

OPTOEMU SENSOR DR (DEMAND RESPONSE)

Features

- > Monitor real-time energy usage from utility meters and equipment
- > See and analyze energy data online
- > Shed loads on predefined usage thresholds
- > Exchange data with a SNAP PAC System, OPC or Modbus/TCP systems, and SQL databases
- > Communicate over standard 10/100 Mbps Ethernet
- > UL listed in U.S. and Canada



OptoEMU Sensor DR

DESCRIPTION

The OptoEMU Sensor™ Energy Monitoring Unit with demand response (DR) monitors the electrical energy used in your facility and then signals electrical equipment to turn on or off in response to limits you define.

To reduce peak energy use that triggers demand charges, electrical equipment loads can also be shed on predefined usage thresholds.

The OptoEMU Sensor DR makes it easy to reduce your energy costs by managing energy consumption, taking advantage of demand response programs from utility providers, and gaining control over your energy pricing.

Why Monitor Energy?

Traditionally, energy has been considered an overhead cost. Utility bills show few details about when and how electricity was used, and they arrive long after the energy was consumed.

However, new energy pricing structures are changing traditional ways of looking at energy costs. Increasingly, commercial and industrial businesses are finding that they can significantly improve the bottom line by managing energy in the same way as other business costs such as people, assets, and inventory.

In addition, new Demand Response (DR) programs from energy providers offer opportunities to turn what used to be an overhead cost into a source of revenue. The OptoEMU Sensor DR helps you take advantage of these opportunities.

Gathering and Viewing Energy Data

The OptoEMU Sensor DR's digital inputs gather data from up to two metering devices that emit pulses (such as a utility meter or submeter). The Sensor DR can also monitor up to 64 data inputs from Modbus devices (over serial and Ethernet).

You can view this real-time and historical energy data through a secure online software service such as [Pulse Energy](#) or [eSight](#). You choose the service that's best for your business, and OptoEMU Sensor DR sends energy data directly to that service. Services usually provide graphs, energy usage comparisons, and other tools to analyze energy use in detail.

OptoEMU Sensors are also compatible with *groov* View mobile operator interfaces you build yourself and use on any smartphone, tablet, or computer. *groov* View is included when you buy a [groov EPIC processor](#), a [groov Edge Appliance \(groov Box\)](#), or [groov Server for Windows](#).

Managing Energy Use

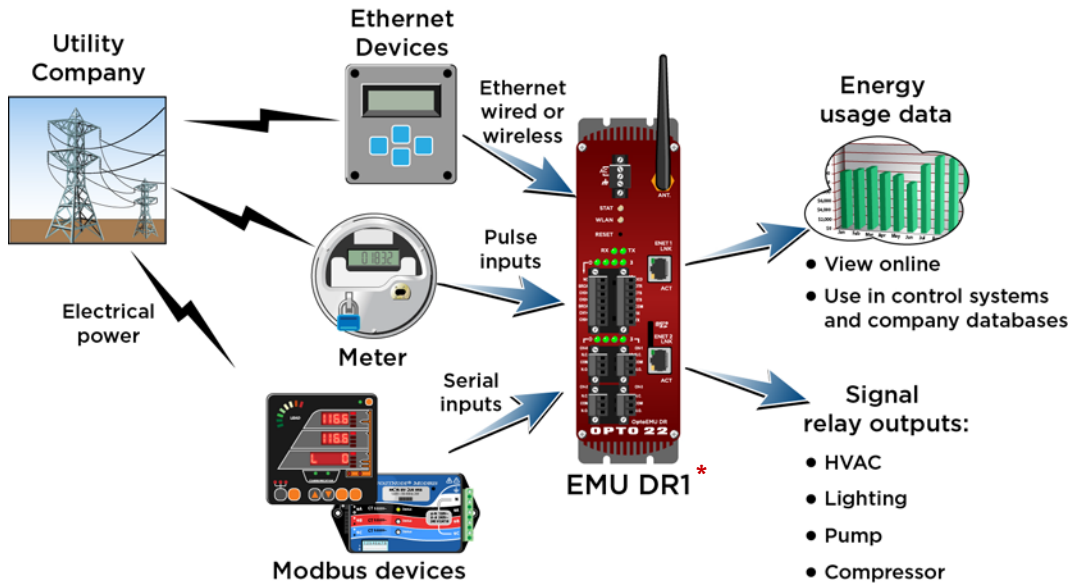
The OptoEMU Sensor DR includes four signal relay outputs that can be used to respond to usage limits you define. These outputs can signal equipment such as HVAC fans and chillers to turn on or off, or signal existing energy or building management systems to perform load shedding.

Each Form C output can be wired for normally open or normally closed.

Part Number

| Part | Description |
|-----------------|---|
| OPTOEMU-SNR-DR2 | Energy monitoring unit with Demand Response capability (wired Ethernet) |

OptoEMU Sensor DR



Configuration

The Sensor includes an easy-to-use utility program for assigning an IP address for communication on your network, configuring inputs and an online data service, and entering the appropriate responses for shedding load.

Communicating with Other Systems

The OptoEMU Sensor DR can also communicate with other systems to coordinate energy management. Sensor data can be incorporated in a PAC Control strategy, a PAC Display HMI, and control systems that communicate through Modbus/TCP or OPC.

Communication

The OptoEMU Sensor DR uses standard networks and protocols to communicate with online services and computer networks.

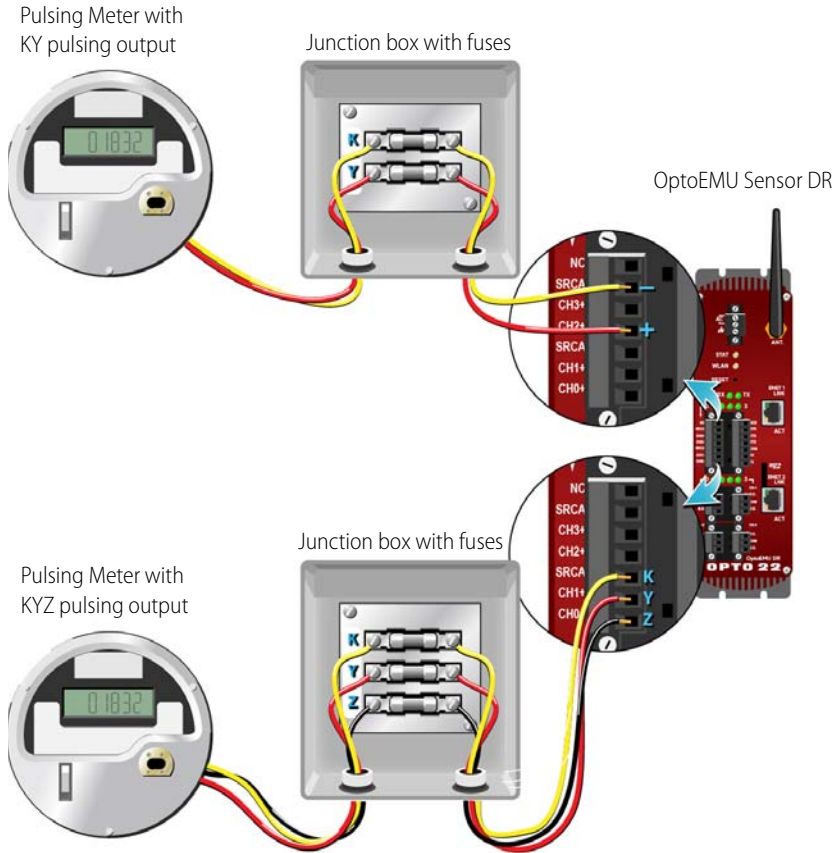
- The **OPTOEMU-SNR-DR2** communicates over a standard 10/100 Mbps wired Ethernet network.
- * **NOTE:** Due to the unavailability of essential parts, the OPTOEMU-SNR-DR1 is now obsolete. (This model offered wireless communication as well as wired.)

With the options of two wired Ethernet network interfaces, you have the flexibility to monitor devices in hard-to-reach areas and to set up networking suited to your business.

Data Storage

The OptoEMU Sensor DR can store data internally. If communication with the software service is lost, the unit stores data for delivery when communication is restored.

Wiring for Pulsed Inputs



Use with either two-wire KY (Form A) or three-wire KYZ (Form C) pulsing devices.

Pin 7 (labeled NC) is not used.

Contact your utility company if connections are not immediately apparent.

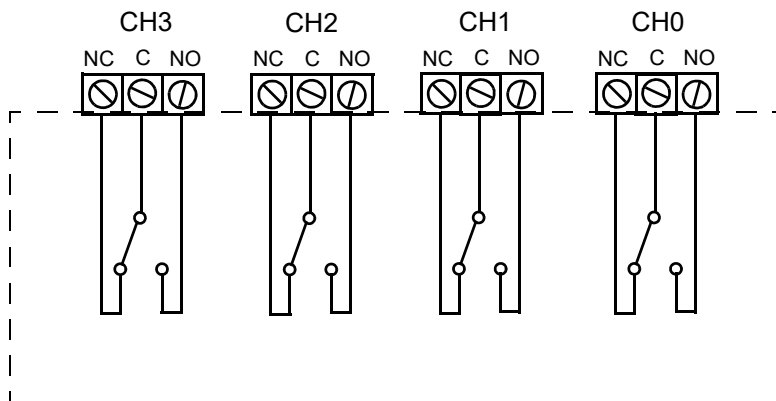
NOTE: If this equipment is used in a manner not specified by Opto 22, the protection provided by the equipment may be impaired.

NOTE: The wireless OPTOEMU-SNR-DR1 (pictured here) is no longer available due to the unavailability of essential parts. The DR2 for wired networks is still available.

Wiring for Signal Relay Outputs (Form C)

Note: You must provide fusing.

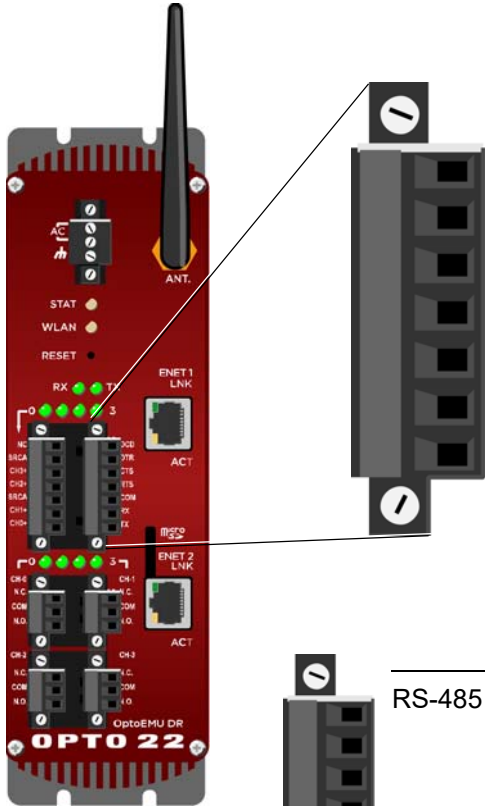
NOTE: Transient protection must be used on inductive loads.



Current rating: 100 mA switching (max.)
@ 250 VAC/VDC (max.)

Wire size: 24–14 AWG

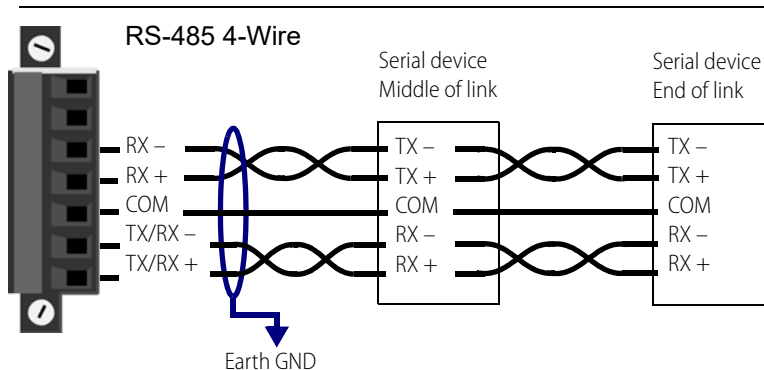
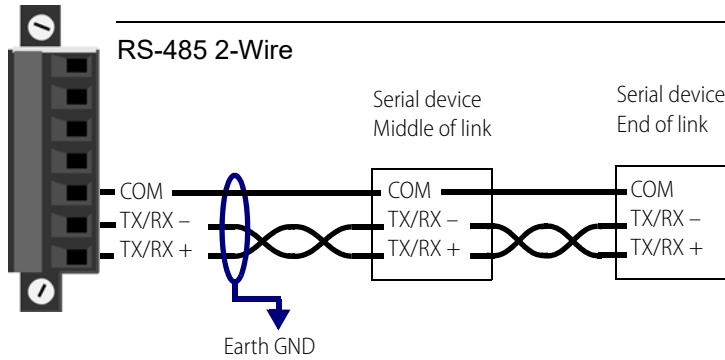
Wiring for Serial Ports



RS-232 and RS-485 Pinouts

| RS-232 | Signal Direction | RS-485 | Signal Direction |
|--------|------------------|--------------|------------------|
| DCD | In | -- | |
| DTR | Out | -- | |
| CTS | In | RX- (4 wire) | In |
| RTS | Out | RX+ (4 wire) | In |
| COM | | COM | |
| RX | In | TX/RX- | In/Out |
| TX | Out | TX/RX+ | In/Out |

Please note: The wireless OPTOEMU-SNR-DR1 (pictured here) is no longer available due to the unavailability of essential parts. The DR2 for wired networks is still available.



SPECIFICATIONS: OPTOEMU SENSOR DR

Overall Unit Specifications

| | OPTOEMU-SNR-DR2 |
|--------------------------------|---|
| Power Requirements | 100–240 VAC, 47–63 Hz, 0.4 A maximum, 8 W |
| Dimensions | Overall 2.45" w x 8.08" h x 4.76" d (6.23 cm x 20.53 cm x 12.09 cm) |
| Enclosure | Sturdy metal case |
| Removable storage | MicroSD card slot (for future use) |
| Backup battery | Rechargeable (recharges whenever the unit has power), 3-year power-off data retention |
| Ethernet Communication (wired) | Two independent 10/100 Mbps Ethernet network interfaces (RJ-45 connectors), each with a separate IP address (separate subnets). |
| Serial Communication | One serial port, software configurable for RS-232 (TX, RX, COM, DTR, DCD, RTS, CTS) or RS-485 (2-wire, 4-wire, optional termination, optional biasing). |
| Indicators | Status of unit Serial: Receiving, Transmitting (future use) Ethernet interfaces (2): Link, Activity Pulse inputs: On/Off status Mechanical relay outputs: On/Off status |
| Other features | Real-time clock |
| Operating Temperature | 0 to 60 °C (32 to 140° F) |
| Storage Temperature | -25 to 85 °C (-13 to 185° F) |
| Humidity | 0% to 95% relative humidity, non-condensing |
| Agency Approvals | UL, cUL, CE, RoHS, DFARS; UKCA |
| Warranty | 30 months |

SPECIFICATIONS (CONTINUED)

Dry Contact Pulse Inputs

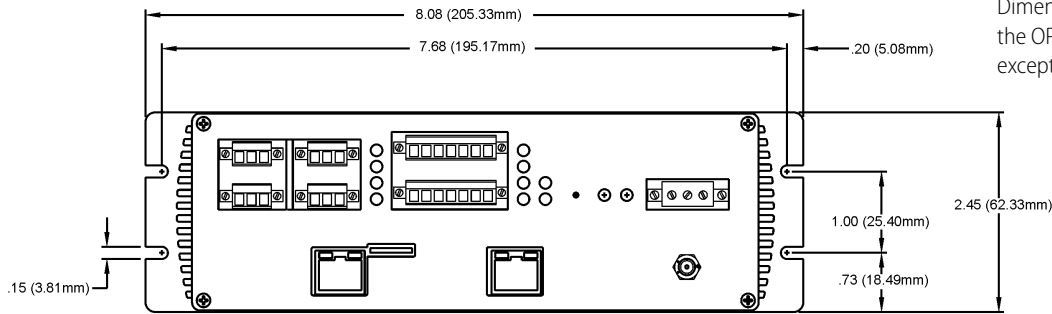
OptoEMU Sensor DR supplies 15 volts to each external dry contact switch and senses switch closure.

| | |
|--|--|
| Open Circuit Voltage (Switch Open) | 15 VDC typical (supplied by OptoEMU Sensor DR) |
| Short Circuit Current (Switch Closed) | 7 milliamps nominal |
| Minimum Off Resistance | >20 K ohms |
| Maximum Allowable ON Resistance (Wire + Contact Resistance) | 500 ohms |
| Turn-on Time | 5 milliseconds |
| Turn-off Time | 25 milliseconds |
| Input-to-output Isolation | 1500 VAC/VDC |
| Minimum Pulse Width | >= 7 milliseconds |
| Maximum Frequency | <= 30 Hz |
| Status indicators | 1 LED per channel |

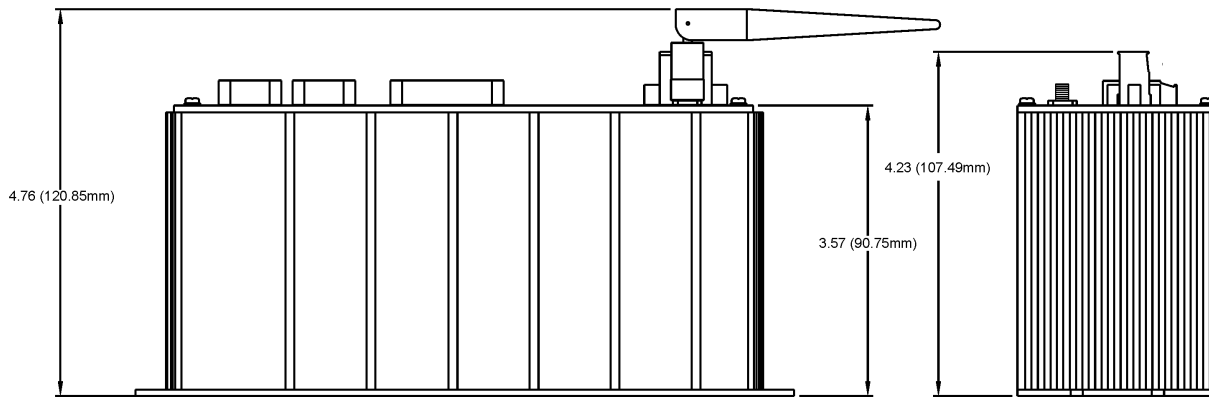
Signal Relay Outputs

| | |
|------------------------------|--|
| Contact Configuration | SPDT relay (with NO and NC contacts) |
| Line Voltage - Range | 0–240 VAC or 0–30 VDC |
| Current Rating | 100 mA switching @ 0–240 VAC or 0–100 VDC |
| Surge Current | 600 mA |
| Minimum Load | 0.1 VDC, 5 mA |
| Contact Resistance | ≤ 100 milliohms |
| Peak Blocking Voltage | 250 VAC/VDC |
| Channel-to-channel isolation | 300 VAC (1500 V transient) |
| Turn-on Time | 6 milliseconds |
| Turn-off Time | 6 milliseconds |
| Temperature | 0 to 70 °C, operating -30 to 85 °C, storage |
| Mechanical Life | 5 x 10 ⁶ operations |
| Operational Life | 1 x 10 ³ operations |
| Status indicators | 1 LED per channel |

DIMENSIONAL DIAGRAM—OPTOEMU-SNR-DR1

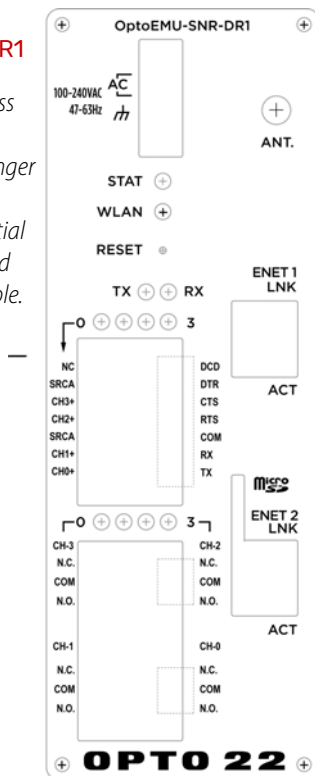


Dimensions are identical for the OPTOEMU-SNR-DR2 except it has no antenna.

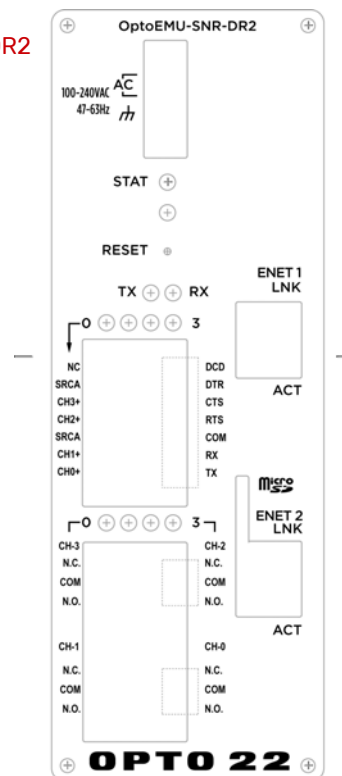


Faceplate, OPTOEMU-SNR-DR1

Please note: The wireless OPTOEMU-SNR-DR1 (pictured here) is no longer available due to the unavailability of essential parts. The DR2 for wired networks is still available.



Faceplate, OPTOEMU-SNR-DR2



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 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
- 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.