OPTO 22

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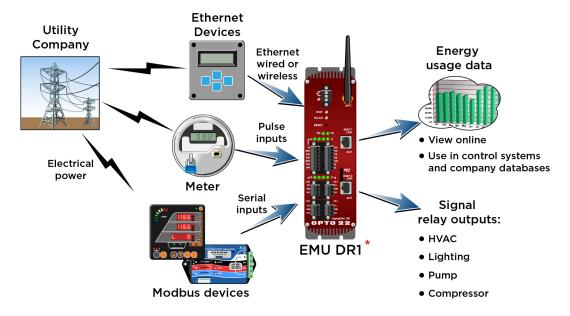
Each Form C output can be wired for normally open or normally closed.

Part Number

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

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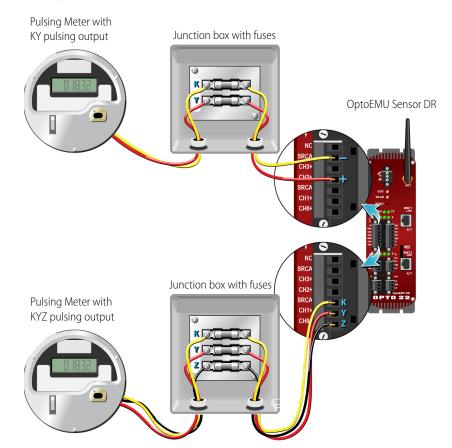
With the options of two wired Ethernet network interfaces, you have the flexibility to monitor devices in hard-to-reach areas and to set up networking suited to your business.

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.

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Wiring for Pulsed Inputs

Pulsing Meter with
KY pulsing output

Junction box with fuses

OptoEMU Sensor DR

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

Pin 7 (labeled NC) is not used.

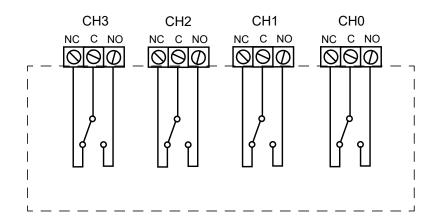Contact your utility company if connections are not immediately apparent.

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.

Junction box with fuses

Pulsing Meter with
KYZ pulsing output

Wiring for Signal Relay Outputs (Form C)

Note: You must provide fusing.

NOTE: Transient protection must be used on inductive loads.

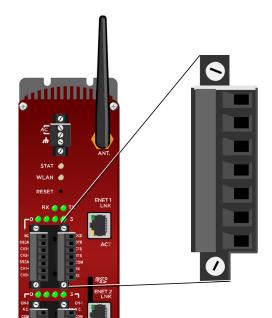| CH3	CH2	CH1	CH0
NC C NO	NC C NO	NC C NO	NC C NO

⚠

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

Wire size: 24–14 AWG

Wiring for Serial Ports

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.

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

RS-485 2-Wire

RS-485 4-Wire

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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
Warranty	30 months

SPECIFICATIONS (CONTINUED)

Dry Contact Pulse Inputs

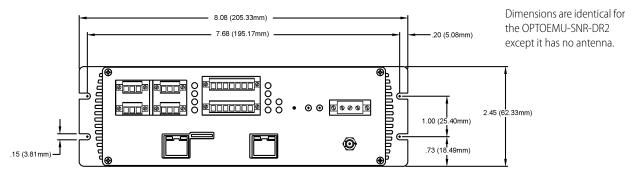OptoEMU Sensor DR supplies 15 volts to each external dry contact switch and senses switch closure.

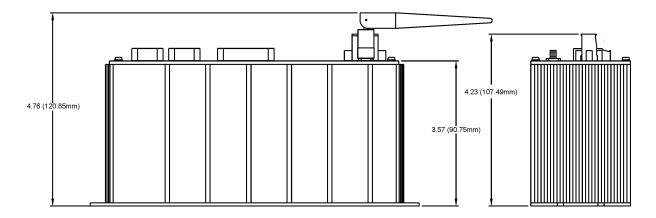|	
Open Circuit Voltage (Switch Open)	15 VDC typical (supplied by OptoEMU Sensor DR)
Short Circuit Current (Switch Closed)	7 milliamps nominal
Minimum Off Resistance	>20 K ohms
Maximum Allowable ON Resistance (Wire + Contact Resistance)	500 ohms
Turn-on Time	5 milliseconds
Turn-off Time	25 milliseconds
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	$\leq$ 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	5×10^6 operations
Operational Life	1×10^3 operations
Status indicators	1 LED per channel

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DIMENSIONAL DIAGRAM—OPTOEMU-SNR-DR1

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

8.08 (205.33mm)
7.68 (195.17mm)
.20 (5.08mm)
2.45 (62.33mm)
1.00 (25.40mm)
.73 (18.49mm)
.15 (3.81mm)

4.76 (120.85mm)
4.23 (107.49mm)
3.57 (90.75mm)
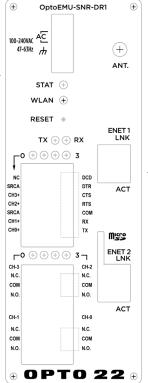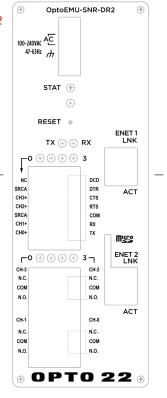
Faceplate, OPTOEMU-SNR-DR1

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.

OptoEMU-SNR-DR1

100-240VAC 47-63Hz

ANT.

STAT
WLAN
RESET

TX RX

0   3
NC   DCD
SRCA   DTR
CH3+   CTS
CH2+   RTS
SRCA   COM
CH1+   RX
CH0+   TX

ENET 1 LNK
ACT

MicroSD

0   3
CH-3   CH-2
N.C.   N.C.
COM   COM
N.O.   N.O.

CH-1   CH-0
N.C.   N.C.
COM   COM
N.O.   N.O.

ENET 2 LNK
ACT

OPTO 22

Faceplate, OPTOEMU-SNR-DR2

OptoEMU-SNR-DR2

100-240VAC 47-63Hz

STAT

RESET

TX RX

0   3
NC   DCD
SRCA   DTR
CH3+   CTS
CH2+   RTS
SRCA   COM
CH1+   RX
CH0+   TX

ENET 1 LNK
ACT

MicroSD

0   3
CH-3   CH-2
N.C.   N.C.
COM   COM
N.O.   N.O.

CH-1   CH-0
N.C.   N.C.
COM   COM
N.O.   N.O.

ENET 2 LNK
ACT

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More about Opto 22

PRODUCTS

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

groov EPIC® System

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

groov EPIC I/O

groov I/O connects locally to sensors and equipment with up to 24 channels on each I/O module. 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 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.

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 or on a monitor connected via the HDMI or USB ports.

groov EPIC Software

Software included in the *groov* EPIC processor:

- PAC Control engine to run PAC Control and PAC Display
- CODESYS Runtime engine to run IEC61131-3 compliant programs built with CODESYS Development System
- Optional access to the Linux operating system through a secure shell (SSH) to download and run custom applications
- *groov* View for building your own device-independent HMI, viewable on the touchscreen, PCs, and mobile devices
- Node-RED for creating simple logic flows from pre-built nodes
- Ignition Edge® from Inductive Automation®, with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT communications with Sparkplug for efficient IIoT data transfer

groov RIO

groov RIO revolutionizes remote I/O by offering a single, compact, PoE-powered industrial package with web-based configuration, commissioning, and flow logic software built in, plus support for multiple OT and IT protocols.

Standing alone, it meets the needs of small, variable I/O count applications, especially those that require data logging or data communications, commonly found in IIoT applications. *groov* RIO can also be used with a Modbus/TCP master or as remote I/O for a *groov* EPIC system.

Older products

From solid state relays (our first products) to world-famous G4 and SNAP I/O, to SNAP PAC controllers, older Opto 22 products are still supported and still doing the job at thousands of installations worldwide. You can count on us to give you 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, comprehensive 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, troubleshooting tips, and OptoForums. In addition, instructor-led, hands-on Premium Factory Training is available 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** (toll-free in the U.S. and Canada) or **+1-951-695-3000**, or visit our website at www.opto22.com.