

## 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 or wireless LAN (802.11a, b, or g) or both
- > 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](#) mobile operator interfaces you build yourself and use on any smartphone, tablet, or computer. For more information, visit [groov.com](#).

### Managing Energy Use

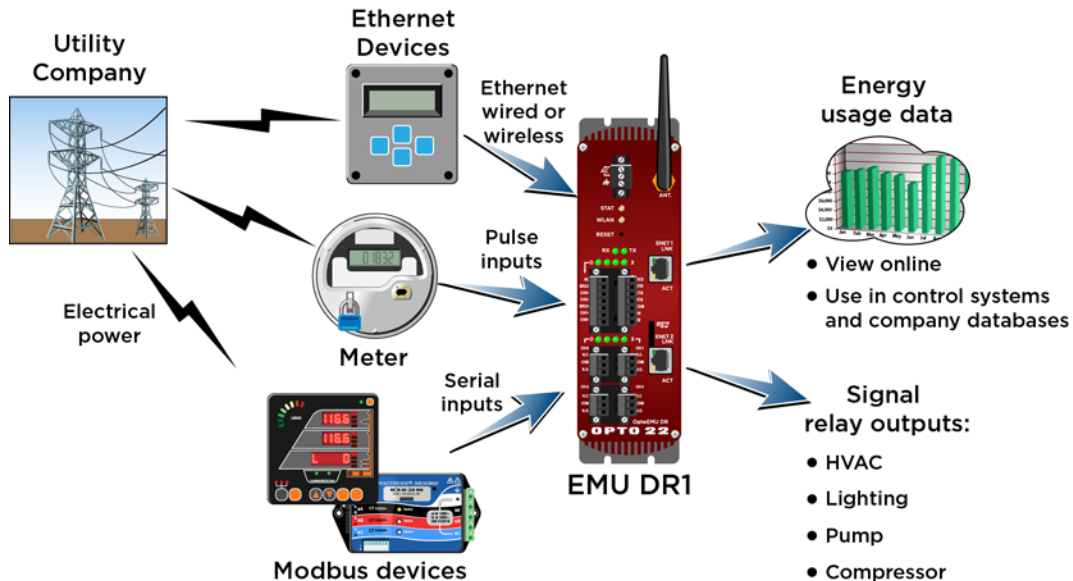
The OptoEMU Sensor DR includes four signal relay outputs that can be used to respond to usage limits you define. These outputs can signal equipment such as HVAC fans and chillers to turn on or off, or signal existing energy or building management systems to perform load shedding.

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

### Part Numbers

Part	Description
OPTOEMU-SNR-DR1	Energy monitoring unit with Demand Response capability (Wired+Wireless)
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. Two DR models are available:

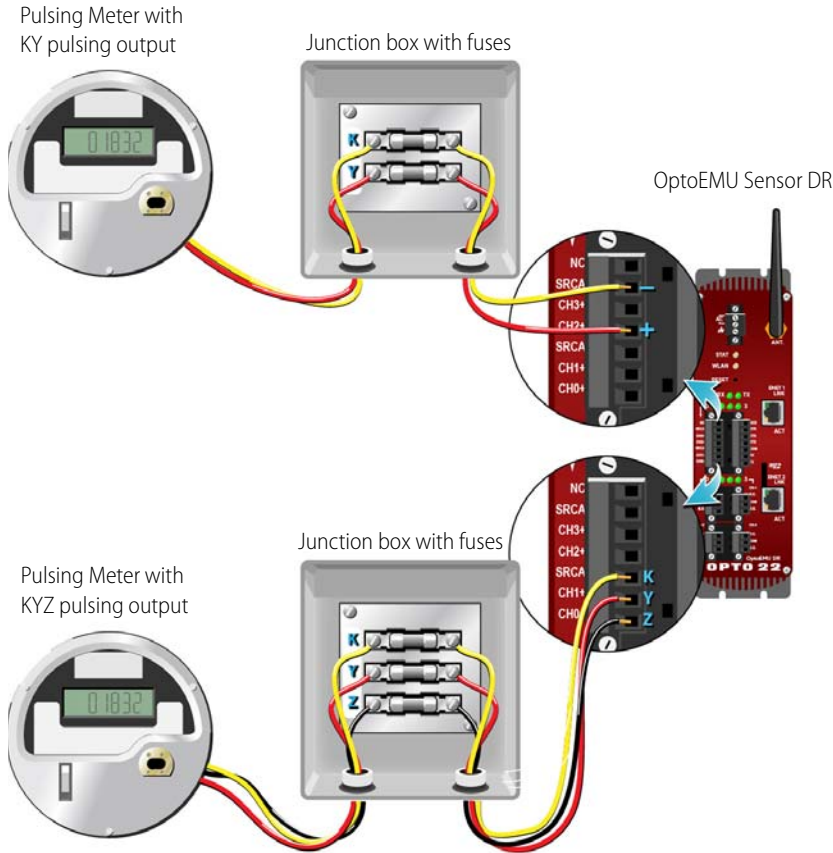
- **OPTOEMU-SNR-DR2** communicates over a standard 10/100 Mbps wired Ethernet network.
- **OPTOEMU-SNR-DR1** communicates over a 10/100 Mbps wired Ethernet network or over an 802.11a, b, or g wireless LAN (local area network). It can also communicate over both, simultaneously. Security on the wireless LAN includes 802.11i WPA2/AES, currently considered the best wireless security, plus the older WPA security standard for backwards compatibility.

With the options of two wired Ethernet network interfaces or two wired plus an independent wireless interface, 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.

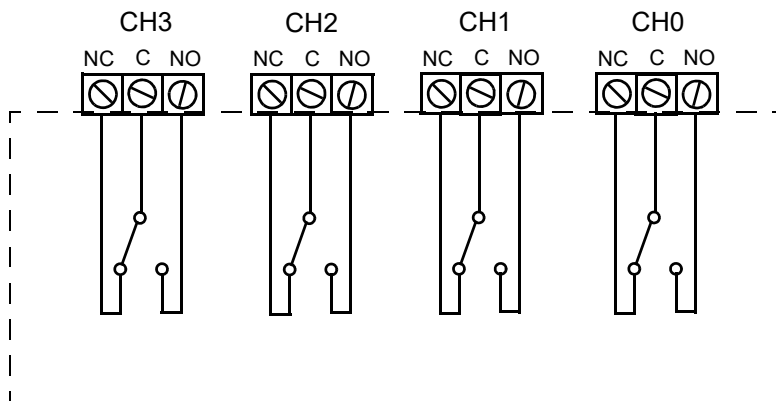
Contact your utility company if connections are not immediately apparent.

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

## Wiring for Signal Relay Outputs (Form C)

Note: You must provide fusing.

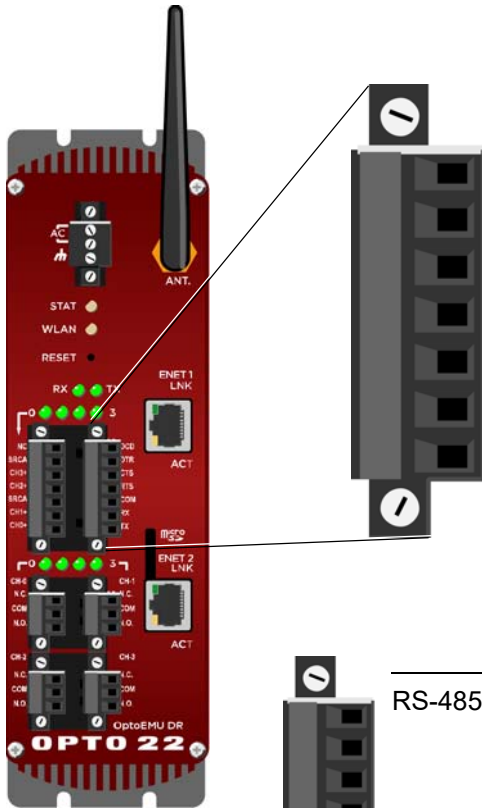
NOTE: Transient protection must be used on inductive loads.



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

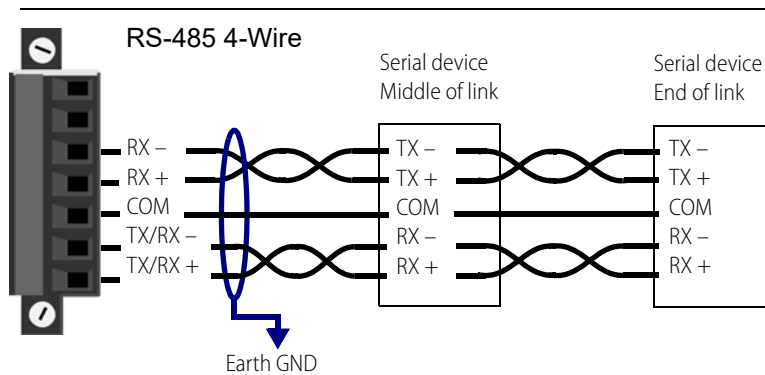
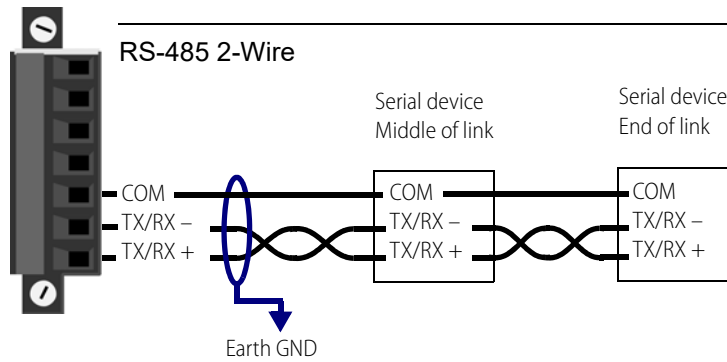
Wire size: 24–14 AWG

## 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



## SPECIFICATIONS: OPTOEMU SENSOR DR

### Overall Unit Specifications

	OPTOEMU-SNR-DR1	OPTOEMU-SNR-DR2
Power Requirements	100–240 VAC, 47–63 Hz, 0.4 A maximum, 8 W	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)	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	Sturdy metal case
Removable storage	MicroSD card slot (for future use)	MicroSD card slot (for future use)
Backup battery	Rechargeable (recharges whenever the unit has power), 3-year power-off data retention	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).	Two independent 10/100 Mbps Ethernet network interfaces (RJ-45 connectors), each with a separate IP address (separate subnets).
	Wireless LAN interface with separate IP address (separate subnet). Security: AES - Compatible with WPA2 Personal (802.11i); TKIP - Compatible with WPA Personal Frequency 802.11a: 5.180–5.240 GHz, 5.745–5.825 GHz	
Ethernet Comm (wireless)	Frequency 802.11b/g: 2.412–2.472 GHz, 2.484 GHz Transmit Power: 15 dBm maximum Antenna Connector: Reverse polarity SMA (RP-SMA or RSMA) Roaming: Supported within an SSID (Service Set Identifier) only	No wireless capability
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).	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 Wireless: WLAN activity Serial: Receiving, Transmitting (future use) Ethernet interfaces (2): Link, Activity Pulse inputs: On/Off status Mechanical relay outputs: On/Off status	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	Real-time clock
Operating Temperature	0 to 60 °C (32 to 140° F)	0 to 60 °C (32 to 140° F)
Storage Temperature	-25 to 85 °C (-13 to 185° F)	-25 to 85 °C (-13 to 185° F)
Humidity	0% to 95% relative humidity, non-condensing	0% to 95% relative humidity, non-condensing
Agency Approvals	UL, cUL, DFARS Wireless: U.S., FCC Part 15 Subpart C; Canada, IC RSS-210	UL, cUL, CE, RoHS, DFARS
Warranty	30 months	30 months

## SPECIFICATIONS (CONTINUED)

### Dry Contact Pulse Inputs

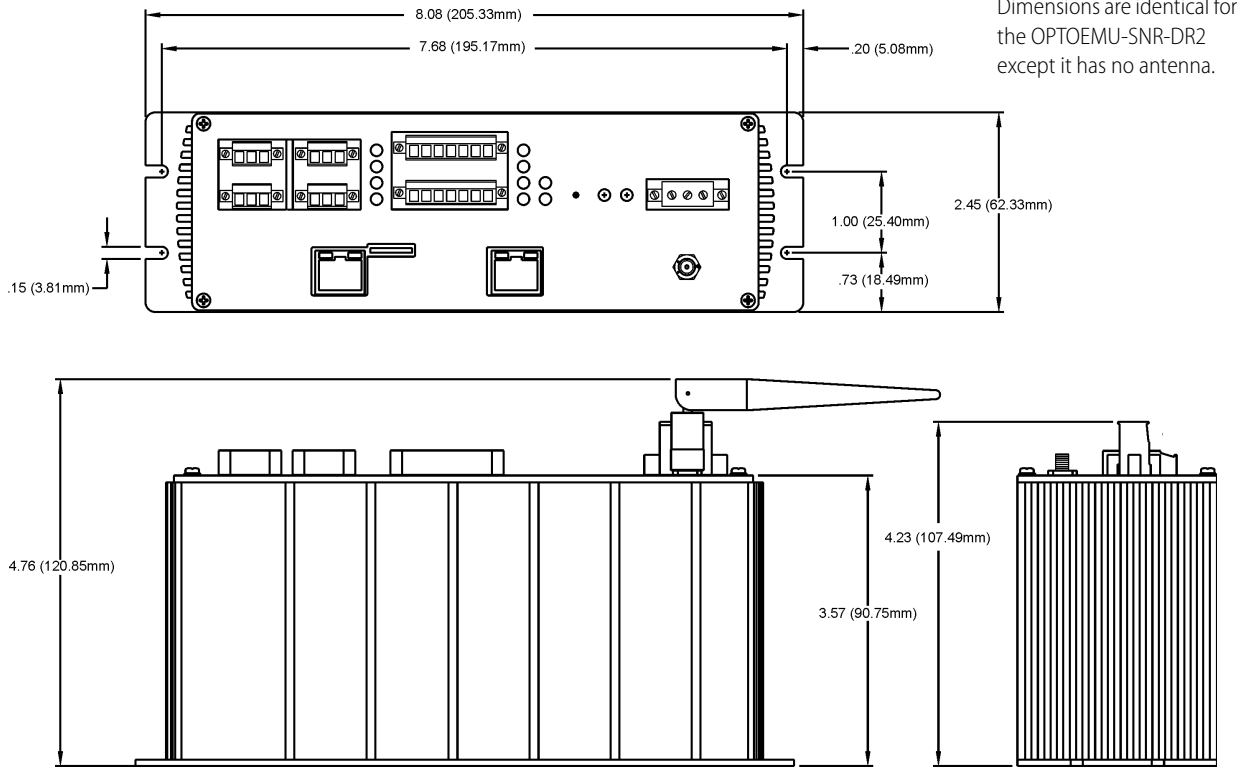
OptoEMU Sensor DR supplies 15 volts to each external dry contact switch and senses switch closure.

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

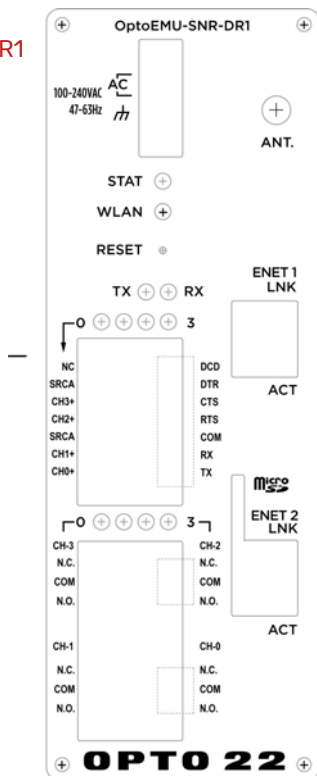
### Signal Relay Outputs

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 <sup>6</sup> operations
Operational Life	1 x 10 <sup>3</sup> operations
Status indicators	1 LED per channel

## DIMENSIONAL DIAGRAM—OPTOEMU-SNR-DR1



Faceplate,  
OPTOEMU-SNR-DR1



Faceplate,  
OPTOEMU-SNR-DR2

