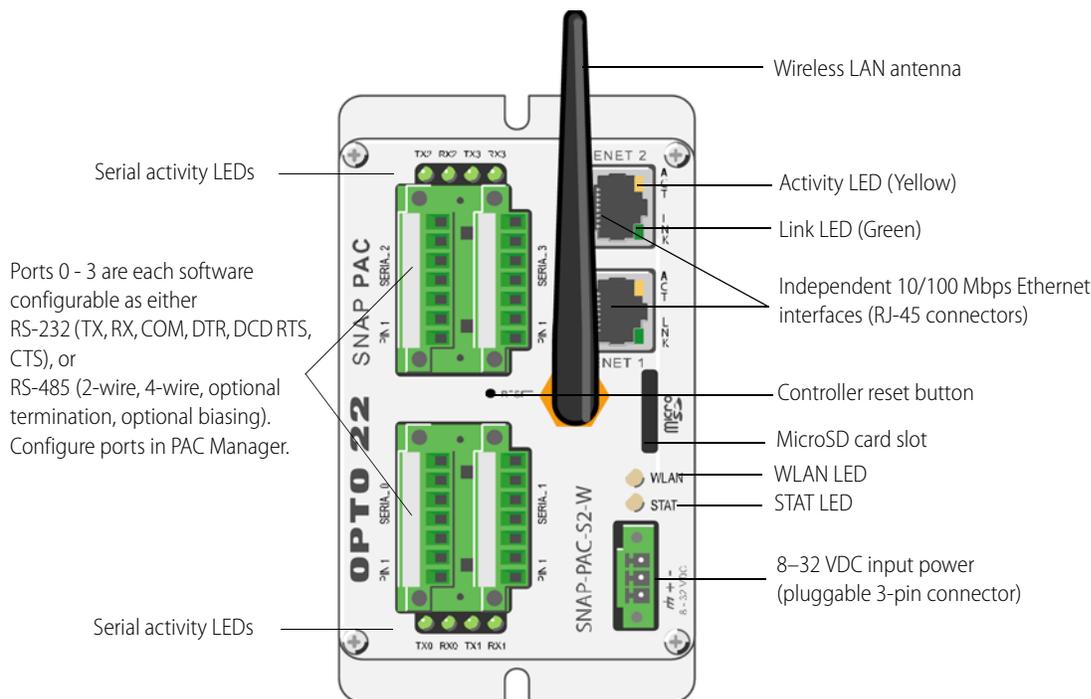
\*Legacy OptoControl Controllers:

| | | |
|---|---|---|
| G4LC32 | G4LC32ISA-LT | M4RTU |
| G4LC32SX | M4 | SNAP-LCM4 |
| G4LC32ISA | M4IO | SNAP-LCSX/PLUS |

### Status and Activity LEDs
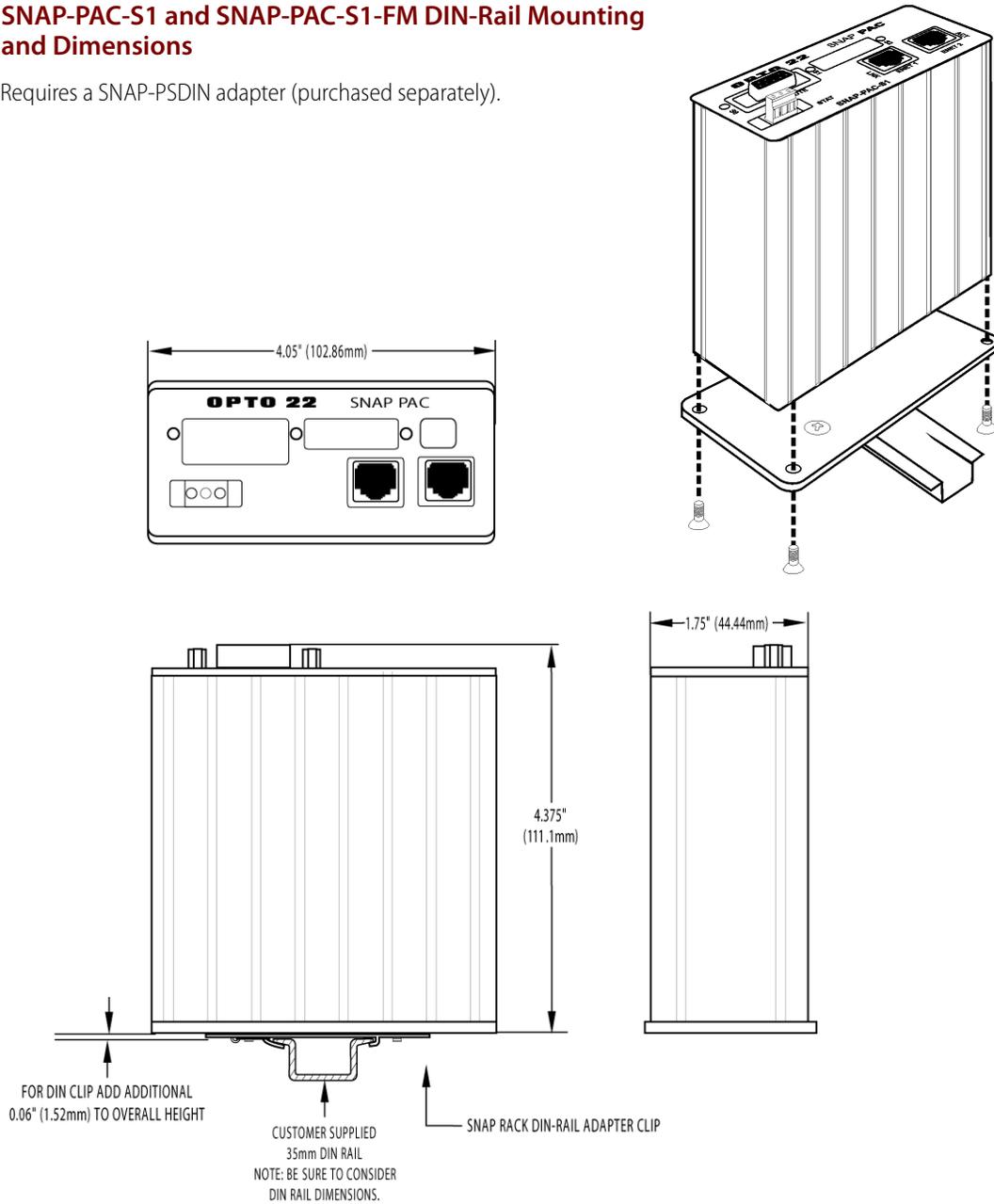
| Indicator | Description |
|-----------|-------------|
| TX0/RX0 | Serial activity on port 0 |
| TX1/RX1 | Serial activity on port 1 |
| TX2/RX2 | Serial activity on port 2 |
| TX3/RX3 | Serial activity on port 3 |
| STAT | Startup status and control program operational status |
| ACT | Ethernet network activity |
| LINK | Link established with Ethernet network |

# SNAP PAC S-Series Controllers

## SNAP-PAC-S2-W Connectors and Indicators (Wired+Wireless)



- Wireless LAN antenna
- Serial activity LEDs
- Activity LED (Yellow)
- Link LED (Green)
- Independent 10/100 Mbps Ethernet interfaces (RJ-45 connectors)
- Ports 0 - 3 are each software configurable as either RS-232 (TX, RX, COM, DTR, DCD RTS, CTS), or RS-485 (2-wire, 4-wire, optional termination, optional biasing). Configure ports in PAC Manager.
- Controller reset button
- MicroSD card slot
- WLAN LED
- STAT LED
- Serial activity LEDs
- 8–32 VDC input power (pluggable 3-pin connector)

### RS-485 and RS-232 Ports[1]

| Pin | RS-232 | Signal Direction | RS-485 | Signal Direction |
|-----|--------|------------------|--------|------------------|
| 1 | TX | Out | TX/RX+ | In/Out |
| 2 | RX | In | TX/RX– | In/Out |
| 3 | COM[2] | | COM[2] | |
| 4 | RTS | Out | RX+ (4 wire) | In |
| 5 | CTS | In | RX- (4 wire) | In |
| 6 | DTR | Out | IRQ+ | In |
| 7 | DCD | In | IRQ– | In |

[1] **CAUTION**: **Do not use communication port connectors from a legacy OptoControl controller\***. Legacy connectors will fit in a SNAP-PAC-S2, but the pin orientation is different. Instead, use the connectors supplied with the SNAP-PAC-S2 controller.

[2] Isolated ground. (Each channel is isolated from the others.)

\*Legacy OptoControl Controllers:

| | | |
|--|--|--|
| G4LC32 | G4LC32ISA-LT | M4RTU |
| G4LC32SX | M4 | SNAP-LCM4 |
| G4LC32ISA | M4IO | SNAP-LCSX/PLUS |

### Status and Activity LEDs

| Indicator | Description |
|-----------|-------------|
| TX0/RX0 | Serial activity on port 0 |
| TX1/RX1 | Serial activity on port 1 |
| TX2/RX2 | Serial activity on port 2 |
| TX3/RX3 | Serial activity on port 3 |
| STAT | Startup status and control program operational status |
| ACT | Ethernet network activity |
| LINK | Link established with Ethernet network |
| WLAN | Wireless LAN status |

## Dimensional Drawings

### SNAP-PAC-S1 and SNAP-PAC-S1-FM Panel Mounting and Dimensions

For SNAP-PAC-S1-W dimensions, see



4.80" (121.84mm)
4.40" (111.77mm)
0.20" (5.03mm)
2.00" (50.80mm)
1.00"(25.39mm)
0.15"(3.81mm)
0.50"(12.70mm)

4.05" (102.86mm)
1.75" (44.44mm)
4.375" (111.1mm)
4.17" (105.9mm)

# SNAP PAC S-Series Controllers

## Dimensional Drawings (continued)

### SNAP-PAC-S1 and SNAP-PAC-S1-FM DIN-Rail Mounting and Dimensions
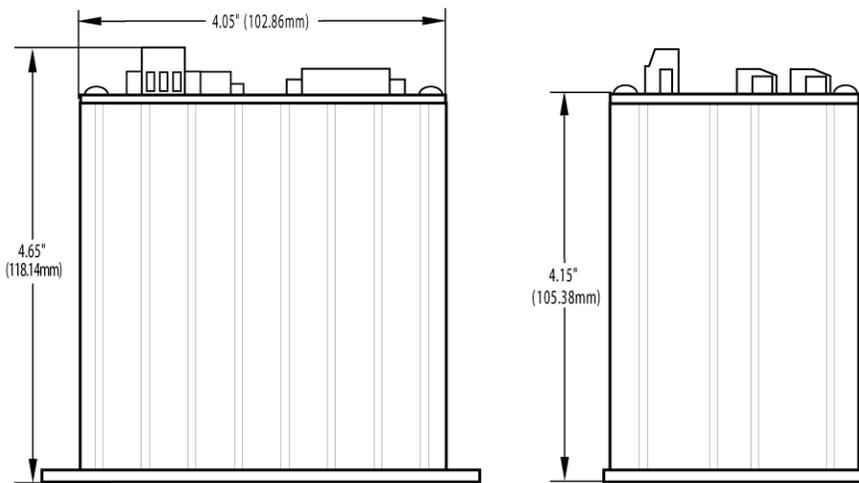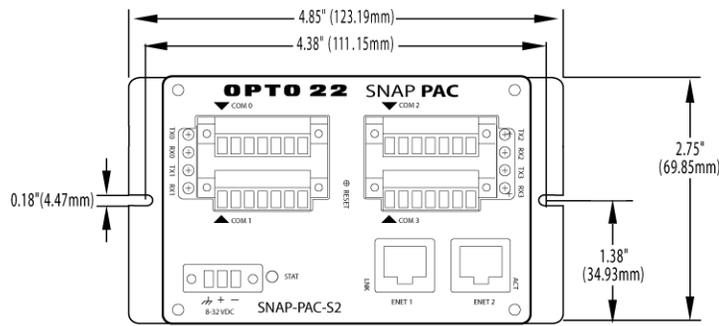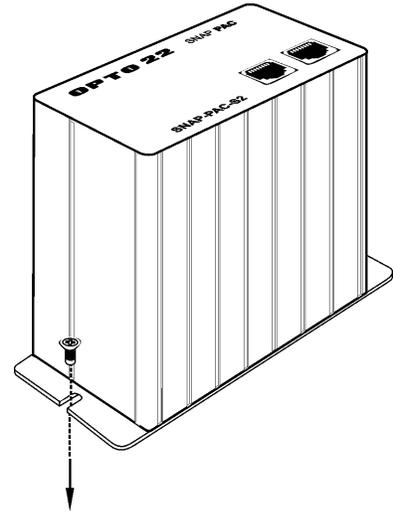
Requires a SNAP-PSDIN adapter (purchased separately).



4.05" (102.86mm)

1.75" (44.44mm)

4.375"
(111.1mm)

FOR DIN CLIP ADD ADDITIONAL
0.06" (1.52mm) TO OVERALL HEIGHT

CUSTOMER SUPPLIED
35mm DIN RAIL
NOTE: BE SURE TO CONSIDER
DIN RAIL DIMENSIONS.

SNAP RACK DIN-RAIL ADAPTER CLIP

## Dimensional Drawings (continued)

### SNAP-PAC-S2 Panel Mounting and Dimensions

For SNAP-PAC-S2-W dimensions, see

# SNAP PAC S-Series Controllers

## Dimensional Drawings (continued)

### SNAP-PAC-S2 DIN-Rail Mounting and Dimensions

Requires a SNAP-S2DIN adapter (purchased separately).



FOR DIN CLIP ADD ADDITIONAL
0.06" (1.52mm) TO OVERALL HEIGHT

CUSTOMER SUPPLIED
35mm DIN RAIL
NOTE: BESURE TO CONSIDER
DIN RAIL DIMENSIONS.

SNAP RACK DIN-RAIL ADAPTER CLIP
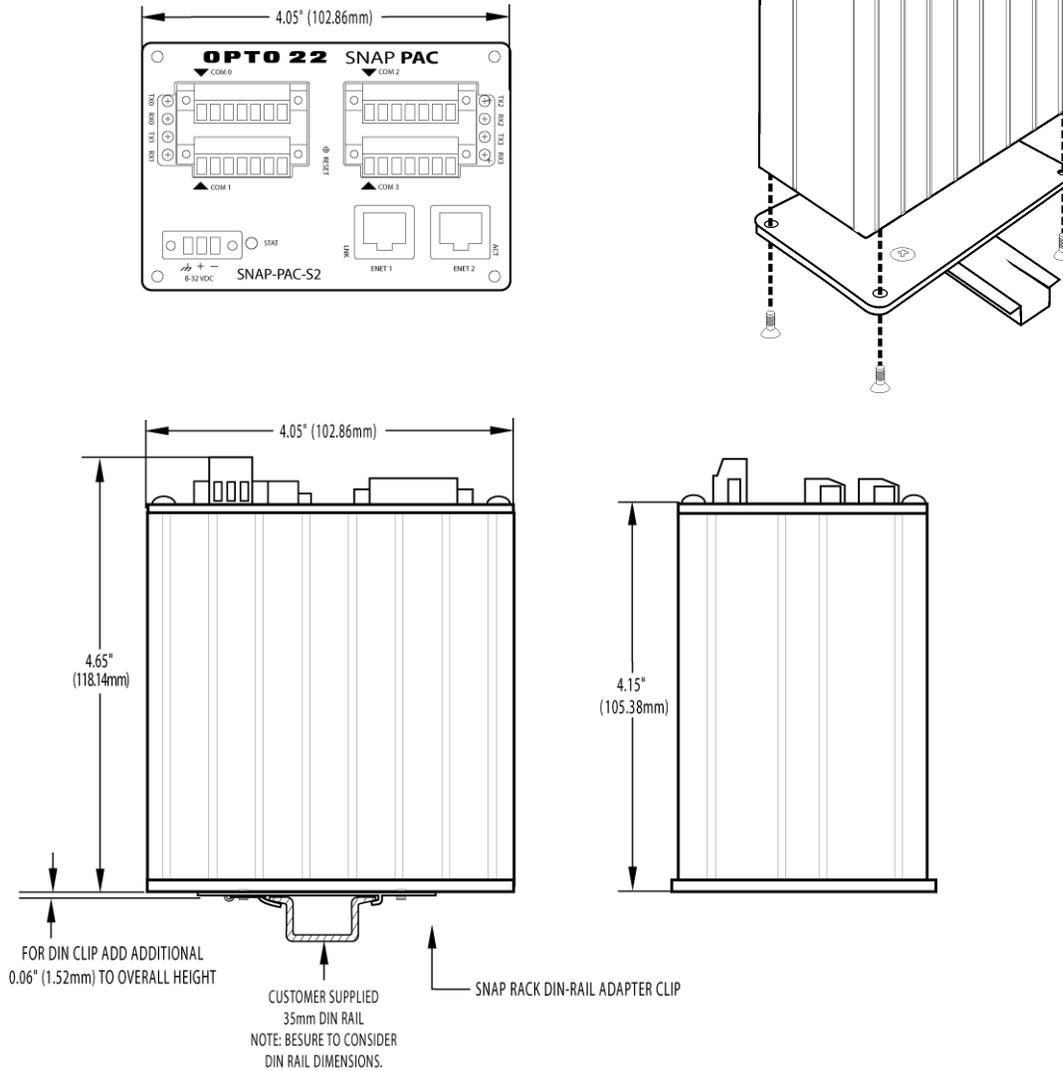
## Dimensional Drawings (continued)

### SNAP-PAC-S1-W Dimensions
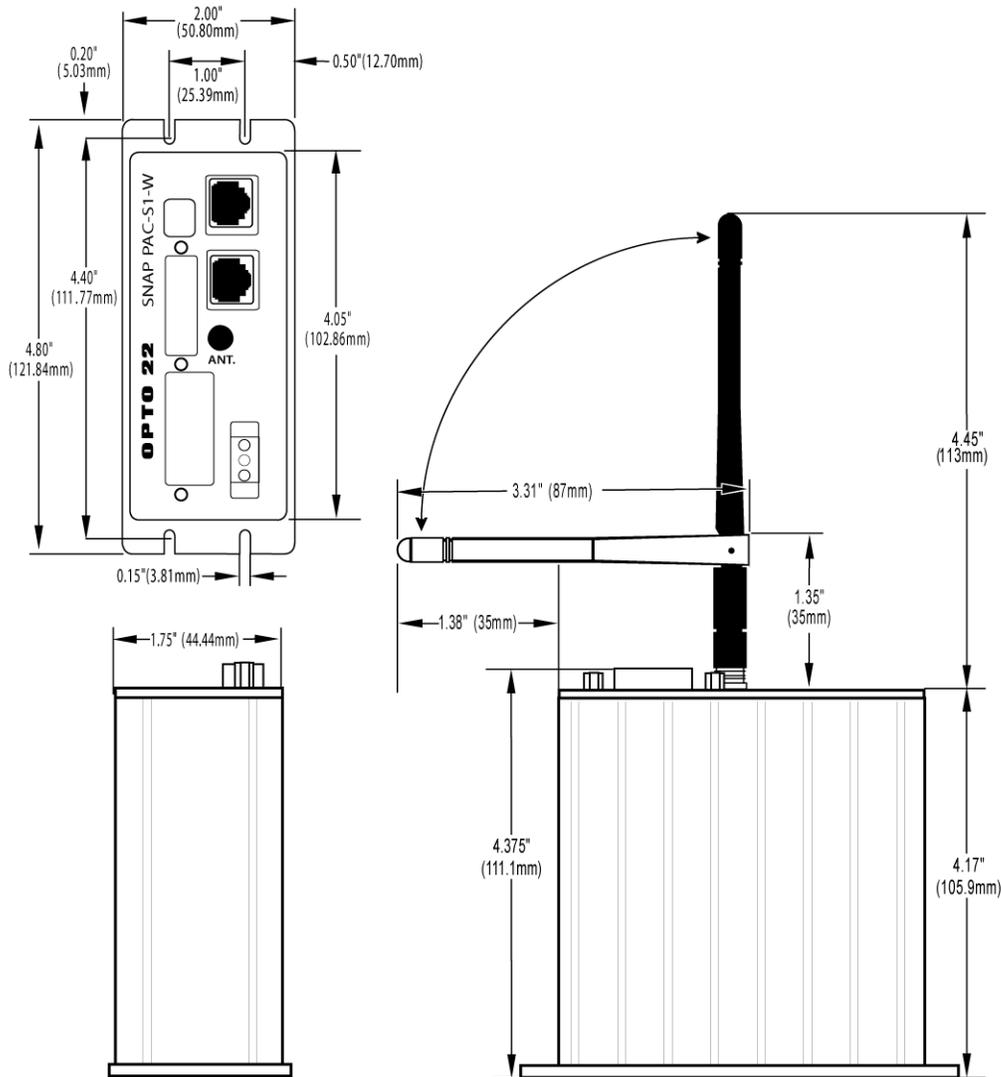
# SNAP PAC S-Series Controllers

## Dimensional Drawings (continued)

### SNAP-PAC-S2-W Dimensions
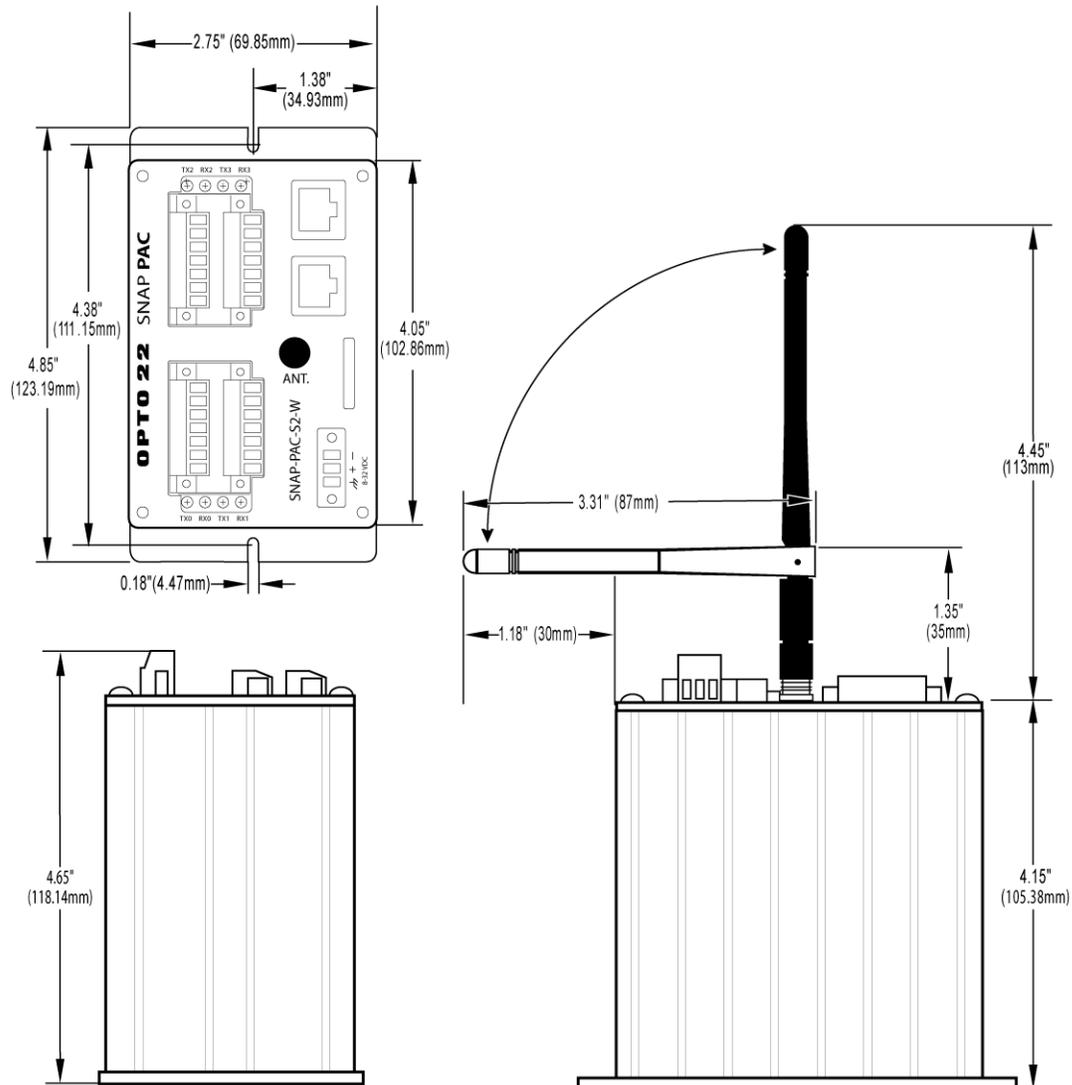
# More About Opto 22

## Products

Opto 22 develops and manufactures reliable, flexible, easy-to-use hardware and software products for industrial automation, energy management, remote monitoring, and data acquisition applications.

### *groov*

*groov* puts your system on your mobile device. With zero programming, you can build mobile operator interfaces to monitor and control systems from Allen-Bradley, Siemens, Schneider Electric, Modicon, and many more. Web-based *groov* puts mobile-ready gadgets at your fingertips. Tag them from your existing tag database, and they automatically scale for use on any device with a modern web browser. See groov.com for more information and your free trial.

### SNAP PAC System

Designed to simplify the typically complex process of selecting and applying an automation system, the SNAP PAC System consists of four integrated components:

- SNAP PAC controllers
- PAC Project™ Software Suite
- SNAP PAC brains
- SNAP I/O™

### SNAP PAC Controllers

Programmable automation controllers (PACs) are multifunctional, modular controllers based on open standards.

Opto 22 has been manufacturing PACs for over two decades. The standalone SNAP PAC S-series, the rack-mounted SNAP PAC R-series, and the software-based SoftPAC™ all handle a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

SNAP PACs are based on open Ethernet and Internet Protocol (IP) standards, so you can build or extend a system easily, without the expense and limitations of proprietary networks and protocols. Wired+Wireless™ models are also available.

### PAC Project Software Suite

Opto 22's PAC Project Software Suite provides full-featured, cost-effective control programming, HMI (human machine interface) development and runtime, OPC server, and database connectivity software for your SNAP PAC System.

Control programming includes both easy-to-learn flowcharts and optional scripting. Commands are in plain English; variables and I/O point names are fully descriptive.

PAC Project Basic offers control and HMI tools and is free for download on our website, www.opto22.com. PAC Project

Professional, available for separate purchase, adds one SoftPAC, OptoOPCServer, OptoDataLink, options for controller redundancy or segmented networking, and support for legacy Opto 22 serial *mistic*™ I/O units.

### SNAP PAC Brains

While SNAP PAC controllers provide central control and data distribution, SNAP PAC brains provide distributed intelligence for I/O processing and communications. Brains offer analog, digital, and serial functions, including thermocouple linearization; PID loop control; and optional high-speed digital counting (up to 20 kHz), quadrature counting, TPO, and pulse generation and measurement.

### SNAP I/O

I/O provides the local connection to sensors and equipment. Opto 22 SNAP I/O offers 1 to 32 points of reliable I/O per module, depending on the type of module and your needs. Analog, digital, and serial modules are all mixed on the same mounting rack and controlled by the same processor (SNAP PAC brain or rack-mounted controller).

## 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 only testing a sample of each batch, we can guarantee most solid-state relays and optically isolated I/O modules for life.
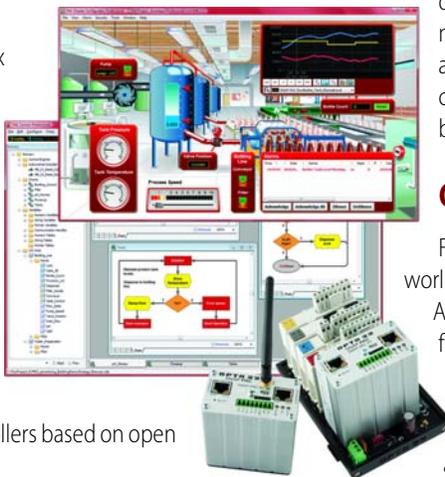
## Free Product Support

Opto 22's California-based Product Support Group offers free, comprehensive technical support for Opto 22 products. Our staff of support engineers represents 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.

Additional support is always available on our website: how-to videos, OptoKnowledgeBase, self-training guide, troubleshooting and user's guides, and OptoForums.

In addition, hands-on training is available for free at our Temecula, California headquarters, and you can register online.

## 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 or 951-695-3000, or visit our website at www.opto22.com.

**www.opto22.com**