SNAP PAC R-Series Controllers

Features

⬛ Rack-mounted industrial controller with I/O processor included.

⬛ Two independent 10/100 Mbps Ethernet network interfaces

⬛ One RS-232 port with handshaking, suitable for modem communication using PPP

⬛ MicroSD card slot for removable data storage

⬛ Full-featured control and HMI software included with purchase

SNAP-PAC-R1 controller

Description

The affordable and compact SNAP PAC R-series programmable automation controllers provide powerful, real-time control and communication to meet your industrial control, monitoring, and data acquisition needs. Part of the Opto 22 SNAP PAC System™, the R-series PAC is a rack-mounted, industrially hardened unit that can handle multiple tasks involving digital and analog control, serial string handling, communication, and enterprise connectivity.

Used with the included PAC Project Basic software suite (or PAC Project Professional, purchased separately), the Ethernet-based SNAP PAC R-series controller runs control programs written in Opto 22's PAC Control™ software. It can monitor and control a wide range of devices and equipment wired to the I/O on its own rack and to I/O on distributed racks equipped with SNAP PAC EB-series brains. Alternatively, the R-series controller can be used as a slave to a larger, SNAP PAC S-series standalone industrial controller.

SNAP PAC R-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.

Four models of the SNAP PAC R-series controller are available:

- **SNAP-PAC-R1** and **SNAP-PAC-R1-FM** control a mix of SNAP analog, digital (both standard and high-density), and serial modules. Full digital functions include high-speed counting, quadrature counting, pulse measurement, and period and frequency measurement. The -FM model is Factory Mutual approved.

- **SNAP-PAC-R2** and **SNAP-PAC-R2-FM** also control a mix of SNAP analog, standard and high-density digital, and serial modules. High-speed digital functions are not included. The -FM model is Factory Mutual approved.

Built-in functions and comparisons of the SNAP-PAC-R1 and SNAP-PAC-R2 are shown in the table on .

Ethernet Communication

SNAP PAC R-series 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 R-series controllers include two 10/100 Mbps Ethernet interfaces for networking to Ethernet hosts and to other I/O units. 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.

Supported protocols over Ethernet include EtherNet™/IP, Modbus®/TCP, SMTP, SNMP, FTP, and OptoMMP.

Part Numbers

Part	Description
SNAP-PAC-R1	Analog/digital/serial rack-mounted controller with two Ethernet ports and high-speed digital functions
SNAP-PAC-R2	Analog/simple digital/serial rack-mounted controller with two Ethernet ports
SNAP-PAC-R1-FM	Analog/digital/serial rack-mounted controller with two Ethernet ports and high-speed digital functions, Factory Mutual approved
SNAP-PAC-R2-FM	Analog/simple digital/serial rack-mounted controller with two Ethernet ports, Factory Mutual approved

Serial Communication

SNAP PAC R-series controllers provide an RS-232 serial link to support Point-to-Point Protocol (PPP) modem connections—for creating TCP/IP networks over serial or PSTN (Public Switched Telephone Network) lines—as well as remote serial device communication.

The RS-232 serial interface supports either a modem connection using PPP or general-purpose communication with serial devices, allowing you to send and receive data from a serial device connected directly to the controller. For additional serial interfaces, you can add one or more SNAP serial communication modules on the rack.

NOTE: The R-series controller does not include an RS-485 port and cannot be used to control Opto 22 serial I/O processors, such as the SNAP PAC SB-series brains. Use an S-series controller for serial brains.

I/O Mounting Racks

SNAP PAC R-series controllers must be connected to the appropriate rack to avoid damage to the controller. Both the SNAP-PAC-R1 and R2 are designed to work with SNAP PAC mounting racks, which are available with 4, 8, 12, or 16 positions for Opto 22 SNAP I/O modules. Part numbers are SNAP-PAC-RCK4, SNAP-PAC-RCK8, SNAP-PAC-RCK12, and SNAP-PAC-RCK16. Factory Mutual-approved versions of these racks, with part numbers ending in -FM, are also available.

SNAP I/O

The SNAP PAC R-series controllers support all SNAP I/O modules available on our website. SNAP digital I/O modules contain four input or output points, and SNAP high-density digital modules contain 16 or 32 input or output points. SNAP analog modules contain 2 to 32 points, depending on the module.

Software

SNAP PAC controllers use Opto 22's **PAC Project** Microsoft® Windows®-compatible automation software for programming, human-machine-interface (HMI) development, and OPC 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 OptoOPCServer™ software for exchanging data with OPC 2.0-compliant client software applications and OptoDataLink™ for exchanging SNAP PAC System data with databases (including Microsoft SQL Server, Microsoft Access, and MySQL), text files, and email systems).

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 the ability to import legacy OptoControl strategies, support for older *mistic*™ serial I/O units, and support for the dual independent Ethernet ports on a SNAP PAC controller. A SNAP R-series controller simultaneously runs up to 16 PAC Control flowcharts, although the PAC Control strategy can actually contain a much larger number of flowcharts. The total number of flowcharts is limited only by the memory available for strategy storage.

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 legacy Opto 22 FactoryFloor® software suite, and using redundant Ethernet communication links on SNAP PAC controllers. PAC Display Professional can also connect to Ethernet-based FactoryFloor controllers running OptoControl strategies.

OptoOPCServer is a fast, efficient OPC 2.0-compliant server for communicating with many Opto 22 products, including SNAP PAC controllers and I/O units, plus legacy Opto 22 Ethernet-based controllers and I/O. 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 is a software application that makes it easy to share data from the SNAP PAC System with commonly used databases, including Microsoft SQL Server, Microsoft Access, and MySQL, as well as text files. The I/O points and strategy variables already created in your PAC Control strategy are automatically available for OptoDataLink to use for data exchange.

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

SNAP PAC R-Series Controllers

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 on our website. To get it immediately, you can buy and download the software from the Opto 22 website at www.opto22.com; the CD and printed documentation will be shipped to you. You can also separately purchase PAC Control Professional, PAC Display Professional, OptoOPCServer, and OptoDataLink as needed.

Specifications

Processor	200 MHz 32-bit ColdFire® 5475 with integrated floating-point unit (FPU)

Memory
   Total RAM
   Battery-backed RAM
   Flash
	(Models manufactured November 2008 and later)[1]
	32 MB (5 MB available for PAC Control strategy; 2 MB for file storage)
	  2 MB (1 MB available for PAC Control strategy)
	  8 MB (3.25 MB available for PAC Control strategy; 384 KB available for file storage)

Removable storage	(Models manufactured November 2008 and later; requires firmware R8.4 or higher) MicroSD card slot: supports MicroSD card up to 2 GB maximum
Backup battery	Rechargeable (recharges whenever the brain has power), 3-year power-off data retention[2]

Communication
   Ethernet (host and I/O)
 	
   RS-232 serial (host only)
	Two independent 10/100 Mbps Ethernet network interfaces (RJ-45 connectors) Each interface has a separate IP address.
	One RS-232 serial port[3] with hardware handshaking

I/O unit compatibility	SNAP PAC I/O units: SNAP PAC R-series and EB-series I/O units
Power requirements	5.0–5.2 VDC @ 1.2 A

Environmental
   Operating temperature
   Storage temperature
   Humidity
	0 °C to 60 °C
	-40 °C to 85 °C
	0% to 95% relative humidity, non-condensing

Software
   PAC Project Basic
 	
   PAC Project Professional
	Includes programming, HMI software, and configuration software; included with purchase of controller.
	PAC Project Basic plus OPC 2.0-compliant OPC server, database connectivity, OptoControl strategy and OptoDisplay project importing, and Ethernet link redundancy or network segmenting support.

Other features	• Multiple protocol support including TCP/IP, FTP, EtherNet/IP, Modbus/TCP, SNMP v2.0c, OptoMMP™, and SMTP • Built-in I/O processor handles up to 16 digital, analog, and serial I/O modules on the same rack[4] • Real-time clock • FTP server/client with file system (in RAM and in removable storage) • Scratch Pad area for peer-to-peer communication • Configurable link redundancy or segmented networking for I/O-controller subnetting (when using PAC Project Professional)

1 Models manufactured before November 2008 have 16 MB RAM (4 MB for strategy; 2 MB for file storage).
2 Models manufactured before July 1, 2007 have a user-replaceable 3-volt CR2032 Lithium battery (typical service life with power off: 5 years).
3 The serial connector can be used for a modem connection using PPP. This connector can also be used for a direct connection to a serial device; communication is handled through PAC Control.
4 SNAP-PAC-R1s with serial numbers lower than 600,000 are limited to eight 4-channel digital modules per rack; remaining eight can be analog, serial, and high-density digital modules.
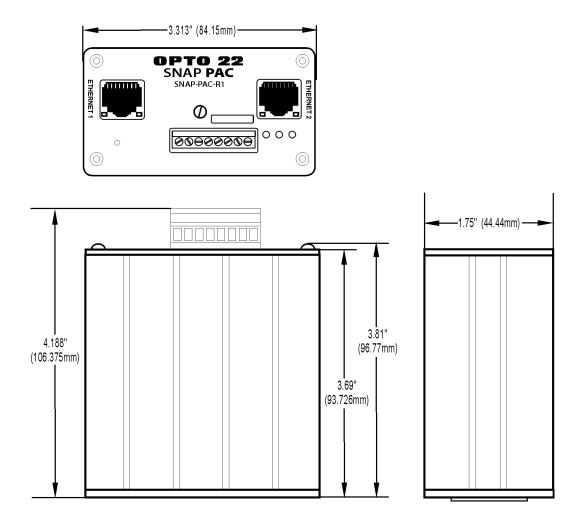
Dimensions

The dimensions are the same for all SNAP PAC R-series controllers.