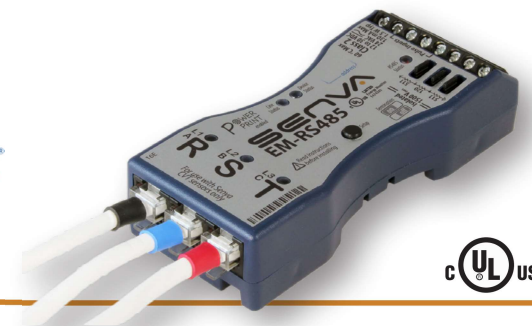


EM-RS485 Series Energy Meters

Protocol Version: BACnet & Modbus
Pulse Version: kWh, KVAR, kVA
Flexible Split-core Rogowski CVT™ Sensors
Monitor loads from 30-6000A & 90-600V



DESCRIPTION

The EM Series is the safest and fastest meter to install on the market. Unique design makes the meter entirely low-voltage. Ideal for retrofits as the high voltage components are embedded in the Current/Voltage Transducer™ (CVT™). Experience high accuracy data rich power metering in a compact easy to use package. Meter recognizes CVTs automatically eliminating time consuming scaling.

Each CVT™ uses digital communication with the meter for superior noise immunity. The CVTs™ are individually calibrated and can be mixed or matched as independent meter channels--1% total accuracy! Features both Modbus and self configuring plug and play BACnet MS/TP for seamless integration.

APPLICATIONS

- Energy Management and performance contracting
- Monitoring for commercial tenants
- Activity-based costing in commercial and industrial facilities
- Real-time power monitoring
- Load shedding
- Audits/temporary monitoring
- Distributed generation



7 year limited warranty

FEATURES

Intelligent Meter Technology

- EM Series meters auto-detect and self configure for electrical service, CVT™ size, communication protocol (BACnet/Modbus), baud rate and more for simple and efficient installation
- Calibration is at the CVT™ level so any CVT™ from the product family will maintain its accuracy with any EM Series meter
- Functions as three independent voltage/current power meters in one--mix and match CVT sizes for multiple loads.
- 2 pulse inputs for summing multiple meters on the EM-PULSE or for general (configurable) pulse counting on the EM-RS485 (from any pulse meter - water, gas, steam, etc.)
- 2 pulse outputs on the EM-PULSE for separately tracking positive and negative energy usage, additional power metrics or power quality alarms

Ultimate Flexibility

- One universal meter supports all CVT™ options in the product family
- Flexible Mounting Options
 - Supports mounting on either horizontal or vertical PR30 (TS 35/F6) DIN rail
 - Snap-in mounting ears allow screwing to any suitable surface
 - Integrated rare earth magnets secure the EM meter to any ferrous enclosure or surface.



Split-core Rogowski CVT™

- Easiest in the industry to install
- Senses both voltage & current
- High accuracy...digitally calibrated; interchangeable
- Available in multiple sizes & ratings to meet any project requirements



Quick Start Auto-detection

- Meter base recognizes the CVT™ sensors and scales itself accordingly
- No manual configuration necessary

Compact Size

- Most compact meter ever - fits in the palm of your hand!

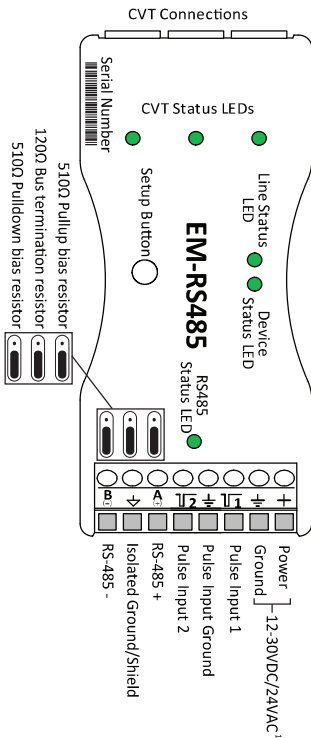
ORDERING

EM-RS485

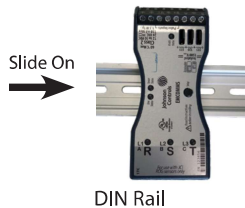
RS485 = Modbus & BACnet

CVT Current/voltage transducers

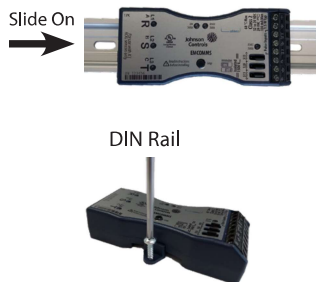
See page 32



Magnetic mount--no



DIN Rail



DIN Rail

Snap-in mounting

SPECIFICATIONS

Power Supply Input	12-30VDC/24VAC ⁽¹⁾ , 100mA max.
Output	RS-485 2-wire, BACnet MS/TP, Modbus RTU
Baud Rates	9600, 19200, 38400, 57600, 76800, 115200
RS-485 Loading	1/4 unit
Wiring Requirements	Conductor gauge 14-26 AWG
Terminal torque rating	0.5 min, 0.6 max
Pulse Inputs	Dual Inputs 3.5 +/- 0.5 VDC, short circuit current is 10mA max
Pulse Rate	50 Hz (default), configurable up to 500 Hz
Pulse active	<100 ohms
Pulse Undefined	100-1000 ohms
Pulse Idle	>1000 ohms
Configurations	1Ph, 2Ph, 3Ph Wye (4-Wire), 3Ph Delta (3-Wire)
Service Types	Voltages 90VL-N through 600VL-L
Frequency	45-65 Hz
Performance	Meter Accuracy 0.2% (ANSI C12.20 Class 0.2 standards)
System Accuracy	1% for V, A, kW, kVAR, kVA
Operating Environment	Temperature 32 to 140F (0 to 60C)
Humidity	0-95% non-condensing
Meter Enclosure	Material Polycarbonate/ABS
Dimensions	4.1 "h x 1.8"w x 0.9"d

TYPICAL OUTPUT POINTS (SEE PROTOCAOL GUIDES FOR COMPREHENSIVE POINTS LIST)

Bi-Directional Energy Measurements*

Power (3-phase Total and Per Phase): Real (kW), Reactive (kVAR), and Apparent (KVA)

Power Factor: 3-phase Average and Per Phase

Present Power Demand Real (kW), Reactive (kVAR), and Apparent (kVA)

Import and Export totals of Present Power Demand: Real (kW), Reactive (kVAR), and Apparent (kVA)

Current (3-Phase Average and Per Phase)

Voltage: Line-Line and Line-Neutral (3-Phase Average and Per Phase)

Frequency

Accumulated Net Energy: Real (kWh), Reactive (kVARh), and Apparent (kVAh)*

Accumulated Real Energy per Phase: Real (kWh), Reactive (kVARh), and Apparent (kVAh)

Import and Export Accumulators of Real and Apparent Energy

Reactive Energy Accumulators (3-Phase Total and Per Phase)

Demand Interval Configuration Fixed or Rolling Block

Demand Interval Configuration: External Sync to Comms (Time Inputs or Protocol)

EM BACnet Protocol Guide

■ www.senvainc.com/emrs485bn



EM Modbus Protocol Guide

■ www.senvainc.com/emrs485mb



BACnet® is a registered trademark of ASHRAE.

EM Series Rogowski CVT™ Sensors

1% total system accuracy (meter & CVT)
For use with Pulse and Protocol Versions of the EM Series Meter
Flexible Split-core Rogowski CVT™ Sensors
Monitor loads from 30-6000A & 90-600V



DESCRIPTION

The Current/Voltage Transducer™ (CVT™) measures both voltage and current, communicating the data digitally to the meter via plug-in low voltage connections. This allows the meter to remain a low-voltage device. Each CVT™ uses digital communication with the meter for superior noise immunity. The CVTs™ are individually calibrated and measurement accuracy is independent of the transducer. To complement the CVT™, our metering platform offers two meter options (EM-PULSE & EM-RS485) which are small enough to fit in the palm of your hand, yet powerful enough to self-configure during installation, removing all manual configuration. Virtually a plug and play BACnet meter!

APPLICATIONS

- Energy Management and performance contracting
- Monitoring for commercial tenants
- Activity-based costing in commercial and industrial facilities
- Real-time power monitoring
- Load shedding
- Audits/temporary monitoring
- Distributed generation

FEATURES

Intelligent CVTs™ boast numerous benefits:

- Digitally calibrated CVTs™ are extremely accurate
- The accuracy is as high as a calibrated system, yet different CVTs™ can be changed from meter to meter while maintaining accuracy. A big advantage for auditing, since meter is not size specific.
- Plug and play installation— individual CVTs™ are digitally recognized by the meter and outputs are automatically scaled—no user set up is required.
- Digital communication offers superior noise immunity compared to traditional induced low-signal Rogowskis
- All the high voltage connections are at the CVT™
- Rogowski CVTs™ are available in 4 sizes from 9" to 36" in circumference and include several rating options from 300A to 6000A and are universally rated for 90-600V



7 year limited warranty



Split-core Rogowski CVT™

- Easiest in the industry to install
- Senses both voltage & current
- High accuracy...digitally calibrated; interchangeable
- Available in multiple sizes & ratings to meet any project requirements



Flexible split-core CVT™ sensors are easy to install and more accurate than traditional CTs

ORDERING



Type

F = Flex Rogowski

Coil (Amps/Size)

03S = 300A/Small
08S = 800A/Small
08M = 800A/Medium
15S = 1500A/Small
15M = 1500A/Medium
24M = 2400A/Medium
24L = 2400A/Large
60G = 6000A/Grande

Lead Length

Blank = 3' (default)
L06 = 6'
L10 = 10'

Lead Color

Blank = Black (default)
C2 = Red
C6 = Blue
3PH = Three CVT Kit (1 Black, 1 Red, 1 Blue)



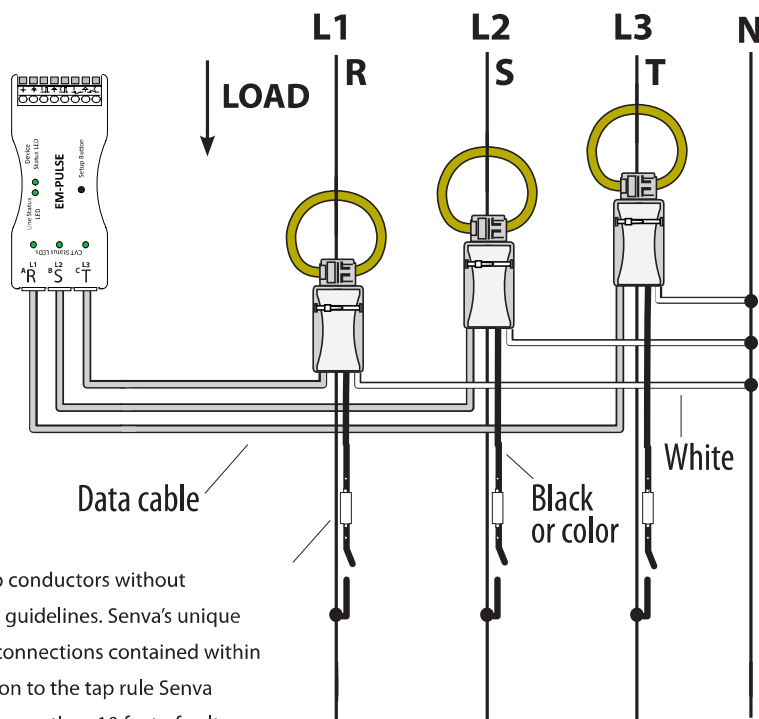
Color

Blank = black (default)
C2 = Red
C6 = Blue
3PH = Three Fuse Kit (1 Black, 1 Red, 1 Blue)

SPECIFICATIONS

Performance	Accuracy	1% System Accuracy (Includes Meter & CVTs) for V, A, KW, kVAR, KVA
Current/Voltage Transducer™	Small Rope Circumference	9"
	Medium Rope Circumference	15"
	Large Rope Circumference	24"
	Grande Rope Circumference	36"
	300A Operating Range ⁽¹⁾	+/-1% 30-300A (+/-3% >10A)
	800A Operating Range ⁽¹⁾	+/-1% 30-800A (+/-3% >10A)
	1500A Operating Range ⁽¹⁾	+/-1% 30-1500A (+/-3% >10A)
	2400A Operating Range ⁽¹⁾	+/-1% 50-2400A (+/-3% >15A)
	6000A Operating Range ⁽¹⁾	+/-1% 120-6000A (+/-3% >40A)
Operating Environment	Temperature	-4 to 140°F (-20 to 60°C)
	Humidity	0-95% non-condensing
Meter Enclosure	Material	Polycarbonate/ABS
	Dimensions	4.1" h x 1.8" w x 0.9" d
CVT™ Enclosure	Material	Polycarbonate/ABS
	Enclosure Dimensions	3.5" h x 1.6" w x 0.8" d
Fuse specifications (see application note)	Fuse type	1/2 Amp, 600VAC slow blow, 200kA AC Interrupting rating
	Dimensions	4.1" h x 1.8" w x 0.9" d

(1) Accuracy based on reading, not full scale.



Under UL 240.21 Senva CVTs may tap conductors without overcurrent protection under certain guidelines. Senva's unique architecture keeps the high voltage connections contained within the CVT enclosure and in consideration to the tap rule Senva does not ship EM Series meters with more than 10 feet of voltage reference wire on any CVT. If your voltage reference must be longer than 10 feet, proper use of over current protection is required (i.e. appropriate fusing or circuit breakers.) See www.senvainc.com for additional information.