



We've got  
your back

**VERIS**

2021

Energy and  
Environmental Sensors

POWER MONITORING  
SINGLE-CIRCUIT

POWER MONITORING  
MULTI-CIRCUIT

POWER  
METERING CTS

NETWORK  
INTEGRATION

POWER  
ACCESSORIES

AIR QUALITY/GAS  
DETECTION

FLOW  
MONITORING

HUMIDITY  
MONITORING

LEAK  
DETECTION

PRESSURE  
MONITORING

TEMPERATURE  
MONITORING

OCCUPANCY  
SENSORS

SETPOINT  
DEVICES

CURRENT  
MONITORING

RELAYS

POWER  
SOURCES

# ABOUT US

Veris Industries is an energy and environmental sensors partner that provides quality products for commercial HVAC and other automation applications.

Since its founding in 1992, Veris has built a strong reputation for dependable products and impeccable customer service. We offer complete lines of innovative power monitoring and environmental sensing products including air quality sensors, current sensors, temperature sensors, pressure sensors, flow meters, power meters, leak detection, setpoint devices and more.

Our long-lasting, reliable products are only part of the story. When you work with Veris, you'll have a knowledgeable expert just a phone call away at all times.



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# PRODUCT CATEGORIES

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# DATA CENTERS



## SERVER ENVIRONMENT

Maintain a consistent environment aisle by aisle

### Occupancy Sensors MSX SERIES

Page 209

Reduce energy consumption and control energy waste by lighting a room only when it's occupied.



### Humidity Sensors HW2 SERIES

Page 125

High accuracy sensor provides an ideal operating environment for critical applications. A modern aesthetic and touchscreen display allow for optimal humidity control at zone level.



### Temperature Sensors TW2, TD SERIES

Page 183

Monitor temperature at a zone level with high accuracy to provide an ideal environment.



## SERVER PANELS & CRACS

Protect critical equipment and ensure uptime

### Liquid & Chemical Leak Detection

LD SERIES & SC SERIES

Page 141-145, 149

Complete leak detection systems protect expensive electronics from costly water damage. Monitor a single location or large area with reliable sensing devices and controller systems.



### Differential Pressure or Air Velocity Sensor

PX3 SERIES

Page 157

Precisely measure differential air pressure or velocity with the flip of a switch using Bluetooth® technology.



### Main Panel & Single-Circuit Power Metering

E5X SERIES

Page 23

DIN mounted power meter ideal for sub-metering individual loads where a local display is required.



## POWER & ENERGY

Monitor large loads transducers, UPSs, PDUs and RPPs

### Energy Meters

ENERCEPT FLEX E20 SERIES

Page 19

Maximum retrofit flexibility. Monitor loads from 50 to 5000 A on the same rope style CT.



### Panelboard Monitoring

E3X SERIES

Page 35

Provides comprehensive monitoring of panelboards and RPPs with revenue-grade accuracy for new construction projects.



### Retrofit Panelboard Monitoring

E31 SERIES

Page 35

Provides comprehensive monitoring of panelboards and RPPs with revenue-grade accuracy for retrofit projects.



## DCIM

Enhance data center infrastructure management with real-time energy information

### Panelboard Monitoring

E3X SERIES

Page 35

Provides comprehensive monitoring of panelboards and RPPs with revenue-grade accuracy for new construction projects.



### Retrofit Panelboard Monitoring

E31 SERIES

Page 35

Provides comprehensive monitoring of panelboards and RPPs with revenue-grade accuracy for retrofit projects.



### Multi-Circuit Metering

E34 SERIES

Page 33

Monitor all PDU loads with a single device.



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# FOOD RETAIL



## COOLING & REFRIGERATION

Monitor temperature of walk-ins, pressure of parallel refrigerators and detect mechanical failures of compressors and motors

### Temperature Sensors

T SERIES

**Page 191**

Accurately monitor temperature in space, refrigeration case, walk-in cooler, freezer and hot water reclaim tank temperature.



### Gauge Pressure Sensors

PG SERIES

**Page 175**

Reliably monitor pressure in parallel refrigeration racks and hydraulic motors.



### Current Sensors

H922

**Page 265**

Detect belt loss and mechanical failure in compressors with a self-powered analog current sensor that provides accurate load trending information.



## HVAC & PHYSICAL PLANT

Energize lighting contactors, monitor cooling towers

### Relays

V100 SERIES

Page 285

Energize lighting contactors with a pilot-duty relay in an easy-to-use nipple mount enclosure.



### Flow Meters

SDI SERIES

Page 97

Measure supply and discharge water to get credit on sewer bill for actual water discharged. Don't be billed for evaporated water.



## ENVIRONMENTS

Regulate environments, efficiently and effectively

### Humidity Sensors

HW2 SERIES

Page 125

Reduce compressor run time and glass door fogging with an accurate and easy-to-use humidity sensor.



### CO<sub>2</sub> Sensors

CW2 SERIES

Page 73

Calling for fresh air only when CO<sub>2</sub> levels are high saves energy. Make the CW2 Series part of your demand controlled ventilation strategy.



### Gas Detection

CO, NO<sub>2</sub> SENSORS

Pages 85 & 87

Easy parking garage monitoring with the GWN and GWNP modular platforms. Monitor CO and NO<sub>2</sub> separately or combined.



### Refrigerant Sensors

Pages 85 & 87

Ideal for variable refrigerant flow, mechanical rooms, and occupied spaces.



## MAIN POWER & SUB-METERING

Monitor main power distribution, light panels and sub-metering

### Energy Meters

ENERCEPT FLEX E20 SERIES

Page 21

Maximum retrofit flexibility. Monitor loads from 50 to 5000 A on the same rope style CT.



### Multi-Circuit Metering

E34 SERIES

Page 33

Monitor up to 28 3-phase loads with a single compact device. Saves cost on both equipment and installation.



### Main Panel & Single-Circuit Power Metering

E5X SERIES

Page 23

The E5X Series offers ultimate versatility in power monitoring with a wide choice in mounting options, inputs, outputs, and communication protocols including BACnet, LON, and Modbus. The meters are compact in size allowing multiple meters to be mounted in the same panel, saving installation time and costs.



# HOSPITALS



## ROOM & PATIENT CARE

Provide ideal environmental conditions while optimizing efficiency

### Occupancy Sensors MSX SERIES

Page 209

Reduce energy consumption and control energy waste by lighting a room only when it's occupied.



### CO<sub>2</sub> Sensors CW2 SERIES

Page 73

Calling for fresh air only when CO<sub>2</sub> levels are high saves energy. Make the CW2 Series part of your demand controlled ventilation strategy.



### Humidity Sensors HW2 SERIES

Page 125

High accuracy sensor provides an ideal operating environment for critical applications. A modern aesthetic and touchscreen display allow for optimal humidity control at zone level.



## HVAC & PHYSICAL PLANT

Increase efficiency,  
extend safety

### Liquid & Chemical Leak Detection

LD SERIES & SC SERIES

Page 141-145, 149

Complete leak detection systems protect expensive electronics from costly water damage. Monitor a single location or large area with reliable sensing devices and controller systems.



### Flow Monitoring

380 SERIES

Page 101

Metering of heated or chilled liquid, with a turbine flow meter and BTU transducer in one compact package.



### Communicating Thermostats

VIC-VT8650 SERIES

Page 223

Maximize system adaptability in rooftop unit control with BACnet, LON or wireless communication protocol.



## POWER & ENERGY

Quantify and qualify usage

### Current Monitoring

H904 VFD SWITCH

Page 251

Accurately and reliably monitor fan status. The H904 automatically compensates for the effects of frequency and amperage changes associated with VFDs, and features a self-adjusting trip point.



### Sub-Metering

ENERCEPT FLEX E20 SERIES

Page 19

Maximum retrofit flexibility. Monitor loads from 50 to 5,000 A on the same rope style CT.



### Main Panel & Single-Circuit Power Metering

E5X SERIES

Page 23

The E5X Series offers ultimate versatility in power monitoring with a wide choice in mounting options, inputs, outputs, and communication protocols including BACnet, LON, and Modbus. The meters are compact in size allowing multiple meters to be mounted in the same panel, saving installation time and costs.



## PARKING STRUCTURE & VEHICLE BAYS

Monitor and balance risks

### Gas Detection

CO, NO<sub>2</sub> SENSORS

Pages 85 & 87

Easy parking garage monitoring with the GWN and GWNP modular platforms. Monitor CO and NO<sub>2</sub> separately or combined.



# INDUSTRIAL AUTOMATION



## WORKSPACE

Maintain a comfortable environment without additional cost

### CO<sub>2</sub> Sensors CW2 SERIES

Page 73

Calling for fresh air only when CO<sub>2</sub> levels are high saves energy. Make the CW2 Series part of your demand controlled ventilation strategy.



### Humidity Sensors HW2 SERIES

Page 125

High accuracy sensor provides an ideal operating environment. A modern aesthetic and touchscreen display allow for optimal humidity control at zone level.



### Temperature Sensors TW2, TD SERIES

Page 183

Monitor temperature at a zone level with high accuracy to provide an ideal environment.



## BUILDING SAFETY & EFFICIENCY

Monitor automated material handling, measure clean room pressure, control safety barriers

### Current Transducers H971

Page 273

Accurately monitor status of DC current loads. Avoid costly equipment damage and downtime.



### Differential Pressure or Air Velocity Sensor PX3 SERIES

Page 157

Precisely measure differential air pressure or velocity with the flip of a switch using Bluetooth® technology.



### Relays V100 SERIES

Page 285

Energize lighting contactors with a pilot-duty relay in an easy-to-use nipple mount enclosure.



## ENERGY & POWER USAGE MONITORING

Monitor and meter power usage and heated or chilled liquids

### Flow Monitoring 380 SERIES

Page 101

Metering of heated or chilled liquid, with a turbine flow meter and BTU transducer in one compact package.



### Sub-Metering ENERCEPT FLEX E20 SERIES

Page 19

Maximum retrofit flexibility. Monitor loads from 50 to 5,000A on the same rope style CT.



### Main Panel & Single-Circuit Power Metering E5X SERIES

Page 23

The E5X Series offers ultimate versatility in power monitoring with a wide choice in mounting options, inputs, outputs, and communication protocols including BACnet, LON, and Modbus. The meters are compact in size allowing multiple meters to be mounted in the same panel, saving installation time and costs.



## HVAC & PHYSICAL PLANT

Detect leaks in sprinkler systems, measure chiller/boiler line pressure and enable rooftop unit control via sensors

### Communicating Thermostats VIC-VT8650 SERIES

Page 223

Maximize system adaptability in rooftop unit control with BACnet, LON or wireless communication protocol.



### Liquid & Chemical Leak Detection LD SERIES & SC SERIES

Page 141-145, 149

Complete leak detection systems protect expensive electronics from costly water damage. Monitor a single location or large area with reliable sensing devices and controller systems.



### Remote Pressure Transducers PWR SERIES

Page 171

The PWR Series remote wet media pressure transducers allow remote pressure sensing capability using existing plumbing runs. With no need to run plumbing lines all the way to the transducer, the installation time and cost is greatly reduced.



# MULTI-FLOOR OFFICE



## WORKSPACE

Provide ideal environmental conditions, while optimizing efficiency



### Occupancy Sensors MSX SERIES

Page 209

Reduce energy consumption and control energy waste by lighting a room only when it's occupied.



### Humidity Sensors HW2 SERIES

Page 125

High accuracy sensor provides an ideal working environment. A modern aesthetic and touchscreen display allow for optimal humidity control at zone level.



### Temperature Sensors TW2, TD SERIES

Page 183

Monitor temperature at a zone level with high accuracy to provide an ideal environment.



## BUILDING SAFETY & EFFICIENCY

Monitor parking structures, maintain optimal building and duct pressure

### Gas Detection CO, NO<sub>2</sub> SENSORS

Pages 85 & 87

Easy parking garage monitoring with the GWN and GWNP modular platforms. Monitor CO and NO<sub>2</sub> separately or combined.



### Differential Pressure or Air Velocity Sensor PX3 SERIES

Page 157

Precisely measure differential air pressure or velocity with the flip of a switch using Bluetooth® technology.



### CO<sub>2</sub> Sensors CW2 SERIES

Page 73

Calling for fresh air only when CO<sub>2</sub> levels are high saves energy. Make the CW2 Series part of your demand controlled ventilation strategy.



## SUB-TENANT & POWER USAGE MONITORING

Accurately monitor and invoice energy consumption

### Adjustable Current Switches H308

Page 241

Reliably detect belt loss, coupling shear, and mechanical failures.



### Sub-Tenant Metering ENERCEPT FLEX E20 SERIES

Page 19

Maximum retrofit flexibility. Monitor loads from 50 to 5,000 A on the same rope style CT.



### Main Panel & Single-Circuit Power Metering E5X SERIES

Page 23

The E5X Series offers ultimate versatility in power monitoring with a wide choice in mounting options, inputs, outputs, and communication protocols including BACnet, LON, and Modbus. The meters are compact in size, allowing multiple meters to be mounted in the same panel, saving installation time and costs.



## HVAC & PHYSICAL PLANT

Detect leaks in sprinkler systems, measure chiller/boiler line pressure, and enable rooftop unit control via sensors

### Motor Control Relays V100 SERIES

Page 285

The Victory 100 Series 10A relays are pilot-duty relays in an easy-to-use nipple mount enclosure. Great for building control applications.



### Multi-Circuit Monitoring E3X SERIES

Page 35

Provides comprehensive monitoring of panelboards and RPPs with revenue-grade accuracy for new construction projects.



### Flow Monitoring 380 SERIES

Page 101

Metering of heated or chilled liquid, with a turbine flow meter and BTU transducer in one compact package.



# RESIDENTIAL MULTI- TENANT



## SUB-TENANT METERING

Monitor main circuits, individual circuits and BTUs for individual billing

### Energy Meters

ENERCEPT FLEX  
E20 SERIES



**Page 19**

Maximum retrofit flexibility. Monitor loads from 50 to 5000 A on the same rope style CT.

### Power & Energy Monitors

E5X SERIES



**Page 23**

DIN mounted power meter ideal for sub-metering individual loads where a local display is required.

### Energy Meters

H8163 SERIES



**Page 27**

Provide revenue grade energy consumption visibility to tenants and building management.

## LIVING & SHARED SPACES

Create comfortable, energy-efficient environments

### Occupancy Sensors

MSX SENSORS

Page 209

Reduce energy consumption and control energy waste by lighting a room only when it's occupied.



### Communicating Thermostats

VIC-VT8650 SERIES

Page 223

Maximize system adaptability in rooftop unit control with BACnet, LON or wireless communication protocol.



### CO<sub>2</sub> Sensors

CW2 SERIES

Page 73

Calling for fresh air only when CO<sub>2</sub> levels are high saves energy. Make the CW2 Series part of your demand controlled ventilation strategy.



## BUILDING INFRASTRUCTURE

Monitor sprinkler systems for leaks and efficiently maintain ideal air quality

### Liquid & Chemical Leak Detection

LD SERIES & SC SERIES

Page 141-145, 149

Complete leak detection systems protect expensive electronics from costly water damage. Monitor a single location or large area with reliable sensing devices and controller systems.



### Gas Detection

CO, NO<sub>2</sub> SENSORS

Pages 85 & 87

Easy parking garage monitoring with the GWN and GWNP modular platforms. Monitor CO and NO<sub>2</sub> separately or together.



### BTU Monitoring

380 SERIES

Page 101

Metering of heated or chilled liquid, with a turbine flow meter and BTU transducer in one compact package.



# SCHOOLS



## CLASSROOMS & COMMON AREAS

Maintain a comfortable learning environment, while optimizing efficiency

### Occupancy Sensors MSX SERIES

Page 209

Reduce energy consumption and control energy waste by lighting a room only when it's occupied.



### Humidity Sensors HW2 SERIES

Page 125

High accuracy sensor provides an ideal learning environment. A modern aesthetic and touchscreen display allow for optimal humidity control at zone level.



### Temperature Sensors TW2, TD SERIES

Page 183

Monitor temperature at zone level with high accuracy to provide an ideal environment.



## BUILDING SAFETY & EFFICIENCY

Monitor parking structures, maintain wood shop/metal shop pressure control, manage demand controlled ventilation

### Gas Detection CO, NO<sub>2</sub> SENSORS

Pages 85 & 87

Easy parking garage monitoring with the GWN and GWNP modular platforms. Monitor CO and NO<sub>2</sub> separately or combined.



### Differential Pressure or Air Velocity Sensor PX3 SERIES

Page 157

Precisely measure differential air pressure or velocity with the flip of a switch using Bluetooth® technology.



### CO<sub>2</sub> Sensors CW2 SERIES

Page 73

Calling for fresh air only when CO<sub>2</sub> levels are high saves energy. Make the CW2 Series part of your demand-controlled ventilation strategy.



## POWER & ENERGY

Quantify and qualify usage

### Sub-Metering ENERCEPT FLEX E20 SERIES

Page 19

Maximum retrofit flexibility. Monitor loads from 50 to 5,000 A on the same rope style CT.



### Multi-Circuit Monitoring E3X SERIES

Page 35

Provides comprehensive monitoring of panelboards and RPPs with revenue-grade accuracy for new construction projects.



### Main Panel & Single-Circuit Power Metering E5X SERIES

Page 23

The E5X Series offers ultimate versatility in power monitoring with a wide choice in mounting options, inputs, outputs, and communication protocols including BACnet, LON, and Modbus. The meters are compact in size allowing multiple meters to be mounted in the same panel, saving installation time and costs.



## HVAC & PHYSICAL PLANT

Empower motor control, detect mechanical failure, meter heated or chilled liquids

### Communicating Thermostats VIC-VT8650 SERIES

Page 223

Maximize system adaptability in rooftop unit control with BACnet, LON or wireless communication protocol.



### Adjustable Current Switches H308

Page 241

Reliably detect belt loss, coupling shear, and mechanical failures.



### Flow Monitoring 380 SERIES

Page 101

Metering of heated or chilled liquid, with a turbine flow meter and BTU transducer in one compact package.





# POWER MONITORING SINGLE-CIRCUIT

Veris Industries leads the way with a complete line of innovative power monitoring solutions that save time and money. Veris power monitors are available with popular communication protocols that allow for labor-saving networked wiring, and standard pulse and analog outputs as well. Earn LEED® points and make Veris power monitors part of your energy conservation plan.

MODEL	DESCRIPTION	PAGE
E2x FLEX	Enercept FLEX Compact Power and Energy Meters	19
E2x System Calibrated	Enercept System Calibrated Compact Power and Energy Meters	21
E5x	Enhanced Power and Energy Meters	23
E5xxxA	Enhanced Power and Energy Meter, Built-in Rope CT Integrator and Power Supply	25
H8163	Sub-tenant Meter with Calibrated CTs	27

See following pages for selection guides.

# MAXIMUM FLEXIBILITY FOR RETROFIT APPLICATIONS

Enercept FLEX® Power and Energy Meters

## APPLICATIONS

- » Retrofit metering for code compliance or energy efficiency goals
- » Easy deployment for many single circuit meters
- » Bi-directional energy monitoring for renewables



## FEATURES

### SIMPLE SETUP

Rotary dials for configuring with the power off

Re-assign phase or CT polarity through software

### ESSENTIAL PROTOCOL SUPPORT

Modbus RTU and BACnet MS/TP support

### VERSATILE DESIGN

Small, lightweight form factor

Control power support for 90-480VAC

## SYSTEM CALIBRATED SERIES

One reference for all-in-one solutions with CTs and fuses prewired

Calibrated 1% system accuracy

Minimized commissioning time



# SINGLE-CIRCUIT ENERGY/POWER METERS GUIDE

## Output / Protocol

SERVICE TYPE	VOLTAGE	PULSE	MODBUS <sup>1</sup>	BACNET MS/TP	BACNET IP <sup>2</sup>	LON	N2
SINGLE-PHASE	120-240V	H8163-xxxx-x-1	H8163-xxxx-x-1 and H8163-CB <sup>1</sup>	H8163-xxxx-x-1 and H8186-CB	H8163-xxxx-x-1, H8186-CB and U013-0013		H8163-xxxx-x-1 and H8126-CB
			E23	E23	E23 and U013-0013		
		E5xB1/E5xCx	E5xCx	E5xHx	E5xHx and U013-0013	E50Fx	
SINGLE-PHASE	240V	H8163-xxxx-x-2	H8163-xxxx-x-2 and H8163-CB	H8163-xxxx-x-2 and H8186-CB	H8163-xxxx-x-2, H8186-CB and U013-0013		H8163-xxxx-x-2 and H8126-CB
			E23	E23	E23 and U013-0013		
		E5xB1/E5xCx	E5xCx	E5xHx	E5xHx and U013-0013	E50Fx	
3-PHASE WYE	120-480V	H8163-xxxx-x-3	H8163-xxxx-x-3 and H8163-CB	H8163-xxx and H8186-CB	H8163-xxxx, H8186-CB and U013-0013		H8163-xxxx-x-3 and H8126-CB
			E23	E23	E23 and U013-0013		
	90-600V	E5xB1/E5xCx	E5xCx	E5xHx	E5xHx and U013-0013	E50Fx	
3-PHASE DELTA (NO-NEUTRAL)	120-480V		E23	E23	E23 and U013-0013		
	90-600V	E50B1/E50Cx	E5xCx	E5xHx	E5xHx and U013-0013	E50Fx	

1. All Veris Modbus products support Modbus RTU (serial) natively. For Modbus TCP (Ethernet), add the U013-0012 Modbus Gateway.

2. The U013-0013 is a BACnet router, which adds BACnet IP support to any product with BACnet MS/TP.

**Retrofit**  
Enercept E23 Series

**Simplicity & Accessibility**  
H8163 Series

**Versatility**  
E50/E51 Series



# OPTIMIZE ENERGY COSTS & CONSUMPTION WITH VISIBILITY OF POWER USE



## Ultimate Flexibility – Enercept E2x FLEX Series Meters

From form factor to function, the Enercept E2x was designed with the user in mind. The meter's small form factor enables installation in panels with limited space and does not require external mounting. Simplified setup and support for a wide range of CTs make the Enercept E2x a highly versatile solution.

## Ultimate Retrofit - Enercept E2x System Calibrated Series Meters

The easiest meter to install with the simplest way to order, the system calibrated Enercept E2x provides higher accuracy without sacrificing flexibility. A single part number includes a pre-wired meter, CTs and fuses. Factory calibration achieves 1% overall accuracy for a wide range of applications.



## Ultimate Simplicity – H8163 Series Meters

Meet requirements & get quick access to the information needed for sub-tenant metering or monitoring energy consumption with this enclosed wall-mount meter that includes a customer accessible LCD display. They are simple to buy with calibrated CTs included, simple to install and use where customers and managers can safely read the information they need, simple to integrate with a range of communication protocol options.

## Ultimate Versatility – E5x Series Meters

Save costs while addressing a broad range of applications from sub-metering to full bi-directional monitoring of renewable energy installations with a meter that has comprehensive measurement capabilities. It can be panel, DIN rail, or wall mounted, and offers a wide choice of inputs, outputs, & communication protocols. Bi-directional models monitor alternative energy sources or loads with regenerative braking.



## E2X FLEX SERIES

Uni-directional, Bi-directional, Modbus, & BACnet



IEC model shown

Enercept FLEX E2x Series power and energy meters provide a unique solution for measuring energy data. Designed with the user in mind, the E2x Series offers maximum application flexibility for retrofit applications.

The Enercept FLEX E2x Series is compatible with split-core, solid-core and Veris E683x Series rope-style Rogowski current transducers (CTs) from 5 to 5000 A, often allowing installers to utilize existing CTs with the meter. Adding to its versatility, the Enercept FLEX E2x Series has a wide input range of 90 to 480 Vac, alleviating the need to keep multiple models in stock. The meter's small form factor enables installation in existing panels with limited space, and does not require external mounting or the expense of extra enclosures or conduit runs. Communicating models support auto detection of baud rate, parity, and protocol for Modbus® RTU and BACnet® MS/TP.

### SPECIFICATIONS

MEASUREMENT ACCURACY*	
Real Power & Energy, 1/3 Volt Current Input Mode	IEC 62053-22 Class 0.2S, ANSI C12.20, 0.2%
Real Power & Energy, Rogowski Current Input Mode	IEC 62053-22 Class 0.5S, ANSI C12.20, 0.5%
Reactive Power & Energy	IEC 62053-24 Class 1, 1%
INPUT VOLTAGE CHARACTERISTICS	
Measured AC Voltage	Min. 90 V <sub>L-N</sub> (156 V <sub>L-L</sub> ) for stated accuracy; UL max.: 480 V <sub>L-L</sub> (277 V <sub>L-N</sub> ); CE max.: 300 V <sub>L-N</sub>
Impedance	2.5 MΩ <sub>L-N</sub> / 5 MΩ <sub>L-L</sub>
Frequency Range	45 to 65 Hz
INPUT VOLTAGE CHARACTERISTICS	
Measurement Range	0 to 0.333 Vac (+20% over-range)
Impedance	33 kΩ
CONTROL POWER	
AC	Drawn from phase A-B line-to-line voltage input 4 VA max.: 90V <sub>L-N</sub> min. UL max.: 480 V <sub>L-L</sub> (277 V <sub>L-N</sub> ) CE max.: 300V <sub>L-N</sub>

### High reliability

ANSI C12.20 0.2% accuracy, IEC 62053-22 Class 0.2S

### 90 to 480 Vac

Application versatility with fewer models to stock

### Wide range of service types

Compatible with CTs from 5 to 5000 A

### Easy installation

DIN rail or screw mount options (with included mounting bracket)

### Easy ordering & stocking

Modbus and BACnet protocols along with uni-directional and bi-directional feature sets in one unit

### Protocol support

Native Modbus and BACnet MS/TP support (no gateway) with serial rates up to 115.2 kbaud

### APPLICATIONS

- Energy monitoring (BAS)
- Renewable energy
- Energy management
- Commercial sub-metering
- Industrial monitoring
- Cost allocation

Ride-through Time	50 ms at 120 Vac
MECHANICAL CHARACTERISTICS	
Ingress Protection (IEC 60529)	IP20
Plug Wire Size (I/O, Communications, CT)	24 to 16 AWG (0.2 to 1.5 mm <sup>2</sup> )
Optional Bracket: Rail Mounted	T35 (35 mm) DIN rail per EN 50022
Optional Bracket: Wall Mounted	Two #10 or M5 screws, 2.953" (75 mm) center-to-center
ENVIRONMENTAL CONDITIONS	
Operating Temperature	-30 to 70 °C (-22 to 158 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Humidity Range	<95% RH (non-condensing)
Altitude of Operation	3 km max.
Pollution Degree	2
Mounting Location	Not suitable for wet locations. For indoor use only.

**SPECIFICATIONS (CONT.)**

**METERING CATEGORY**

UL	CAT III; for distribution systems up to 277 V <sub>L-N</sub> / 480 Vac <sub>L-L</sub>
CE	CAT III; for distribution systems up to 300 V <sub>L-N</sub>
Dielectric Withstand	Per UL 61010-1, EN 61010-1
Conducted and Radiated Emissions	FCC part 15 Class A, EN 61000-6-4, EN 61326-1 Class A (industrial)
Conducted and Radiated Immunity	EN 61000-6-2, EN 61326-1 (industrial)

**WARRANTY**

Limited Warranty	5 years
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**AGENCY APPROVALS**

US and Canada	UL 61010-1
Europe (CE)	EN 61010-1

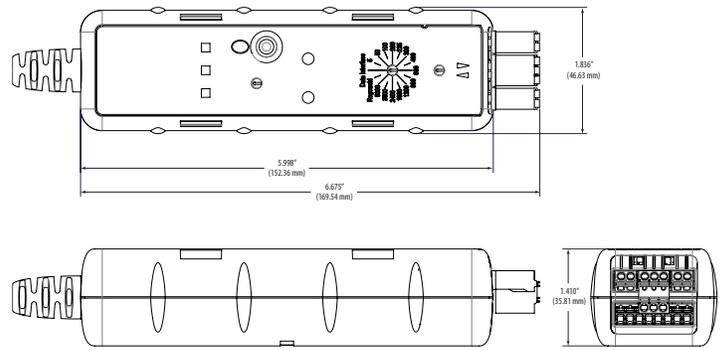


- \* The meters were tested compliant to the norms:
- ANSI C12.20, Class 0.2, from 1% to 100% rated current
  - IEC 62053-22, Class 0.2S, from 1% to 100% rated current
  - IEC 62053-22, Class 0.5S for Rogowski coils, from 1% to 100% rated current
  - IEC 62053-24 Class 1, from 1% to 100% rated current

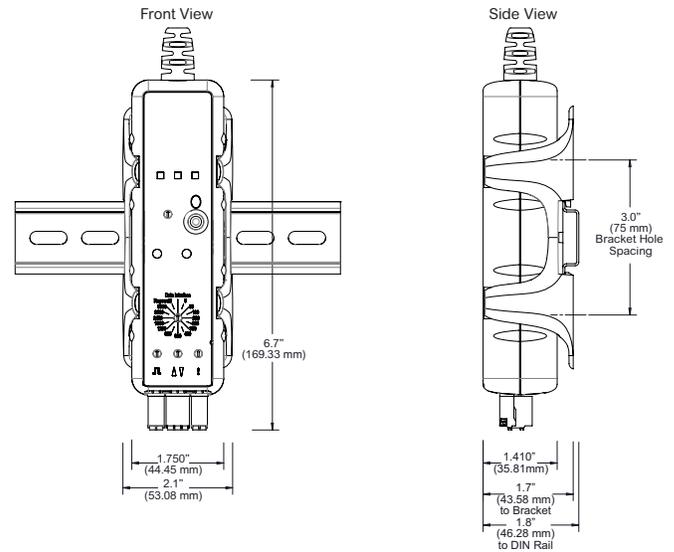
**ORDERING INFORMATION**

	E23CX
<b>MEASUREMENT CAPABILITY - FULL DATA SET</b>	
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)	•
Peak 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	•
ANSI C12.20 0.2% Accuracy, IEC 62053-22 Class 0.2S	•
Accumulated Net Energy: Real (kWh), Reactive (kVARh), and Apparent (kVAh)	•
Accumulated Real Energy by Phase (kWh)	•
Import and Export Accumulators of Real and Apparent Energy	•
Reactive Energy Accumulators by Quadrant (3-phase Total and Per Phase)	•
Demand Interval Configuration: Fixed or Rolling Block	•
Demand Interval Configuration: External Sync to Comms	•
<b>OUTPUTS</b>	
RS-485 Serial (Modbus RTU Protocol)	•
RS-485 Serial (BACnet MS/TP Protocol)	•

**DIMENSIONAL DRAWING**



**DIMENSIONS, MOUNTED**



**ORDERING INFORMATION**

<p>Data Set</p> <p>E</p> <p>23 = Uni/Bi Dir (FDS)</p>	<p>I/O</p> <p>C = RS-485 MB/BAC</p>	<p>System Types &amp; Wires</p> <p>5 = 1, 2, or 3ph (A-B-C-N) IEC International 6 = 1, 2, or 3ph (A-B-C-N) ANSI North &amp; South America</p>				
<p>Example:</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">E</td> <td style="padding: 2px 5px;">23</td> <td style="padding: 2px 5px;">C</td> <td style="padding: 2px 5px;">6</td> </tr> </table> </div>			E	23	C	6
E	23	C	6			

**ACCESSORIES P. 69**



## SYSTEM CALIBRATED E2X SERIES

Uni-directional, Bi-directional,  
Modbus & BACnet



System calibrated Enercept E2x Series power and energy meters provide a unique solution for measuring energy data. Designed with the user in mind, these meters offer maximum application flexibility for retrofit applications.

These meters provide innovative three-phase networked (Modbus RTU and BACnet MS/TP) power transducers that calibrate measurement electronics, high accuracy industrial grade CTs and fusing protection in a single package. External mounting is eliminated, greatly reducing installation and configuration time and cost. Color coordination between voltage leads and CTs makes phase matching easy. Communicating models support auto detection of baud rate, parity and protocol for Modbus RTU and BACnet MS/TP. Up to 63 Enercept meters can be daisy-chained on a single RS-485 network.

### SPECIFICATIONS

MEASUREMENT ACCURACY <sup>1</sup>	
Real Power & Energy, 1/3 Volt Current Input Mode	IEC 62053-21 Class 1S, ANSI C12.1, 1%
Real Power & Energy, Rogowski Current Input Mode	IEC 62053-21 Class 1S, ANSI C12.1, 1%
Reactive Power & Energy	IEC 62053-24 Class 1, 1%
System Accuracy	± 1% (split-core models). 1% on Rogowski models reading from 5 to 100% of rated current of the CTs. This is accomplished by matching the CTs with electronics and calibrating them as a system.
INPUT VOLTAGE CHARACTERISTICS	
Measured AC Voltage	Min. 90 V <sub>L-N</sub> (156 V <sub>L-L</sub> ) for stated accuracy; UL max.: 480 V <sub>L-L</sub> (277 V <sub>L-N</sub> ); CE max.: 300 V <sub>L-N</sub>
Impedance	2.5 MΩ <sub>L-N</sub> / 5 MΩ <sub>L-L</sub>
Frequency Range	45 to 65 Hz
Measurement Input Range	0 to 0.333 Vac (+20% over-range)
Impedance	33 kΩ
CONTROL POWER	
AC	AC: Drawn from phase A-B line-to-line voltage input; 4 VA max.: 90 V <sub>L-N</sub> min.; UL max.: 480 V <sub>L-L</sub> (277 V <sub>L-N</sub> ); CE max.: 300 V <sub>L-N</sub>

### Pre-wired & factory calibrated

Meter, CTs and fuse pack pre-wired and factory calibrated for time-saving installation and improved system-level accuracy ... meter + CTs + Fuse pack (ANSI models ONLY), meter + CTs (IEC models)

### Easy ordering & stocking

Modbus and BACnet protocols along with uni-directional and bi-directional feature sets in one unit

### 90 to 480 Vac

Application versatility with fewer models to stock

### Easy installation

DIN rail or screw mount options (with included mounting bracket)

### One part number

One part number simplifies ordering ... meter + CTs + fuse pack (ANSI models ONLY), meter + CTs (IEC models)

### Protocol support

Modbus RTU and BACnet MS/TP

### APPLICATIONS

- Energy monitoring (BAS)
- Renewable energy
- Energy management
- Commercial submetering
- Industrial monitoring
- Cost allocation

Ride-through Time	50 ms at 120 Vac
MECHANICAL CHARACTERISTICS	
Ingress Protection (IEC 60529)	IP20
Plug Wire Size (I/O, Communications)	24 to 16 AWG (0.2 to 1.5 mm <sup>2</sup> )
Optional Bracket: Rail Mounted	T35 (35 mm) DIN rail per EN 50022
Optional Bracket: Wall Mounted	Two #10 or M5 screws, 2.953" (75 mm) center-to-center
CT RATINGS	
E23C5-xx, E23C6-xx	1000 Vac reinforced insulation rating
E23C5-101, E23C6-101, E23C5-201, E23C6-201	600 Vac basic insulation rating, 300 Vac reinforced insulation rating
E23C5-401, E23C6-401	1000 Vac basic insulation rating, 600 Vac reinforced insulation rating
ENVIRONMENTAL CONDITIONS	
Operating Temp.	0 to 70 °C (32 to 158 °F)
Storage Temp. (with CTs)	-40 to 85 °C (-40 to 185 °F)
Storage Temp. (with Rogowski Coils)	-40 to 70 °C (-40 to 158 °F)

**SPECIFICATIONS (CONT.)**

Humidity Range	<95% RH (non-condensing)
Altitude of Operation	3 km max.
Pollution Degree	2
Mounting Location	Not suitable for wet locations. For indoor use only.

**METERING CATEGORY**

UL	CAT III; for distribution systems up to 277 V <sub>L-N</sub> / 480 Vac <sub>L-L</sub>
CE	CAT III; for distribution systems up to 300 V <sub>L-N</sub>
Dielectric Withstand	Per UL 61010-1, EN 61010-1
Conducted and Radiated Emissions	FCC part 15 Class A, EN 61000-6-4, EN 61326-1 Class A (industrial)
Conducted and Radiated Immunity	EN 61000-6-2, EN 61326-1 (industrial)

**AGENCY APPROVALS**

US and Canada	UL 61010-1
Europe (CE)	IEC/EN 61010-1

**WARRANTY**

Limited Warranty	5 years
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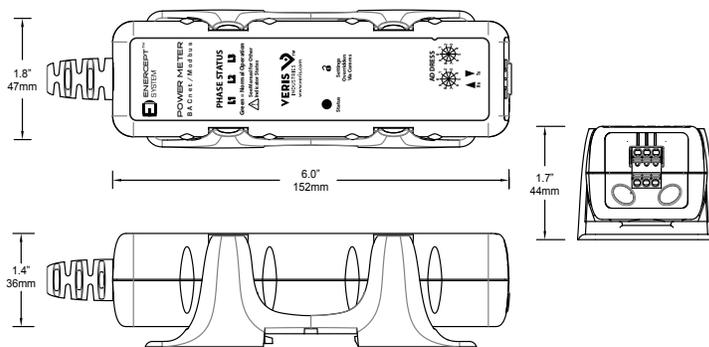


1. The meters were tested compliant to the norms:
- ANSI C12.1, Class 1 from 1% to 100% rated current
  - IEC 62053-21, Class 1 from 1% to 100% rated current
  - IEC 62053-24 Class 1, from 1% to 100% rated current

**ORDERING INFORMATION**

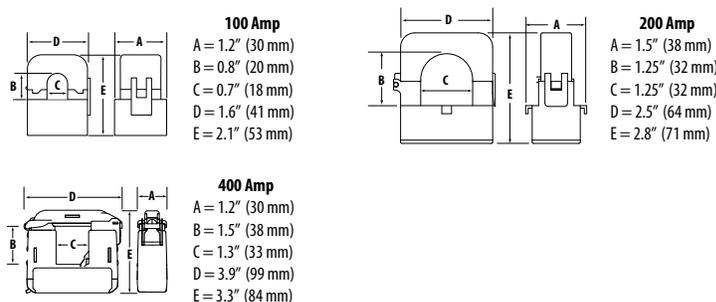
MEASUREMENT CAPABILITY - FULL DATA SET		E23Cx -XXX
Bi-directional Energy Measurements	•	
Power (3-phase Total and Per Phase): Real (kW) Reactive (kVAR) and Apparent (kVA)	•	
Power Factor: 3-Phase Average and Per Phase	•	
Present Power Demand: Real (kW), Reactive (kVAR) and Apparent (kVA)	•	
Import and Export Totals of Present Power Demand: Real (kW), Reactive (kVAR) and Apparent (kVA)	•	
Peak 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 by Phase (kWh)	•	
Import and Export Accumulators of Real and Apparent Energy	•	
Reactive Energy Accumulators by Quadrant (3-phase Total and Per Phase)	•	
Demand Interval Configuration: Fixed or Rolling Block	•	
Demand Interval Configuration: External Sync to Comms	•	
OUTPUTS		
RS-485 Serial (Modbus RTU Protocol)	•	
RS-485 Serial (BACnet MS/TP Protocol)	•	

**DIMENSIONAL DRAWING**



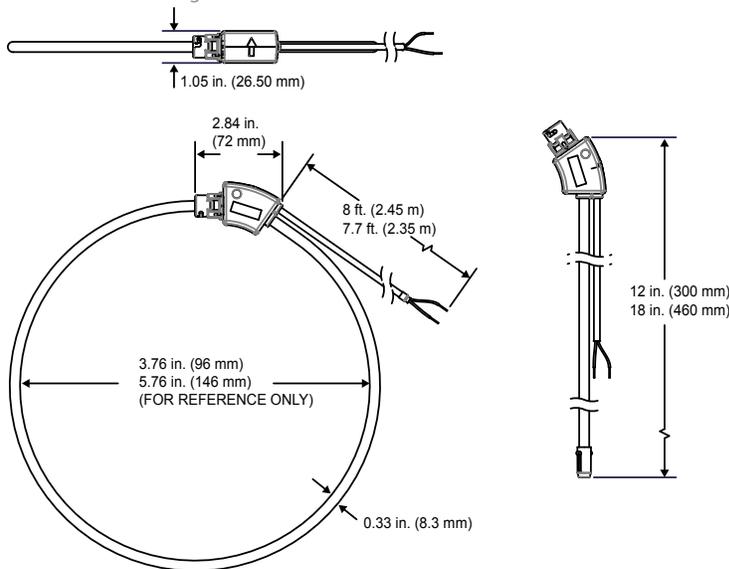
**100A, 200A & 400 A CTS**

Dimensional Drawings



**12" & 18" ROGOWSKI CT**

Dimensional Drawing



**ORDERING INFORMATION**

Data Set	I/O	System Types & Wires	CT Size
E	C	5 = IEC international wire code 6 = ANSI North & South America wire code	101 = 3 ph, 3 wire, 100 A, split-core micro 201 = 3 ph, 3 wire, 200 A, split-core mini 401 = 3 ph, 3 wire, 400 A, split-core small 12 = 3 ph, 3 wire, 12" Rogowski 18 = 3 ph, 3 wire, 18" Rogowski
<p>Example: E 23 C 6 - 201</p>			

**ACCESSORIES P. 69**



# E5X SERIES

## Versatile Energy Monitoring Solution



The E5x Series DIN Rail Meter combines exceptional performance and easy installation to deliver a cost-effective solution for power monitoring applications. The E5x can be installed on standard DIN rail or surface mounted as needed. The Modbus, LON, and BACnet output models offer added flexibility for system integration. The data logging capability (E5xC3 and E5xx5) protects data in the event of a communications or power failure elsewhere in the system. Combinations of serial communication, pulse output, and phase alarms are provided to suit a wide variety of applications. Additional pulse inputs on E5xHx and E50Fx provide an easy way to incorporate simple flow sensors to track gas, water, steam, or other energy forms using a BACnet or LON system.

The E51 models add a bi-directional monitoring feature designed expressly for renewable energy applications, allowing measurement of power imported from the utility grid as well as power exported from the renewable energy source (e.g. solar panels). In this way, a facility administrator can track all energy data, ensuring accuracy in billing and crediting. They are also useful for monitoring loads that use regenerative braking.

### SPECIFICATIONS

<b>INPUTS</b>	
Control Power, AC	50/60 Hz; 5 VA max.; 90 V min.; UL Maximums: 600 V <sub>L-L</sub> (347 V <sub>L-N</sub> ); CE Maximum: 300 V <sub>L-N</sub>
Control Power, DC	3W max.; UL and CE: 125 to 300 Vdc (external DC current limiting required)
Voltage Input	UL: 90 V <sub>L-N</sub> to 600 V <sub>L-L</sub> ; CE: 90 V <sub>L-N</sub> to 300 V <sub>L-N</sub>
<b>CURRENT INPUT</b>	
Scaling	5 A to 32,000 A
Input Range	0 to 0.333 V or 0 to 1 V (selectable) CTs must be rated for use with Class 1 voltage inputs
Pulse Inputs E5xHx & E50Fx only	Contact inputs to pulse accumulators (one set with E5xH2 and E50F2; two sets with E5xH5 and E51F5)*
<b>ACCURACY</b>	
Real Power & Energy	0.2% (ANSI C12.20, IEC 62053-22 Class 0.2S)
<b>OUTPUTS</b>	
E50B1 & E5xCx	Real Energy Pulse: N.O. static**; Alarm contacts: N.C. static**

## Revenue grade measurements

Meets ANSI C12.20 Class 0.2 standards

## High reliability

ANSI C12.20 0.2% accuracy, IEC 62053-22 Class 0.2S on E5xxx

## Easy installation

DIN rail or screw mounting options

## Multiple applications

Real energy output and phase loss alarm output on E50Bx and E5xCx models...one device serves multiple applications

## Data logging

Ensures long term data retrieval and safeguards during power failures (E5xC3 and E5xx5)

## Wide CT compatibility

Compatible with CTs from 5 A to 32000 A

### APPLICATIONS

- Energy monitoring in building automation systems
- Renewable energy
- Energy management
- Commercial sub-metering
- Industrial monitoring
- Cost allocation

E50Bx	Reactive energy pulse 30 Vac**
E5xCx	RS-485 2-wire Modbus RTU (1200 baud to 38.4 kbaud)
E5xHx	RS-485 2-wire BACnet MS/TP (9600 baud to 115.2 kbaud)
E50Fx	2-wire LON FT

<b>MECHANICAL</b>	
Mounting	DIN Rail or 3-point screw mount

<b>ENVIRONMENTAL</b>	
Altitude of Operation	3000 m
Operating Temp Range	-30 to 70 °C (-22 to 158 °F)
Storage Temp Range	-40 to 85 °C (-40 to 185 °F)
Humidity Range	<95% RH non-condensing
Mounting Location	Not suitable for wet locations. For indoor use only.

<b>WARRANTY</b>	
Limited Warranty	5 years

<b>AGENCY APPROVALS</b>	
Agency Approvals	UL 508 (Open Type Device), IEC/EN 61010-1, California CSI Solar, ANSI C12.20, Cat III, Pollution Degree 2



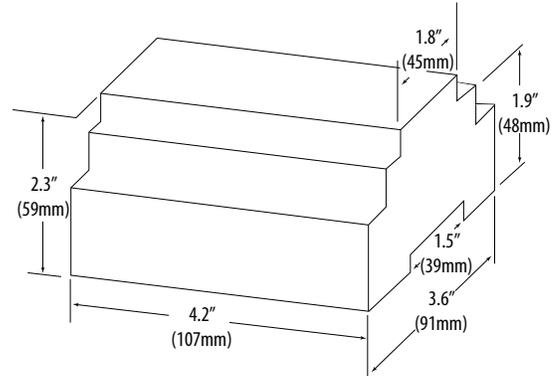
\*10 kΩ Vac/dc to 4 to 10 Vdc.  
\*\*30 Vac/dc, 100 mA max. (AC: 50/60Hz).



**ORDERING INFORMATION**

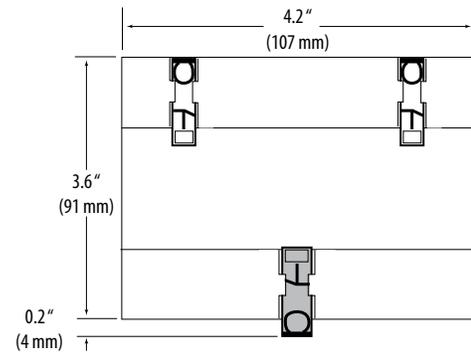
	E50B1	E50C2	E50C3	E50F2	E50F5	E50H2	E50H5	E51C2	E51C3	E51H2	E51H5	
<b>MEASUREMENT CAPABILITY - FULL DATA SET</b>												
Bi-directional Energy Measurements										•	•	•
Power (3-phase total and per phase): Real (kW) Reactive (kVAR), and Apparent (kVA)	•	•	•	•	•	•	•	•	•	•	•	•
Power Factor: 3-phase average & per phase	•	•	•	•	•	•	•	•	•	•	•	•
Present Power Demand: Real (kW), Reactive (kVAR), and Apparent (kVA)	•	•	•	•	•	•	•	•	•	•	•	•
Import and Export totals of Present Power Demand: Real (kW), Reactive (kVAR), & Apparent (kVA)								•	•	•	•	•
Peak 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	•	•	•	•	•	•	•	•	•	•	•	•
ANSI C12.20 0.2% accuracy, IEC 62053-22 Class 0.2S	•	•	•	•	•	•	•	•	•	•	•	•
Accumulated Net Energy: Real (kWh), Reactive (kVARh), and Apparent (kVAh)	•	•	•	•	•	•	•	•	•	•	•	•
Accumulated Real Energy by phase (kWh)	•	•	•	•	•	•	•	•	•	•	•	•
Import and Export Accumulators of Real and Apparent Energy								•	•	•	•	•
Reactive Energy Accumulators by Quadrant (3-phase total & per phase)								•	•	•	•	•
Demand Interval Configuration: Fixed or Rolling Block	•	•	•	•	•	•	•	•	•	•	•	•
Demand Interval Configuration: External Sync to Comms		•	•	•	•	•	•	•	•	•	•	•
<b>DATA LOGGING</b>												
Data Logging: 10 16-Bit Configurable (can include Date/Time) Data Buffers			•							•		
Data Logging: 3 Timestamped 32-Bit Configurable Data Buffers					•		•					•
Store up to 60 days of readings at 15-minute intervals			•		•		•			•		•
<b>OUTPUTS</b>												
Alarm Output (N.C.)	•	•	•	•		•		•	•	•		•
1 Pulse Output (N.O.)		•	•					•	•			
2 Pulse Outputs (N.O.)	•											
RS-485 Serial (Modbus RTU Protocol)		•	•					•	•			
RS-485 Serial (BACnet MS/TP Protocol)						•	•			•	•	
LON FT Serial (LonTalk Protocol)				•	•							
<b>INPUTS</b>												
2 Pulse Contact Accumulator Inputs				•	•		•					•
1 Pulse Contact Accumulator Input			•		•					•		

**DIMENSIONAL DRAWING**



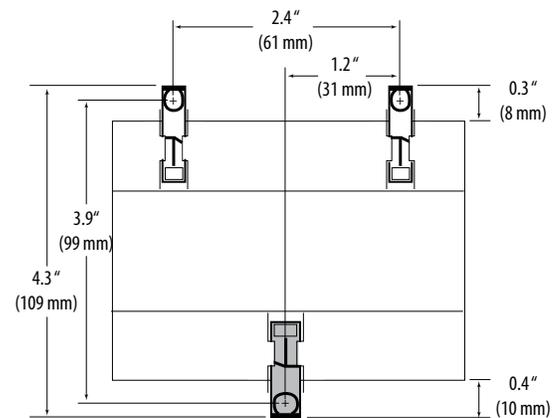
**DIN MOUNT CONFIGURATION**

Mounting Diagram



**SCREW MOUNT CONFIGURATION**

Mounting Diagram



## E5XXXA SERIES

Cost-Saving, Versatile Monitoring Solution with Associated E683x Rope Style CTs (Sold Separately)



E50xxxA/E51xxxA



E683x Series Rope CT (sold separately)

The E5xxxA Series DIN Rail Meter combines exceptional metering performance with a built-in integrator and power supply to deliver a cost-effective, easily installed solution for power monitoring applications. Multiple communication protocol options offer added flexibility for easy system integration.

E5xxxA devices work exclusively with Veris E683x Series rope CTs for fast connection. The rope style CTs allow convenient installation in tight spaces.

The data logging capability (E5xC3A and E5xx5A) protects data in the event of a power or communications failure elsewhere in the system. Different devices in the series offer serial communication, pulse output, and phase alarms to suit a wide variety of applications.

### SPECIFICATIONS

ACCURACY	
Real Power & Energy E5xxxA	0.5% (ANSI C12.20, IEC 62053-22 Class 0.5S)
INPUTS	
Control Power, AC	50/60 Hz; 5 VA max.; 90 V min.; UL Maximums: 600 V <sub>L-L</sub> (347 V <sub>L-N</sub> ); CE Maximum: 300 VL-N
Control Power, DC	3 W max.; UL and CE: 125 to 300 Vdc (external DC current limiting required)
Voltage Input	UL: 90 V <sub>L-N</sub> to 600 V <sub>L-L</sub> ; CE: 90 V <sub>L-N</sub> to 300 V <sub>L-N</sub>
Current Input Scaling Input Range	50 to 5000 A E683x Series rope style CTs only (CTs must be rated for connection to Class 1 voltage inputs)
Pulse Inputs (E5xHxA & E50FxA only)	Contact inputs to pulse accumulators (one set with E5xH2A & E50F2A; two sets with E5xH5A & E51F5A)*
OUTPUTS	
All Models (except E5xHxA & E50FxA)	Real Energy Pulse: N.O. static**; Alarm contacts: N.C. static**
E50BxA	Reactive energy pulse**
E5xCxA	RS-485 2-wire Modbus RTU (1200 baud to 38.4 kbaud)

## Faster installation 0.5% accuracy

Integrator and power supply for the CTs are built into the meter... fewer devices to purchase and faster installation

ANSI C12.20 0.5% accuracy, IEC 62053-22 Class 0.5S on all E5xxxA...great for cost allocation

## Rope CTs

Versatile rope CTs allow convenient installation in tight spaces

## Easy installation

DIN rail or screw mounting options

## 400 to 5000A

Designed to work exclusively with E683x Series rope CTs which offer 1% accuracy from 50 to 5000 A... monitor a wide range of loads with breakers from 400 to 5000 A

## Multiple applications

Real energy output and phase loss alarm output on E50BxA and E5xCxA models...one device serves multiple applications

### APPLICATIONS

- Energy monitoring in building automation systems
- Renewable energy
- Energy management
- Commercial sub-metering
- Industrial monitoring
- Cost allocation

E5xHxA	RS-485 2-wire BACnet MS/TP (9600 baud to 115.2 kbaud)
E50FxA	2-wire LON FT

MECHANICAL	
Mounting	DIN rail or 3-point screw mount

ENVIRONMENTAL	
Operating Temp Range	-30 to 70 °C (-22 to 158 °F)
Storage Temp Range	-40 to 85 °C (-40 to 185 °F)
Humidity Range	<95% RH non-condensing
Mounting Location	Not suitable for wet locations. For indoor use only.

WARRANTY	
Limited Warranty	5 years

AGENCY APPROVALS	
Agency Approvals	UL 508, IEC/EN 61010-1, California CSI Solar, ANSI C12.20

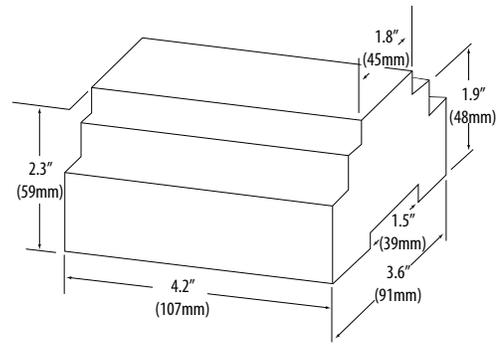


\*10 kΩ Vac/dc to 4 to 10 Vdc.  
\*\*30 Vac/dc, 100 mA max.

**ORDERING INFORMATION**

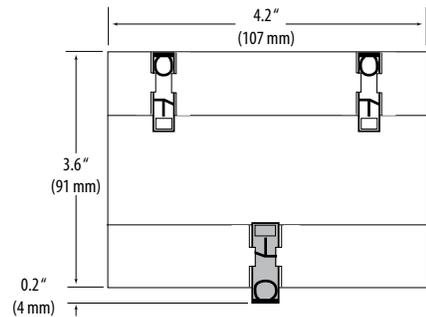
	E50B1A	E50C2A	E50C3A	E50F2A	E50F5A	E50H2A	E50H5A	E51C2A	E51C3A	E51H2A	E51H5A
<b>MEASUREMENT CAPABILITY - FULL DATA SET</b>											
Bi-directional Energy Measurements											
Power (3-phase total and per phase): Real (kW) Reactive (kVAR), & Apparent (kVA)	•	•	•	•	•	•	•	•	•	•	•
Power Factor: 3-phase average & per phase	•	•	•	•	•	•	•	•	•	•	•
Present Power Demand: Real (kW), Reactive (kVAR), and Apparent (kVA)	•	•	•	•	•	•	•	•	•	•	•
Import & Export totals of Present Power Demand: Real (kW), Reactive (kVAR), & Apparent (kVA)								•	•	•	•
Peak 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	•	•	•	•	•	•	•	•	•	•	•
ANSI C12.20 0.5% accuracy, IEC 62053-22 Class 0.5S	•	•	•	•	•	•	•	•	•	•	•
Accumulated Net Energy: Real (kWh), Reactive (kVARh), and Apparent (kVAh)	•	•	•	•	•	•	•	•	•	•	•
Accumulated Real Energy by phase (kWh)	•	•	•	•	•	•	•	•	•	•	•
Import and Export Accumulators of Real and Apparent Energy								•	•	•	•
Reactive Energy Accumulators by Quadrant (3-phase total and per phase)								•	•	•	•
Demand Interval Configuration: Fixed or Rolling Block	•	•	•	•	•	•	•	•	•	•	•
Demand Interval Configuration: External Sync to Comms	•	•	•	•	•	•	•	•	•	•	•
<b>DATA LOGGING</b>											
Data Logging: 10 16-Bit Configurable (can include Date/Time) Data Buffers			•							•	
Data Logging: 3 Timestamped 32-Bit Configurable Data Buffers						•		•			•
Store up to 60 days of readings at 15-minute intervals			•			•		•			•
<b>OUTPUTS</b>											
Alarm Output (N.C.)	•	•	•	•		•		•	•	•	
1 Pulse Output (N.O.)		•	•					•	•		
2 Pulse Outputs (N.O.)	•										
RS-485 Serial (Modbus RTU Protocol)		•	•					•	•		
RS-485 Serial (BACnet MS/TP Protocol)						•	•			•	•
LONFT Serial (LonTalk Protocol)				•	•						
<b>INPUTS</b>											
2 Pulse Contact Accumulator Inputs					•		•				•
1 Pulse Contact Accumulator Input				•		•				•	

**DIMENSIONAL DRAWING**



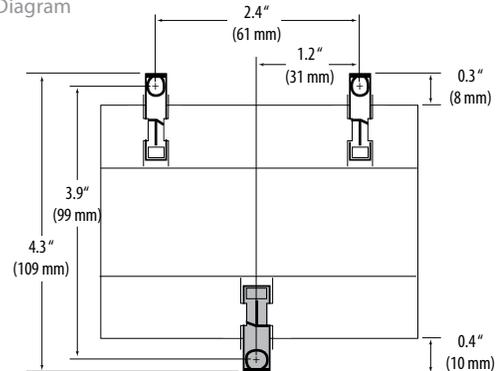
**DIN MOUNT CONFIGURATION**

Mounting Diagram



**SCREW MOUNT CONFIGURATION**

Mounting Diagram



**REQUIRED CTS**

MODEL	DESCRIPTION
E683C502	Rogowski CT, 250 mm (9"), 600 V, 5 kA
E683D502	Rogowski CT, 300 mm (12"), 600 V, 5 kA
E683G502	Rogowski CT, 460 mm (18"), 600 V, 5 kA
E683J502	Rogowski CT, 600 mm (24"), 600 V, 5 kA
E683L502	Rogowski CT, 900 mm (35"), 600 V, 5 kA

ACCESSORIES P. 69



# H8163 SERIES

Sub-tenant Meter with Calibrated CTs for Superior System Accuracy



The H8163 Series Energy Meters are easy to install and provide exceptional system accuracy, making them ideal for all sub-metering applications.

Each meter is factory-matched with one to three split-core CTs. The meter/CT pairs are system-calibrated to provide excellent total system accuracies of 1% from 2% to 100% of the amperage rating of the CTs (e.g., 2 to 100 A with 100 A CTs). Matching serial numbers assure that the meter and CT were calibrated together (matching does not apply if using 100 A CTs).

The H8163 is easy to install. The split-core CTs virtually eliminate the need to remove electrical conductors, reducing installation time. The meter is also capable of detecting and correcting phase reversal, eliminating the need for concern about CT load orientation. The convenient color coding of the CTs and voltage leads make correct connection simple.

## SPECIFICATIONS

INPUTS (VOLTAGE)	
H8150	90 to 132 Vac line-to-neutral
H8163	90 to 300 Vac line-to-neutral
ACCURACY	
System Accuracy	±1% of reading from 2% to 100% of the rated current of the CTs, accomplished by matching the CTs with electronics and calibrating them as a system
Sample Rate	1280 Hz
OUTPUTS	
LCD Display All Models	1.2" x 3.8" (31 mm x 97 mm) viewing area, 160 segments, backlit with LCD
H8163 ONLY	
Pulse Output	Normally open, Opto-FET, 100 mA@24 Vac/dc
Pulse Rate	0.10 <sup>1</sup> , 0.25 <sup>2</sup> , 0.50, or 1.00 kWh per pulse
Pulse Width	200 msec closed
Phase Loss Alarm	N.O. (opens on alarm), Opto-FET, 100 mA @ 24 Vac/dc; fixed threshold 25% below

## Revenue grade measurements

Meets ANSI C12.20 Class 0.2 standards

## Equipment protection

Phase-loss alarm (H8163)

## LCD display

High resolution backlit LCD display provides clear readings at a distance...reduces the risk of data misinterpretation. Back-lighting can be disabled if desired.

## Easy connection

H8163 provides a pulse output from 1/10 to 1 pulse per kWh for easy connection to existing control or data acquisition systems

## Reduce installation costs

With the optional communications board (H8163-CB), the H8163 can easily be added to a Modbus, BACnet or N2 control system network to report multiple variables including kW, kWh, kVAR, PF, amps and volts, providing crucial power information at a reduced installation cost

## APPLICATIONS

- Commercial tenant sub-metering
- Performance contracting
- Allocating costs
- Real-time power monitoring via local display or through control/data acquisition systems

ENVIRONMENTAL	
Protection Class	NEMA 1
Altitude of Operation	2000 m
Operating Temp Range	0 to 50 °C (32 to 122 °F)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)
Humidity Range	0 to 95% non-condensing; indoor use only
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	
Agency Approvals	UL61010-1, Cat. III, Pollution Degree 2

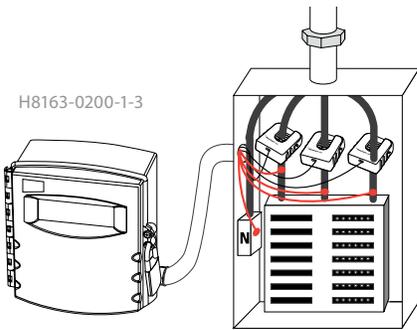


Approved for California CSI Solar applications (check the CSI website for model numbers).  
 1. Not supported at >1600 A.  
 2. Not supported at >2400 A.  
 Note: Meter and CTs serial numbers must match, except for 100A CTs. Neutral voltage connection is required.



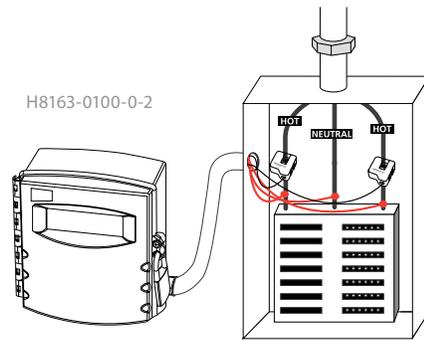
**208/120 Vac, 4-WIRE, 3Ø, 200 A SERVICE**

Wiring Diagram



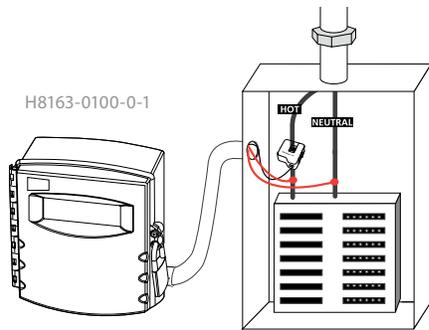
**240 Vac, 3-WIRE, SINGLE PHASE, 100 A SERVICE**

Wiring Diagram

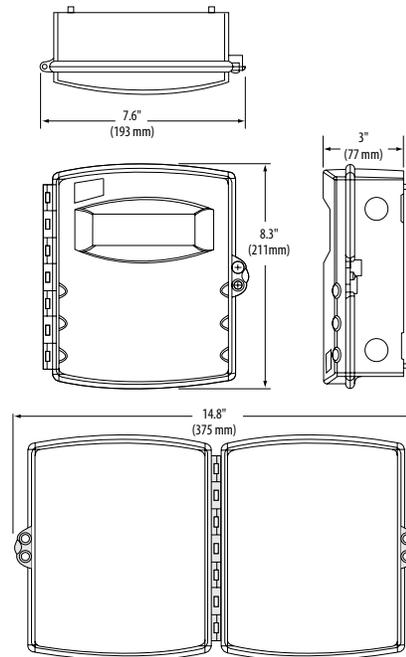


**120 Vac, 2-WIRE, SINGLE PHASE, 100 A SERVICE**

Wiring Diagram



**DIMENSIONAL DRAWING**



**DATA OUTPUTS**

- kWh, Consumption
- kW, Real power
- kVAR, Reactive power
- kVA, Apparent power
- Power factor
- Voltage, line to line
- Voltage, line to neutral
- Amps, Average current
- kW, Real Power ØA
- kW, Real Power ØB
- kW, Real Power ØC
- Power factor ØA
- Power factor ØB
- Power factor ØC
- Voltage, ØA to ØB

- Voltage, ØB to ØC
- Voltage, ØA to ØC
- Voltage, ØA to Neutral
- Voltage, ØB to Neutral
- Voltage, ØC to Neutral
- Amps, Current ØA
- Amps, Current ØB
- Amps, Current ØC
- Demand kW and kVAR \*
- Peak Demand \*
- Time Stamp \*

\* With H8163-CB Communications Board installed

**ORDERING INFORMATION**

120 Vac to 480 Vac (nom.) with Pulse and Phase Loss Outputs

AMPS	1 CT	2 CTs	3 CTs	VOLTAGE	OUTPUT
100 Micro	H8163-0100-0-1	H8163-0100-0-2	H8163-0100-0-3	120 to 480 Vac	Pulse & Phase Loss
200 Mini		H8163-0200-1-2	H8163-0200-1-3		
300 Small		H8163-0300-2-2	H8163-0300-2-3		
400 Med			H8163-0400-3-3		
800 Med			H8163-0800-3-3		
800 Lg			H8163-0800-4-3		
1600 Lg			H8163-01600-4-3		
2400 Lg			H8163-2400-4-3		

ACCESSORIES P. 69





# POWER MONITORING MULTI-CIRCUIT

Veris leads the way with a complete line of innovative power monitoring solutions that save time and money. Veris power monitors are available with popular communication protocols that allow for labor-saving networked wiring, and standard pulse and analog outputs as well. Earn LEED® points and make Veris power monitors part of your energy conservation plan.

MODEL	DESCRIPTION	PAGE
E34	Multi-circuit Meter	33
E30, E31	Panelboard Monitoring System	35

See following pages for selection guides.

# MINIMIZE COST AND SPACE PER METER

E34E Series Multi-Circuit Meter

## APPLICATIONS

- » Building and tenant sub-metering
- » HVAC and lighting equipment management
- » Cost allocation and peak load reduction



## FEATURES

### AFFORDABLE METERING POINT

Add many metering points with low equipment and installation costs

### COMMON CTs, 1/3V OUTPUTS

Eliminates need for shorting blocks and allows long CT lead extensions without compromising accuracy

### REVENUE GRADE MEASUREMENT

ANSI and IEC Class 0.5% accuracy, ideal for tenant billing

### ADVANCED ALARMING

Extensive alarming capabilities provide warning of critical load levels and dropouts

### CONFIGURE THE METERS YOU WANT

User-configurable to any combination of 1, 2, or 3-phase meters



# MULTI-CIRCUIT ENERGY/ POWER METERS GUIDE

## NEW PANELBOARDS

90 TO 300V LINE-TO-NEUTRAL SERVICE VOLTAGE, WITH LOADS UP TO 120A PER BRANCH

MAX. # OF BRANCHES:	24	36	42	48	72	84
3/4" CT spacing			E30x042			E30x084
1" CT spacing			E30x142			E30x184
18 mm CT spacing	E30x224	E30x236	E30x242	E30x248	E30x272	E30x284

For BACnet IP or MS/TP on A, B, or C models, add the E8951 Modbus-to-BACnet converter (see Network Integration section for more information).

Four levels of functionality available (x = A, B, C or E):

- A = Power/Energy for Branches & Mains
- B = Power/Energy for Mains, Current only for Branches
- C = Current only for Branches & Mains
- E = Power/Energy for Branches & Mains; integrated Ethernet with Modbus TCP, BACnet and SNMP

## PANELBOARD RETROFITS

90 TO 300V LINE-TO-NEUTRAL SERVICE VOLTAGE, WITH LOADS UP TO 240A PER BRANCH

MAX. # OF BRANCHES:	42	84
With 50A Branch CTs & 4' round ribbon cables	E31x42	E31x84
Order Branch CTs & ribbon cables separately	E31x002	E31x004

For BACnet IP or MS/TP on A, B, or C models, add the E8951 Modbus-to-BACnet converter (see Network Integration section for more information).

Four levels of functionality available (x = A, B, C or E):

- A = Power/Energy for Branches & Mains
- B = Power/Energy for Mains, Current only for Branches
- C = Current only for Branches & Mains
- E = Power/Energy for Branches & Mains; integrated Ethernet

## MULTIPLE 3-PHASE LOADS

90 TO 300V LINE-TO-NEUTRAL SERVICE VOLTAGE, SUPPORTS CTS WITH 0.333V SECONDARY

'A' - MODBUS RTU ONLY	'E' - INTEGRATED ETHERNET	NUMBER OF METERS			
		3-PHASE WITHOUT NEUTRAL	3-PHASE WITH NEUTRAL	2-PHASE	1-PHASE
E34A04	E34E04	4	3	6	12
E34A08	E34E08	8	6	12	24
E34A14	E34E14	14	10	21	42
E34A28	E34E28	28	21	42	84

For BACnet IP or MS/TP on 'A' models, add the E8951 Modbus-to-BACnet converter (see Network Integration section for more information).

**Branch Circuit Power Monitoring for New Panels**  
E30, E30E

**Branch Circuit Power Monitoring for existing Panel Retrofits**  
E31

**Power Monitoring up to 28 3-Phase Meters**  
E34

# FLEXIBLE POWER MONITORING



## NEW PANELBOARD INSTALLATIONS

E30 SERIES, page 35

Monitor up to 84 branch circuits, two 3-phase mains, and two neutrals in one compact meter. Designed to be integrated into any brand of panelboard, the E30 provides the data you need to monitor multiple PDUs, RPPs, key areas of buildings, or customer spaces.



## RETROFIT PANELBOARD INSTALLATIONS

E31 SERIES, page 35

Monitor up to 84 branch circuits, two 3-phase mains, and two neutrals in one flexible meter. Designed to be field installed into existing panels, the E31 offers a main board and two or four adapter boards that can be integrated into the existing panel or remote mounted in a separate enclosure. Varying the ribbon cable and CT lead length gives you the ultimate flexibility to install metering in tight spaces and/or critical power panels.



## MULTI-CIRCUIT METER

E34 SERIES, page 33

Add many 1-phase, 2-phase or 3-phase metering points with a single product. Saves on both equipment and installation costs as compared to individual meters.



# E34X SERIES

Add Up to 28 3-Phase Meters by Installing One Device



E34A



E34E

The E34x Series Multi-Circuit Meters make it easy to add many revenue grade metering points without having to purchase, mount, wire and commission individual energy meters. Simply add a single device with common voltage inputs and communication interface that can measure the current, voltage, power and energy consumption of up to (14) 3-phase circuits with a single board or up to (28) 3-phase circuits with a 2-board configuration. Save on the cost of both equipment and installation.

Modbus RTU is standard on all models. The E34E offers a serial connection with a choice of Modbus RTU or BACnet MS/TP, as well as an Ethernet connection with Modbus TCP, BACnet IP and SNMP.

To aid in commissioning, a configuration software tool, an Ethernet discovery tool (for the E34E) and a Commissioning Guide are available at no cost at [veris.com/modbus](http://veris.com/modbus).

## SPECIFICATIONS

### VOLTAGE INPUTS

Measurement Voltage	90 to 300 Vac line-to-neutral, 50/60 Hz
Control Power	E34A: 90 to 277 Vac line-to-neutral, 50/60 Hz, 8 VA E34E: 100 to 277 Vac line-to-neutral, 50/60 Hz, 15 VA

### ACCURACY

Power/Energy	IEC 62053-21 Class 0.5, ANSI C12.20 class 0.5
Voltage	±0.5% of reading 90 to 277 V line-to-neutral
Current	±0.5% of reading from 2% to 100% of full-scale

### OPERATION

Sampling Frequency	2560 Hz
Update Rate	2 seconds (both panels)
Overload Capability	22 kAIC

### E34A SERIAL COMMUNICATION

Physical Interface	DIP switch-selectable 2-wire or 4-wire, RS-485
Protocols Supported	Modbus RTU
Address	DIP switch-selectable address 1 to 247 (in pairs of 2)*
Baud Rate	DIP switch-selectable 9600, 19200, 38400
Parity	DIP switch-selectable NONE, ODD, EVEN

## Affordable metering points

Add many metering points with lower equipment and installation cost than traditional alternatives.

## Common CTs, 1/3V outputs

Eliminates need for shorting blocks and allows long CT lead extensions without compromising accuracy. Choose from a range of CT styles & sizes.

## Revenue grade measurements

ANSI & IEC Class 0.5% provides the accuracy needed for tenant billing applications.

## Configure the meters you want

Choose 4, 8, 14 or 28 3-phase meters. User-configurable to any combination of 1-, 2-, 3-phase meters. Reconfigure channels as needed to monitor neutral current.

## APPLICATIONS

- Commercial and residential sub-tenant billing
- Load-based cost allocation
- Load balancing
- Demand/response
- Overload protection
- Energy management

### E34E SERIAL COMMUNICATION

Physical Interface	2-wire RS-485
Protocols Supported	Modbus RTU or BACnet MSTP
Address Range	1 to 247 for Modbus RTU; 0-127 for BACnet MS/TP
Baud Rate	9600, 19200, 38400
Parity	Modbus RTU: NONE, ODD, EVEN BACnet MS/TP: NONE (fixed)

### E34E ETHERNET COMMUNICATION

Physical Interface	RJ45 connector with 10/100 Mbit Ethernet
Protocols Supported	Modbus TCP, BACnet IP, SNMP V2c

### TERMINAL BLOCK TORQUE

Removable Connectors	4.4 to 5.3 in-lb (0.5 to 0.6 N-m)
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### OPERATING CONDITIONS

Operating Temp. Range	0 to 60 °C (32 to 140 °F) (<95% RH non-condensing)*
Storage Temp. Range	-40 to 70 °C (-40 to 158 °F)
Altitude of Operation	3000 m
Mounting Location	Indoor use, dry location

### WARRANTY

Limited Warranty	5 years
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### COMPLIANCE INFORMATION

Agency Approvals	UL508, IEC/EN61010-1
Installation Category	Cat III, pollution degree 2



### MEASUREMENTS

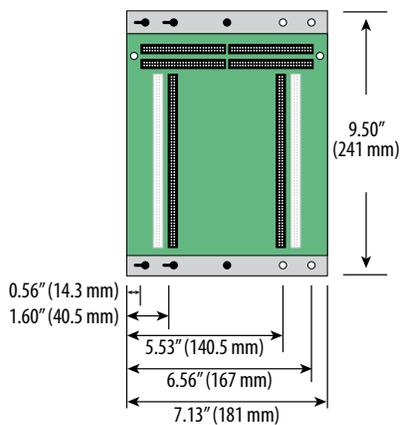
Real Time Measurements	Current: multi-phase average and per phase
	Current phase angle per branch
	Real power (kW): multi-phase total and per phase
	Apparent power (kVA): multi-phase total and per phase
	Power factor: multi-phase average and per phase
Demand Measurements	Current present demand: multi-phase average and per phase
	Real power (kW) present demand: multi-phase average and per phase
Historic Maximums	Maximum instantaneous current: multi-phase average and per phase
	Maximum current demand: multi-phase average and per phase
	Maximum real power demand: multi-phase total and per phase
Accumulated Energy	Energy (kWh): multi-phase total and per phase
Energy Snapshots	Energy (kWh): multi-phase total and per phase
<b>MODBUS ALARMS</b>	
Alarms	Voltage over/under
	Branch current over/under
	Mains current over/under

### NUMBER OF METERS SUPPORTED

E34A MODBUS RTU ONLY	E34E INTEGRATED ETHERNET	NUMBER OF METERS		
		3-PHASE	2-PHASE	1-PHASE
E34A04	E34E04	4	6	12
E34A08	E34E08	8	12	24
E34A14	E34E14	14	21	42
E34A28	E34E28	28	42	84

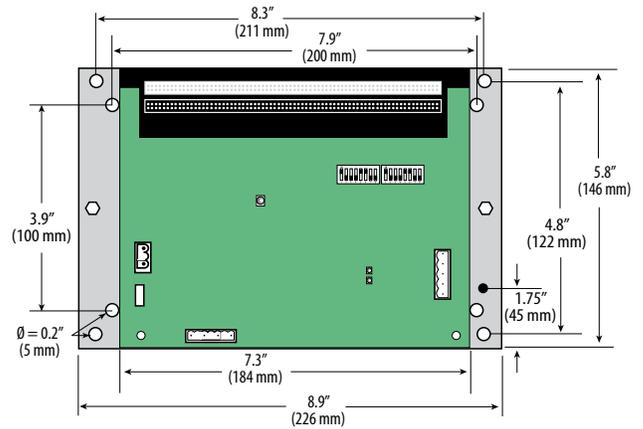
### 28-METER CT ADAPTER ASSEMBLY

Dimensional Drawing



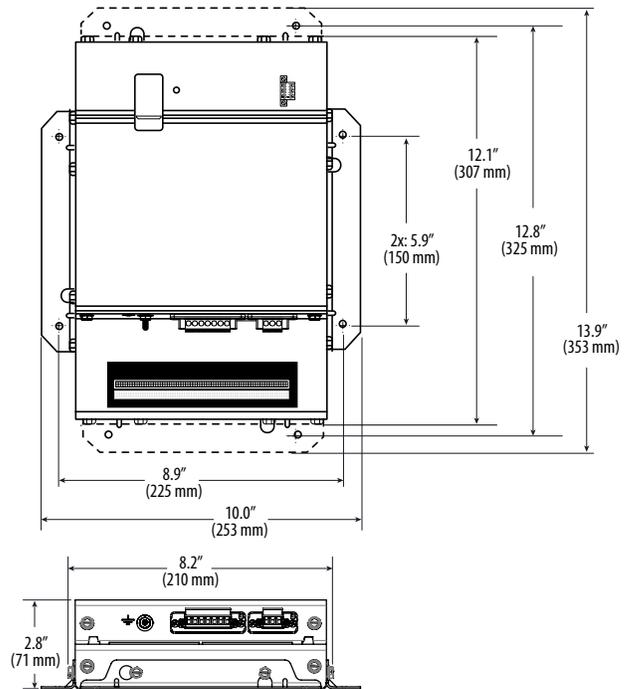
### E34A BASE BOARD

Dimensional Drawing



### E34E MAIN UNIT

Dimensional Drawing



# E30 & E31 SERIES

Monitor Entire Panelboards with One Device



E30A/E30B/E30C  
E31A/E31B/E31C



E30E/E31E  
Integrated Modbus RTU and TCP, BACnet MS/TP and IP, SNMP

The E30 and E31 Panelboard Monitoring Systems provide a cost-effective solution for high density monitoring in critical applications. A single meter can monitor up to 84 circuits and two branches (eight circuits). Each meter's circuits can be assigned to logical meters representing single, dual or three phase circuits.

Tailored for high density breaker panels, the E30 comes with 100A solid-core current transformer (CT) strips, with spacing that matches typical breaker spacing. This allows for the alignment of the metering instruments and reduces the chance of miswiring the CTs when all circuits have the same rating, such as in a data center power distribution unit (PDU).

Adaptable to a large variety of loads, the E31 supports different split core CTs for larger windows and ratings between 50A, 100A and 200A.

Each meter is available in four variants: Models A, B, C and E.

Models B and C are intended for simple current monitoring (Model C) and power factor and energy monitoring (Model B).

Models A and E measure all of the Model B and C data points as well as power and total harmonic distortion (THD). Model E is Ethernet enabled.

## SPECIFICATIONS

INPUTS	
Input Power	A/B/C models: 90 to 277 Vac line-to-neutral, 50/60 Hz, 8 VA E models: 100 to 277 Vac line-to-neutral, 50/60 Hz, 15 VA

ACCURACY	
Power/Energy	IEC 62053-21 Class 1, ANSI C12.1-2008. 1% system accuracy (includes main board and 50 A or 100 A branch CTs)
Voltage	±0.5% of reading 90 to 277 Vac line-to-neutral
Current	±0.5% of reading
Minimum ON Current	50 mA

OPERATION	
Sampling Frequency	2560 Hz
Update Rate	2 seconds (when both panels and all circuits are used)
Overload Capability	22 kAIC

E30/E31 MODEL A, B OR C SERIAL COMMUNICATION	
Physical Interface	DIP switch-selectable 2-wire or 4-wire, RS-485
Protocols Supported	Modbus RTU
Address Range	DIP switch-selectable address 1 to 247 (in pairs of 2)

## Revenue grade

ANSI and IEC Class 1 metering system accuracy including branch CTs

## Measure THD

Identify load inefficiencies and avoid early wear and tear

## 50 mA to 100 A

Widest dynamic range in the industry, 50 mA to 100 A monitoring

## Site adapted metering

Choose 4, 8, 14 or 28 3-phase meters. Configurable to any combination of 1-, 2-, 3-phase meters. Channels can be reassigned as needed.

## APPLICATIONS

- Data center PDU
- High density applications
- Critical buildings
- Load-based cost allocation
- Load management
- Load balancing
- Energy management

Baud Rate	DIP switch-selectable 9600, 19200, 38400
Parity	DIP switch-selectable NONE, ODD, EVEN

E30/E31 MODEL E SERIAL COMMUNICATION	
Physical Interface	2-wire RS-485
Protocols Supported	Modbus RTU or BACnet MSTP
Address Range	1 to 247 for Modbus RTU; 0-127 for BACnet MS/TP
Baud Rate	9600, 19200, 38400
Parity	Modbus RTU: NONE, ODD, EVEN BACnet MS/TP: NONE (fixed)

E30/E31 MODEL E ETHERNET COMMUNICATION	
Physical Interface	RJ45 connector with 10/100 Mbit Ethernet
Protocols Supported	Modbus TCP, BACnet IP, SNMP V2c concurrently

ENVIRONMENTAL	
Operating Range	0 to 60 °C (32 to 140 °F) (<95% RH non-condensing)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)
Altitude of Operation	3000 m
Mounting Location	Not suitable for wet locations. For indoor use only.

WARRANTY	
Limited Warranty	5 years

AGENCY APPROVALS	
Agency Approvals	UL508 Listed, EN61010-1, Cat. III, Pollution Degree 2



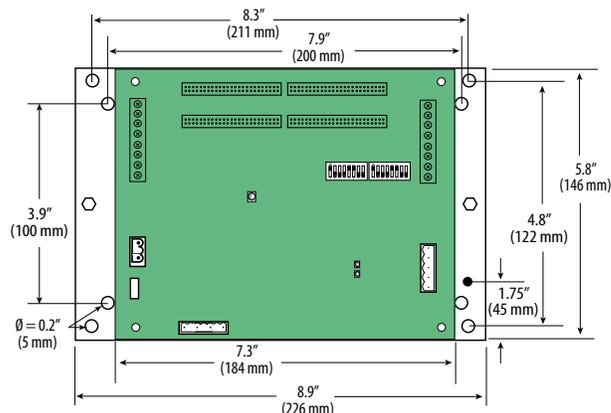
**PRODUCT CAPABILITIES**

	E30A/ E31A	E30B/ E31B	E30C/ E31C	E30E/ E31E
<b>MONITORING AT MAINS</b>				
Current per phase	•	•	•	•
Max. current per phase	•	•	•	•
Current demand per phase	•	•	•	•
Max. current demand per phase	•	•	•	•
Current phase angle	•	•	•	•
Energy (kWh) per phase	•	•	•	•
Real Power (kW) per phase	•	•	•	•
Apparent Power (kVA)	•	•	•	•
Power factor total*	•	•	•	•
Power factor per phase	•	•	•	•
Voltage, L-L and average	•	•	•	•
Voltage, L-N and average	•	•	•	•
Voltage, L-N and per phase	•	•	•	•
Frequency (phase A)	•	•	•	•
<b>MONITORING AT BRANCH CIRCUIT</b>				
Current	•	•	•	•
Max. current	•	•	•	•
Current demand	•	•	•	•
Max. current demand	•	•	•	•
Current phase angle	•	•	•	•
Real power (kW)	•	•	•	•
Real power (kW) demand	•	•	•	•
Real power (kW) demand max.	•	•	•	•
Energy (kWh) per circuit	•	•	•	•
Power factor	•	•	•	•
Apparent Power (kVA)	•	•	•	•
V-LL THD, V-LN THD & Current THD %	•	•	•	•
<b>MODBUS ALARMS</b>				
Voltage over/under	•	•	•	•
Current over/under	•	•	•	•
<b>PROTOCOLS SUPPORTED</b>				
Modbus RTU	•	•	•	•
Modbus TCP	**	**	**	•
BACnet MS/TP	**	**	**	•
BACnet IP with BBMD support	**	**	**	•
SNMP V2	**	**	**	•

\* Based on a 3-phase breaker rotation.  
 \*\* With E8951 added.

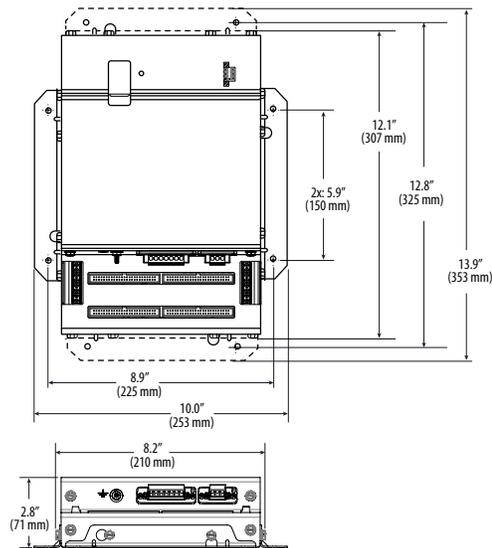
**A/B/C MODELS MAIN BOARD**

Dimensional Drawing

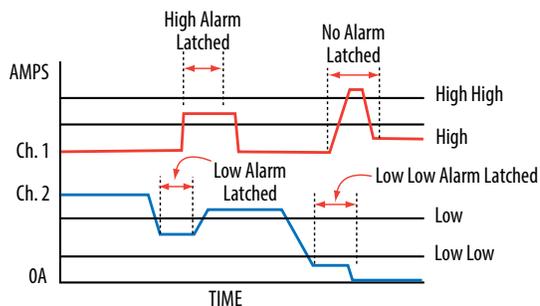


**E MODELS**

Dimensional Drawing



**OPERATION EXAMPLE**

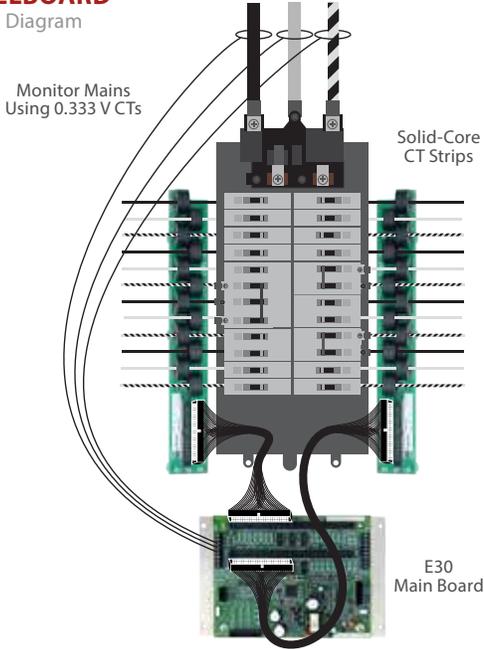




E30

Solid-Core CT Strips

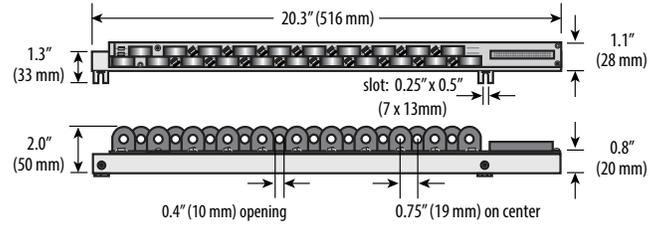
**PANELBOARD**  
Wiring Diagram



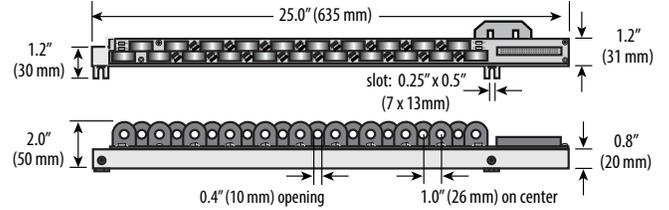
**BRANCH CT STRIPS**

Dimensional Drawing

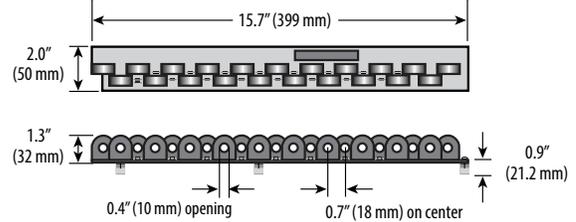
E30x242 - 42 branch CTs, 3/4" spacing



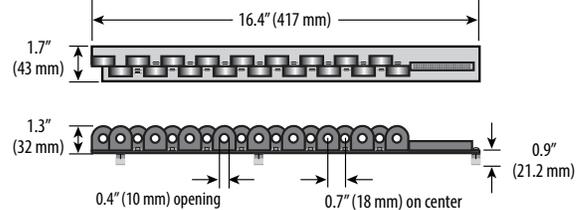
E30x242 - 42 branch CTs, 1" spacing



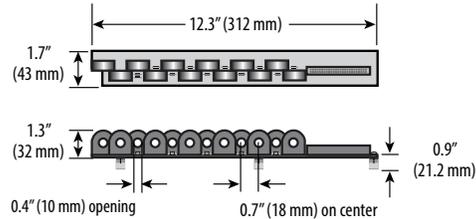
E30x242 - 42 branch CTs, 18 mm spacing



E30x236 - 36 branch CTs, 18 mm spacing



E30x224 - 24 branch CTs, 18 mm spacing



**SOLID-CORE BRANCH CTs**

	100 A SOLID-CORE BRANCH CT
Voltage Rating	300 Vac
Temperature	0 to 60 °C
Agency	EN61010-1

**ATTENTION**  
Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

**E30 (SOLID-CORE) ORDERING INFORMATION**

Description	Branch CT Spacing	# of Branch CTs & Ribbon Cables
E30 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A = Advanced	0 = 100 A, 3/4" spacing	24 = 2 strips of 12 branch CTs (18 mm only) and two 4-ft. round ribbon cables
B = Intermediate	1 = 100 A, 1" spacing	36 = 2 strips of 18 branch CTs (18 mm only) and two 4-ft. round ribbon cables
C = Basic	2 = 100 A, 18 mm spacing	42 = 2 strips of 21 branch CTs (3/4", 1", or 18 mm) and two 4-ft. round ribbon cables
E = Advanced w/Ethernet		48 = 4 strips of 12 branch CTs (18 mm only) and four 4-ft. round ribbon cables
		72 = 4 strips of 18 branch CTs (18 mm only) and four 4-ft. round ribbon cables
		84 = 4 strips of 21 branch CTs (3/4", 1", or 18 mm) and four 4-ft. round ribbon cables

Example: **E30**

NOTE: CTs for mains (not used on C models) must be ordered separately. Use 0 to 0.333V CTs rated for use with Class 1 voltage inputs.

Free configuration tool available from [www.veris.com](http://www.veris.com). Consult factory for additional mounting options.



### E31 (SPLIT-CORE) ORDERING INFORMATION

#### 1 Boards

Description	# of CTs
<b>E31</b>	
A = Advanced board	002 = 2 adapter boards, no CTs, no cables
B = Intermediate board	004 = 4 adapter boards, no CTs, no cables
C = Basic board	42 = 2 adapter boards, 42 50A CTs, 2 4 ft. round ribbon cables
E = Advanced with Ethernet	84 = 4 adapter boards, 84 50A CTs, 4 4 ft. round ribbon cables
	Y63 = 2 adapter boards, flat ribbon cables, pre-assembled on one bracket, CTs not included (not available with E31E models)

#### 2 Branch CTs (up to 21 CTs per adapter board)

Description	
<b>E31CT</b>	
0 = 6-pack, 50A Branch CT, 6 ft. (1.8 m) lead	3 = Single CT, 200A Branch CT, 6 ft. (1.8 m) lead
0R20 = 6-pack, 50A Branch CT, 20 ft. (6 m) lead	3R20 = Single CT, 200A Branch CT, 20 ft. (6 m) lead
1 = 6-pack, 100A Branch CT, 6 ft. (1.8 m) lead	
1R20 = 6-pack, 100A Branch CT, 20 ft. (6 m) lead	

#### 3 Ribbon Cable (order 1 cable per adapter board)

Description	
<b>CBLO</b>	
31 = Round Ribbon Cable, 18 in. (0.5 m)	08 = Flat Ribbon Cable, 18 in. (0.5 m)
32 = Round Ribbon Cable, 30 in. (0.8 m)	16 = Flat Ribbon Cable, 4 ft. (1.2 m)
22 = Round Ribbon Cable, 4 ft. (1.2 m)	17 = Flat Ribbon Cable, 5 ft. (1.5 m)
33 = Round Ribbon Cable, 8 ft. (2.4 m)	18 = Flat Ribbon Cable, 6 ft. (1.8 m)
23 = Round Ribbon Cable, 10 ft. (3 m)	19 = Flat Ribbon Cable, 8 ft. (2.4 m)
24 = Round Ribbon Cable, 20 ft. (6 m)	20 = Flat Ribbon Cable, 10 ft. (3 m)
	21 = Flat Ribbon Cable, 20 ft. (6 m)

#### Ordering Examples:

Option A: For monitoring 42 or 84 circuits, order a pre-made kit from Group 1 only (see Application/Wiring Diagram above). Example: E31x42 or E31x84

Option B: For monitoring other configurations, build your own kit by selecting from Groups 1, 2, and 3.

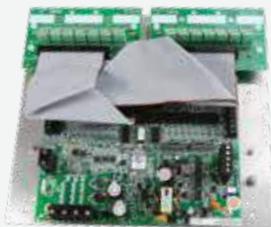
Example kit for an 18-circuit panel retrofit:

- 1 E31A002 - Advanced board, 2 adapter boards (1 unit)
- 2 E31CT0 - 50A Branch CT six-pack (3 units)
- 3 CBL023 - 10 ft. round ribbon cable (2 units)

**NOTE:** CTs for mains (not used on E3xC models) must be ordered separately. Use 0 to 0.333 V CTs rated for use with Class 1 voltage inputs.



E31



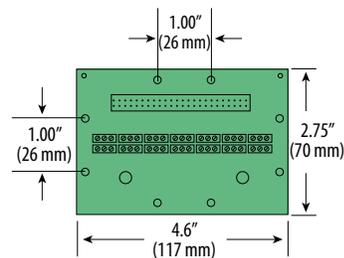
E31xY63

### SPLIT-CORE BRANCH CTs

	50 A SPLIT-CORE BRANCH CT	100 A SPLIT-CORE BRANCH CT	200 A SPLIT-CORE BRANCH CT
Voltage Rating	300 Vac	300 Vac (CE), 600 Vac (UL)	300 Vac (CE), 600 Vac (UL)
Measurement Range	0 to 60 A	0 to 120 A	0 to 240 A
Temperature	0 to 60 °C	0 to 60 °C	0 to 60 °C
Agency	UL 61010-1 Recognized, EN61010-1	UL 61010-1 Recognized, EN61010-1	UL 61010-1 Recognized, EN61010-1

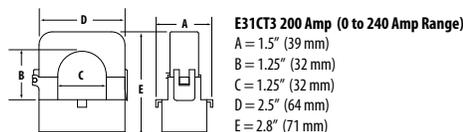
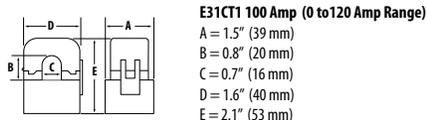
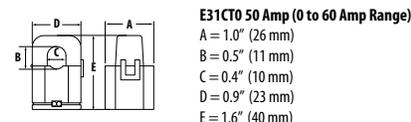
### E31 ADAPTER BOARD

Dimensional Drawing



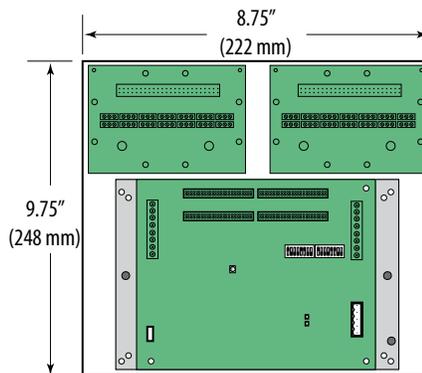
### BRANCH CTs

Dimensional Drawing

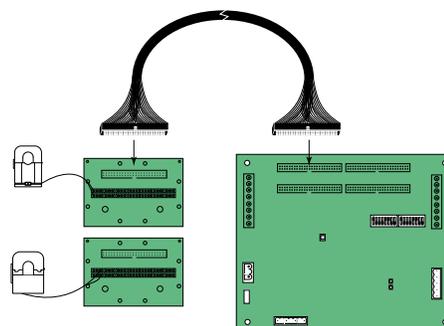


### E31XY63 BOARDS WITH BRACKET

Dimensional Drawing



### WIRING DIAGRAM



Observe precautions for handling static sensitive devices to avoid damage to the circuitry that is not covered under the factory warranty.

ACCESSORIES P. 69





# POWER METERING CTs

Veris provides a complete line of current transformers/transducers to suit many applications. We offer both voltage and amperage outputs for compatibility with other devices and systems, as well as a variety of core sizes and styles to fit into tight spaces. Browse our extensive offering to find the ideal solution for your needs.

MODEL	DESCRIPTION	PAGE
H681x Series	1 V and 0.333 V Output, Medium Current Rating, Split-core	41
E681x/E682x Series	0.333 V Output, Medium Current Rating, Solid-core and Split-core	43
SCT Series	0.333 V Output, Low Current Rating, Split-core	45
E683x Series	Rope-Style Core AC Current Transducer (for use only with E5xxxA and E2x Series meters)	47
H681x-5A Series	5A Output, Split-core	49
AL/BL/CL Series	5A Output, Solid-core	51

## METERING CT SELECTION GUIDE

	MODEL	RANGE	ID	MODEL	RANGE	ID	MODEL	RANGE	ID
SOLID-CORE	ALxxx page 51	50 to 400A	1.1" (26 mm)				E682Axxxx3 page 43	50 to 100A	0.4" (10 mm)
	BLxxx page 51	60 to 1200A	2.0" (52 mm)				E682Cxxxx3 page 43	200A	1.0" (25 mm)
	CLxxx page 51	1200 to 2000A	3.0" (76 mm)				E682Dxxxx3 page 43	400A	1.25" (31 mm)
SPLIT-CORE							E681A051V3 page 43	50A	0.4" (10 mm)
							E681B101V3 page 43	100A	0.6" (16 mm)
							E681C201V3 page 43	200A	1.25" (31 mm)
	H6810-xxxA-5A page 49	200 to 300A	1.2" x 1.3" (30 x 32 mm)	H6810-xxxA-1V page 41	100 to 300A	1.2" x 1.3" (30 x 32 mm)	H6810-xxxA-0.3V page 41	100 to 300A	1.2" x 1.3" (30 x 32 mm)
	H6811-xxxA-5A page 49	400 to 800A	2.5" x 2.9" (62 x 73 mm)	H6811-xxxA-1V page 41	400 to 800A	2.5" x 2.9" (62 x 73 mm)	H6811-xxxA-0.3V page 41	400 to 800A	2.5" x 2.9" (62 x 73 mm)
	H6812-xxxA-5A page 49	800 to 1600A	2.5" x 5.5" (62 x 139 mm)	H6812-xxxA-1V page 41	800 to 2400A	2.5" x 5.5" (62 x 139 mm)	H6812-xxxA-0.3V page 41	800 to 2400A	2.5" x 5.5" (62 x 139 mm)
							SCT-0750-xxx page 45	5 to 200A	0.75" (20 mm)
							SCT-1250-xxx page 45	50 to 600A	1.25" (32 mm)

Note: If using an E2x or E5xxxA power meter, order the E683x Rogowski rope style CTs, page 47.



# EASILY TRANSFORM ELECTRICAL SERVICE AMPERAGES TO VOLTAGES COMPATIBLE WITH MONITORING EQUIPMENT

E683x Series Rogowski CTs

## APPLICATIONS

- » Flexible core for an easy installation, even in tough locations
- » Supports a wide range of amperages, meaning you can always order the same CT, regardless of load size



## FEATURES

### FAST CT CONNECTION

Built-in power supply and integrator (compatible with E2x and E5xxxA power and energy meters)

### ENHANCED ACCURACY

Phase angle  $<0.5$  degrees measures at 50% rated current

### INSTALLATION EASE AND FLEXIBILITY

Flexible core fits in tight enclosures and insulated leads

### 1% ACCURACY

From 50 to 5000 A...monitor a wide range of loads with breakers from 400 to 5000 A



# H681X SERIES

## Medium Current Ranges

H681x-V  
(subset of models shown)



The H681x Series of 1 volt and 0.333 volt split-core current transformers (CTs) provide secondary AC voltage proportional to the primary (sensed) current. For use with power meters, data loggers, chart recorders, and other instruments, the H681x-V series CTs provide a cost-effective means to transform electrical service amperages to a voltage compatible with monitoring equipment.

Note: See the H681x-5A Series datasheet for 5A output models.

### SPECIFICATIONS

Split-Core

INPUTS	
Frequency Range	50/60 Hz
Leads	6 ft (1.8 m), 20 ft (6 m)
ACCURACY	
Accuracy	±1% of reading from 10% to 100% of rated current, specified with the primary conductor(s) centered in the CT window
OUTPUTS	
Output at Rated Current	1 V or 0.333 V
MECHANICAL	
Insulation	600 Vac
ENVIRONMENTAL	
Operating Temp Range	2400A models only: -15 to 50 °C (5 to 122 °F); All other models: -15 to 60 °C (5 to 140 °F)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)
Humidity Range	0 to 95% non-condensing
Altitude of Operation	3 km max.
Mounting Location	Not suitable for wet locations. For indoor use only.
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	
Agency Approvals	UL61010-1, IEC 61010-1, EN 61010-1
Installation Category	Category III, Pollution Degree 2



## High accuracy

±1% from 10% to 100% of rated current

## UL Recognized

UL Recognized, including UL2808

## 1 V or 0.333 V

1 V or 0.333 V output versions available

### APPLICATIONS

- Data logging
- Recording
- Power monitoring
- Energy management
- Alternative energy monitoring
- Cost allocation

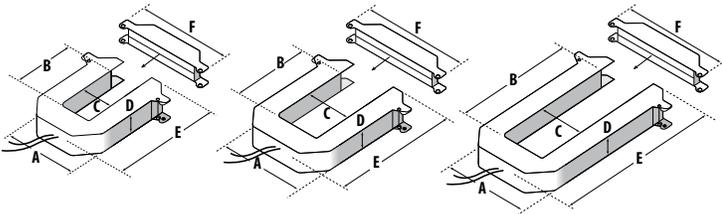
UL2808

INPUTS	
Frequency Range	50/60 Hz
Leads	16 AWG, 8 ft (2.4 m), 20 ft (6 m)
ACCURACY	
Accuracy	These CTs meet or exceed accuracy requirements specified in IEC 61869-2, Table 201, Class 1
OUTPUTS	
Output at Rated Current	1 V or 0.333 V
MECHANICAL	
Insulation	600 Vac
ENVIRONMENTAL	
Operating Temp Range	-15 to 60 °C (5 to 140 °F)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)
Humidity Range	0 to 95% non-condensing
Altitude of Operation	2 km max.
Mounting Location	Not suitable for wet locations. For indoor use only.
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	
Agency Approvals	UL2808
Installation Category	Category III, Pollution Degree 2



**SPLIT-CORE**

Dimensional Drawings



**H6810/Small**  
100 - 300 Amp

A = 3.8" (97 mm)  
B = 1.2" (31 mm)  
C = 1.3" (32 mm)  
D = 1.2" (31 mm)  
E = 4.0" (102 mm)  
F = 4.8" (122 mm)

**H6811/Medium**  
400 - 800 Amp

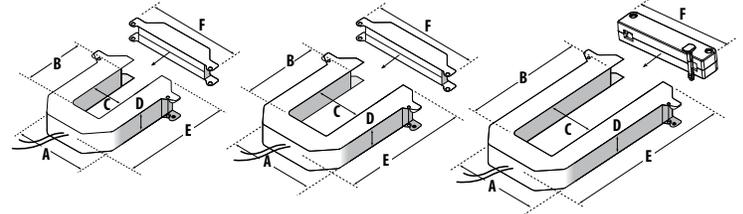
A = 4.9" (125 mm)  
B = 2.9" (74 mm)  
C = 2.5" (64 mm)  
D = 1.2" (31 mm)  
E = 5.2" (132 mm)  
F = 6.0" (152 mm)

**H6812/Large**  
800 - 2400 Amp

A = 4.9" (125 mm)  
B = 5.5" (140 mm)  
C = 2.5" (64 mm)  
D = 1.2" (31 mm)  
E = 7.9" (201 mm)  
F = 6.0" (152 mm)

**UL2808**

Dimensional Drawings



**H6810/Small**  
100 - 400 Amp

A = 3.23" (82 mm)  
B = 1.4" (36 mm)  
C = 1.4" (36 mm)  
D = 1.12" (28 mm)  
E = 3.25" (83 mm)  
F = 4.12" (105 mm)

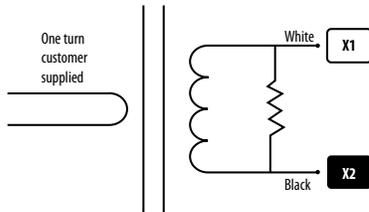
**H6811/Medium**  
600 - 800 Amp

A = 4.95" (126 mm)  
B = 2.9" (74 mm)  
C = 2.46" (63 mm)  
D = 1.2" (31 mm)  
E = 5.36" (136 mm)  
F = 5.83" (148 mm)

**H6812/Large**  
1000 - 2400 Amp

A = 4.91" (125 mm)  
B = 5.73" (146 mm)  
C = 2.47" (63 mm)  
D = 1.16" (30 mm)  
E = 8.12" (206 mm)  
F = 4.91" (125 mm)

**WIRING EXAMPLE**



**ORDERING INFORMATION**

MODEL*	DESCRIPTION
H6810-100A-.3V (R20)	Split-core CT, Size 2, 100 A: 0.333 V
H6810-200A-.3V (R20)	Split-core CT, Size 2, 200 A: 0.333 V
H6810-300A-.3V (R20)	Split-core CT, Size 2, 300 A: 0.333 V
H6811-400A-.3V (R20)	Split-core CT, Size 3, 400 A: 0.333 V
H6811-600A-.3V (R20)	Split-core CT, Size 3, 600 A: 0.333 V
H6811-800A-.3V (R20)	Split-core CT, Size 3, 800 A: 0.333 V
H6812-800A-.3V (R20)	Split-core CT, Size 4, 800 A: 0.333 V
H6812-1000A-.3V (R20)	Split-core CT, Size 4, 1000 A: 0.333 V
H6812-1200A-.3V (R20)	Split-core CT, Size 4, 1200 A: 0.333 V
H6812-1600A-.3V (R20)	Split-core CT, Size 4, 1600 A: 0.333 V
H6812-2000A-.3V (R20)	Split-core CT, Size 4, 2000 A: 0.333 V
H6812-2400A-.3V (R20)	Split-core CT, Size 4, 2400 A: 0.333 V
H6810-100A-.3VU	Split core CT, .3V, 100A UL2808
H6810-200A-.3VU	Split core CT, .3V, 200A UL2808
H6810-300A-.3VU	Split core CT, .3V, 300A UL2808
H6810-400A-.3VU	Split core CT, .3V, 400A UL2808
H6811-600A-.3VU	Split core CT, .3V, 600A UL2808
H6811-800A-.3VU	Split core CT, .3V, 800A UL2808
H6812-800A-.3VU	Split core CT, .3V, 800A UL2808
H6812-1000A-.3VU	Split core CT, .3V, 1000A UL2808
H6812-1200A-.3VU	Split core CT, .3V, 1200A UL2808
H6812-1600A-.3VU	Split core CT, .3V, 1600A UL2808
H6812-2000A-.3VU	Split core CT, .3V, 2000A UL2808
H6812-2400A-.3VU	Split core CT, .3V, 2400A UL2808

MODEL*	DESCRIPTION
H6810-100A-1V	Split-core CT, Size 2, 100 A: 1 V
H6810-200A-1V	Split-core CT, Size 2, 200 A: 1 V
H6810-300A-1V	Split-core CT, Size 2, 300 A: 1 V
H6811-400A-1V	Split-core CT, Size 3, 400 A: 1 V
H6811-600A-1V	Split-core CT, Size 3, 600 A: 1 V
H6811-800A-1V	Split-core CT, Size 3, 800 A: 1 V
H6812-800A-1V	Split-core CT, Size 4, 800 A: 1 V
H6812-1000A-1V	Split-core CT, Size 4, 1000 A: 1 V
H6812-1200A-1V	Split-core CT, Size 4, 1200 A: 1 V
H6812-1600A-1V	Split-core CT, Size 4, 1600 A: 1 V
H6812-2000A-1V	Split-core CT, Size 4, 2000 A: 1 V
H6812-2400A-1V	Split-core CT, Size 4, 2400 A: 1 V
H6810-100A-1VU	Split core CT, 1V, 100A UL2808
H6810-200A-1VU	Split core CT, 1V, 200A UL2808
H6810-300A-1VU	Split core CT, 1V, 300A UL2808
H6810-400A-1VU	Split core CT, 1V, 400A UL2808
H6811-600A-1VU	Split core CT, 1V, 600A UL2808
H6811-800A-1VU	Split core CT, 1V, 800A UL2808
H6812-800A-1VU	Split core CT, 1V, 800A UL2808
H6812-1000A-1VU	Split core CT, 1V, 1000A UL2808
H6812-1200A-1VU	Split core CT, 1V, 1200A UL2808
H6812-1600A-1VU	Split core CT, 1V, 1600A UL2808
H6812-2000A-1VU	Split core CT, 1V, 2000A UL2808
H6812-2400A-1VU	Split core CT, 1V, 2400A UL2808

ACCESSORIES P. 69



# E681X & E682X SERIES

Medium Current Ranges



## High accuracy

±0.5% from 5% to 120% of rated current for E682x or ±1% from 10% to 100% of rated current for E681x

## UL Recognized

UL Recognized

## 0.333 V output

0.333 V output

### APPLICATIONS

- Data logging
- Recording
- Power monitoring
- Energy management
- Alternative energy monitoring
- Cost allocation

The E681x and E682x Series of current transducers provide a standard voltage output for use with data loggers, chart recorders, and power monitoring equipment. Both series have 0.333 V output. E682x devices are solid-core, while E681x CTs are split-core.

### SPECIFICATIONS

Split-Core

Output at Rated Current	0.333 Vac
Accuracy	1% from 10% to 100% of rated current
Frequency Range	50/60 Hz
Leads	22 AWG, 600 Vac, UL 1015 bonded pair, 6 ft. (1.8 m) standard length
Max. Voltage L-N Sensed Conductor*	E681A051V3: 300 Vac (basic insulation rating), 150 Vac (reinforced insulation rating) E681B101V3 and E681C201V3: 600 Vac (basic insulation rating), 300 Vac (reinforced insulation rating)
Operating Temp Range	0 to 70 °C (32 to 158 °F)
Storage Temp Range	-40 to 105 °C (-40 to 221 °F)
Humidity Range	0 to 95% non-condensing
Altitude of Operation	3 km max.
Installation Category	Category III, pollution degree 2
Mounting Location	Not suitable for wet locations. For indoor use only.

#### WARRANTY

Limited Warranty	5 years
------------------	---------

#### AGENCY APPROVALS

Agency Approvals	UL 61010-1, IEC 61010-1, EN 61010-1
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### SPECIFICATIONS

Solid-Core

Output at Rated Current	0.333 Vac
Accuracy	±0.5% of reading from 5% to 120% of rated current
Frequency Range	50/60 Hz
Leads	22 AWG, 600 Vac, UL 1015 bonded pair, 6 ft. (1.8 m) standard length
Max. Voltage L-N Sensed Conductor*	600 Vac (basic insulation rating), 300 Vac (reinforced insulation rating)
Operating Temp Range	-40 to 85 °C (40 to 185 °F)
Storage Temp Range	-50 to 105 °C (-58 to 221 °F)
Humidity Range	0 to 95% non-condensing
Altitude of Operation	3 km max.
Agency Approvals	UL61010-1, EN61010-1
Installation Category	Category III, pollution degree 2
Mounting Location	Not suitable for wet locations. For indoor use only.

#### WARRANTY

Limited Warranty	5 years
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#### AGENCY APPROVALS

Agency Approvals	UL 61010-1, IEC 61010-1, EN 61010-1
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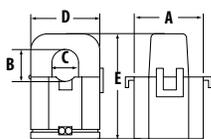


\* Do not apply these current transducers to circuits having a phase-to-phase voltage greater than the maximum rated voltage (300 Vac or 600 Vac, see above), unless adequate additional insulation is applied between the primary conductor and the current transducers. Veris assumes no responsibility for damage of equipment or personal injury caused by products operated on circuits above their published ratings.

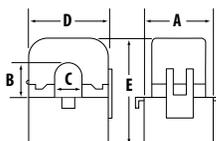


### E681X

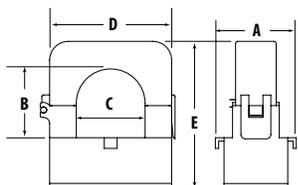
Dimensional Drawings



**50 Amp**  
 A = 1.0" (26 mm)  
 B = 0.5" (11 mm)  
 C = 0.4" (10 mm)  
 D = 0.9" (23 mm)  
 E = 1.6" (40 mm)



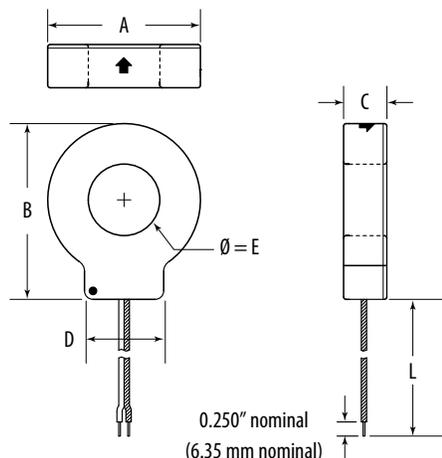
**100 Amp**  
 A = 1.2" (29.5 mm)  
 B = 0.6" (16 mm)  
 C = 0.6" (16 mm)  
 D = 1.85" (47 mm)  
 E = 2.1" (53 mm)



**200 Amp**  
 A = 1.5" (39 mm)  
 B = 1.25" (32 mm)  
 C = 1.25" (32 mm)  
 D = 2.5" (64 mm)  
 E = 2.8" (71 mm)

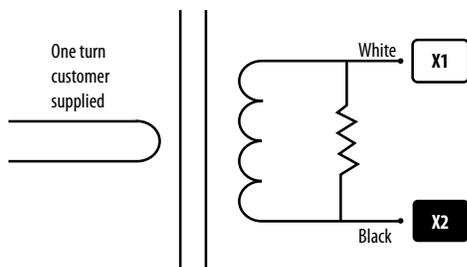
### E682X

Dimensional Drawing



MODEL	L	A	B	C	D	E
E682A051V3	6'	1.3"	1.5"	0.7"	0.8"	0.4"
E682A101V3	(1.8 m)	(33 mm)	(38 mm)	(18 mm)	(21 mm)	(10 mm)
E682C201V3	6'	2.3"	2.6"	0.7"	1.2"	1.0"
	(1.8 m)	(59 mm)	(66 mm)	(18 mm)	(31 mm)	(25 mm)
E682D401V3	6'	2.8"	3.2"	1.0"	1.4"	1.25"
	(1.8 m)	(70 mm)	(82 mm)	(25 mm)	(36 mm)	(31 mm)

### WIRING EXAMPLE



### ORDERING INFORMATION

Split-core

MODEL	DESCRIPTION
E681A051V3	Split-core CT, 50 A: 0.333 V, 0.4 in ID, 6 ft leads
E681B101V3	Split-core CT, 100 A: 0.333 V, 0.6 in ID, 6 ft leads
E681C201V3	Split-core CT, 200 A: 0.333 V, 1.25 in ID, 6 ft leads

Solid-core

MODEL	DESCRIPTION
E682A051V3	Solid-core CT, 50 A: 0.333 V, 0.4 in ID, 6 ft leads
E682A101V3	Solid-core CT, 100 A: 0.333 V, 0.4 in ID, 6 ft leads
E682C201V3	Solid-core CT, 200 A: 0.333 V, 1.0 in ID, 6 ft leads
E682D401V3	Solid-core CT, 400 A: 0.333 V, 1.25 in ID, 6 ft leads

Note: Other lead lengths are available. Consult factory.



## SCT SERIES

Low Current Ranges



SCT

SCT AC current sensors have center hole sizes and current ratings to suit many application. SCT models have a split core that is perfect for retrofits. Output is the industry standard of 0.333 Vac.

### SPECIFICATIONS

#### INPUTS

Frequency Range	50 to 400 Hz
Leads	8 ft (2.43 m)

#### ACCURACY

Accuracy	±1% of reading from 10% to 130% of rated current
----------	--

#### OUTPUTS

Output @ Rated Current	0.333 Vac
------------------------	-----------

#### MECHANICAL

Insulation	600 Vac
------------	---------

#### ENVIRONMENTAL

Installation Category III	Pollution Degree 2
Operating Temp Range	-10 to 55 °C (14 to 131 °F)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)

#### WARRANTY

Limited Warranty	3 years
------------------	---------

#### AGENCY APPROVALS

Agency Approvals	cURus, ANSI/IEEE 57.13, CE, RoHS
------------------	----------------------------------



\*The CE mark indicates RoHS2 compliance.

## High accuracy

±1% from 10% to 130% of rated current

## Interleaving joints

Interleaving joints for reliability with a self-locking mechanism and no exposed metal

## Compatible with existing systems

0.333 Vac standard output

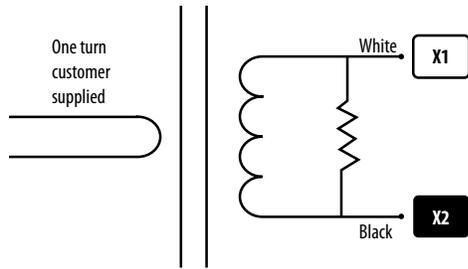
## UL Recognized

UL Recognized

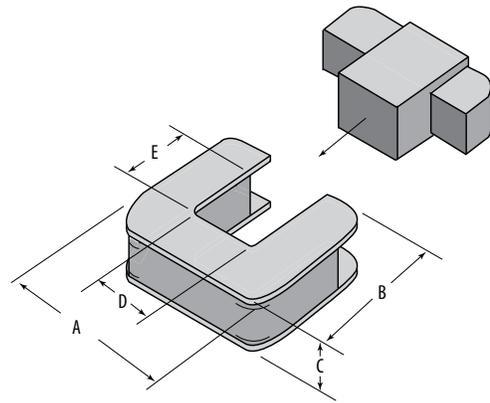
### APPLICATIONS

- Data logging
- Recording
- Power monitoring
- Energy management
- Alternative energy monitoring
- Cost allocation

**WIRING EXAMPLE**



**DIMENSIONAL DRAWING**



**ORDERING INFORMATION**

MODEL	MANUF. PART NUMBER	RATING (A)	DESCRIPTION
U004-0030	SCT-0750-005	5	CT, Split-core, 5 A: 0.333 Vac, 0.750" ID
U004-0031	SCT-0750-010	10	CT, Split-core, 10 A: 0.333 Vac, 0.750" ID
U004-0032	SCT-0750-030	30	CT, Split-core, 30 A: 0.333 Vac, 0.750" ID
U004-0033	SCT-0750-050	50	CT, Split-core, 50 A: 0.333 Vac, 0.750" ID
U004-0034	SCT-0750-070	70	CT, Split-core, 70 A: 0.333 Vac, 0.750" ID
U004-0035	SCT-0750-100	100	CT, Split-core, 100 A: 0.333 Vac, 0.750" ID
U004-0036	SCT-0750-150	150	CT, Split-core, 150 A: 0.333 Vac, 0.750" ID
U004-0037	SCT-0750-200	200	CT, Split-core, 200 A: 0.333 Vac, 0.750" ID
U004-0039	SCT-1250-070	70	CT, Split-core, 70 A: 0.333 Vac, 1.250" ID
U004-0040	SCT-1250-100	100	CT, Split-core, 100 A: 0.333 Vac, 1.250" ID
U004-0041	SCT-1250-150	150	CT, Split-core, 150 A: 0.333 Vac, 1.250" ID
U004-0042	SCT-1250-200	200	CT, Split-core, 200 A: 0.333 Vac, 1.250" ID
U004-0043	SCT-1250-250	250	CT, Split-core, 250 A: 0.333 Vac, 1.250" ID
U004-0044	SCT-1250-300	300	CT, Split-core, 300A : 0.333 Vac, 1.250" ID
U004-0045	SCT-1250-400	400	CT, Split-core, 400 A: 0.333 Vac, 1.250" ID
U004-0046	SCT-1250-600	600	CT, Split-core, 600 A: 0.333 Vac, 1.250" ID

MODEL	A	B	C	D	E
SCT-0750-xxx	2.0" (51 mm)	2.1" (54 mm)	0.61" (16 mm)	0.75" (20 mm)	0.75" (20 mm)
SCT-1250-xxx	3.25" (83 mm)	3.35" (86 mm)	1.0" (26 mm)	1.25" (32 mm)	1.25" (32 mm)



## E683X SERIES

Exclusively for E2x and E5xxxA  
Power and Energy Meters (sold separately)



The E683x Series of Rogowski flexible rope style current transducers (CTs) provide secondary AC voltage proportional to the primary (sensed) current. For use with E5xxxA and E2x Series power meters, the E683x Series CTs provide a cost-effective means to transform electrical service amperages to a voltage compatible with monitoring equipment. The flexible core makes it easy to fit in tight enclosures.

These products provide reinforced insulation between the sensed conductor and the output leads.

The E683x Series works exclusively with the E2x and E5xxxA power and energy meters and is a U018 equivalent. These meters have a built-in power supply and integrator, so CT connection is fast and simple.

### SPECIFICATIONS

INPUTS	
Frequency Range	50/60 Hz
Cable	1000 Vac UL Style 21223 cable with 22 AWG leads
ACCURACY	
Accuracy	±1% from 50 to 5000 A
OUTPUT	
Output at Rated Current	Custom for E5xxxA and E2x Series power meters
MECHANICAL	
Insulation category	600 V Cat IV, Pollution Degree 2
ENVIRONMENTAL	
Installation Category IV	Pollution Degree 2
Operating Temp. Range	-15 to 60 °C (5 to 140 °F)
Storage Temp. Range	-40 to 70 °C (-40 to 158 °F)
WARRANTY	
Limited Warranty	3 years
AGENCY APPROVALS	
Agency Approvals	EN61010-1; UL61010-1; EN61010-2-032; UL61010-2-032



### Easy installation

Insulated leads

### Maximum flexibility

Fits difficult spaces

### Fast CT connection

Compatible with E2x and E5xxxA power and energy meters with built-in power supply and integrator for fast CT connection... see the E2xxx and E5xxxA datasheets

### UL Recognized

UL Recognized

### 1% accuracy

1% accuracy from 50 to 5000 A... monitor a wide range of loads with breakers from 400 to 5000 A

### Enhanced accuracy

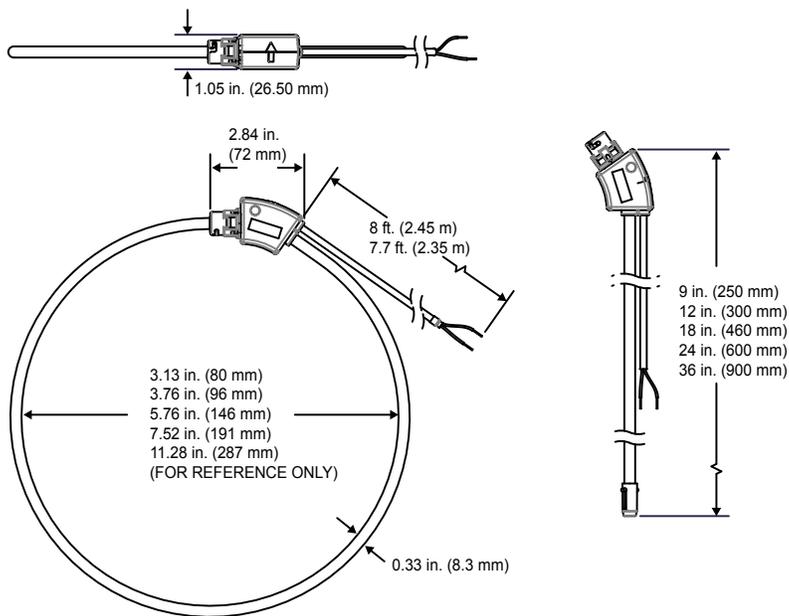
Phase angle <0.5 degrees, measured at 50% rated current

### APPLICATIONS

- Data logging
- Recording
- Power monitoring
- Energy management
- Alternative energy monitoring
- Cost allocation



**DIMENSIONAL DRAWING**



CT CORE LENGTH	APPROXIMATE INSIDE DIAMETER WITH CLOSED CONNECTOR
9 in. (250 mm)	Ø 3.13 in. (80 mm)
12 in. (300 mm)	Ø 3.76 in. (96 mm)
18 in. (460 mm)	Ø 5.76 in. (146 mm)
24 in. (600 mm)	Ø 7.52 in. (191 mm)
36 in. (900 mm)	Ø 11.28 in. (287 mm)

**ORDERING INFORMATION**

MODEL	DESCRIPTION
E683C502	Rogowski CT, 250 mm (9"), 600 V, 5 kA, U018 equivalent
E683D502	Rogowski CT, 300 mm (12"), 600 V, 5 kA, U018 equivalent
E683G502	Rogowski CT, 460 mm (18"), 600 V, 5 kA, U018 equivalent
E683J502	Rogowski CT, 600 mm (24"), 600 V, 5 kA, U018 equivalent
E683L502	Rogowski CT, 900 mm (36"), 600 V, 5 kA, U018 equivalent

Note: These CTs are compatible with the E2x and E5xxxA Series meters only.



# H681X-5A SERIES

Split-Core Current Transformers, 5A Output



H681x-5A  
(subset of models shown)

H681x-5A split-core current transformers (CTs) provide secondary amperage proportional to the primary (sensed) current. For use with power meters, data loggers, chart recorders, and other instruments, the H681x Series 5 Amp CTs provide a cost-effective means to transform electrical service amperages to a 0 to 5 Amp level compatible with monitoring equipment.

## SPECIFICATIONS

Split-core

INPUTS	
Frequency Range	50/60 Hz
Leads	6 ft (1.8 m)
ACCURACY	
Accuracy	±1% of reading from 5% to 100% of rated current, specified with the primary conductor(s) centered in the CT window.
OUTPUTS	
Output at Rated Current	5 A
MECHANICAL	
Insulation	600 Vac
ENVIRONMENTAL	
Operating Temp Range	2400A models only: -15 to 50 °C (5 to 122 °F); All other models: -15 to 60 °C (5 to 140 °F)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)
Humidity Range	0 to 95% non-condensing
Altitude of Operation	3 km max.
Mounting Location	Not suitable for wet locations. For indoor use only.
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	
Agency Approvals	UL61010-1, IEC 61010-1, EN 61010-1
Installation Category	Category III, Pollution Degree 2



## Easy installation

Unique hinge design

## UL Recognized

UL Recognized, including UL2808

## 5 Amps standard

5 Amp standard output...  
compatible with existing systems

## APPLICATIONS

- Data logging
- Recording
- Power monitoring
- Energy management
- Alternative energy monitoring
- Cost allocation

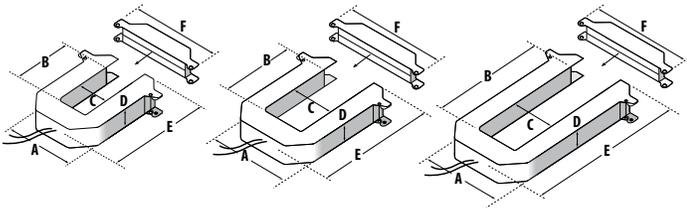
UL2808

INPUTS	
Frequency Range	50/60 Hz
Leads	16 AWG, 8 ft (2.4 m), 20 ft (6 m)
ACCURACY	
Accuracy	These CTs meet or exceed accuracy requirements specified in IEC 61869-2, Table 201, Class 1 (not applicable for small aperture CTs, 200-300 A).
OUTPUTS	
Output at Rated Current	5 A
MECHANICAL	
Insulation	600 Vac
ENVIRONMENTAL	
Operating Temp Range	-15 to 60 °C (5 to 140 °F)
Storage Temp Range	-40 to 70 °C (-40 to 158 °F)
Humidity Range	0 to 95% non-condensing
Altitude of Operation	2 km max.
Mounting Location	Not suitable for wet locations. For indoor use only.
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	
Agency Approvals	UL2808
Installation Category	Category III, Pollution Degree 2



**DIMENSIONAL DRAWINGS**

Split-Core



**H6810/Small**  
200-300 Amp

- A = 3.8" (96 mm)
- B = 1.2" (31 mm)
- C = 1.3" (32 mm)
- D = 1.2" (31 mm)
- E = 4.0" (100 mm)
- F = 4.8" (121 mm)

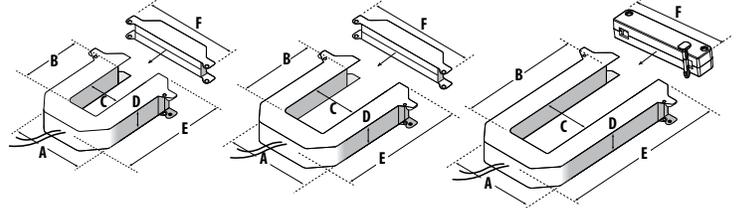
**H6811/Medium**  
400-800 Amp

- A = 4.9" (125 mm)
- B = 2.9" (73 mm)
- C = 2.5" (62 mm)
- D = 1.2" (31 mm)
- E = 5.2" (132 mm)
- F = 6.0" (152 mm)

**H6812/Large**  
800-2400 Amp

- A = 4.9" (125 mm)
- B = 5.5" (139 mm)
- C = 2.5" (62 mm)
- D = 1.2" (31 mm)
- E = 7.9" (201 mm)
- F = 6.0" (152 mm)

UL2808



**H6810/Small UL2808**  
200-400 Amp

- A = 3.23" (82 mm)
- B = 1.4" (36 mm)
- C = 1.4" (36 mm)
- D = 1.12" (28 mm)
- E = 3.25" (83 mm)
- F = 4.12" (105 mm)

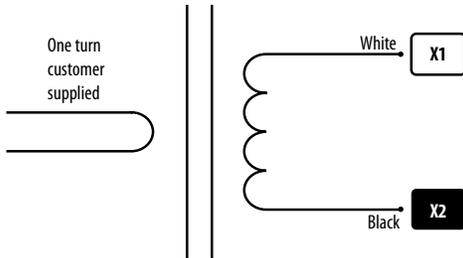
**H6811/Medium UL2808**  
600-800 Amp

- A = 4.95" (126 mm)
- B = 2.9" (74 mm)
- C = 2.46" (63 mm)
- D = 1.2" (31 mm)
- E = 5.36" (136 mm)
- F = 5.83" (148 mm)

**H6812/Large UL2808**  
1000-2400 Amp

- A = 4.91" (125 mm)
- B = 5.73" (146 mm)
- C = 2.47" (63 mm)
- D = 1.16" (30 mm)
- E = 8.12" (206 mm)
- F = 4.91" (125 mm)

**WIRING EXAMPLE**



**ORDERING INFORMATION**

MODEL	DESCRIPTION
H6810-200A-5A	Split-core CT, Small, 200A:5A
H6810-300A-5A	Split-core CT, Small, 300A:5A
H6811-400A-5A	Split-core CT, Medium, 400A:5A
H6811-600A-5A	Split-core CT, Medium, 600A:5A
H6811-800A-5A	Split-core CT, Medium, 800A:5A
H6812-800A-5A	Split-core CT, Medium, 800A:5A
H6812-1000A-5A	Split-core CT, Large, 10 00A:5A
H6812-1200A-5A	Split-core CT, Large, 1200A:5A
H6812-1600A-5A	Split-core CT, Large, 1600A:5A
H6812-2000A-5A	Split-core CT, Large, 2000A:5A
H6812-2400A-5A	Split-core CT, Large, 2400A:5A
H6810-200A-5AU	Split core CT, Small, 5A, 200A UL2808
H6810-300A-5AU	Split core CT, Small, 5A, 300A UL2808
H6810-400A-5AU	Split core CT, 5A, Small, 400A UL2808
H6811-600A-5AU	Split core CT, Medium, 5A, 600A UL2808
H6811-800A-5AU	Split core CT, Medium, 5A, 800A UL2808
H6812-800A-5AU	Split core CT, Large, 5A, 800A UL2808
H6812-1000A-5AU	Split core CT, Large, 5A, 1000A UL2808
H6812-1200A-5AU	Split core CT, Large, 5A, 1200A UL2808
H6812-1600A-5AU	Split core CT, Large, 5A, 1600A UL2808
H6812-2000A-5AU	Split core CT, Large, 5A, 2000A UL2808
H6812-2400A-5AU	Split core CT, Large, 5A, 2400A UL2808

Note: Burden rating capacity (VA) available upon request.

ACCESSORIES P. 69



# AL, BL & CL SERIES

Solid-core Designs



Veris AL, BL and CL solid-core current transformers provide a 0 to 5A AC output for use with transducers, data loggers, and chart recorders.

## SPECIFICATIONS

<b>INPUTS</b>	
Frequency Range	50 to 400 Hz
Leads	2 ft (0.6 m)
<b>ACCURACY</b>	
Accuracy	Specified at 60 Hz (see Ordering Information)
<b>OUTPUTS</b>	
Output at Rated Current	5 A
<b>MECHANICAL</b>	
Insulation	600 Vac (basic)
<b>ENVIRONMENTAL</b>	
Operating Temp Range	-30 to 55 °C (-22 to 131 °F)
Storage Temp Range	-30 to 105 °C (-22 to 221 °F)
Mounting Location	Not suitable for wet locations. For indoor use only.
<b>WARRANTY</b>	
Limited Warranty	1 year
<b>AGENCY APPROVALS</b>	
Agency Approvals	ANSI/IEEE C57.13, "Standard Requirements for Instrument Transformers," IEEE C57.13.2, "IEEE Standard Conformance Test Procedures for Instrument Transformers," and cURus.



## UL Recognized

UL Recognized

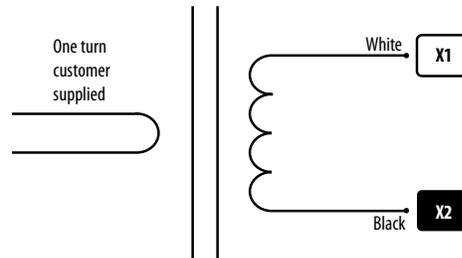
## 5 Amps standard

5A standard output ... compatible with existing systems

## APPLICATIONS

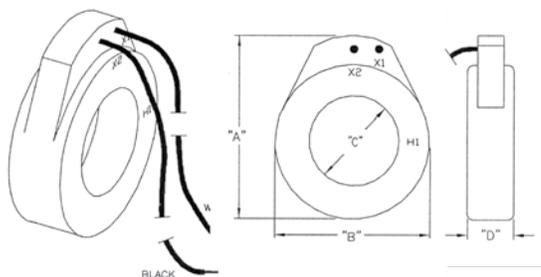
- Data logging
- Recording
- Power monitoring
- Energy management
- Alternative energy monitoring
- Cost allocation

## WIRING EXAMPLE



**AL/BL/CL**

Dimensional Drawings



**AL/SMALL**

50 Amp, 100 Amp, 150 Amp, 200 Amp, 250 Amp, 300 Amp, 400 Amp  
 A = 2.7" (70 mm)  
 B = 2.5" (63 mm)  
 C = 1.1" (26 mm)  
 D = 1.1" (26 mm)

**BL/MEDIUM**

500 Amp, 600 Amp, 800 Amp, 1000 Amp, 1200 Amp  
 A = 3.7" (90 mm)  
 B = 3.4" (88 mm)  
 C = 2" (52 mm)  
 D = 1.1" (26 mm)

**CL/LARGE**

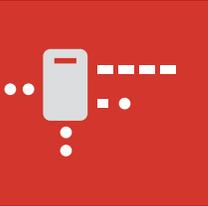
1200 Amp, 1500 Amp, 1600 Amp, 2000 Amp  
 A = 4.9" (124 mm)  
 B = 4.5" (115 mm)  
 C = 3" (76 mm)  
 D = 1.1" (26 mm)

**ORDERING INFORMATION**

MODEL	RATIO	ACCURACY AT 60 Hz	BURDEN CAPACITY IN VA
AL500	50:5	3%	2.0
AL101	100:5	1%	2.0
AL151	150:5		4.0
AL201	200:5		4.0
AL251	250:5		6.0
AL301	300:5		8.0
AL401	400:5		10.0
BL501	500:5		12.5
BL601	600:5		15.0
BL801	800:5		8.0
BL102	1000:5		10.0
BL122	1200:5		12.5
CL122	1200:5		10.0

ACCESSORIES P. 69





# NETWORK INTEGRATION

Veris Network Integration devices allow the collection, storage, transmission, and display of power monitoring information. Devices include data loggers, signal conditioners, wireless transmitters, protocol converters, and local displays for power monitoring projects and installations, helping you to complete a solution.

MODEL	DESCRIPTION	PAGE
H8822	Data Acquisition System, Full-featured Model	55
A7810/A8810	Data Acquisition Systems, For Embedded Applications	57
A8332-8F2D	Flexible I/O Module	59
A8911-23	Pulse Input Module	61
H8932/H8936	Network Display	63
E8951	Modbus-to-BACnet Protocol Converter	65
U0012-0012/U0012-0013 & U013-0015	Modbus Gateway/BACnet Router	67

## NETWORK INTEGRATION SELECTION GUIDE

	MODEL	PAGE
Add Modbus TCP (Ethernet) Communication to a Modbus Meter	H8822, A8810, U013-0012	55, 57, 67
Add BACnet MS/TP (Serial) Communication to a Modbus Meter	E8951	65
Add BACnet IP (Ethernet) Communication to a Modbus Meter	E8951	65
Add BACnet IP (Ethernet) Communication to a BACnet MS/TP Meter	U013-0013/U013-0015	67
Add SNMP (Ethernet) Communication to an E30A/E31A Meter	E8951	65
Log Data from Modbus Devices	H8822, A8810	55, 57
Access a Modbus Meter with a Web-Enabled Interface	H8822, A8810	55, 57
Access Pulse Output Meters/Sensors with a Web-Enabled Interface	A7810	57
Generate Alarm Notifications from Modbus Devices	H8822, A8810	55, 57
Convert Pulse/Analog Outputs to Modbus	A8332-8F2D, A8911-23	59, 61
Add a Local Display to a Modbus (Serial) Meter	H8936	63
Add Local Control of Alarms to a Modbus Multi-Circuit Meter	H8936	63

# NEED BACNET, BUT YOUR METER COMMUNICATES MODBUS?

E8951 Protocol Converter

## APPLICATIONS

- » Pre-configured to support all Veris meters
- » Automatically detects supported Modbus devices and configures BACnet objects, no programming or setup required
- » Easily integrate Modbus meters into Building Automation Systems



## FEATURES

### MULTI-COMMUNICATE

Supports BACnet IP and Modbus TCP access simultaneously

### A GREAT INTEGRATION TOOL

Compatible with Veris' H80xx Series, H8163 with H8163-CB, E5x Series, and E3x Series

### POINTS OF COLLECTION

Each converter can support over 10,000 BACnet measurement points for maximum data collection



# H8822 ACQUISUITE™

## Modbus Protocols, Data Logging and Server Capabilities



H8822

The H8822 AcquiSuite™ data acquisition system is the perfect do-it-yourself solution for your energy logging needs. This server combines the flexibility of Ethernet communication with a low installed cost. It is an ideal device for recording electrical, natural gas, water, and other building energy usages.

The AcquiSuite has eight flexible I/O options. After installation, data from a connected device is time-stamped and stored in nonvolatile memory at user-selected intervals until the next scheduled upload to the SQL database server. The AcquiSuite sends data to the Building Manager Online™ server or to other third party software providers.

### SPECIFICATIONS

Input Power	120 to 240 Vac 50/60Hz transformer to 24 Vdc, included
Operating System	Linux
Flash ROM	16 MB NOR Flash (expandable with USB memory device)
Memory	32 MB RAM
LEDs	8x pulse input, 4 modem activity, Modbus TX/RX, power status
LCD	2 x 16 LCD character, two buttons
LAN	10/100, auto-crossover detection
Protocols	Modbus/RTU, Modbus/TCP, TCP/IP, PPP, HTTP/HTML, FTP, SNMP, SMTP, XML
Serial Port	RS-485 Modbus
Interval Recording	User selectable 1 to 60 minutes. Default 15-minute interval.
Inputs	8x, user selectable - 0-10V - Min/Max/Ave/Instantaneous; 4 to 20 mA- Min/Max/Ave/Instantaneous; Pulse - Consumption, Rate; Resistance - Min/Max/Ave/Instantaneous; Runtime - Runtime, Status
Outputs	2x, Dry contact 30VDC, 150mA max.

### PROCESSORS

Main Processor	ARM 9
I/O Co-Processor	ARM 7

### Plug and play

Install and configure in minutes

### LCD display

Easy installation and troubleshooting

### Flexible data formats

Hardware and software provide data in flexible, industry-standard formats for databases, spreadsheets, etc.

### Integrated web server

Provides setup and configuration using any standard web browser

### APPLICATIONS

- Aggregating energy and operational information from remote sites
- Developing load profiles for energy purchases
- Gathering “near real-time” performance data
- Measurement and verification

### MODEMS

Phone	V.34 bis, 33,600 bps (H8822)
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### WARRANTY

Limited Warranty	2 years
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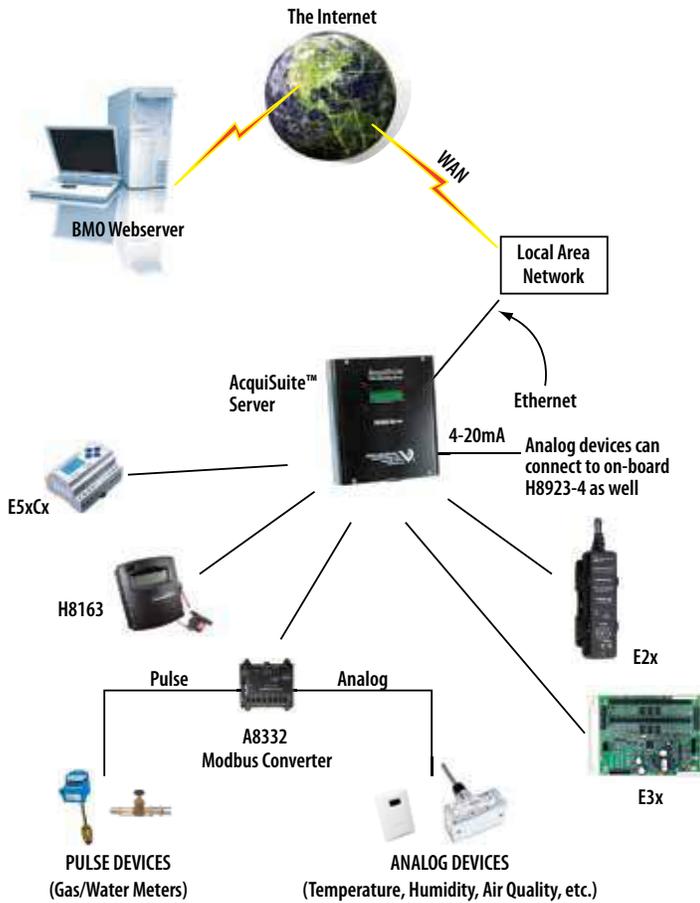
### AGENCY APPROVALS

Agency Approvals	FCC Part 15, Class A
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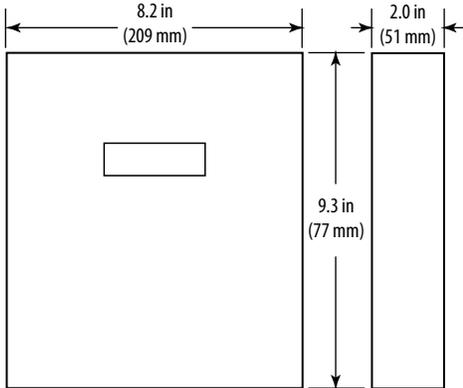
Note: Indoor use only.



**APPLICATION EXAMPLE**



**DIMENSIONAL DRAWING**



**THE ACQUISUITE SYSTEM ALLOWS**

Internet Display of Data Using the BMO Website	View performance data in an easy graphical format. Store, display, and download historical data in a secure SQL database. Design custom views of data from one or more buildings or systems.
Security and Flexibility	Store data on board in non-volatile memory. Protect information in the event of a power failure. Time-stamp all interval data with an on-board real-time clock.
Compatibility with Existing Systems	Use the I/O module to connect to existing sensors and meters. Use TCP/IP protocols to interface with spreadsheets, databases, text files, etc.

**ORDERING INFORMATION**

MODEL	DESCRIPTION
H8822	AcquiSuite Demand Response System: 8 Flexible I/O Inputs

# A7810 ACQUILITE™ & A8810 ACQUISUITE™

Flexible Data Servers for Embedded Applications



The A7810 AcquiLite™ and A8810 AcquiSuite™ data acquisition server for embedded applications allows users to collect energy data from meters and environmental sensors and send it via Modbus communication protocol (wired or wireless using the H8830) to IP-based applications. No software is required. Operation is plug-and-play, and information can be accessed using any web browser. The A7810 supports four pulse inputs, while the A8810 supports Modbus serial input.

The compact housing and industrial temperature range make the A7810 and A8810 ideal for embedded applications. Reduce development time and speed up integration by collecting and distributing energy data directly from your equipment.

## SPECIFICATIONS

Input Power	24 Vdc, 500 mA*
Isolation	
A7810	RJ45 Ethernet isolated to 1500 Vdc from main board (power and pulse inputs not isolated)
A8810	RJ45 Ethernet and RS-485 port isolated to 1500 Vdc from main board (power and USB not isolated)
Main Processor	ARM 9 embedded CPU
Operating System	Linux 2.6
Flash ROM	16 MB NOR Flash
Memory	32 MB RAM
LEDs	
A7810	Ethernet, pulse (x4), power, alarm
A8810	Ethernet, Modbus TX/RX, power, alarm
Console	2 x 16 LCD character, two push buttons
Interval Recording	1 to 60 minutes, user selectable (default 15 minutes)
Pulse Inputs A7810	4 inputs, dry contact, standard or KYZ, closure threshold 100 Ω to 2.5 kΩ user selectable; max. rate 10 Hz; min. width 50 msec
Serial Port Input	
A8810	RS-485 Modbus, supports up to 32 external devices (expandable)

## Track data in real time

Provides the right information for trending, planning, and identifying waste

## Alarm notification

For data points above or below target levels...quick notification for optimal performance maintenance

## Industrial temp. range

Industrial temperature range (-30 to 70 °C), perfect for embedded applications...speeds up development and integration of energy data

## Communications

Compatible with multiple communication protocols... push or pull data to energy dashboards and software applications for easy system integration

## Easy installation

DIN rail mounting

## APPLICATIONS

- Measurement and verification (M&V)
- Reduce energy costs
- Access energy information from local and remote sites
- Benchmark building energy usage
- Demand response
- Renewable energy

## COMMUNICATION

Protocols	
A7810	Modbus/TCP, TCP/IP, PPP, HTTP/HTML, FTP, NTP, XML, SNMP-Trap
A8810	Modbus/RTU, Modbus/TCP, TCP/IP, PPP, HTTP/HTML, FTP, NTP, XML, SNMP-Trap
LAN	RJ45 10/100 Ethernet, auto polarity

## ENVIRONMENTAL

Operating Temp Range	-30 to 70 °C (-22 to 158 °F)
Operating Humidity Range	0 to 95% RH non-condensing; indoor use only

## WARRANTY

Limited Warranty	2 years
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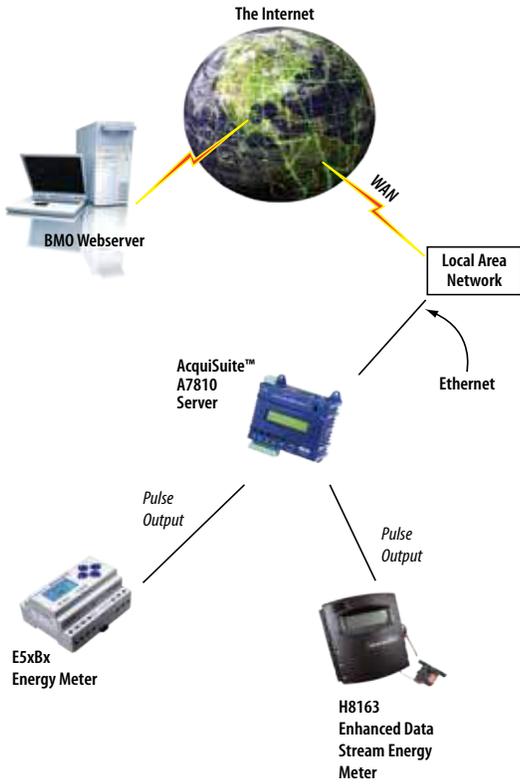
## AGENCY APPROVALS

A7810	FCC CFR 47 Part 15, Class A; EN 61000; EN 61326; UL61010 recognized; EN 61010
A8810	CE; FCC Part 15, Class A; EN 61000; EN 61326; UL61010 recognized

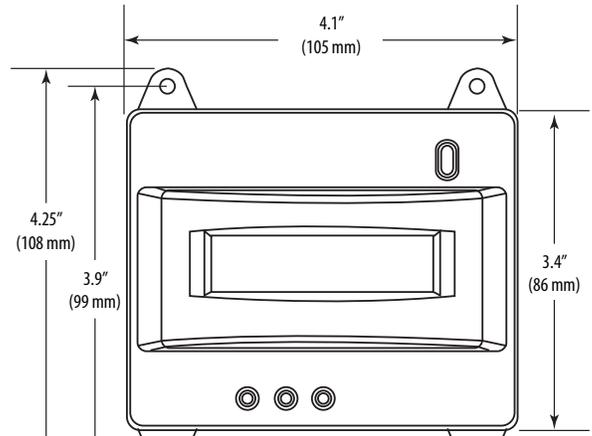


\*This unit is to be sourced by a Class 2 power supply with the following output: 24 Vdc, 500 mA min. not to exceed 8 A.

**A7810**  
Application Example



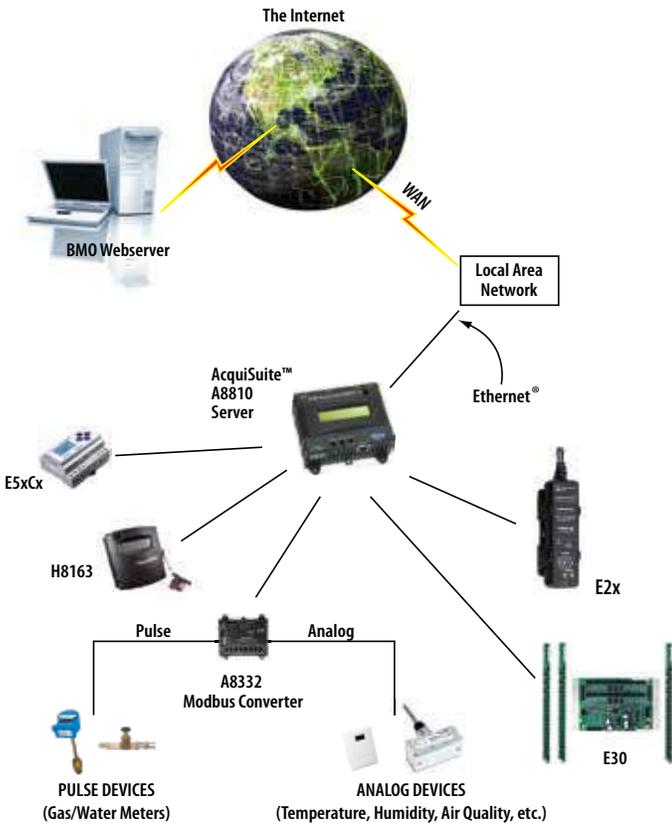
**A7810 & A8810**  
Dimensional Drawing



**THE ACQUISUITE SYSTEM ALLOWS**

Internet Display of Data Using the BMO Website	View performance data in an easy graphical format. Store, display, and download historical data in a secure SQL database. Design custom views of data from one or more buildings or systems.
Security and Flexibility	Store data on board in non-volatile memory. Protect information in the event of a power failure. Time-stamp all interval data with an on-board real-time clock.
Compatibility with Existing Systems	Use the I/O module to connect to existing sensors and meters. Use TCP/IP protocols to interface with spreadsheets, databases, text files, etc. (A8810 only).

**A8810**  
Application Example



**ORDERING INFORMATION**

MODEL	DESCRIPTION
A7810	AcquiLite EMB data acquisition server, pulse input
A8810	AcquiSuite EMB data acquisition server, Modbus serial input



# A8332-8F2D

## Pulse/Analog-to-Modbus Converter



A8332-8F2D

The A8332-8F2D Input Module provides a convenient way to optimize energy use and accurately allocate costs. Add eight standard pulse and/or analog sensors to a data acquisition network. Integrate your Veris network sensors through the A8332-8F2D to a Veris H8822 Data Acquisition Server.

The A8332-8F2D is the first truly flexible input module that allows incorporation of virtually any industry-standard sensor through a single device. The module can be incorporated with cost-effective data acquisition and wireless metering solutions such as the H8822 AcquiSuite DR™ server, which, as a properly integrated system, provides high performance and low cost. This system can be incorporated into a new or existing Building Automation System (BAS). Using the AcquiSuite data acquisition system, users can set input types (pulse, analog, resistive, etc.), giving access to real time resource consumption for a facility on a single board.

### SPECIFICATIONS

Processor	ARM 7, field upgradable firmware
LED	8 input status LEDs (red), 2 Modbus TX/RX (yellow), 1 power/alive status (green)
Protocols	Modbus/ RTU
Power Supply	24 Vdc, 200 mA (not included)
Serial Port	RS-485 Modbus, 19200 or 9600 baud. 8N1
Inputs	8x, user selectable; 0-10V: Min/Max/Ave/Instantaneous; 4 to 20 mA: Min/Max/Ave/Instantaneous; Pulse: Consumption, Rate; Resistance: 0 to 10 V: Min/Max/Ave/Instantaneous
Maximum Pulse Rate	10 Hz
Contact Closure Threshold	1 kΩ
Isolation	RS-485 port is optically isolated

### OPERATING ENVIRONMENT

	Indoor use only; -30 to 70 °C (32 to 122 °F), 0 to 95% RH non-condensing
--	--

### WARRANTY

Limited Warranty	2 years
------------------	---------

## Connect up to eight sensors

Connect up to eight industry-standard sensors to the AcquiSuite data acquisition network

## DIP switch

Field-selectable address DIP switch...no software or PC configuration required at device

## Universal inputs

Universal inputs simplify setup... just connect sensors and select device output type via the AcquiSuite or using Obvius configuration software

## High reliability

Non-volatile memory retains configuration and pulse data during power failures

## LEDs

Check device status at a glance... LED indicators allow for fast recognition of on/off status, TX/RX communications, and 8 input notifications

## Prevent data loss

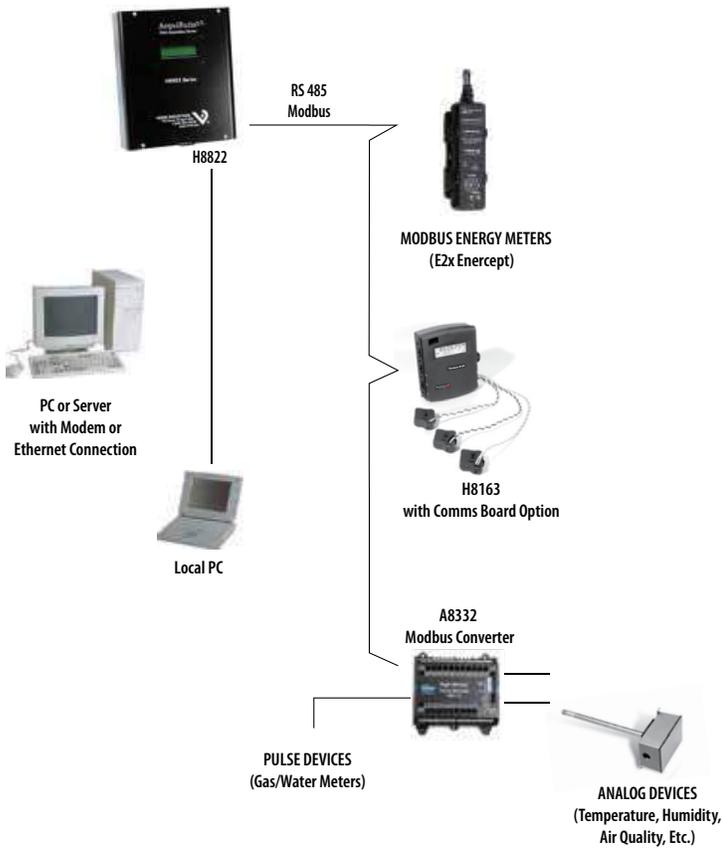
All configuration information and input data is stored in non-volatile memory to prevent data loss in the event of power failure

### APPLICATIONS

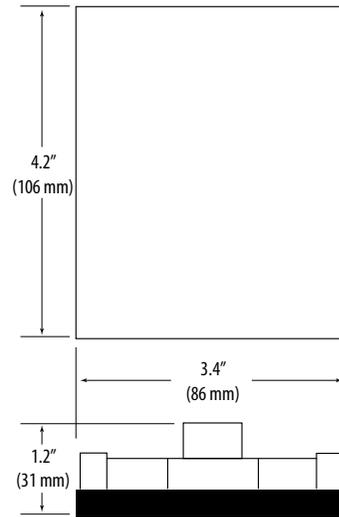
- Demand response program control and reporting
- Cost allocation to tenants and third parties
- Measurement and verification of energy savings
- Converting pulse inputs from water and gas flow meters to a Modbus network
- Monitoring performance of building systems (e.g., chillers, boilers, fans)



**APPLICATION EXAMPLE**



**DIMENSIONAL DRAWING**



**ORDERING INFORMATION**

MODEL	MANUF. PART #	DESCRIPTION
U013-0011	A8332-8F2D	Flexible I/O Module



# A8911-23

Up to 23 Separate Pulse Inputs



A8911-23

The A8911-23 Input Module provides an easy way to integrate multiple pulse output devices to Modbus systems such as the Veris AcquiSuite data acquisition network. The A8911-23 accepts up to 23 standard pulse sensors and can function as a slave device with any Modbus master. This data can be networked to other critical energy sensors such as Veris Modbus power meters to provide a comprehensive energy monitoring solution.

## SPECIFICATIONS

Processor	ARM 7, field upgradable firmware
LED	23 input status LEDs (red), 2 Modbus TX/RX (yellow), 1 power/alive status (green)
Protocols	Modbus/ RTU
Power Supply	9 Vdc to 30 Vdc, 200 mA (not included)
Serial Port	RS-485 2-wire, 19200 or 9600 baud. N81
Pulse Inputs	23 independent pulse count inputs; 32-bit pulse counter; rolls over at 4.295 billion per channel; Intended for use with dry contact outputs; pulse count values stored in nonvolatile memory; Pulse rate/width user selectable to 10 Hz, 50 Hz, or 100 Hz

### MINIMUM PULSE WIDTH

10 Hz Mode	50 msec
50 Hz Mode	10 msec
100 Hz Mode	5 msec
Contact Closure Threshold	100 Ω to 5 kΩ (user selectable)
Isolation	Pulse inputs, power inputs and RS-485 are non-isolated

### OPERATING ENVIRONMENT

	Indoor use only; 0 to 50 °C (32 to 122 °F), 0 to 95% RH non-condensing
--	--

### WARRANTY

Limited Warranty	2 years
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### AGENCY APPROVALS

Agency Approvals	FCC CFR 47 Part 15, Class A
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## 4000 ft. communication

External communications via shielded twisted pair 18 to 22 gauge wire...allows communication up to 4000 feet

## 200 ft. pulse communication

Pulse input communication up to 200 feet using 18 to 24 gauge control wire

## DIN rail mount

Quick and easy installation

## APPLICATIONS

- Demand response program control and reporting
- Cost allocation to tenants and third parties
- Measurement and verification of energy savings
- Gas, water, steam, and BTU meters
- Monitoring performance of building systems (e.g., chillers, boilers, fans)

## DIP switches

Onboard DIP switches for Modbus addressing

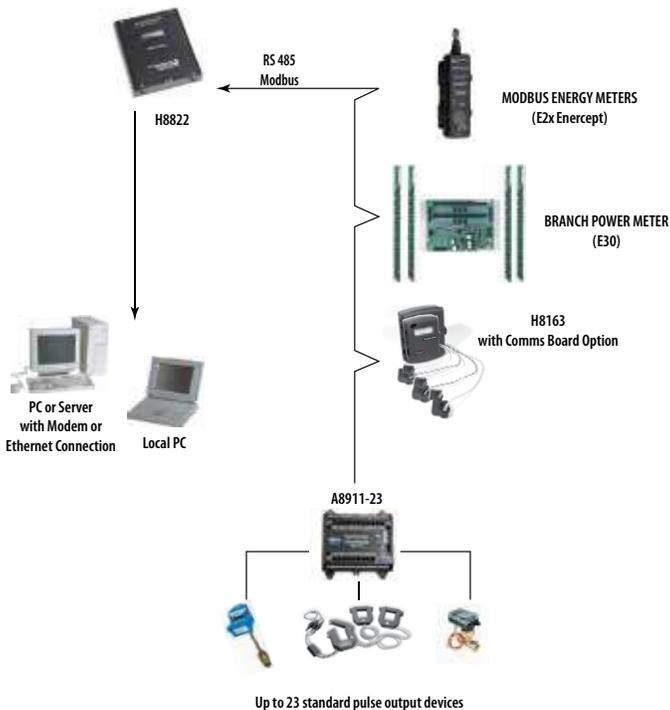
## Pulse inputs

Industry standard pulse inputs connect to most pulse output meters

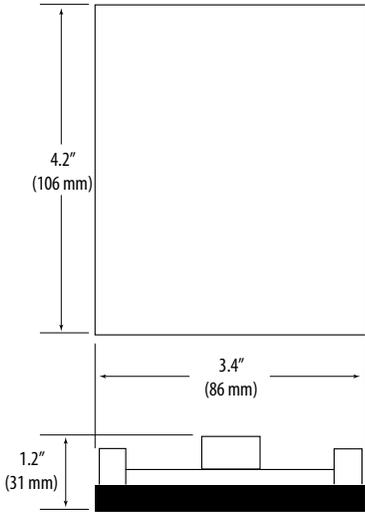
## LED verification

LED verification of RS-485 Modbus TX/RX communications

APPLICATION EXAMPLE



DIMENSIONAL DRAWING



ORDERING INFORMATION

MODEL	MANUF. PART #	DESCRIPTION
U013-0010	A8911-23	Pulse input module (up to 23 standard pulse devices)

# H8932 & H8936

Modbus-to-Bridgepoint



The H8932/H8936 serves as a display for Modbus data. The product sits in series between downstream metering devices and the upstream master, providing a display of the data passing through it. Registers of the E50Cx and E51Cx energy monitors can be viewed. The E30 and E31 meters are also supported, but the H8932/H8936 only presents a subset of the most important data points measured. The H8936 is enclosed in a box for easy installation, while the H8932 is available with no box for fast mounting to a panel.

## SPECIFICATIONS

AC Power Source	120 Vac 50/60 Hz, line-to-neutral; internal fuse
Fuse Ratings	200 mA@250 5x20 mm Fast-Blow
AC Power Voltage Tolerance	(90 to 132 Vac) for 120 V
AC Power Frequency	50/60 Hz
AC Power Termination	2-position Euro-style pluggable connector (max. wire size 12 gauge)
Alternate DC Power Source	12 Vdc, 300 mA external current limiting required (auxiliary input disabled if line connected)
Terminal Block Torque	4.9 in-lb (0.56 N-m)
Operating Temperature Range	0 to 50 °C (32 to 122 °F); <95% RH non-condensing; indoor use only
Storage Temperature Range	-20 to 70 °C (-4 to 158 °F)

## NETWORK COMMUNICATIONS

Interface	Downstream: RS-485; Upstream: RS-485, RS-232
Protocol	Modbus RTU
Baud Rate	UI-selectable 2400, 4800, 9600, 19200
Parity	UI-selectable NONE, ODD, EVEN
Communication Format	8 data bits, 1 start bit, 1 stop bit
RS-485	¼ load transceivers; duplex is UI-selectable 2-wire or 4-wire; 5-position Euro-style pluggable connector
RS-232 (Upstream Only)	DCE, no handshaking; DB-9 connection; pin 2: transmitted data from display; pin 3: received data to display; pin 5: ground
Terminal Block Torque	4.4 in-lb (0.5 N-m)

## Pass-through communications

Pass-through communications to other Modbus® devices

## Monitor from a single location

Monitor a variety of Veris power transducers from a single location

## Multi-color LED

Shows alarm status at a glance

## Simple setup

Easy keypad setup

## Large LCD

1" x 4" backlit LCD with adjustable brightness control for easy viewing

## Report Slave ID

Other Modbus devices must respond to the "Report Slave ID" command (11h) to allow pass-through communications from upstream network

## APPLICATIONS

- Allocating load-based costs
- Collecting energy data
- Managing loads
- Tenant submetering
- Overload protection

## UI-SWITCH INPUTS

Number/Function	Four (METER, UP, DOWN, SELECT)
-----------------	--------------------------------

## AUXILIARY INPUT (REMOTE ALARM)

Type	Contact closure or pull-to-ground (10 mA max.)
Isolation	Optical to 2500 Vac
Sense	UI-selectable N.O. or N.C. (i.e. Closed = Alarm or Open = Alarm)
Terminal Block Torque	3.5 to 4.4 in-lb (0.4 to 0.5 N-m)

## LCD

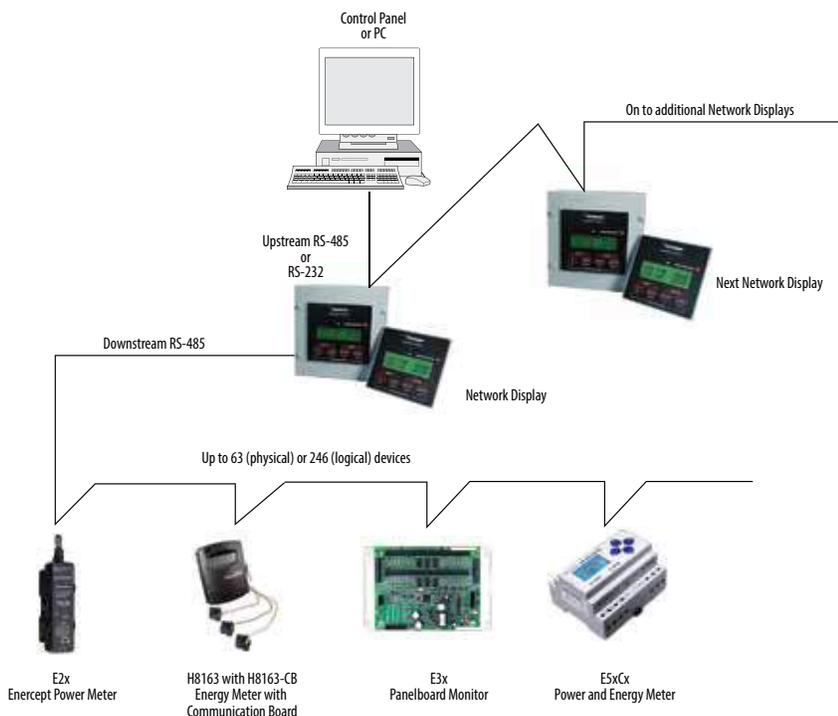
Size	1" x 4" visible area, 2 lines x 16 characters per line
Backlight	Green, UI-adjustable brightness in 10 steps
Status (Tri-Color LED)	Green = normal operation; Yellow = warning; Red = alarm

## WARRANTY

Limited Warranty	5 years
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### NETWORK HOST MODE

Application Example

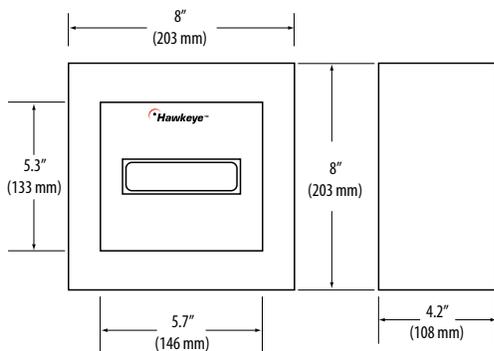


### LOCAL DISPLAY MODE

Application Example



### DIMENSIONAL DRAWING



### ORDERING INFORMATION

MODEL	DESCRIPTION
H8936	Modbus network display enclosed in NEMA box
H8932	Modbus network display panel mount, no box



# E8951

Integrate Multiple Modbus Meters into a BACnet Network



E8951

The E8951 Modbus-to-BACnet Protocol Converter enables easy integration of a broad selection of Veris meters with Building Automation Systems via BACnet protocol. When networked, the E8951 detects supported Modbus meters and gives them a unique BACnet Device ID and full set of measurement data and configuration objects. Simply select the desired protocol settings using DIP switches and the integral web server, and the supported Veris Modbus meters are available as fully-supported BACnet devices.

## SPECIFICATIONS

### DOWNSTREAM (DEVICE) INTERFACES

Physical Layer	2-wire RS-485
Line Termination	Internal, 120 Ω
Line Polarization	Internal
Protocol	Modbus RTU
Baud Rate	9600 to 38400 (selections vary with Modbus devices used)
Number of Devices Supported	BACnet mode - Up to 32 devices (10,000+ total BACnet data objects) SNMP mode - One 84-channel E30A/E31A or two 42-channel E30A per E8951 Modbus mode - 32 devices

### UPSTREAM (CONTROLLER) ETHERNET INTERFACE

Physical Layer	10/100 Mb Ethernet
Protocol	BACnet IP, Modbus TCP, SNMP

### UPSTREAM (CONTROLLER) SERIAL INTERFACE

Physical Layer	2-wire RS-485
Protocol	BACnet MS/TP or Modbus RTU
Baud Rate	9600, 19200, 38400, 76800
Parity	Even, Odd or None (Modbus RTU only, BACnet MS/TP is always none)

### INPUT POWER REQUIREMENTS

Supply Voltage	Class 2; 9 to 30 Vdc or 12 to 24 Vac 50/60Hz
Nominal Current Draw @ 12V	240 mA

## BACnet, Modbus, SNMP

Enables access to most Veris Modbus RTU meters via standard building automation protocols - BACnet MS/TP, BACnet IP, Modbus TCP and SNMP\*

## Simultaneous support

Supports BACnet IP and Modbus TCP access simultaneously

## Application flexibility

Supports a broad range of Veris meters: H8163 with H8163-CB, E2x, E50C2, E51C2, E50C3\*\*, E51C3\*\*, E30xxxx, E31xxxx, E34xxx and U013-0010/0011 I/O modules

## Extensive data collection

Each E8951 can support over 10,000 BACnet measurement points (32 meters max.)

## Mixed meter support

Simultaneously supports mixed meter types (with common baud rate)...versatility in the field

## Easy setup

Automatically detects supported meters and configures BACnet objects...no programming or manual mapping of Modbus points required

## APPLICATIONS

- Energy management systems
- Building automation systems
- Integrated metering of HVAC systems and chillers
- SNMP access to E30A/E31A products in data centers\*

\* Supports SNMP with a single E30A or E31A meter per E8951.  
\*\* The logging functionality of these meters is not supported.

### ENVIRONMENTAL

Operating Temp Range	-40 to 60 °C (-40 to 140 °F)
Operating Humidity Range	5 to 90% RH non-condensing; indoor use only

### WARRANTY

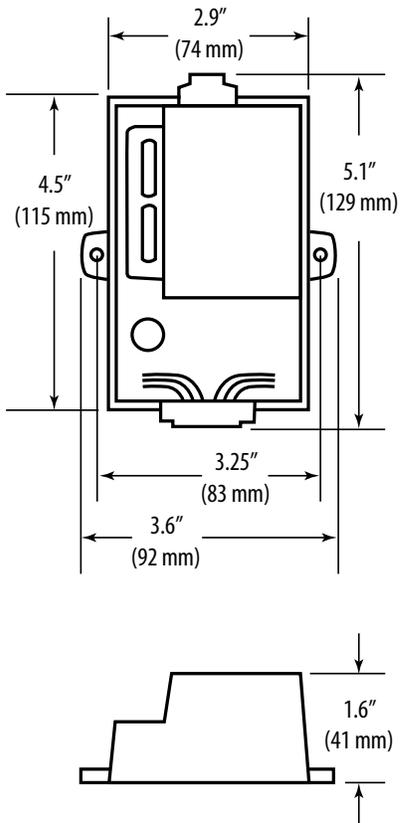
Limited Warranty	2 years
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### AGENCY APPROVALS

Agency Approvals	CE; TUV approved to UL916; FCC Part 15 Class A; BTL
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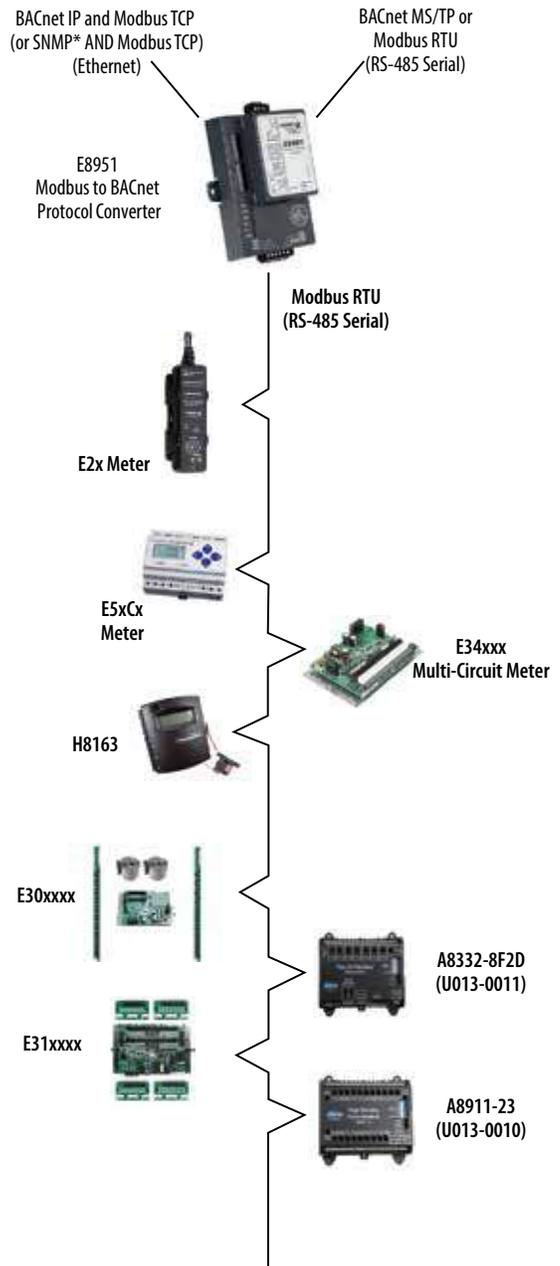
**DIMENSIONAL DRAWING**



**ORDERING INFORMATION**

MODEL	DESCRIPTION
E8951	Modbus-to-BACnet Protocol Converter

**APPLICATION EXAMPLE**



\*Supports SNMP only with a single E30A or E31A meter per E8951.



# U013-0012, U013-0013 & U013-0015

Easy Translation of Protocols to Integrate into a Network



U013-0012 Modbus Gateway provides access to all Veris Modbus RTU products over a network using Modbus TCP protocol.

U013-0013 and U013-0015 BACnet routers provide access to all Veris BACnet MS/TP products over a network using BACnet IP protocol. The U013-0015 (LX model) offers a faster operation speed and supports more BBMD entries.

Integral web browsers enable quick and simple setup of network configuration and serial communication parameters. All three products provide easy translation of serial protocols to the corresponding network protocol without requiring any device-specific translation.

## SPECIFICATIONS

U013-0012

### DOWNSTREAM (DEVICE) INTERFACES

Physical Layer	2-wire or 4-wire RS-485
Protocol	Modbus RTU
Baud Rate	50 to 921,600

### UPSTREAM (CONTROLLER) ETHERNET INTERFACE

Physical Layer	10/100 Mb Ethernet, Fixed IP or DHCP
Protocol	Modbus TCP

### INPUT POWER REQUIREMENTS

Supply Voltage	12 to 48 Vdc
Nominal Current	400 mA@12 Vdc, 130 mA@48 Vdc

### ENVIRONMENTAL

Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Temperature	0 to 55 °C (32 to 131 °F)
Relative Humidity	5 to 95% RH noncondensing; indoor use only

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL; CE; FCC Part 15 Class A; RoHS
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## Easy setup

Requires no product-specific configuration

## DIN rail mount

Easy installation

## Connect multiple devices

Connect multiple devices to one network drop

## Wireshark®

U013-0015 MS/TP slave devices are discoverable via automatic slave discovery and built-in MS/TP traffic capture using Wireshark with web page display\*

\*Wireshark is an open source packet analyzer for network traffic available from wireshark.org. Wireshark is a registered trademark of the Wireshark Foundation.

## APPLICATIONS

- Energy management systems
- Data center management
- Building automation systems

## SPECIFICATIONS

U013-0013 & U013-0015

### DOWNSTREAM (DEVICE) INTERFACES

Physical Layer	2-wire RS-485
Protocol	BACnet MS/TP
Baud Rate	U013-0013: 9600 to 78,600 U013-0015: 9600 to 115,200

### UPSTREAM (CONTROLLER) ETHERNET INTERFACE

Physical Layer	10/100 Mb Ethernet, Fixed IP
Protocol	BACnet IP
BBMD Support	U013-0013: 5 entries U013-0015: 50 entries

### INPUT POWER REQUIREMENTS

Supply Voltage	U013-0013: 24 Vdc±10%, 2 W; or 24 Vac ±10%, 4 VA, 50/60 Hz U013-0015: 24 Vdc±10%, 6 W; or 24 Vac ±10%, 10 VA, 50/60 Hz
Frequency	47 to 63 Hz

### ENVIRONMENTAL

Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Temperature	0 to 60 °C (32 to 140 °F)
Relative Humidity	10 to 95% RH non-condensing

### WARRANTY

Limited Warranty	2 years
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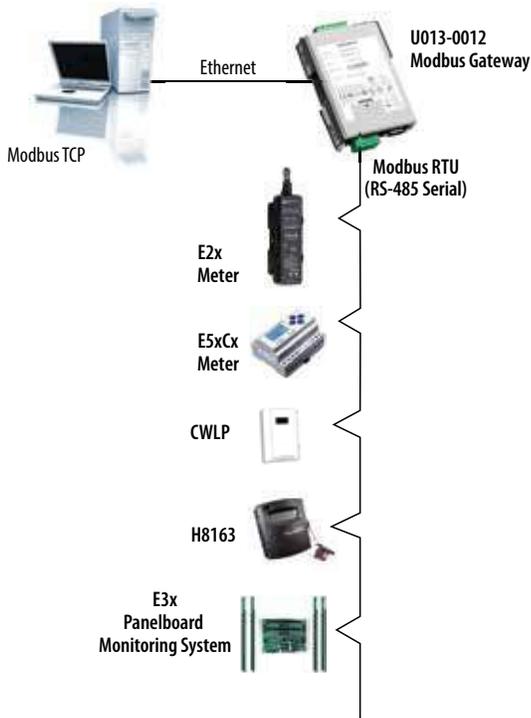
### AGENCY APPROVALS

Agency Approvals	CE; FCC Part 15 Class A; RoHS
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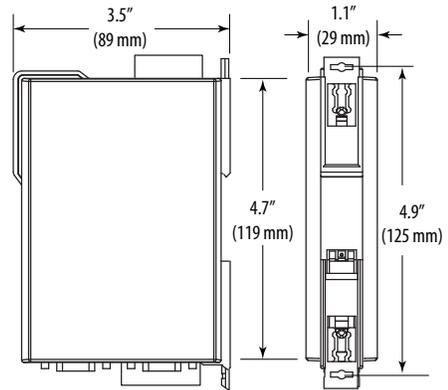
**U013-0012**

Application Example



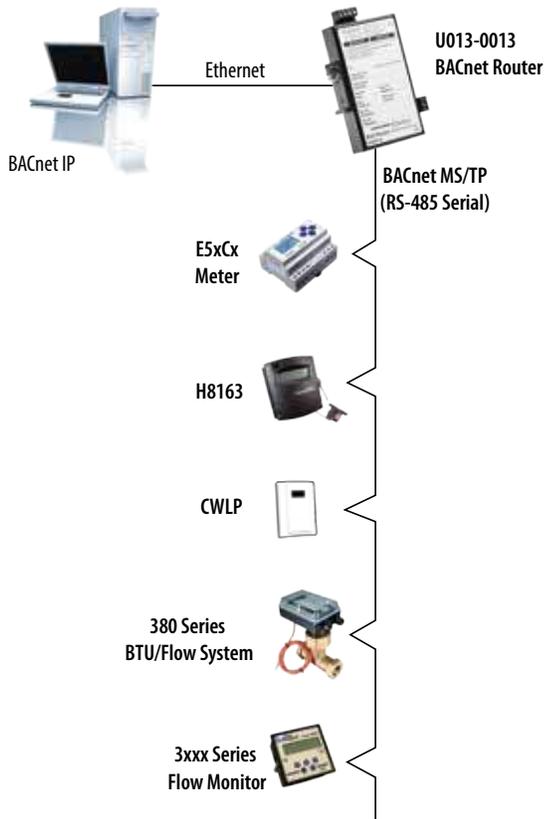
**U013-0012**

Dimensional Drawing



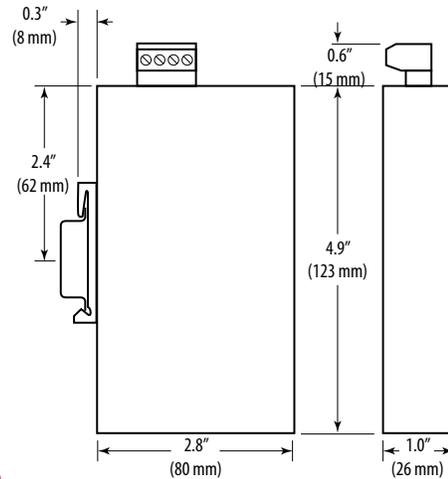
**U013-0013/U013-0015**

Application Example



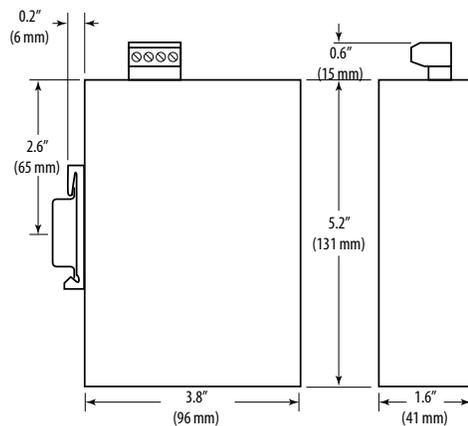
**U013-0013**

Dimensional Drawing



**U013-0015**

Dimensional Drawing



**ORDERING INFORMATION**

MODEL	DESCRIPTION
U013-0012	Modbus Gateway (RTU to TCP)
U013-0013	BACnet Router (MS/TP to IP)
U013-0015	BACnet Router (MS/TP to IP)-LX Model



# ACCESSORIES SELECTION GUIDE: POWER MONITORING

Product	Description	Single-Circuit				Multi-Circuit			Power CTs		Page
		E20 FLEX	E5x	E5xxxA	H8163	E30	E31	E34	AL, BL, CL & H681x-5A	H681xV	
AE001	E3x MCB Cover, Veris Brand					•	•	•			
AE004	Replacement Mounting Clips for E5x		•	•							
AE006	E30 Solid-Core CT Repair Kit						•				
AE012	NEMA4X Enclosure for Single DIN Meter		•	•							
AE013	NEMA4X Enclosure for 4 DIN Meters		•	•							
AH02/03/04	Fuse Pack	•	•	•		•	•	•	•		
AH06	CT Mounting Bracket								•	•	
AH11	Bonding Kit for H81xx Series Meters				•						
AV01	35 mm DIN Rail - 1 Meter Long	•	•	•	•		•				
AV02	DIN Rail Stop Clip	•	•	•			•				
AV05	2.75 in Wide SnapTrack - 2 in Length						•				
CBLxxx	Ribbon Cables for E3x Series					•	•	•			35
E31CTDB	Pair of E31 Adapter Boards with Mtg Kits						•				35
E31CTx	Split-Core branch CTs for E3x Series						•				35
E681x	Split-Core CTs with 1/3V Outputs	•	•			•*	•*	•			43
E682x	Split-Core CTs with 1/3V Outputs	•				•*	•*	•			43
E683x	Rogowski CTs for E20 Flex and E5xxxA	•		•							47
E8951	Modbus-to Bacnet Protocol Converter	•	•	•	•	•	•	•			65
H681x-5A	Split-Core CTs with 5A Outputs										49
H681x	Split-Core CTs with 1/3V Outputs	•	•	•		•*	•*	•			41
H8932/H8936	Remote Display (2-line LCD)	•	•	•	•	•	•				63
U002-000x	Shorting Blocks for Use with 5A CTs								•		
U013-0012	Modbus Gateway, RTU to TCP	•	•	•	•	•	•	•			67
U013-0013	BACnet Router, MS/TP to IP	•	•	•	•						67
U013-0015	BACnet Router LX, MS/TP to IP		•	•	•						67

\* For aux CT inputs (not branch CTs).





**AE001**  
E3x MCB Cover, Veris Brand



**AE006**  
E30 Solid-Core CT Repair Kit



**AE012, AE013, AE014**  
NEMA4X Enclosure for Single DIN Meter  
NEMA4X Enclosure for 4 DIN Meters



**AH02, AH03, AH04**  
AC Fuse Kits with Hi-interrupt Capability



**AH06**  
CT Mounting Brackets



**AV01**  
35 mm DIN Rail - 1 Meter Long



**AV02**  
DIN Rail Stop Clip



**AV05**  
2.75 in Wide SnapTrack, 2-in. Length (AV05)



**CBLXXX**  
Ribbon Cables for E3x Series



**E31CT0, E31CT0, E31CT3**  
Split-Core branch CTs for E3x Series



**E681X**  
Split-Core CTs with 1/3V Outputs



**E682X**  
Split-Core CTs with 1/3V Outputs



**E683X**  
Rogowski Rope Style CT



**E8951**  
Modbus-to-Bacnet Protocol Converter



**H681X**  
Split-Core CTs with 1/3V Outputs



**H8932, H8936**  
Remote Display (2-line LCD)



**U002-000X**  
Shorting Blocks for Use with 5A CTs



**U013-0012**  
Modbus Gateway, RTU to TCP



**U013-0013**  
BACnet Router, MS/TP to IP



# AIR QUALITY/ GAS DETECTION

Veris offers an extensive line of CO, CO<sub>2</sub>, VOC and NO<sub>2</sub> sensors. Whether your application requires ventilation of a parking garage or an indoor venue, we have the perfect product for your needs. Comply with OSHA and ASHRAE 62.1 standards for air quality while saving energy by limiting runtime of exhaust fans and HVAC equipment. Ideal for Demand Control Ventilation (DCV) applications.

MODEL	DESCRIPTION	PAGE
CW2	Analog Air Quality Sensors	73
CW2 Protocol	Protocol Air Quality Sensors	75
CWE2 & CWV2	Economy and Value Wall Mount CO <sub>2</sub> Sensors	77
CD	Deluxe Duct & Wall CO <sub>2</sub> Sensors	79
CDE	Standard Duct and Wall CO <sub>2</sub> Sensors	81
CRLSXX	Remote Mount CO <sub>2</sub> Sensor with Field-Selectable Outputs	83
GWN	Platform, CO/NO <sub>2</sub> Gas Sensors	85
GWNP	Platform, CO/NO <sub>2</sub> Gas Sensors, Protocol Communication	87
UG-7-A6O Uniguard	Duct Mount Smoke Detector	89
GPS	Ionization Systems and Sensors	91

## AIR QUALITY SELECTION GUIDE

### CO<sub>2</sub> SENSORS

FEATURES	Wall Mount	Duct Mount	Remote Mount
Analog Output	CW2, CWE2, CWV2 pages 73, 77	CDL, CDE pages 79, 81	
Field-Selectable Output	CW2, CWE2, CWV2 pages 73, 77	CDL, CDE pages 79, 81	CRLSXX page 83
Resistive Temperature Output	CW2, CWE2 pages 73, 77	CDL page 79	
Relay Output		CDL page 79	
Protocol Output (BACnet and Modbus)	CW2xP page 75		
Touchscreen or LCD Display with Humidity and Temperature Options	CW2L, CW2T page 73	CDL page 79	

### GAS PLATFORM

FEATURES	CO Sensors	NO <sub>2</sub> Sensors	CO/NO <sub>2</sub> Sensors	Refrigerant Sensors
Selectable Output 4 to 20 mA/0-5 or 0-10 Vdc	GWN page 85	GWN page 85		GWN page 85
Protocol Output (BACnet and Modbus)	GWNP page 87	GWNP page 87	GWNP page 87	GWNP page 87

### DUCT SMOKE SENSORS

FEATURES	Wall Mount	Duct Mount	Remote Mount
Relay Output		UG-7-A6O page 89	

### IONIZATION SYSTEMS AND SENSORS

FEATURES	Wall Mount	Duct Mount	Remote Mount
Ionization Systems (Stand-alone)		GPS-DM, GPS-FC, GPS-iRIB page 91	
Ionization Systems (Analog Output)		GPS-iMEASURE-D page 91	



# CUT INSTALLATION COSTS

GWN Series Gas Platform

## SIMPLE INSTALLATION, LOWER COSTS

- » Buy one base unit and install any of our six precision AG series sensors
- » Field-replaceable sensors save valuable installation and maintenance time

## MULTI-GAS CAPABILITIES

- » Measure CO and NO<sub>2</sub> separately, combine CO/NO<sub>2</sub>, or measure refrigerant

## SEAMLESS SYSTEM INTEGRATION

- » Easy-to-use interface to control systems via BACnet or Modbus



GWN/GWNP

AGAE/AGPE

## CO AND NO<sub>2</sub> SENSORS

### AG04 COMBINATION CO/NO<sub>2</sub> SENSOR\*

No need to install multiple sensors to measure CO and NO<sub>2</sub>

#### APPLICATIONS:

Parking Garages, Vehicle Bays

\*Compatible with protocol (BACnet MSTP/Modbus) units only



AG04



AG01

CO 3% Accuracy



AG01E

CO 3% Accuracy

## REFRIGERANT SENSORS

Get the best bang for your buck with AG05 and AG06 refrigerant sensors

#### APPLICATIONS:

Variable Refrigerant Flow, Mechanical Rooms, Occupied Spaces



AG06

R410a



AG05

R134a



## CW2 SERIES

Individual or 4-in-1 CO<sub>2</sub>, VOC, RH & Temperature



The CW2 Series of air quality sensors for living space is a flexible multi-sensor platform for use with BAS controllers designed to accept 4 to 20mA, 0 to 5Vdc or 0 to 10Vdc outputs. CW2 Series sensors are available with three user interface options: touchscreen, LCD with three buttons and blank. CO<sub>2</sub> and temperature sensors are included with all CW2 Series air quality sensors. Models with VOC sensors and relative humidity sensors are also available.

### SPECIFICATIONS

#### OPERATING ENVIRONMENT

Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Analog Output	Selectable 4 to 20 mA, 0 to 5 V, 0 to 10 V
Operating Temp. Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)

#### CO<sub>2</sub> TRANSMITTER

Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	0 to 2000/5000 ppm (selectable)
Accuracy	±30 ppm ±3% of measured value
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change

#### VOC TRANSMITTER OPTION

Sensor Type	Solid state
Output Range	0 to 100% AQI for VOC
Accuracy	±15% of measured value
Output Scale	0 to 1,000 ppb of total VOC (TVOC)

	LEVEL	VENTILATION RECOMMENDATION	TVOC (ppb)
AQI Table*	>61%	Greatly increased	>610
	20 to 61%	Significantly increased	200 to 610
	10 to 20%	Slightly increased	100 to 200
	5 to 10%	Average	50 to 100
	0 to 5%	Target value	0 to 50

## Microprocessor based

Microprocessor controlled for excellent stability

## Self-calibrating

Innovative self-calibration algorithm...easy to maintain

## Dual-beam NDIR CO<sub>2</sub> sensor

Dual-beam, non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value...high accuracy measurement

### APPLICATIONS

- Controlling ventilation in response to accuracy
- ASHRAE 62.1 compliant
- Office buildings, conference rooms, schools, retail stores, etc.

## Easy to install

Large wiring terminals on baseplate and snap-on covers with security screw simplify installation and service

## Field selectable

Field-selectable outputs for operation flexibility

## Multi-sensor platform

CO<sub>2</sub>, VOC, RH and temp in one device...lower installation and service costs

#### RH TRANSMITTER OPTION

HS Sensor	Thin-film capacitive, replaceable
Accuracy	±2% from 10 to 80% RH @ 25 °C (77 °F)
Hysteresis	1.5% typical
Stability	±1% @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (77 °F) typical

#### TEMPERATURE TRANSMITTER OPTION

Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)

#### DISPLAY MODELS

Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240x300 px Setpoint: 0-10Vdc. Temperature, humidity or fan speed selectable Timeout override: Display timeout** Lockout override: Touchscreen/button lockout**
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: 0-10Vdc. Temperature, humidity or fan speed selectable Timeout override: Display timeout** Lockout override: Touchscreen/button lockout**

#### SETPOINTS\*\*\*

Temperature Setpoint	0 to 10V output Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Humidity Setpoint	0 to 10V output Scale: 0 to 100% RH

**SPECIFICATIONS (CONT.)**

Fan Speed	0 to 10V output
Setpoint	Off 0V, Low 3.3V, Med. 6.7V, High 10.0V

**OVERRIDE**

Override Button	Display models feature momentary-to-ground override button
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**WIRING TERMINALS**

Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbF) max.

**WARRANTY**

Limited Warranty	5 years
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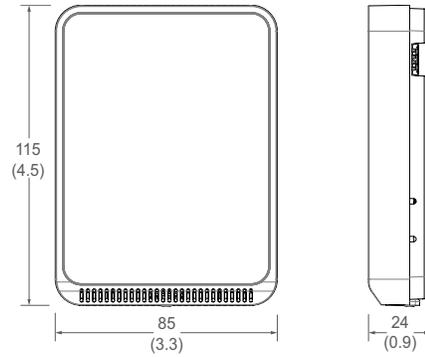
**COMPLIANCE INFORMATION**

Agency Approvals	UL 916, European conformance CE: EN61000-6-2, EN61000-6-3, EN61000 Series - industrial immunity, EN 61326-1 FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)
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\* Air Quality Index for VOC aligns with TVOC levels for IAQ as specified by the WHO (World Health Organization).  
\*\*DIP switch selectable.  
\*\*\* One setpoint type is selectable via DIP switch on display models only.

**DIMENSIONAL DRAWING**

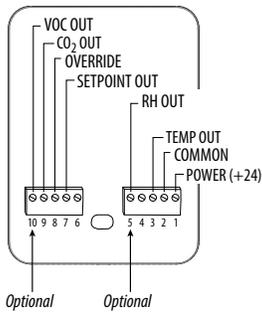


**USER INTERFACE TYPES**



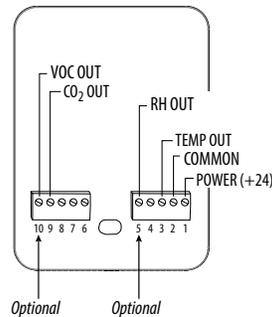
**CW2L/CW2T DISPLAY MODELS WITH TEMP TRANSMITTER**

Wiring Diagram



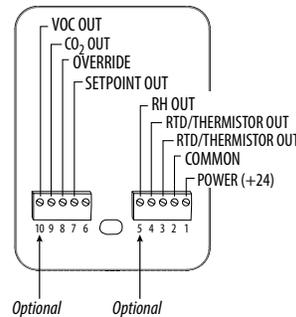
**CW2X WITH TEMP TRANSMITTER**

Wiring Diagram



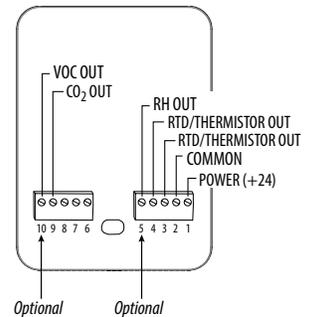
**CW2L/CW2T DISPLAY MODELS WITH RTD/THERMISTOR**

Wiring Diagram



**CW2X WITH RTD/THERMISTOR**

Wiring Diagram



**ORDERING INFORMATION**

User Interface	Output	RH Accuracy*	Temperature	VOC Sensor
CW2 T = Color touchscreen L = 3-button LCD display X = None***	A = Analog output	2 = 2% X = None***	A = Transmitter C = 1000 PT RTD D = 10K T2 thermistor H = 10K T3 thermistor K = 10K curve G/11K shunt M = 20K NTC thermistor N = 1.8K TAC thermistor	V = NDIR CO2 / VOC** = None

Example: CW2 T A 2 A V

\* Replaceable 1% with NIST certificate, 2% with NIST certificate and 2% elements available.  
\*\* VOC only available with temperature transmitter option  
\*\*\* For analog non-display, non-RH, models with RTD/thermistor order from CWE2 line.

**REPLACEABLE RH ELEMENTS**

MODEL	RH ACCURACY	CALIBRATION CERTIFICATE	DESCRIPTION
HS1N	±1%	X	Replaceable RH sensor, 1% with NIST certification
HS2N	±2%	X	Replaceable RH sensor, 2% with NIST certification
HS2X	±2%		Replaceable RH sensor, 2%



Replaceable RH Element

ACCESSORIES P. 93



# CW2 PROTOCOL SERIES

Individual or 4-in-1 CO<sub>2</sub>, VOC, RH & Temperature



The CW2 Protocol Series of air quality sensors for living space is a flexible multi-sensor platform for use with BAS controllers designed to accept BACnet or Modbus outputs. CW2 Protocol Series sensors are available with three user interface options: touchscreen, LCD with three buttons and blank. CO<sub>2</sub> and temperature sensors are included with all CW2 Protocol Series air quality sensors. Models with VOC sensors and relative humidity sensors are also available.

## SPECIFICATIONS

OPERATING ENVIRONMENT	
Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Protocol Output	BACnet or Modbus via RS-485, selectable
Operating Temp. Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)

CO <sub>2</sub> TRANSMITTER	
Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	0 to 2000/5000 ppm (selectable)
Accuracy	±30 ppm ±3% of measured value
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change

VOC TRANSMITTER OPTION	
Sensor Type	Solid state
Output Range	0 to 100% AQI for VOC
Accuracy	±15% of measured value
Output Scale	0 to 1,000 ppb of total VOC (TVOC)

	LEVEL	VENTILATION RECOMMENDATION	TVOC (ppb)
AQI Table*	>61%	Greatly increased	>610
	20 to 61%	Significantly increased	200 to 610
	10 to 20%	Slightly increased	100 to 200
	5 to 10%	Average	50 to 100
	0 to 5%	Target value	0 to 50

## Communicating

Embedded BACnet and Modbus communication protocols...easy systems integration

## Self-calibrating

Innovative self-calibration algorithm...easy to maintain

## Dual-beam NDIR CO<sub>2</sub> sensor

Dual-beam, non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value...high accuracy measurement

## APPLICATIONS

- Controlling ventilation in response to accuracy
- ASHRAE 62.1 compliant
- Office buildings, conference rooms, schools, retail stores, etc.

## RH TRANSMITTER OPTION

HS Sensor	Thin-film capacitive, replaceable
Accuracy	±2% from 10 to 80% RH @ 25°C (77 °F)
Hysteresis	1.5% typical
Stability	±1% @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (77 °F) typical

## TEMPERATURE TRANSMITTER

Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)

## DISPLAY MODELS

Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240x300 px Setpoint: Temperature, humidity or fan speed selectable Timeout override: Display timeout Lockout override: Touchscreen/button lockout
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: Temperature, humidity or fan speed selectable Timeout override: Display timeout Lockout override: Touchscreen/button lockout

## SETPOINTS

Temperature Setpoint	Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Humidity Setpoint	Scale: 0 to 100% RH
Fan Speed Setpoint	Off, Low, Medium, High

## Configurable baud rates

Configurable to multiple baud rates...transfer data at the right speed for the system

## Easy to install

Large wiring terminals on baseplate and snap-on covers with security screw simplify installation and service

## Multi-sensor platform

CO<sub>2</sub>, VOC, RH and temp in one device...lower installation and service costs

### SPECIFICATIONS (CONT.)

#### VERRIDE

Override Button	Display models feature momentary override button
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#### WIRING TERMINALS

Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbF) max.

#### WARRANTY

Limited Warranty	5 years
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#### COMPLIANCE INFORMATION

Agency Approvals	UL 916, European conformance CE: EN61000-6-2 EN61000-6-3 EN61000 Series - industrial immunity EN 61326-1 FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)
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\* Air Quality Index for VOC aligns with TVOC levels for IAQ as specified by the WHO (World Health Organization)

### USER INTERFACE TYPES

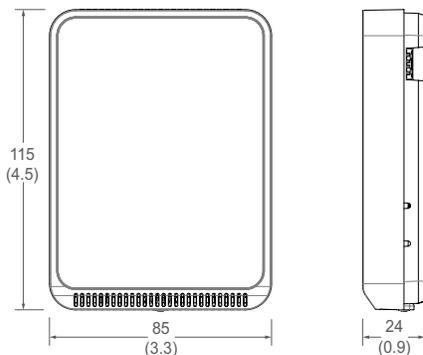


Touchscreen

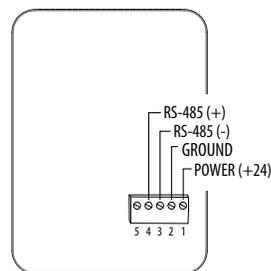
LCD with Buttons

Blank

### DIMENSIONAL DRAWING



### WIRING DIAGRAM



### ORDERING INFORMATION

CW2	User Interface T = Color touchscreen L = 3-button LCD display X = None***	Output P = BACnet/Modbus	RH Accuracy* 2 = 2% X = None	A	VOC Sensor V = NDIR CO2 / VOC = None	Example: CW2 [ T ] [ P ] [ 2 ] [ A ] [ V ]
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\* Replaceable 1% with NIST certificate, 2% with NIST certificate and 2% elements available.

### REPLACEABLE RH ELEMENTS

MODEL	RH ACCURACY	CALIBRATION CERTIFICATE	DESCRIPTION
HS1N	±1%	X	Replaceable RH sensor, 1% with NIST certification
HS2N	±2%	X	Replaceable RH sensor, 2% with NIST certification
HS2X	±2%		Replaceable RH sensor, 2%



Replaceable RH Element

ACCESSORIES P. 93



## CWE2 & CWV2 SERIES

Economy and Value Wall Mount CO<sub>2</sub> Sensors



The CWE2 and CWV2 Series of air quality sensors for living space are for use with BAS controllers designed to accept 4 to 20mA, 0 to 5 Vdc or 0 to 10 Vdc outputs. These sensors measure CO<sub>2</sub> levels using a dual-beam, non-dispersive infrared (NDIR) technology.

The CWE2 Series Economy sensor has an accuracy of  $\pm 30$  ppm  $\pm 3\%$  of measured value, features 2-wire 4 to 20mA and 3-wire voltage outputs, and is available with optional temperature output.

The CWV2 Value sensor with an accuracy of  $\pm 40$  ppm  $\pm 5.5\%$  of measured value, is ideal for bid-spec applications.

### SPECIFICATIONS

#### OPERATING ENVIRONMENT

Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Max. Current	CWE2: 20 mA CWV2: 45 mA
Analog Output	Selectable 4 to 20 mA, 0 to 5 V, 0 to 10 V
Operating Temperature Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)

#### CO<sub>2</sub> TRANSMITTER

Sensor Type	Dual-beam, non-dispersive infrared (NDIR), diffusion sampling
Output Range	0 to 2000 ppm
Accuracy	CWE2: $\pm 30$ ppm $\pm 3\%$ of measured value CWV2: $\pm 40$ ppm $\pm 5.5\%$ of measured value
Repeatability	CWE2: $\pm 20$ ppm $\pm 1\%$ of measured value CWV2: $\pm 30$ ppm $\pm 4.5\%$ of measured value
Response Time	$\leq 75$ seconds for 90 degree step change
Startup Time	CWE2: $\leq 20$ seconds
Max. Load Resistance*	CWE2: 100 $\Omega$ at 20 Vdc 250 $\Omega$ at 24 Vdc 500 $\Omega$ at 30 Vdc

#### WIRING TERMINALS

Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbf) max.

#### WARRANTY

Limited Warranty	CWE2: 3 years CWV2: 1 year
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## 2-Wire 4-20 mA Output

CWE2 models offer 2-wire current outputs...lower installation costs

## Easy to install

Large wiring terminals on baseplate and snap-on covers with security screw simplify installation and service

## Field selectable

Field-selectable outputs for operation flexibility

### APPLICATIONS

- Controlling ventilation in response to occupancy
- Office buildings, conference rooms, schools, retail stores, etc.
- Facilitating compliance with ASHRAE 62.1 standard for air quality

## Economy Sensor

Competitively-priced sensors ideal for bid-spec

## Self-calibrating

Innovative self-calibration algorithm...easy to maintain

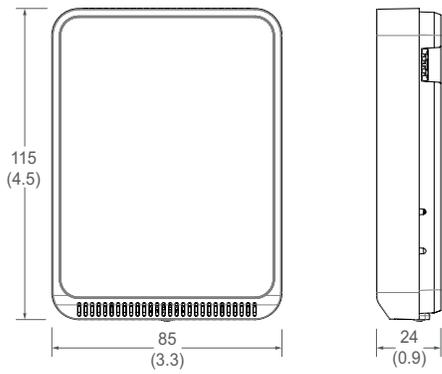
### COMPLIANCE INFORMATION

Agency Approvals	UL 916, European conformance CE: EN61000-6-2 EN61000-6-3 EN61000 Series - industrial immunity EN 61326-1 FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)
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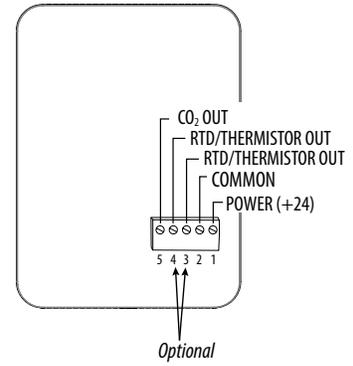
\*Applicable for CWE2 4-20 mA current mode only. If load parameters are not met, product will reset.

### DIMENSIONAL DRAWING



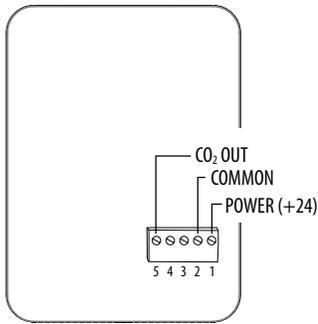
### CWE2 VOLTAGE OUTPUT

Wiring Diagram



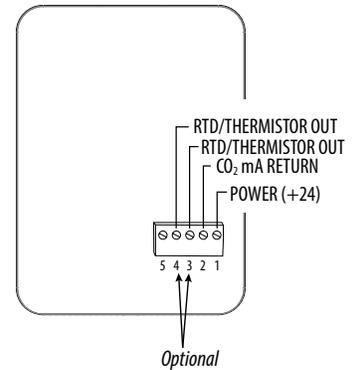
### CWV2

Wiring Diagram



### CWE2 CURRENT OUTPUT

Wiring Diagram



### ORDERING INFORMATION

Temperature Option

CWE2  

Blank = None  
 C = 1000 PT RTD  
 D = 10K T2 thermistor  
 H = 10K T3 thermistor  
 K = 10K curve G/11K shunt  
 M = 20K NTC thermistor  
 N = 1.8K TAC thermistor

Example:  
CWE2 C

CWV2 (No Options)

## CD SERIES

Individual or 3-in-1 CO<sub>2</sub>, RH and Temperature



CDL carbon dioxide (CO<sub>2</sub>) sensors maximize energy savings, while helping optimize ventilation. These sensors allow ventilation systems to be controlled by the amount of CO<sub>2</sub> present in a space. The CDL Series detect fluctuations in CO<sub>2</sub> levels and signal ventilation systems to provide an inlet of fresh air optimal for the space at a given time saving energy and increasing tenant comfort.

### SPECIFICATIONS

Input Power	Class 2; 20 to 30 Vdc/24 Vac 50/60 Hz; 100 mA max.
Analog Output	4 to 20 mA (clipped and capped)/0 to 5 Vdc/0 to 10 Vdc (selectable)
Operating Temp Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High impact ABS plastic
Terminal Block Torque	0.2 N-m (2.0 in-lbf) max.
Terminal Block Wire Size	28 to 14 AWG (0.5 to 1.5mm <sup>2</sup> )

#### CO<sub>2</sub> TRANSMITTER

Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	0 to 2000/5000 ppm (programmable)
Accuracy	±30 ppm ±2% of measured value*
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change

#### RH TRANSMITTER OPTION

HS Sensor	Fully replaceable, digitally profiled thin-film capacitive (32-bit mathematics) U.S. Patent 5,844,138
Accuracy	±2% from 10 to 80% RH @ 25 °C; NIST traceable multi-point calibration
Hysteresis	1.5% typical
Stability	±1% @ 20 °C (68 °F) annually for two years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (typical)

#### TEMPERATURE TRANSMITTER OPTION

Sensor Type	Solid-state, integrated circuit
Accuracy	±0.5 °C (±1 °F) typical
Resolution	0.1 °C (0.2 °F)
Output Range	10 to 35°C (50 to 95°F)

### Microprocessor based

Microprocessor-based design increases accuracy and reduces installation time

### Self-calibrating

Innovative self-calibration algorithm...easy to maintain

### NDIR

Non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value...high accuracy measurement

### Snap-on faceplate

Snap-on faceplate...no screws required, making installation and service easy

### Field-selectable

Field-selectable outputs for operation flexibility

### Integrated probe

Integrated transducer and probe...eliminates the need to install a separate pick-up tube

### APPLICATIONS

- Controlling ventilation in response to occupancy
- ASHRAE 62.1 air quality standard compliance

#### RELAY CONTACTS

1 Form C (SPDT)	1 A@30 Vdc, resistive; 30 W max.
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#### WARRANTY

Limited Warranty	5 years
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#### AGENCY APPROVALS

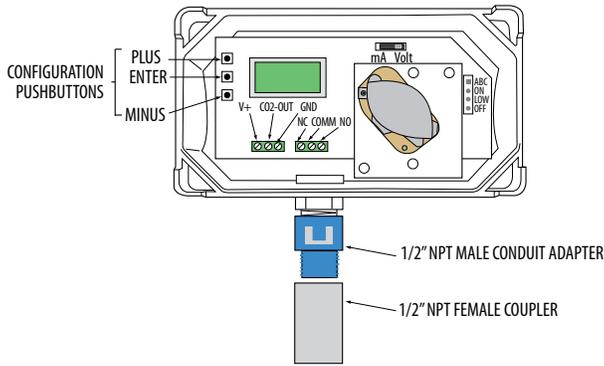


RTD/Thermistors in wall packages are not compensated for internal heating of product. EMC Conformance: Low voltage directive 2014/35/EU and EMC directive 2014/30/EU. EMC Special Note: Connect this product to a DC distribution network or an AC DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements). \* Measured at NTP.

Note: Rough handling and transportation may cause a temporary reduction of CO<sub>2</sub> sensor accuracy. With time, the ABC function will tune the readings back to the correct accuracy range. The default tuning speed is limited to 30 ppm per week.

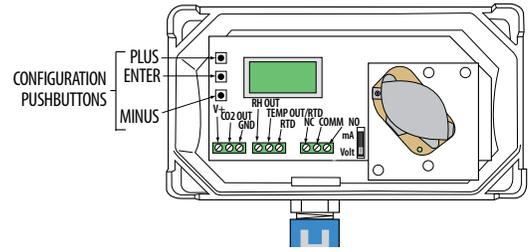
### CDL (CO<sub>2</sub> ONLY)

Wiring Diagram



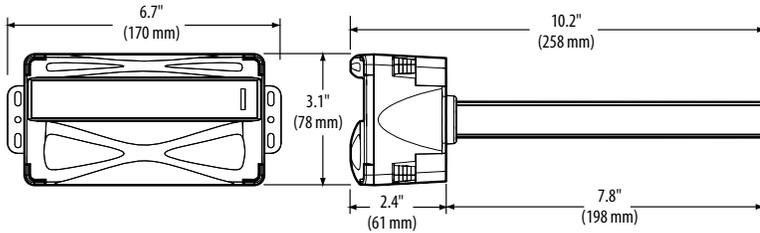
### CDL (TEMP AND/OR RH OPTIONS)

Wiring Diagram



### CDL

Dimensional Drawing



### ORDERING INFORMATION

RH Option	Temp	Sensor Type	Optional Cal Cert
CDLS <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H = RH2% X = No RH	T = Temp X = No Temp (Stop here)	A = Transmitter B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor R = 10k US, Thermistor S = 10k 3A221, Thermistor T = 100k, Thermistor U = 20k "D", Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor	Blank = None 1 = 1 pt Temp Cert* 2 = 2 pt Temp Cert*
<p>Example:</p> <p>CDLS <input type="checkbox"/> H <input type="checkbox"/> T <input type="checkbox"/> B <input type="checkbox"/> 2</p>			

\*Not available with W and Y high accuracy thermistors.

## CDE

Field-selectable 4 to 20 mA / 0 to 10 Vdc Output



CDE

CDE is a non-dispersive infrared (NDIR) sensor designed for measuring environmental CO<sub>2</sub> concentration in ventilation systems. With a measurement range of 0 to 2000 ppm, the CDE sensor is compliant with ASHRAE and other standards for ventilation control

CDE provides a user-selectable 4 to 20 mA or 0 to 10 Vdc output for versatility. Microprocessor-based digital electronics and a unique self-calibration algorithm improves long-term stability and accuracy.

### SPECIFICATIONS

Input Power	Class 2; 20 to 30 Vdc/24 AC 50/60 Hz; 100 mA max.
Analog Output	4 to 20 mA (clipped & capped)/0 to 10 Vdc (selectable)
Operating Temp. Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High impact ABS plastic
Terminal Block Torque:	0.5 to 0.6 N-m (4.4 to 5.3 in-lbf) max.
Terminal Block Wire Size:	24 to 12 AWG (0.25 to 2.5mm <sup>2</sup> )
Sensor Type	Non-dispersive infrared, diffusion sampling
Output Range	0 to 2000 ppm
Accuracy	±30 ppm ±2% of measured value*
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change

### WARRANTY

Limited Warranty	3 years
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### AGENCY APPROVALS



EMC Conformance: Low voltage directive 2014/35/EU and EMC directive 2014/30/EU.  
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).

\* Measured at NTP

Note: Rough handling and transportation may cause a temporary reduction of CO<sub>2</sub> sensor accuracy. With time, the ABC function will tune the readings back to the correct accuracy range. The default tuning speed is limited to 30 ppm per week.

## NDIR

Non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value... high accuracy measurements

## Sensitivity

Low ambient sensitivity

## Bid-spec

Idea for bid spec applications where low cost is key factor

## 4 to 20 mA/ 0 to 10 Vdc

4 to 20 mA/0 to 10 Vdc output for flexible control system interface

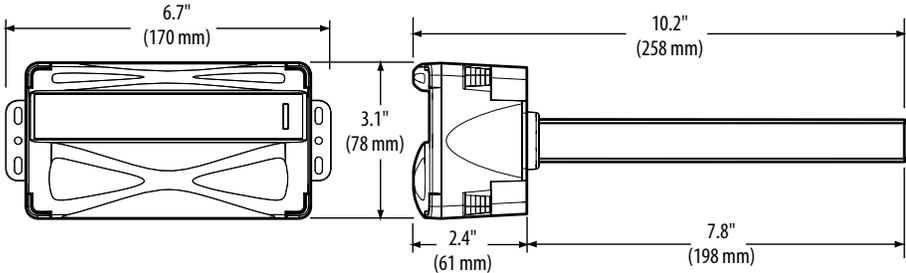
## Self-calibrating

Innovative self-calibration algorithm...easy to maintain. 5-year calibration interval (recommended)

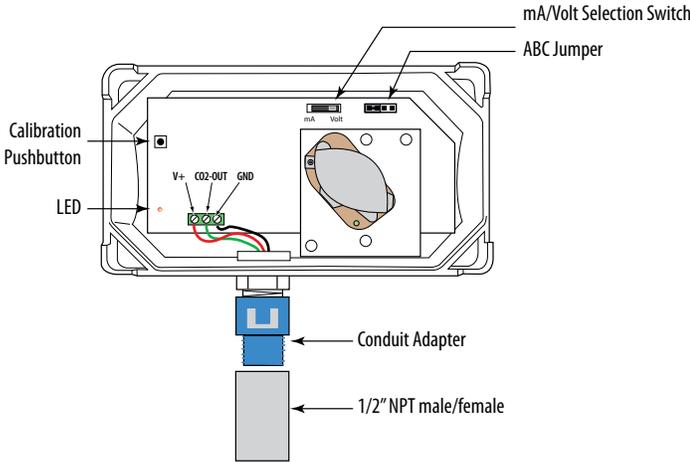
### APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1 standard for air quality

**CDE**  
Dimensional Drawing



**CDE**  
Wiring Diagram



**ORDERING INFORMATION**

MODEL	DESCRIPTION
CDE	Economy duct CO <sub>2</sub> sensor



# CRLSXX

Suitable for Outside Air Measurement Applications



CRL



The CRLSXX remote mount carbon dioxide sensor is designed for use in HVAC control applications. Inside buildings, people are the major source of CO<sub>2</sub>. By controlling fresh air based on CO<sub>2</sub> levels, energy can be saved and tenant comfort improved.

The remote capability of the CRLSXX provides flexibility for unique applications.

## SPECIFICATIONS

Input Power	Class 2; 20 to 30 Vdc/24 Vac 50/60 Hz; 100 mA maximum
Analog Output	4 to 20mA (clipped & capped)/0 to 5 Vdc/ 0 to 10 Vdc (selectable)
Operating Temp Range*	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (4.4 to 5.3 in-lbf) max.
Terminal Block Wire Size	24 to 12 AWG (0.25 to 2.5mm <sup>2</sup> )

### CO<sub>2</sub> TRANSMITTER

Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	0 to 2000/5000 ppm (programmable)
Accuracy**	±30 ppm ±2% of measured value

## NDIR

Non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value...high accuracy

## Sensitivity

Low ambient sensitivity

## Microprocessor based

Microprocessor-based design reduces long-term drift and calibration requirements

## Self-calibrating

Innovative self-calibration algorithm...easy to maintain. 5-year calibration interval (recommended)

## LCD

LCD display for visibility

## Field-selectable

Field-selectable 4 to 20 mA/0 to 5 V/0 to 10 V output for system flexibility

## APPLICATIONS

- Controlling HVAC in response to occupancy
- Improving tenant comfort
- Facilitating compliance with ASHRAE 62.1 standard for air quality
- Direct measuring of outside air or sample from other remote area

Repeatability	±20 ppm ±1% of measured value
Response Time***	<60 seconds for 90% step change

### WARRANTY

Limited Warranty	5 years
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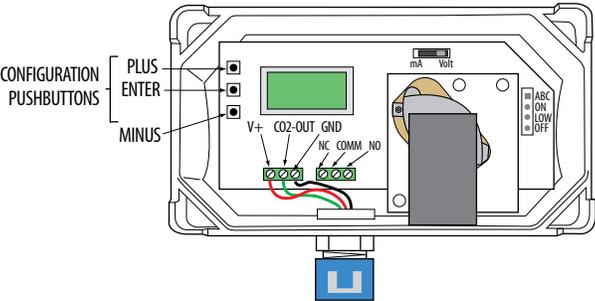
### AGENCY APPROVALS



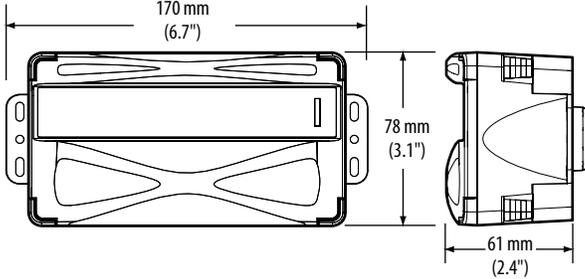
EMC Conformance: Low voltage directive 2014/35/EU and EMC directive 2014/30/EU. EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements). \*When directly measuring outside air, ensure the temperature of the air as it reaches the sensor is between 0 and 50 °C. \*\*Measured at NTP \*\*\*Response time when used with 3ft long sampling tube, Veris part number AA50. Note: Rough handling and transportation may cause a temporary reduction of CO<sub>2</sub> sensor accuracy. With time, the ABC function will tune the readings back to the correct accuracy range. The default tuning speed is limited to 30 ppm per week.



WIRING DIAGRAM



DIMENSIONAL DRAWING



ORDERING INFORMATION

MODEL	DESCRIPTION
CRLSXX	Remote mount CO <sub>2</sub> sensor.

ACCESSORIES P. 93



## GWN

### Modular Gas Sensor Platform Accepts AG Series Gas Sensors



GWN

AGAE Enclosure  
(sold separately)

GWN Series platform offers a convenient means for sensing gases in the environment. The GWN is mounted to any single-gang electrical box and wired to the building controller. Then, a single AGxx gas sensor (sold separately) is installed in the GWN. With this design, there is no need for a costly new installation when a sensor reaches the end of its life. The GWN platform remains installed, and the installer simply opens the GWN housing to replace the modular sensor inside, reducing labor costs and downtime.

AG Series sensors can be swapped in the GWN platform at any time with minimal effort. The GWN platform converts the signal from the AG sensor into an analog or relay signal compatible with building control systems.

The available AGAE metal enclosure (sold separately) provides a modular solution for applications that require a rugged enclosure along with an integral audible horn and 10 A relay for direct fan control.

#### SPECIFICATIONS

Input Power	15 to 30 Vdc/24 Vac ±20%, Class 2, 50/60Hz, max. 60 mA
Relay Ratings	1A/30 Vac/dc, normally open
Operating Temperature Range	-20 to 50 °C (-4 to 122 °F)
Operating Humidity Range	0 to 90% RH non-condensing
Terminal Block Wire Size	30 to 12 AWG
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)
Protection Class (self-evaluated)	IP20

#### WARRANTY

Limited Warranty	5 years*
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#### COMPLIANCE INFORMATION

Agency Approvals	Intertek ETL Listed to UL 61010-1
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## Modular design

Modular platform accepts Veris AG Series sensors (sold separately)...no need to install a new GWN when the sensor life wears out

## LEDs

Three colored LEDs - red, yellow and green - for easy status viewing

## Microprocessor based

Microprocessor controlled... excellent stability operation

#### APPLICATIONS

- Parking garage ventilation
- Air quality compliance
- Vehicle bays (ambulance/fire/taxi)
- Mechanical rooms
- Sally ports

## Wide options

Interface to control system via 4 to 20 mA with relay, 0 to 5 / 0 to 10 Vdc with relay, or relay only options...application flexibility

## No calibration

No calibration required...easy maintenance and worry-free

## Versatile interface

Interface to DDC systems or direct fan control

The GWN operates only when an AG Series gas sensor is installed (sold separately). Accuracy, sensitivity, setpoints, and measurement range are dependant on the AG Series sensor connected to the GWN platform. See the AG Series sensor installation guide for details.  
\* The AG Series gas sensors are warranted for two years from the date of manufacture. The AG Series sensors are not included in the five-year GWN warranty.



AG01  
CO Sensor



AG01E  
CO Sensor



AG02  
NO<sub>2</sub> Sensor



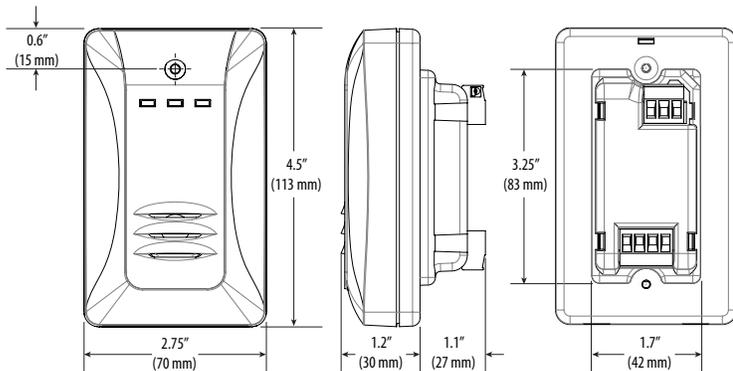
AG05  
R134a Refrigerant Sensor



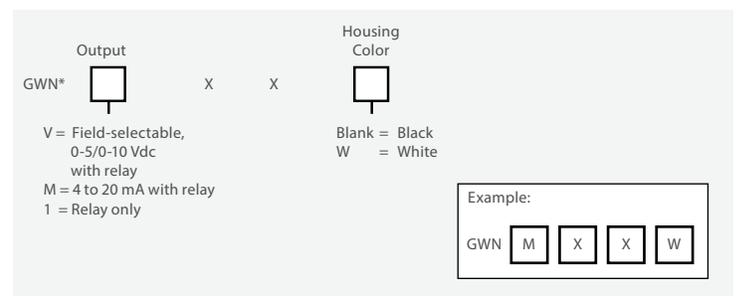
AG06  
R410a Refrigerant Sensor

SENSOR TYPE	Electrochemical	Electrochemical	Electrochemical	Non-dispersive infrared	Non-dispersive infrared
MEASUREMENT RANGE	0 to 300 ppm	0 to 500 ppm	0 to 15 ppm	0 to 2000 ppm	0 to 2000 ppm
ACCURACY	±3% of range	±5% of range	±5% of range at 25 °C	±2% of range (60 to 2000 ppm)	±2% of range (60 to 2000 ppm)
ANALOG OUTPUT SCALING	0 to 200 ppm	0 to 200 ppm	0 to 15 ppm	0 to 2000 ppm	0 to 2000 ppm
RESOLUTION	1 ppm	1 ppm	0.1 ppm	1 ppm	1 ppm
SENSOR WARRANTY	2 years from manufacture date	1 year from manufacture date	2 years from manufacture date	2 years from manufacture date	2 years from manufacture date
LOW SETPOINT VALUE	25 or 35 ppm (switch selectable)	25 or 35 ppm (switch selectable)	1 ppm (fixed)	100 ppm (fixed)	100 ppm (fixed)
HIGH SETPOINT VALUE	180 ppm (fixed)	180 ppm (fixed)	3 ppm (fixed)	500 ppm (fixed)	500 ppm (fixed)
OPERATING TEMP. RANGE	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)
OPERATING HUMIDITY RANGE	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing

**DIMENSIONAL DRAWING**

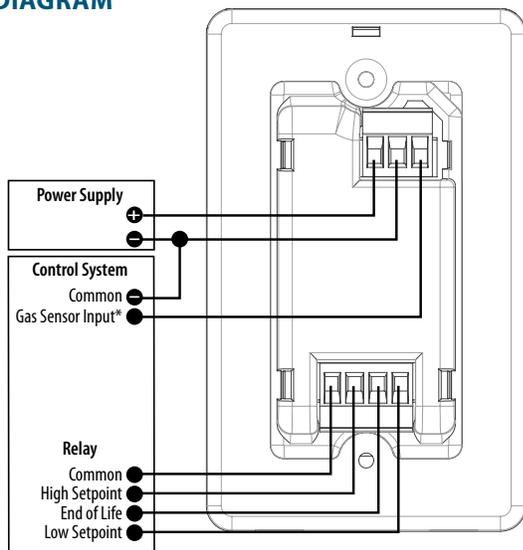


**ORDERING INFORMATION - PLATFORM**



\*The GWN will not operate without an AG Series sensor installed. Sensors are sold separately.

**WIRING DIAGRAM**



\* Not available on relay only models.

**ORDERING INFORMATION - REQUIRED SENSORS**

MODEL	DESCRIPTION
AG01	CO sensor, 3% accuracy. CO sources include exhaust from gasoline powered engines, furnaces, water heaters and generators.
AG01E	CO sensor, 5% accuracy. CO sources include exhaust from gasoline engines, furnaces, water heaters and generators
AG02	NO <sub>2</sub> sensor. NO <sub>2</sub> sources include exhaust from diesel powered engines and generators.
AG05	R134a sensor. R134a is a refrigerant used in HVAC applications.
AG06	R410a sensor. R410a is a refrigerant used in HVAC applications.

Note: See Specifications section for AG sensor warranty details.

**ORDERING INFORMATION - ACCESSORY ENCLOSURE**

MODEL	DESCRIPTION
AGAE	Metal wall mount enclosure for the GWN gas platform with audible horn and 10 A relay

**ACCESSORIES P. 93**



## GWNP

### Modular Gas Sensor Platform Accepts AG Series Gas Sensors



GWNP

AGPE Enclosure  
(sold separately)

GWNP Series protocol communications platform offers a convenient means for sensing gases in the environment. The GWNP is mounted to any single-gang electrical box and wired to the building controller. Then, a single AGxx gas sensor (sold separately) is installed in the GWNP. With this design, there is no need for a costly new installation when a sensor reaches the end of its life. The GWNP platform remains installed, and the installer simply opens the GWNP housing to replace the modular sensor inside, reducing labor costs and downtime.

AG Series sensors can be swapped in the GWNP platform at any time with minimal effort. The GWNP platform converts the signal from the AG sensor into protocol communications compatible with building control systems.

The available AGPE metal enclosure (sold separately) provides a modular solution for applications that require a rugged enclosure along with an integral audible horn and 10 A relay for direct fan control.

### SPECIFICATIONS

Input Power	15 to 30 Vdc/24 Vac ±20%, Class 2, 50/60Hz, max. 60 mA
Relay Ratings	1A/30 Vac/dc, normally open
Operating Temperature Range	-20 to 50 °C (-4 to 122 °F)
Operating Humidity Range	0 to 90% RH non-condensing
Terminal Block Wire Size	30 to 12 AWG
Protocol	BACnet and Modbus (selectable)
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)
Protection Class (self-evaluated)	IP20

#### WARRANTY

Limited Warranty	5 years*
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#### COMPLIANCE INFORMATION

Agency Approvals	Intertek ETL Listed to UL 61010-1
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### Communication

Interface to control system via BACnet and Modbus protocols. BTL certified.

### Microprocessor based

Microprocessor controlled for excellent stability

### Modular platform

Modular platform accepts Veris AG Series sensors (sold separately)... no need to install a new GWNP when the sensor life wears out

### No calibration

No calibration required...easy maintenance and worry-free operation

### LEDs

Three colored LEDs - red, yellow and green - for easy status viewing

### Versatile interface

Interface to DDC systems or direct fan control

### APPLICATIONS

- Parking garage ventilation
- Air quality compliance
- Vehicle bays (ambulance/fire/taxi)
- Mechanical rooms
- Sally ports

The GWNP operates only when an AG Series gas sensor is installed (sold separately). Accuracy, sensitivity, setpoints, and measurement range are dependant on the AG Series sensor connected to the GWNP platform. See the AG Series sensor installation guide for details.

\* The AG Series gas sensors are warranted for two years from the date of manufacture. The AG Series sensors are not included in the five-year GWNP warranty.



AG01  
CO Sensor



AG01E  
CO Sensor



AG02  
NO<sub>2</sub> Sensor



AG04\*  
CO & NO<sub>2</sub> Sensor



AG05  
R134a Refrigerant Sensor



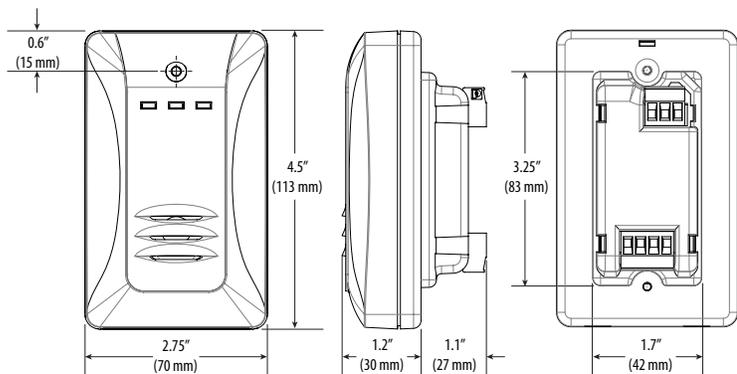
AG06  
R410a Refrigerant Sensor

SENSOR TYPE	Electrochemical	Electrochemical	Electrochemical	CO: Electrochemical NO <sub>2</sub> : Electrochemical	Non-dispersive infrared	Non-dispersive infrared
MEASUREMENT RANGE	0 to 300 ppm	0 to 500 ppm	0 to 15 ppm	CO: 0 to 500 ppm NO <sub>2</sub> : 0 to 20 ppm	0 to 2000 ppm	0 to 2000 ppm
ACCURACY	±3% of range	±5% of range	±5% of range at 25 °C	CO: ±5% of range NO <sub>2</sub> : ±5% of range	±2% of range (60 to 2000 ppm)	±2% of range (60 to 2000 ppm)
OUTPUT SCALING	0 to 200 ppm	0 to 200 ppm	0 to 15 ppm	N/A	0 to 2000 ppm	0 to 2000 ppm
RESOLUTION	1 ppm	1 ppm	0.1 ppm	CO: 1 ppm NO <sub>2</sub> : 0.1 ppm	1 ppm	1 ppm
SENSOR WARRANTY	2 years from manufacture date	1 year from manufacture date	2 years from manufacture date	2 years from manufacture date	2 years from manufacture date	2 years from manufacture date
LOW SETPOINT VALUE	25 or 35 ppm (switch selectable)	25 or 35 ppm (switch selectable)	1 ppm (fixed)	CO: 25 ppm (default)** NO <sub>2</sub> : 1 ppm (default)**	100 ppm (fixed)**	100 ppm (fixed)**
HIGH SETPOINT VALUE	180 ppm (fixed)	180 ppm (fixed)	3 ppm (fixed)	CO: 180 ppm (default)** NO <sub>2</sub> : 3 ppm (default)**	500 ppm (fixed)**	500 ppm (fixed)**
OPERATING TEMP. RANGE	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)	-20 to 40 °C (-4 to 104 °F)	-20 to 50 °C (-4 to 122 °F)	-20 to 50 °C (-4 to 122 °F)
OPERATING HUMIDITY RANGE	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing	0 to 90% RH non-condensing

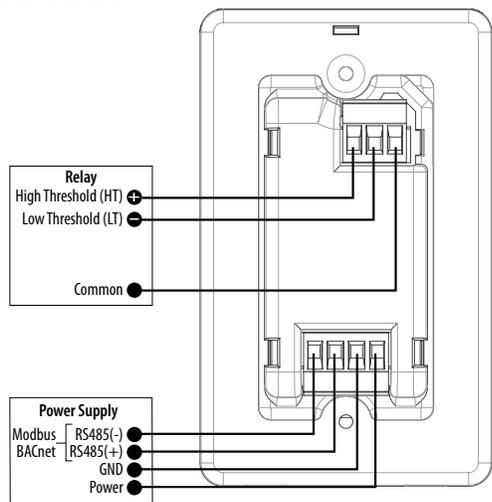
\*The AG04 sensor works only with GWNP (protocol output) Series gas platform devices. The AG04 will not work with GWNM, GWNV or GWN1 versions of the GWN Series.

\*\*Low and high level setpoint can be adjusted between 0 and top of range if used with a GWNP (protocol) gas platform.

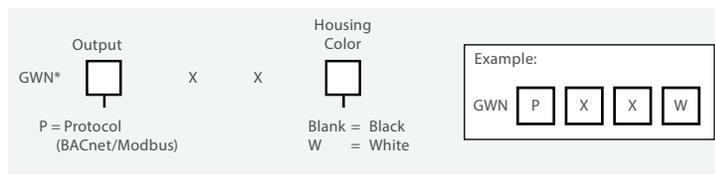
**DIMENSIONAL DRAWING**



**WIRING DIAGRAM**



**ORDERING INFORMATION - PLATFORM**



\*The GWNP will not operate without an AG Series sensor installed. Sensors are sold separately.

**ORDERING INFORMATION – REQUIRED SENSORS**

MODEL	DESCRIPTION
AG01	CO sensor, 3% accuracy. CO sources include exhaust from gasoline powered engines, furnaces, water heaters and generators.
AG01E	CO sensor, 5% accuracy. CO sources include exhaust from gasoline engines, furnaces, water heaters and generators
AG02	NO <sub>2</sub> sensor. NO <sub>2</sub> sources include exhaust from diesel powered engines and generators.
AG04	CO & NO <sub>2</sub> combination sensor. CO sources include exhaust from gasoline powered engines, furnaces, water heaters and generators. NO <sub>2</sub> sources include exhaust from diesel engines and generators
AG05	R134a sensor. R134a is a refrigerant used in HVAC applications.
AG06	R410a sensor. R410a is a refrigerant used in HVAC applications.

Note: See Specifications section for AG sensor warranty details.

**ORDERING INFORMATION – ACCESSORY ENCLOSURE**

MODEL	DESCRIPTION
AGPE	Metal wall mount enclosure for the GWNP gas platform with audible horn and 10 A relay

**ACCESSORIES P. 93**



## UG-7-A60 UNIGUARD®

Optical Smoke Detector with Single High-Efficiency Sampling Tube



UG-7-A60 Series  
with pickup tube installed

Smoke entering a duct system will be dispersed throughout the entire building. Uniguard duct detectors utilize the photoelectric sensing method and are designed to sense the existence of smoke in the duct. This housing design, along with the detector technology, is capable of detecting unsafe conditions by sampling the air in the duct. When smoke is detected, the Uniguard's relays provide a signal which may be used to turn off circulating fans, blowers and any other auxiliary devices that are connected to the system. This enables the management of hazardous smoke through the space being monitored by the duct detection arrangement.

This Uniguard comes in two models: UG-7-A60-24V operates with 24 Vdc/ac and UG-7-A60-120V with 120 Vac. Alarm and supervisory relay contacts are accessible to interface with a control panel, HVAC control, and multiple auxiliary functions including turning off the fan.

The Uniguard can be installed on any side of the duct.

The UG-7-A60 detector contains an intelligent controlling circuit. This circuit is adjusting the sensitivity to give an optimal function during the entire lifetime of the detector. When the controlling circuit can no longer compensate for contamination, a service alarm is indicated.

UG-7-A60 has a linking function that allows interconnection between a maximum of 100 units. The linking function can close dampers or stop fans further away in the ventilation system, before the smoke has reached the places where the linked detectors are installed. When one of the linked UG-7-A60 goes into smoke alarm, all other detectors' AUX relays are activated.

### SPECIFICATIONS

Power Supply Voltage	UG-7-A60-24V: 24 Vdc (-5/+20%) 24 Vac (±10%), 50-60 Hz UG-7-A60-120V: 110-120 Vac, 50-60 Hz
Reset Time (by power down)	1 sec. max.
Power Up Time	1 min.

## Efficient Sampling Adjustable

Highly efficient single sampling tube

Automatic sensitivity adjustment.  
Multiple pickup tube lengths available.

## Easy to Install

Single sampling tube allows quick installation. Device can be installed on any side of the duct.

### APPLICATIONS

- Duct smoke detection in HVAC systems

Sensitivity Test	Nominal sensitivity 0.96 to 1.20%/ft.
Max. Standby Current	UG-7-A60-24V: 42 mA (DC mode), 82 mA (AC mode) UG-7-A60-120V: 31 mA at 120 Vac
Max. Alarm Current	UG-7-A60-24V: 83 mA (DC mode), 145 mA (AC mode) UG-7-A60-120V: 42 mA at 120 Vac
Link Current	5 mA
Total Max. Auxiliary Current Output, Terminals 2 & 5	Without linked detectors: 30 mA With linked detectors: 25 mA
Operating Temperature	32 to 100 °F (0 to 38 °C)
Storage Temperature	-22 to 158 °F (-30 to 70 °C)
Humidity	0 to 95% RH
Duct Air Velocity Range	100 to 4000 ft/min (0.5 to 20.32 m/s)
Dimensions (L x W x D)	11 x 6.5 x 3.27" (279 x 165 x 83 mm)
Weight	1.04 kg
Air Sampling Tube	Aluminium, hole diameter 1.5" (38 mm)

### RELAY CONTACT RATINGS

Alarm Initiation Contacts (SPST)	1.0 A @ 24 Vdc (resistive) 1.0 A @ 120 Vac (resistive)
Supervisory Contacts (SPST)	1.0 A @ 24 Vdc (resistive) 1.0 A @ 120 Vac (resistive)
Alarm Auxiliary Contacts (DPDT)	10 A @ 30 Vdc (resistive) 10 A @ 250 Vac (resistive) ½ HP @ 240 Vac ¼ HP @ 120 Vac

### WARRANTY

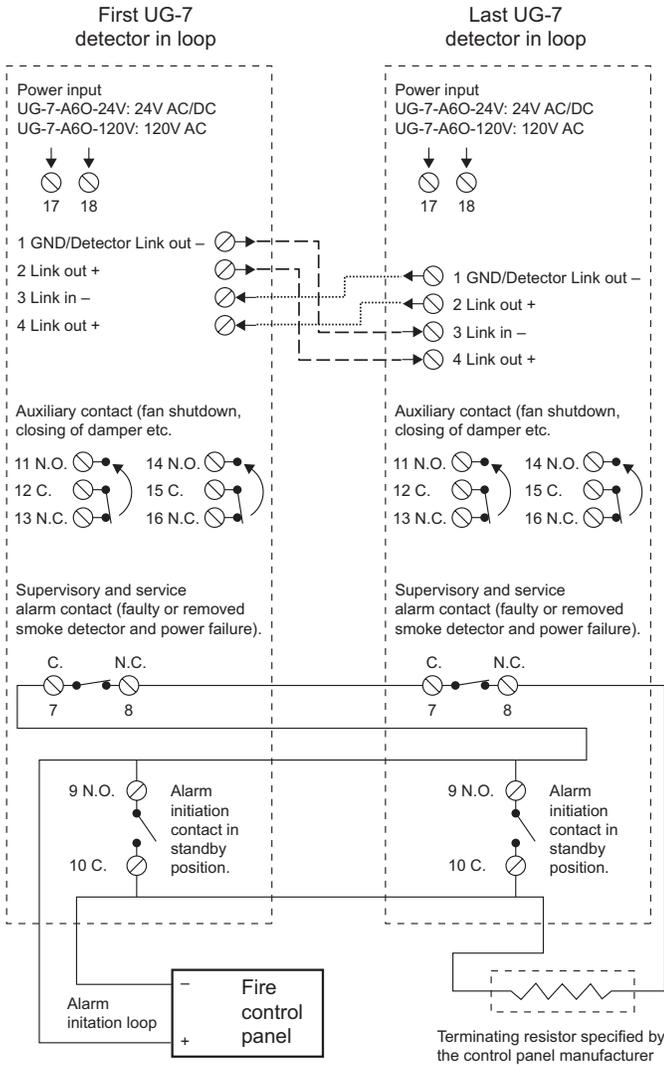
Limited Warranty	2 years
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### AGENCY APPROVALS

Agency Approvals	UL Signaling Listed: S24724 Fire Alarm Equipment Listed: California State Fire Marshall
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**WIRING DIAGRAM**



**ORDERING INFORMATION**

MODEL	DESCRIPTION
CAL-UG-7-A60-24V*	SMOKE,DUCT,24V,UL
CAL-UG-7-A60-120V*	SMOKE,DUCT,120V,UL
CAL-ST1	SMOKE,ACCY,PICKUP TUBE,1FT
CAL-ST2	SMOKE,ACCY,PICKUP TUBE,2FT
CAL-ST5	SMOKE,ACCY,PICKUP TUBE,5FT
CAL-ST9	SMOKE,ACCY,PICKUP TUBE,9FT
CAL-UG-MB-75	SMOKE,ACCY,MOUNTING BRACKET
CAL-UG-COVER-75	SMOKE,ACCY,CONDENSATION COVER

\*Pickup tube not included. Pickup tube ordered separately.



CAL-UG-MB-75  
Mounting Bracket



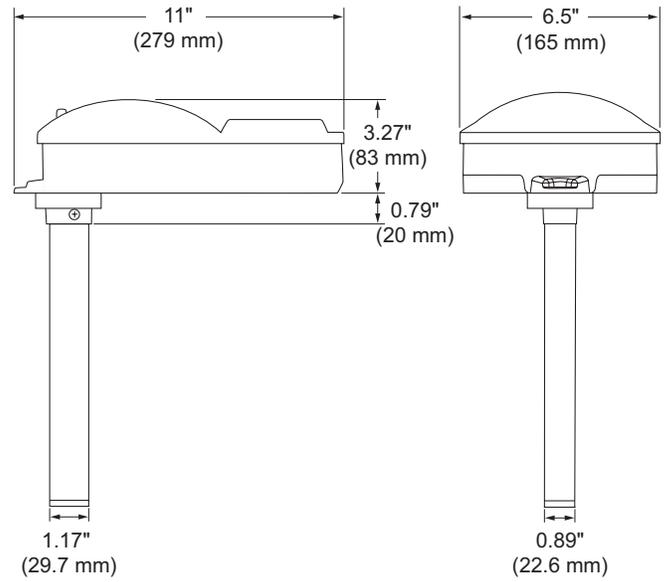
CAL-STx  
Pickup Tube



CAL-UG-COVER-75  
Condensation Cover

**DIMENSIONAL DRAWING**

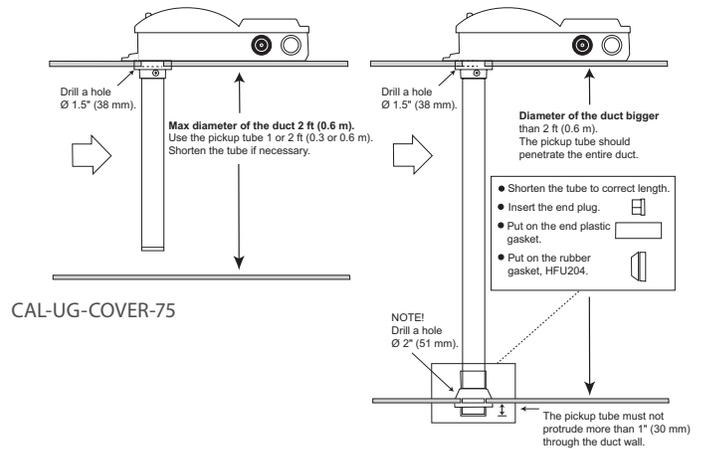
Inches (mm)



**AIR PICKUP TUBE**

The air pickup tube has a continuous pickup along its entire length. The length of the pickup tube is chosen based on the width of the ventilation duct. Pickup tubes are available in four lengths: 1, 2, 5 and 9 ft (0.3, 0.6, 1.5 and 2.8 m). When the ventilation duct is wider than Ø 2 ft (0.6 m), the pickup tube should penetrate the whole duct. See diagram below.

Hole diameter 1.5" (38 mm).



ACCESSORIES P. 93



# GPS SERIES

## Needlepoint Bipolar Ionization Systems



An ion is a molecule or atom that is positively or negatively charged, meaning it must either gain or relinquish electrons in order to become neutral. Naturally occurring ions are everywhere in the outdoors, and they are constantly working to clean the air. Ions are created with energy from rushing water, crashing waves and even sunlight.

Needlepoint Bipolar Ionization (NPBI) technology cleans indoor air by generating ions without producing ozone or other harmful by-products, so you can bring outdoor freshness to the indoors. This patented technology produces a high concentration of positive and negative ions, delivering them to the space via the ventilation system. Within the air stream, ions attach to particles, where they combine, become larger and are more easily filtered from the air. When ions come in contact with pathogens, they disrupt the pathogens' surface proteins, rendering them inactive. Five separate in duct ionization systems to fit your application are offered.

The iMEASURE-D Duct Ionization sensor allows for monitoring of levels of ionization in the air. Higher ionization levels means fewer active pathogens and larger particles more easily filtered out of the air.

### SPECIFICATIONS

#### IONIZATION SYSTEMS

Input Voltage	GPS-FC and GPS-DM models: 24 to 240 Vac; GPS-IRIB models: 110 to 240 Vac
Power	GPS-FC24-AC: 8 Watts; GPS-FC48-AC: 10 Watts; GPS-DM48-AC: 12 Watts; GPS-IRIB: 5 Watts
Frequency	50/60 Hz
Ion Output	GPS-FC48-AC/GPS-DM48-AC: >400 million ions/sec; GPS-FC24-AC: >300 million ions/sec; GPS-IRIB: >35 million ions/sec per foot
Airflow Capacity	GPS-FC48-AC/GPS-DM48-AC: 4800 CFM / 12 Tons; GPS-FC24-AC: 2400 CFM / 6 Tons; GPS-IRIB: 3200 CFM / 8 Tons

## Reduces particles

Particle reduction and smoke control

## Neutralizes odors

Odors neutralized by destroying VOCs

## Reduces pathogens

Kills pathogens (bacteria, viruses, mold), helps to control allergens/asthma, prevents Dirty Sock Syndrome

## Saves energy

Energy savings of up to 30% by reducing outdoor air intake, reducing pressure loss by keeping coils clean without an expensive UV system, and requires no maintenance

### APPLICATIONS

- Healthcare
- Schools and universities
- Manufacturing
- Office buildings
- Airports
- Food service
- Fitness
- Arenas and stadiums
- Hospitality
- Worship

Status Display	GPS-DM48-AC: LCD display indicates relay status and is used for adjustment of auto-cleaning frequency; GPS-FC models: Single LED indicates relay status and is used for adjustment of auto-cleaning frequency; GPS-IRIB models: Single LED indicates relay status
Alarm Relay Rating	250 Vac / 1A, N.O. (close when powered with no faults)
Operating Temperature Range	GPS-FC and GPS-DM models: -20 to 200 °F (-29 to 93 °C); GPS-IRIB Models: -40 to 140 °F (-40 to 60 °C)
Auto-Cleaning	GPS-FC and GPS-DM models only: Mechanical wiper, default setting brushes every three days

#### IONIZATION SENSOR

Mounting Location	Duct
Input Voltage	12 to 24 Vac / Vdc
Current draw	100 mA max.
Sensor Range	0 to 20K, 0 to 200K, 0 to 2M Ions/cc (jumper selectable)
Sensor Output	0 to 10 Vdc
Power	<2 Watts
Operating Temperature Range	-20 to 140 °F (-4 to 60 °C)
Humidity Range	0 to 99% RH, non-condensing

#### WARRANTY

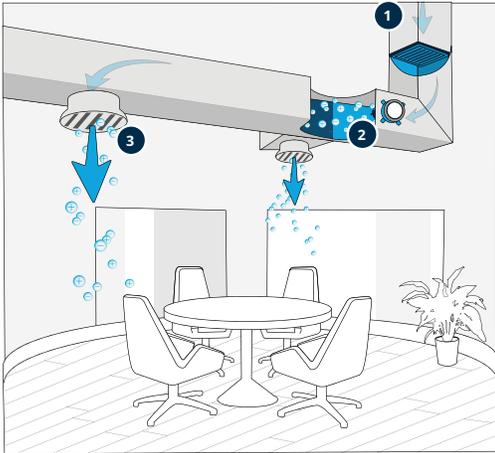
Limited Warranty	
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#### AGENCY APPROVALS

Agency Approvals	UL867, OSHPD Seismic (OSP), IAQP, CE
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**APPLICATION DIAGRAM**

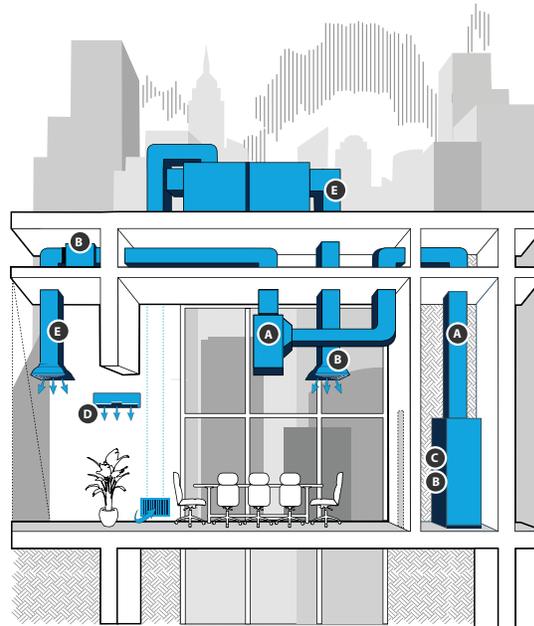


In-room ion density is dependent on a variety of factors, including proximity of the ionizing equipment to the occupied space, air flow rates and path of the ductwork within the building.

- Step 1:** Conditioned air flows into the distribution duct system.
- Step 2:** Air is ionized by the GPS device.
- Step 3:** Positive and negative ions are delivered into the environment.

**INSTALLATION EXAMPLES**

From Air Handling Units to fan-powered boxes, Veris has the solution.



- A: DM48
- B: FC24
- C: FC48
- D: iRIB 18/36
- E: iMEASURE-D

**DIMENSIONS**

MODEL	L	W	H	INSERTION DEPTH	INSERTION DIAMETER
GPS-DM48-AC	9.0"	7.75"	7.75"	7.0"	3.75"
GPS-FC48-AC	11.1"	1.84"	3.52"		
GPS-FC24-AC	7.9"	1.1"	5"		
GPS-iRIB Power Unit	3.75"	1.75"	1.0"		
GPS-iRIB-18 Ionizer Strip	18.0"	1.5"	0.05"		
GPS-iRIB-36 Ionizer Strip	36.0"	1.5"	0.05"		
GPS-iMEASURE-D	12.1"	6.2"	3.25"	10.5"	2"

**AUTO-CLEANING TECHNOLOGY**

Auto-cleaning technology ensures sustained ion output over time. Ion output can decrease without this feature, in addition to accumulation of humidity and other material build-up. Competitive products and brushes must be manually cleaned, and while, a simple process, this rarely occurs. The auto-cleaning feature performs regular wipes of emitter brushes, which prevents build-up. The resulting benefit is optimal lifetime performance.



**ORDERING INFORMATION**

MODEL	DESCRIPTION	MOUNTING LOCATION	DISPLAY	SELF-CLEANING	AIRFLOW CAPACITY
GPS-DM48-AC	Duct ionization system	Through duct wall	LCD	X	4800 CFM / 12 tons*
GPS-FC48-AC	Duct ionization system	Duct wall, duct floor, fan inlet		X	4800 CFM / 12 tons*
GPS-FC24-AC	Duct ionization system			X	2400 CFM / 6 tons*
GPS-iRIB-18	Flexible ionization strip	Traditional split systems, PTACs, fan coils, air handlers, ductless mini splits, ducted modules, ceiling cassettes			3200 CFM / 8 tons*
GPS-iRIB-36	Flexible ionization strip				3200 CFM / 8 tons*

\* Multiple units can be combined to meet system air capacity requirements.

MODEL	DESCRIPTION	MOUNTING LOCATION	OUTPUT RANGE	SENSOR RANGE	AIRFLOW CAPACITY
GPS-iMEASURE-D	Duct ionization sensor	Duct wall, duct floor, fan inlet, AHUs	0 to 10 V	0 to 20K, 0 to 200K, 0 to 2M ions/cc (selectable)	1,000 to 100,000 CFM



# ACCESSORIES SELECTION GUIDE: AIR QUALITY/ GAS DETECTION

Product	Description	CD	CDE	CRLSXX	GWN	GWNP
<b>CO<sub>2</sub> MONITORING</b>						
AA01	CO <sub>2</sub> Calibration Kit, Includes 16-Liter "Zero" Gas, Regulator Valve, Carrying Case & Tubing Kit	•	•	•		
AA26	17-Liter CO <sub>2</sub> Span Calibration Gas (2000 ppm) — Replacement Disposable Bottles	•	•	•		
AA27	103-Liter CO <sub>2</sub> Span Calibration Gas (2000 ppm) — Replacement Disposable Bottles	•	•	•		
AA28	17 liter CO <sub>2</sub> Zero Calibration Gas — Disposable Replacement Bottles	•	•	•		
AA29	103 liter CO <sub>2</sub> Zero Calibration Gas — Disposable Replacement Bottles	•	•	•		
AA35	Duct Aspiration Box (Allows Wall Mount CO <sub>2</sub> Sensors to be Mounted into the Duct)					
AA36	CO <sub>2</sub> Outdoor Aspirator Box (Allows Wall Mount CO <sub>2</sub> Sensors to Sense Outdoor Air)			•		
AA50	Remote Sample Pick-up Kit			•		
<b>CO Monitoring</b>						
AA32	CO Test Verification Kit, 17 Liter				•	•
AA37	CO Gas 100 PPM 17-Liter Disposable Replacement Gas (Requires Regulator Valve AA40)				•	•
AA38	CO Gas 100 PPM 103-Liter Disposable Replacement Gas (Requires Regulator Valve AA41)				•	•
AA39	CO Test Verification Kit, 103 Liter				•	•



**AA01**  
CO2 Calibration Kit, Includes 16-Liter "Zero" Gas, Regulator Valve, Carrying Case & Tubing Kit



**AA26**  
17-Liter CO<sub>2</sub> Span Calibration Gas (2000 ppm) - Disposable Replacement Bottles



**AA27**  
103-Liter CO<sub>2</sub> Span Calibration Gas (2000 ppm) - Disposable Replacement Bottles



**AA38**  
CO Gas 100 PPM 103 Liter Replacement Disposable Gas (Requires Regulator Valve AA41)



**AA39**  
Carbon Monoxide Test Verification Kit 103 Liter



**AA40**  
Regulator Valve for 17-Liter Bottle

**AA41**  
Regulator Valve for 103-Liter Bottle



**AA50**  
Remote Sample Pickup Kit





# FLOW MONITORING

Veris Industries offers an extensive range of devices for monitoring flow and the transfer of thermal energy in liquids. Our impeller models are available in insertion and tee styles for installation flexibility, including hot tap models for your convenience. Several non-impeller designs are also available, including an ultrasonic meter for sensing without cutting into a pipe, an electromagnetic meter for slurries, a nutating disc meter for industrial applications, and a turbine meter for long term service. We also carry a selection of transmitters and monitors, making us a “one-stop shop” for all your flow monitoring needs.

MODEL	DESCRIPTION	PAGE
SDI	Insertion Meter, Small Diameter Impeller (SDI)	97
220x, 228x	Insertion Meter, Standard Impeller/Hot Tap	99
250x	Tee Meter, Brass	100
380	Tee Meter, BTU System	101
310, 320, 340	Transmitter: Analog, BTU, Pulse, and Protocol Output	103
Magnetoflow	Electromagnetic (Mag) Meter	105
TFX5000	Ultrasonic Flow and Energy BTU Meter	107
170, RCDL	Nutating Disc Meter	109
450, 1000	Turbine Meter	111
B142/B3000	Gas Turbine Flow Meter and Monitor	113
VN2000	Vortex Shedding Steam Meter	115
FC-5000	Monitor: Local Display, Output and BTU	117
O2	Electronic Flow Meter with Scaled Pulse Output	120
QSE	Electromagnetic Flow Meter	121

## FLOW SENSOR SELECTION GUIDE

### FLOW SENSORS

	INSERT	PLASTIC TEE	METAL TEE	CLAMP-ON
Basic Model	220x/ 228x page 99	228PV/735/ 4000 page 101	228x, 250x pages 99, 100	
Hot Tap Capability	SDI, 225x/ 226x pages 97, 98			
BTU Measurement			380 page 101	
Small Diameter Impeller	SDI page 97			
Built-in Transmitter	SDI page 97			

### TRANSMITTERS AND MONITORS

	ANALOG OUTPUT	SCALED PULSE OUTPUT	PROTOCOL OUTPUT
Transmitter	310 page 103	320 page 103	
Transmitter with BTU Calculation	340 page 103		340 page 103
Flow Monitor with LCD Display	3000 page 117	3000 page 117	3000 page 117
Ultrasonic Flow Monitor with LCD Display and BTU Calculation	3050 page 117	3050 page 117	3050 page 117

### SPECIALITY METERS

Non-Impeller Styles	Electromagnetic page 105	Nutating Disc page 109	Turbine page 111	Ultrasonic page 107	Vortex Shedding page 115
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# MAXIMIZE EFFICIENCY WITH ECONOMY SOLUTIONS

QSE and O2 Economy Flow and Energy BTU Meters

Conserve resources by measuring your present consumption with Veris liquid flow and energy meters!

## FEATURES

### WIDE ARRAY OF FLUID MONITORING

Including water, brine and raw sewage

### COMPLETE SYSTEM VIEW

Net total measurement  
Energy Consumption (BTU)  
Chiller efficiency  
Waste water

### EASY SYSTEM INTEGRATION

Many analog and protocol communications including Modbus and BACnet



## SDI SERIES

For Pipe Sizes 1-1/2" to Over 36"



### NEMA 4 housing

Rugged and weather-proof

### Highly durable

Stainless steel impeller, tungsten carbide shaft and Torion® bearing

### Multiple outputs

Scaled pulse and 4 to 20 mA output available

### Material options

Other materials available. See chart on facing page.

### Fewer leaks

Viton® O-ring seal standard

The direct insert style liquid flow sensor with stainless steel/PPS plastic or PEEK plastic tip combines flow sensing with a built-in transmitter for an all-in-one flow measuring system. This device fits all 1-1/2" to over 36" (38 to 915 mm) pipes, and it is intended for direct installation into the pipe through a 1" NPT hole.

This sensor is available with or without hot tap capability. In the hot tap installation, the sensor is mounted in the pipe under pressure by attaching a service saddle or weld-on fitting to the pipe. Then the sensor assembly is attached to an isolation valve and extended into the pipeline to measure flow. Hot tap installations are often required in retrofit projects, but even in new construction, a hot tap sensor can be desirable for service considerations.

Software and programming cable are required to operate these meters. If the meter will be used for hot tap installation, the BGR-8A1027 tool is also needed (see Ordering Information).

### APPLICATIONS

- Flow measuring projects
- True hot tap installations
- BTU applications (requires temperature sensors and transmitter/monitor)

### SPECIFICATIONS

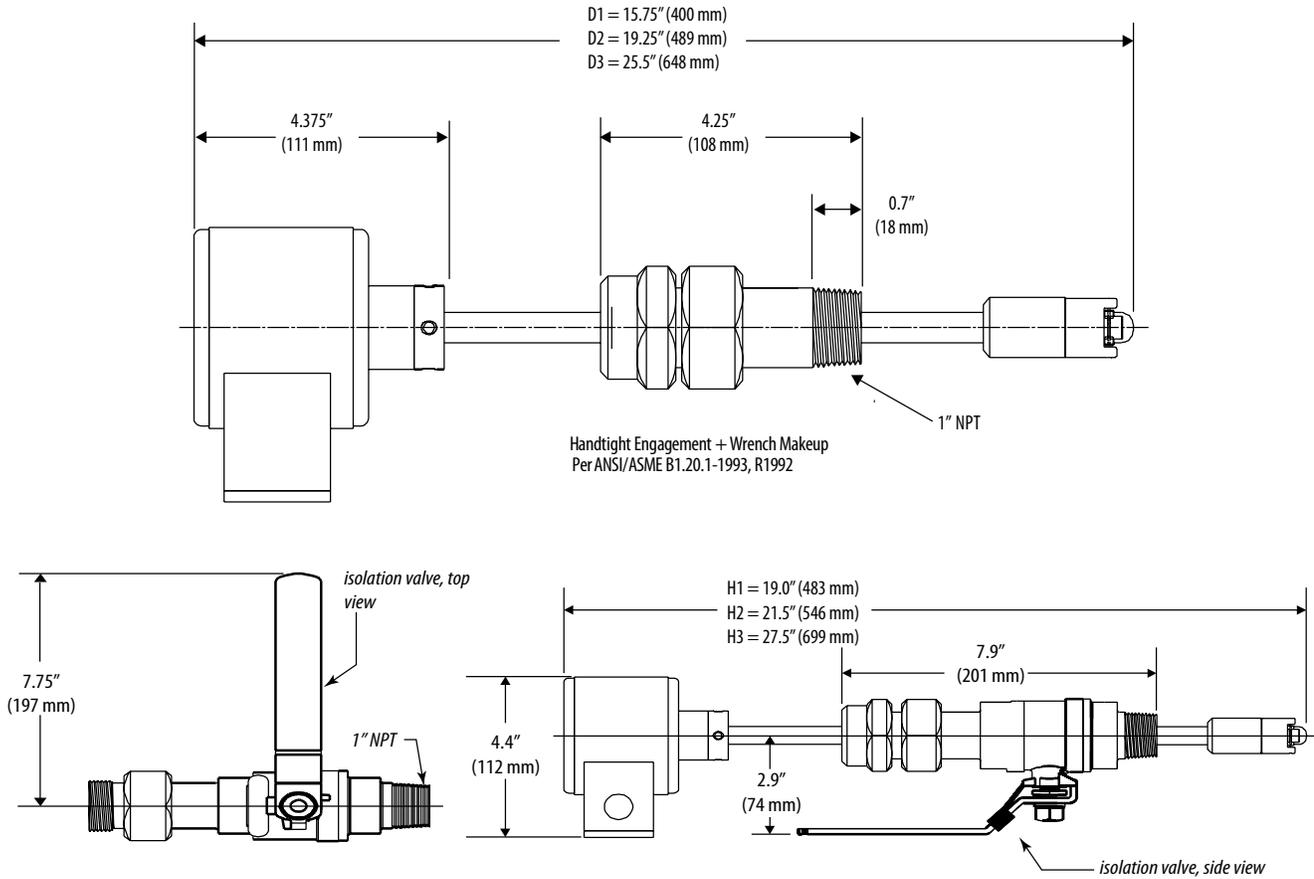
Recommended Design Flow Range	0.3 to 20 ft./sec
Pressure Rating	1000 psi @ 21 °C (70 °F)
Maximum Temp Rating	135 °C (300 °F)
Operating Temperature	Electronics: 20 to 65 °C (14 to 150 °F)
Pressure Drop	0.5 psi or less @ 10 ft/sec for all pipe sizes 1.5" diameter and up
Accuracy	±1% of rate over optimum flow range*
Repeatability	±0.5%

#### WARRANTY

Limited Warranty	1 year
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\* ≥10 upstream and ≥5 downstream straight pipe diameters, uninterrupted flow.

**DIMENSIONAL DRAWINGS**



**ORDERING INFORMATION - COMMON CONFIGURATIONS**

VERIS PART #	MANUFACTURER PART #	DESCRIPTION
BGR-8A301-20*	8A301-20*	Flow, Programming Cable with CD for Badger/DI Prod, Serial PC Connector
BGR-840134-0002*	840134-0002*	Flow, Programming Data Converter with Cable and CD, USB PC Connector
BGR-8SDI0D1N10-0200	8SDI0D1N10-0200	Flow, SDI, SS, 1.5 to 10, 4 to 20 mA, No Display
BGR-8SDI0H1N10-0200	8SDI0H1N10-0200	Flow, SDI, Hot Tap, SS, 1.5 to 10, 4 to 20 mA, No Display
BGR-8A1027**	8A1027**	Flow, Tool, Hot Tap Adapter, 1" Machine to 1" NPT
BGR-8SDI0D1N00-0200	8SDI0D1N00-0200	Flow, SDI, SS, 1.5 to 10, Frequency, No Display
BGR-8SDI0H1N00-0200	8SDI0H1N00-0200	Flow, SDI, SS, 1.5 to 10, Hot Tap, Frequency, No Display

\* Software and programming cable are required for analog, Modbus, LonWorks, BACnet transmitter and meter products.

\*\* A1027 required to adapt SDI hot tap sensor 1" machine thread to 1" NPT for hot tap drilling tools.

**ORDERING INFORMATION - SPECIAL ORDER MODELS\*\*\***

Material	Type	Electronic Housing	Output	Display	O-Ring	Shaft	Impeller	Bearing
8SDI <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> N = NEMA 4X	<input type="checkbox"/>	<input type="checkbox"/> - <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 0 = Stainless Steel	<input type="checkbox"/> 0
0 = Stainless Steel/PPS plastic Tip 1 = Brass/PPS plastic Tip (no Hot Tap) 2 = Stainless Steel/PEEK plastic Tip	D1 = Direct Insert for Pipe 1½ - 10" D2 = Direct Insert for Pipe 12 - 36" D3 = Direct Insert 36" and up H1 = Hot Tap for Pipe 1½ - 10" H2 = Hot Tap for Pipe 12 - 36" H3 = Hot Tap 36" and up		0 = Frequency (standard) 1 = Analog 4 to 20 mA 2 = Scaled Pulse 5 = Bidirectional, analog, 4 to 20 mA (hot tap SS only) 6 = Bidirectional, scaled pulse (hot tap SS only)	0 = No Display 1 = LCD Option (requires output option 1 or 2)	0 = Viton® (standard) 1 = EDPM 2 = AFLAS®	0 = Zirconia Ceramic (optional) 1 = Hastelloy® C-276 (optional) 2 = Tungsten Carbide (standard)		

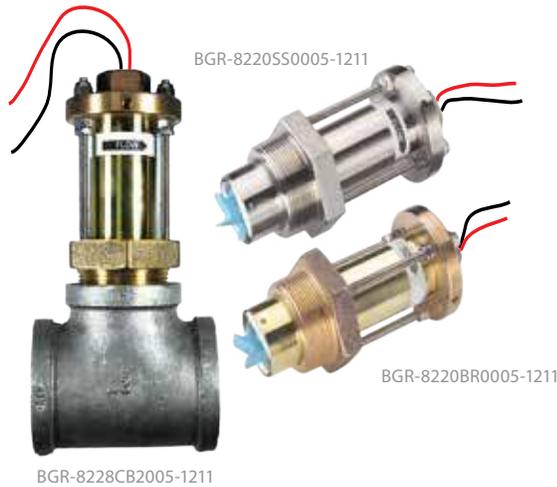
Example: 8SDI  1  D3  N  6  0  0  2  0  0

\*\*\* Consult Veris sales to order these models.



## 220X & 228X SERIES

For Pipe Sizes 3" to Over 40"



Insert-style liquid flow sensors with brass or stainless steel sleeves fit pipe sizes from 3" to 40" (77 to 1016 mm). These sensors can be purchased with a bronze or iron tee. Sensor output is a frequency that indicates flow rate. Used in conjunction with a compatible flow monitor or transmitter, these non-magnetic flow sensors provide an accurate reading of the rate of liquid flow, as well as total accumulated flow.

### SPECIFICATIONS

Temperature Rating	105 °C (221 °F) continuous
Pressure Rating	At 38 °C (100 °F) Insert: 400 psi; brass tee: 200 psi; iron tee: 175 psi
Recommended Design Flow Range	0.5 to 30 ft/sec (0.15 to 9 m/sec); initial detection below 0.3 ft/sec
Wetted Materials	UHMW-PE bearing, polyamide impeller, tungsten carbide shaft, EPDM O-rings
Accuracy	1% F.S. over recommended design flow range; ±4% of reading within calibration range*
Repeatability	±0.3% of full scale over recommended design flow range*
Linearity	±0.2% of full scale over recommended design flow range*
Output Frequency	3.2 Hz to 200 Hz
Output Pulse Width	5 ms ±25%

### WARRANTY

Limited Warranty	1 year
------------------	--------

\* ≥10 upstream and ≥5 downstream straight pipe diameters, uninterrupted flow.

### 2000 ft signal travel

Signal can travel up to 2000 ft (609 m) between the sensor and the display unit without the need for amplification

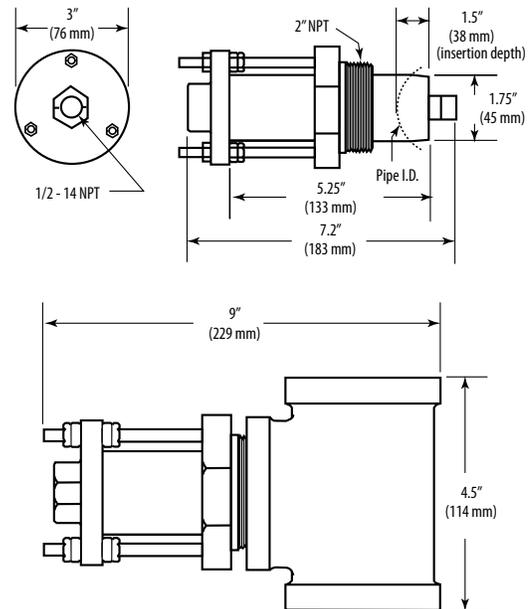
### Cable options

Supplied with 20 ft (6 m) of 2-conductor AWG 20 UL type PTLC cable (105 °C rated)

### Non-magnetic sensing

Six-bladed impeller design with a proprietary, non-magnetic sensing mechanism for high accuracy and repeatability. Forward-swept impeller is less prone to fouling by water-borne debris...reliable performance with minimal downtime.

### DIMENSIONAL DRAWINGS



### ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-8220BR0005-1211	8220BR0005-1211	Flow, Sensor, Insert, Brass Sleeve, 3" to 40" (77 to 1016 mm) pipe
BGR-8220SS0005-1211	8220SS0005-1211	Flow, Sensor, Insert, SS Sleeve, 3" to 40" (77 to 1016 mm) pipe
BGR-8228BR2005-1211	8228BR2005-1211	Flow, Sensor, Insert, Brass, 2" Brass Tee
BGR-8228CB2005-1211	8228CB2005-1211	Flow, Sensor, Insert, Brass, 2" Iron Tee
BGR-8228BR2505-1211	8228BR2505-1211	Flow, Sensor, Insert, Brass, 2.5" Brass Tee

# 250X SERIES

For Pipe Sizes 1/2" to 1 1/2" NPT



BGR-8250BR0505-1211

Metal tee-style liquid flow sensor with cast brass housing fits 1/2" to 1 1/2" NPT. These sensors are accurate, even at low flow rates. Use in conjunction with a flow monitor or transmitter for a complete flow monitoring system.

## SPECIFICATIONS

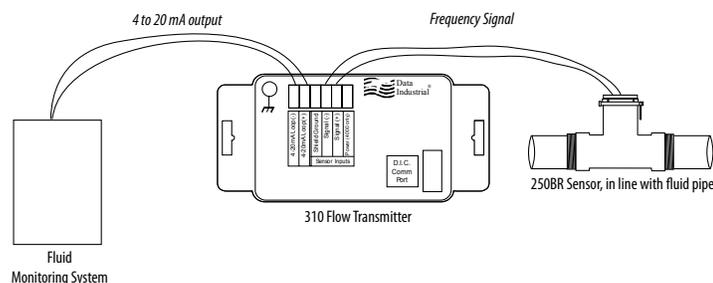
Maximum Pressure	At 38 °C (100 °F) 400 psi; at 105 °C (221 °F) 325 psi
Wetted Materials	UHMW-PE bearing, polyamide impeller, tungsten-carbide shaft, EPDM O-rings
Recommended Flow	0.3 to 15 ft/sec (0.09 to 4.5 m/sec)
Accuracy	±1.0% of rate
Repeatability	±0.7% over recommended design flow range*
Linearity	±0.7% over recommended design flow range*
Rangeability	60:1
Output Frequency	0.8 to 80 Hz

## WARRANTY

Limited Warranty	1 year
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\* ≥10 upstream and ≥5 downstream straight pipe diameters, uninterrupted flow.

## APPLICATION EXAMPLE



## 2000 ft signal travel

Signal can travel up to 2000 ft (609 m) between the sensor and the display unit without the need for amplification

## No amplification

Signal can travel up to 2000 ft (609 m) between the sensor and the display unit without the need for amplification

## Ideal for low flow rates

Operation and repeatability even at low flow rates

## Cable options

Supplied with 20 ft (6 m) of 2-conductor AWG 20 UL type PTLC cable (105 °C rated)

## Non-magnetic sensing

Six-bladed impeller design with a proprietary, non-magnetic sensing mechanism for high accuracy and repeatability. Forward-swept impeller is less prone to fouling by water-borne debris...reliable performance with minimal downtime.

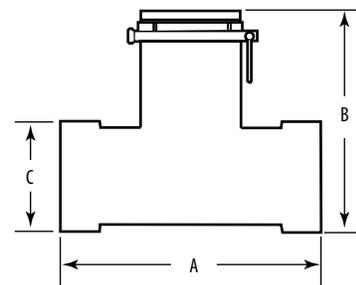
## Highly durable

PPS electronics housing

## APPLICATIONS

- Measuring liquid flow rates

## DIMENSIONAL DRAWING



Model	A	B	C
BGR-8250BR0505-1211	4.0" (102 mm)	4.7" (120 mm)	1.7" (44 mm)
BGR-8250BR0705-1211	4.0" (102 mm)	4.7" (120 mm)	1.7" (44 mm)
BGR-8250BR1005-1211	5.5" (140 mm)	4.8" (121 mm)	2.2" (56 mm)
BGR-8250BR1205-1211	6.1" (155 mm)	5.0" (127 mm)	2.4" (61 mm)
BGR-8250BR1505-1211	6.5" (165 mm)	5.2" (132 mm)	2.7" (69 mm)

## ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-8250BR0505-1211	8250BR0505-1211	Flow, Sensor, 1/2" Cast Brass Tee
BGR-8250BR0705-1211	8250BR0705-1211	Flow, Sensor, 3/4" Cast Brass Tee
BGR-8250BR1005-1211	8250BR1005-1211	Flow, Sensor, 1" Cast Brass Tee
BGR-8250BR1205-1211	8250BR1205-1211	Flow, Sensor, 1-1/4" Cast Brass Tee
BGR-8250BR1505-1211	250BR1505-1211	Flow, Sensor, 1-1/2" Cast Brass Tee



## 380 SERIES

Measures Temperature and Flow Rate and Calculates Energy



Series 380 BTU system provides a low-cost system for metering hot and cold systems. The 380 measures flow and temperature differential to accurately calculate energy. With BACnet, Modbus RS-485, or scaled pulse output, it can interface with many existing control systems.

The rugged design incorporates an impeller flow sensor and two temperature probes, one mounted in the flow sensor tee and the other on either the supply or return line, depending on the application.

Commissioning can be done in the field via a computer connection or set up at the factory. Setup includes energy measurement units, measurement method, communication protocol, pulse output control, fluid density, and specific heat parameters (requires re-usable programming cable and software, see Ordering Information).

### SPECIFICATIONS

Input Power	12 to 35 Vdc/12 to 28 Vac, 200 mA
Communication	Modbus RTU, BACnet MSTP
Output	Scaled pulse, open drain
Flow Calculation Accuracy	±2% of flow rate within range; 0.5% repeatability
Temperature Sensors	Meets IEC751 Class B
Flow Range	1 to 15 FPS
Pressure	Up to 400 psi

#### MATERIALS

Housing	Polycarbonate
Flow Sensor	PEEK
Potting Material	Polyurethane
Tee Material	Bronze

#### ENVIRONMENTAL

Fluid Temperature	-20 to 126 °C (-4 to 260 °F)
Ambient Temperature	-20 to 65 °C (-4 to 149 °F)

#### WARRANTY

Limited Warranty	1 year
------------------	--------

### BACnet & Modbus

BACnet and Modbus protocols are standard features...easy integration with existing control systems

### Easy installation

Minimal connections...simplify installation, saving time and cost

### Stainless steel impeller

316 stainless steel impeller with tungsten carbide shaft

### APPLICATIONS

- Energy management
- Data systems

### Integrated flow & temperature

Integration of flow and temperature sensors with metering components...single solution for BTU metering

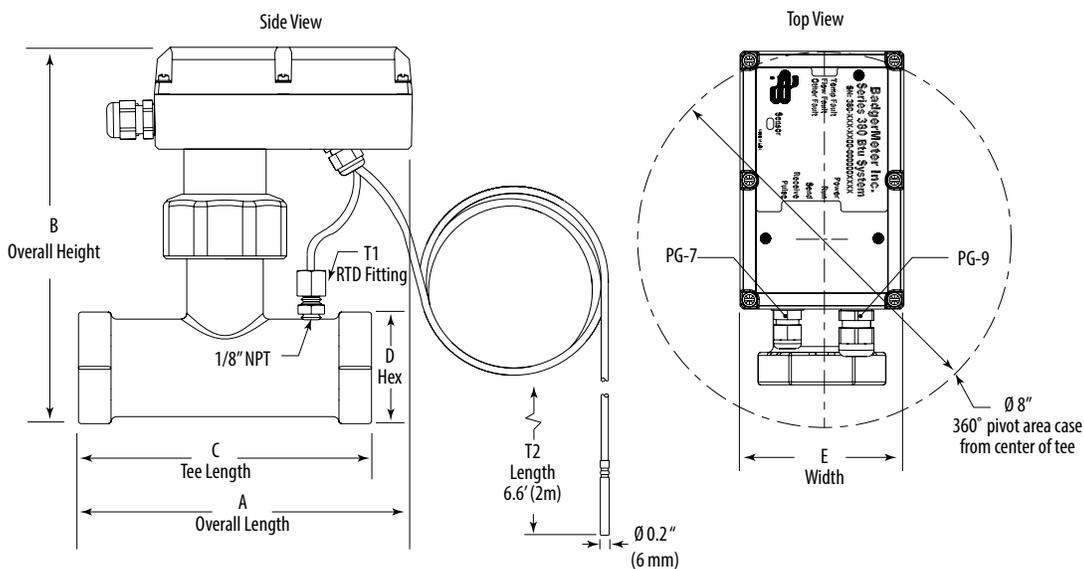
### Two temperature probes

Rugged, compact design with two temperature probes

### Sensor

PEEK sensor tip

### DIMENSIONAL DRAWING



TEE/NPT SIZE	A	B	C	D	E
2" (51 mm)	7.9" (201 mm)	8.5" (216 mm)	7.8" (197 mm)	3.3" (84 mm)	3.5" (89 mm)
1.5" (38 mm)	7.3" (185 mm)	8.3" (209 mm)	6.7" (170 mm)	2.75" (70 mm)	3.5" (89 mm)
1.25" (32 mm)	7.1" (180 mm)	8.1" (204 mm)	6.2" (158 mm)	2.4" (60 mm)	3.5" (89 mm)
1" (25.4 mm)	6.7" (170 mm)	7.9" (201 mm)	5.4" (137 mm)	2" (51 mm)	3.5" (89 mm)
0.75" (19 mm)	6.7" (170 mm)	7.9" (201 mm)	5.4" (137 mm)	2" (51 mm)	3.5" (89 mm)

### ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION	MAX. GAL/MIN (GPM)
BGR-8380207000-1202*	8380207000-1202	BTU system, hot and cold service, 3/4" tee NPT, with pulse, Modbus and BACNet outputs	25
BGR-8380210000-1202*	8380210000-1202	BTU system, hot and cold service, 1" tee NPT, with pulse, Modbus and BACNet outputs	40
BGR-8380212000-1202*	8380212000-1202	BTU system, hot and cold service, 1-1/4" tee NPT, with pulse, Modbus and BACNet outputs	70
BGR-8380215000-1202*	8380215000-1202	BTU system, hot and cold service, 1-1/2" tee NPT, with pulse, Modbus and BACNet outputs	95
BGR-8380220000-1202*	8380220000-1202	BTU system, hot and cold service, 2" tee NPT, with pulse, Modbus and BACNet outputs	150
BGR-8A304-1M **	8A304-1M	Programming Cable with CD for 380 Series	n/a

\* Requires programming accessory.

\*\* Required to program 380 Series BTU meters (reusable). Standard USB type A to mini-B cable included. Software available from manufacturer's website, [www.badgermeter.com](http://www.badgermeter.com)



## 3X0 SERIES

Converts Flow Signal to a Linear 4 to 20 mA Analog or a Protocol Signal



3x0 programmable transmitters are capable of converting the frequency signal from any compatible flow sensors to a preferred output type (analog, scaled pulse, protocol). In addition to standard square wave signals, it can also accept a sine wave, making it a versatile transmitter for numerous applications. The 310 and 320 offer analog and scaled pulse output, respectively, while the 340 models offer communication protocols (N2, BACnet/Modbus, or LonWorks), with energy (BTU) measurement (appropriate software and programming cables are required for installation; see Ordering Information).

### SPECIFICATIONS

310-00

Power Requirements	Loop input voltage 9 to 35 Vdc
Input Frequency	0.4 Hz to 10 kHz
Load Resistance	Max 750 Ω @ 24 Vdc
Operating Temp Range	-29 to 70 °C (-20 to 158 °F)
Storage Temp Range	-40 to 85 °C (-40 to 185 °F)
Accuracy	±0.04% of reading over entire span
Linearity	0.1% of full scale

#### WARRANTY

Limited Warranty	1 year
------------------	--------

## Compact

Saves space in crowded enclosures

## Communicating

Communication protocols available on the 340 models

## Programmable

Programmable (units of measure, calibration, etc.) using computer with Windows®-based operating system...save installation time in the field by pre-programming the device

## Input options

Accepts sine wave input from a variety of other sources for application flexibility

### APPLICATIONS

- Converting sine/square wave signals to 4 to 20 mA or protocol
- Increasing wire run length limit for flow sensors
- Connecting flow sensors to BAS panels

320-00

Power Requirements	12 to 24 Vac 85 mA max.; 12 to 35Vdc, 30 mA max.; reverse and over voltage protected to 40 Vdc
Input Frequency	0.4 to 10 kHz
Transient Suppression	Complies with IEC-801-4 electrical burst, fast transient specification
Pulse Output	Isolated solid state switch in any standard or custom flow total units; adjustable 50 ms to 1.0 sec pulse output width in 50 ms increments
Maximum Sinking Current	100 mA @ 35 Vdc
Operating Temp Range	-29 to 70 °C (-20 to 158 °F)
Storage Temperature Range	-40 to 85 °C (-40 to 185 °F)

#### WARRANTY

Limited Warranty	1 year
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340-00

Power Requirements	12 to 24 Vdc or 12 to 24 Vac, 70 mA max.
Flow Sensor Input	Excitation voltage 3-wire sensors: 9.1 Vdc 500Ω source impedance
Frequency	4 to 10000 Hz
Temp Sensor Input	10k Dale Thermistor (requires two, sold separately)
Operating Temp Range	-29 to 70 °C (-20 to 158 °F)
Storage Temp Range	-40 to 85 °C (-40 to 185 °F)

#### UNITS OF MEASURE

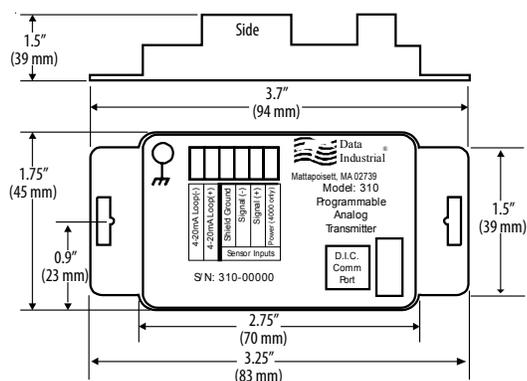
Flow Rate	gpm, gph, l/sec, l/min, l/hr, ft <sup>3</sup> /sec, ft <sup>3</sup> /min, ft <sup>3</sup> /hr, m <sup>3</sup> /sec, m <sup>3</sup> /min, m <sup>3</sup> /hr
Total Flow	gallons, liters, cubic feet, cubic meters
Energy Rate	kBTU/min, kBTU/hr, kW, MW, hp, tons
Total Energy	BTU, kBTU, MBTU, kWh, MWh, kJ, MJ

#### WARRANTY

Limited Warranty	1 year
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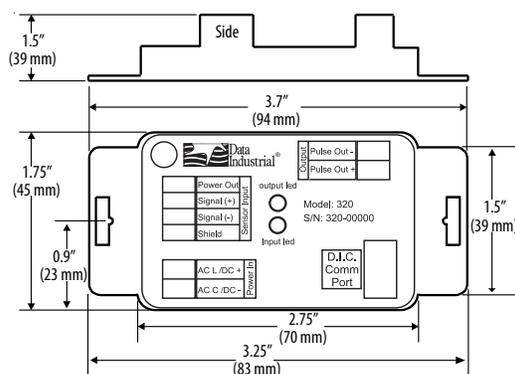
### BGR-8310-00

Dimensional Drawing



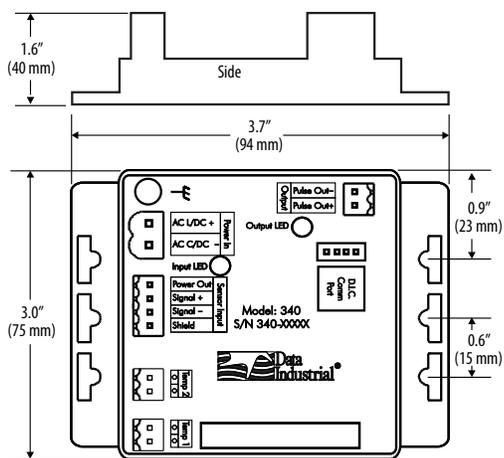
### BGR-8320-00

Dimensional Drawing



### BGR-8340-00

Dimensional Drawing



## ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-8310-00	8310-00 <sup>1,2</sup>	Flow Transmitter, Analog, Programmable, 4 to 20 mA Output
BGR-8340BN/MB-00	8340BN/MB-00 <sup>1,2</sup>	Flow Transmitter, BTU, BN-MB, No Enclosure
BGR-8340BN/MB-03	8340BN/MB-03 <sup>1,2</sup>	Flow Transmitter, BTU, BN-MB, Plastic Enclosure
BGR-8320-00	8320-00 <sup>1</sup>	Flow Transmitter, Programmable, Scaled Pulse Output
BGR-8340-00	8340-00 <sup>1,2</sup>	Flow Transmitter, Programmable, Frequency Output
BGR-8A301-20	8A301-20	Programming Cable with CD for Analog/Modbus/BACnet/LonWorks Outputs, Serial PC Connector
BGR-40134-0002	840134-0002	Programming Cable with CD for Analog/Modbus/BACnet/LonWorks Outputs, USB PC Connector

1. Software and programming cable are required for analog, Modbus, BACnet transmitter and meter products.

2. 340 Series also requires two 10k T2 thermistors for energy (BTU) measurement.

## ACCESSORIES

Veris TI Series immersion temperature sensors with 10K Type 2 thermistor work with the 340 Series transmitters with BTU.



# ELECTROMAGNETIC SERIES

Measure Fluid Flow in Wastewater and Slurries



Electromagnetic Series

Electromagnetic (mag) flow meters are capable of measuring flow in almost any liquid, slurry, or paste with a minimum of electrical conductivity using Faraday's law of induction. These meters are highly accurate, at 0.25% or better, exceeding AWWA accuracy standards for mechanical meters. The smart, micro-processor based electronics are simple to operate, with AMR and SCADA ready standard outputs. The NEMA 4X enclosure provides durability.

## SPECIFICATIONS

Flow Range	0.1 to 39.4 fps (0.03 to 12 m/s)
Max. Operating Pressure	150 psi
Accuracy	±0.25% of rate for velocities greater than 1.64 fps (0.50 m/s); ±0.004 fps (±0.001 m/s) for velocities less than 1.64 fps (0.50 m/s)
Repeatability	±0.1%
Analog Outputs	4 to 20 mA, 0 to 20 mA, 0 to 10 mA, 2 to 10 mA (programmable and scalable) Voltage sourced 24 Vdc (isolated); max. loop resistance < 800 Ω
Digital Outputs	Four total, configurable 24 Vdc sourcing active output (up to two), 100 mA total, 50 mA each; sinking open collector output (up to four), 30 Vdc max., 100 mA each; AC solid-state relay (up to two), 48 Vac, 500 mA max.
Pulse Outputs	Scalable up to 10 kHz, passive open collector up to 10 kHz, active switched 24 Vdc. Up to two outputs (forward and reverse) Pulse width programmable from 1 to 1100 ms or 50% duty cycle
Flow Direction	Unidirectional or bidirectional, two separate totalizers (programmable)
Coil Power	Pulsed DC
Minimum Conductivity	5.0 micromhos/cm
Electrode Materials	Standard: alloy C; Optional: 316 stainless steel, gold/platinum plated, tantalum, platinum/rhodium
Liner Material	PFA up to 3/8", PTFE 1/2" thru 24", soft or hard rubber from 1" thru 54"

## Reliable, durable design

Open flow tube design...no head loss, no moving parts to fail

## 0.25% accuracy

0.25% accuracy independent of fluid viscosity, density, and temperature

## Bi-directional

Bi-directional flow measurement capability...suitable for inter-city billing

## Password security

Protect against unwanted program changes

## Wide flow range

Exceeds operating characteristics of turbine and propeller meters

## Well & reclaimed water

Works with most solids common in liquid systems...great for well water and reclaimed water systems...not fouled by sand, gravel, or debris

## APPLICATIONS

- Monitoring flow in systems likely to contain solids

NSF Listed	Models with hard rubber liner 4" size and up; Models with PTFE liner all sizes
Fluid Temperature	With remote amplifier: PFA, PTFE, 155 °C (311 °F) With Meter Mounted Amplifier: Rubber 80 °C (178 °F); PFA, PTFE 100 °C (212 °F)
Pipe Spool Material	316 stainless steel
Meter Housing Material	Carbon steel welded
Flanges	Standard (ANSI B16.5 Class 150 RF): carbon steel; Optional: 316 stainless steel
Meter Enclosure Classification	NEMA 4X (IP66); Optional: Submersible NEMA 6P (remote amplifier required)
Junction Box Enclosure Protection	For remote amplifier option: powder coated die-cast aluminum, NEMA 4 (IP65)
Cable Entries	½" NPT cord grip
Optional Stainless Steel Grounding Ring Thickness	For meter sizes up to 10": 0.135" thickness per ring; For meter sizes above 10": 0.187" thickness per ring

## POWER SUPPLY

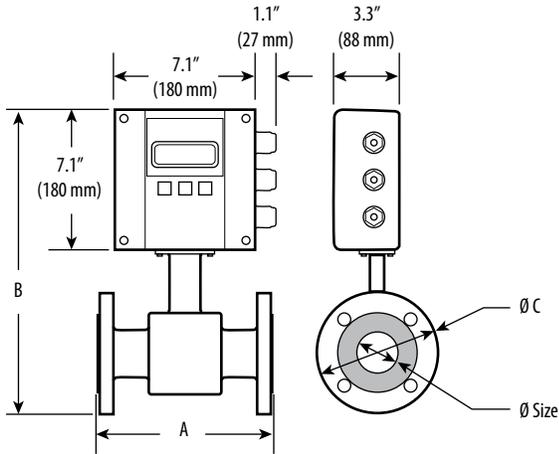
AC	85 to 265 Vac; typical power: 20 VA or 15 W; max. power: 26 VA or 20 W
DC (optional)	10 to 36 Vdc; Typical power: 10 W; max. power: 14 W

## WARRANTY

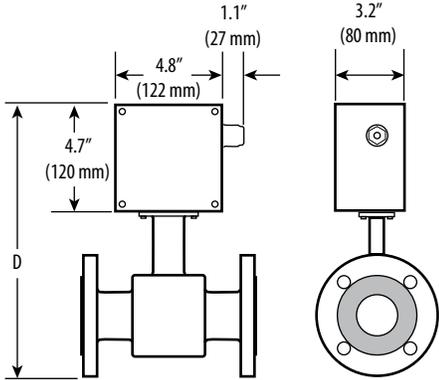
Limited Warranty	2 years
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**ELECTROMAGNETIC SERIES**

Dimensional Drawings



Meter with M2000 amplifier



Meter with junction box for remote M2000 amplifier

Size		A		B		C		D		Est. Weight with M-2000		Flow Range			
inch	mm	lb	kg	LPM		GPM									
												min	max	min	max
2	50	8.9	225	15.9	403	6.0	152	13.2	335	26	11.5	4.70	1400	1	373
3	80	11.0	280	17.3	440	7.5	191	14.7	372	54	24.5	12	3600	3	956
4	100	11.0	280	18.4	466	9.0	229	15.7	398	56	25.5	19	5600	5	1493
6	150	15.8	400	20.6	524	11.0	279	17.9	456	60	27.0	40	12700	11	3361
8	200	15.8	400	22.5	572	13.5	343	20.4	518	86	39.0	75	22600	20	5975
10	250	19.7	500	26.8	681	16.0	406	24.1	613	178	81.0	120	35300	30	9336

Note: Other meter sizes and configurations are available. Consult Veris for availability.

**ORDERING INFORMATION**

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-M2-020-R1-A-MWWS-XXGF	M2-020-R1-A-MWWS-XXGF	Flow, Mag, 2", Hard Rubber Liner, 4-20mA/Freq
BGR-M2-030-R1-A-MWWS-XXGF	M2-030-R1-A-MWWS-XXGF	Flow, Mag, 3", Hard Rubber Liner, 4-20mA/Freq
BGR-M2-040-R1-A-MWWS-XXGF	M2-040-R1-A-MWWS-XXGF	Flow, Mag, 4", Hard Rubber Liner, 4-20mA/Freq
BGR-M2-060-R1-A-MWWS-XXGF	M2-060-R1-A-MWWS-XXGF	Flow, Mag, 6", Hard Rubber Liner, 4-20mA/Freq
BGR-M2-080-R1-A-MWWS-XXGF	M2-080-R1-A-MWWS-XXGF	Flow, Mag, 8", Hard Rubber Liner, 4-20mA/Freq
BGR-M2-020-R1-A-RAFS-XXGF	M2-020-R1-A-RAFS-XXGF	Flow, Mag, 2", Hard Rubber Liner, 30'Remote Amp, 4-20mA/Freq
BGR-M2-030-R1-A-RAFS-XXGF	M2-030-R1-A-RAFS-XXGF	Flow, Mag, 3", Hard Rubber Liner, 30'Remote Amp, 4-20mA/Freq
BGR-M2-040-R1-A-RAFS-XXGF	M2-040-R1-A-RAFS-XXGF	Flow, Mag, 4", Hard Rubber Liner, 30'Remote Amp, 4-20mA/Freq
BGR-M2-060-R1-A-RAFS-XXGF	M2-060-R1-A-RAFS-XXGF	Flow, Mag, 6", Hard Rubber Liner, 30'Remote Amp, 4-20mA/Freq
BGR-M2-080-R1-A-RAFS-XXGF	M2-080-R1-A-RAFS-XXGF	Flow, Mag, 8", Hard Rubber Liner, 30'Remote Amp, 4-20mA/Freq
BGR-M2-020-R1-A-MWWM-XXGF	M2-020-R1-A-MWWM-XXGF	Flow, Mag, 2", Hard Rubber Liner, 4-20mA/Freq/Modbus
BGR-M2-030-R1-A-MWWM-XXGF	M2-030-R1-A-MWWM-XXGF	Flow, Mag, 3", Hard Rubber Liner, 4-20mA/Freq/Modbus
BGR-M2-040-R1-A-MWWM-XXGF	M2-040-R1-A-MWWM-XXGF	Flow, Mag, 4", Hard Rubber Liner, 4-20mA/Freq/Modbus
BGR-M2-060-R1-A-MWWM-XXGF	M2-060-R1-A-MWWM-XXGF	Flow, Mag, 6", Hard Rubber Liner, 4-20mA/Freq/Modbus
BGR-M2-080-R1-A-MWWM-XXGF	M2-080-R1-A-MWWM-XXGF	Flow, Mag, 8", Hard Rubber Liner, 4-20mA/Freq/Modbus
BGR-M2-020-R1-A-RAFM-XXGF	M2-020-R1-A-RAFM-XXGF	Flow, Mag, 2", Hard Rubber Liner, 30'Remote Amp, mA/F/Modbus
BGR-M2-030-R1-A-RAFM-XXGF	M2-030-R1-A-RAFM-XXGF	Flow, Mag, 3", Hard Rubber Liner, 30'Remote Amp, mA/F/Modbus
BGR-M2-040-R1-A-RAFM-XXGF	M2-040-R1-A-RAFM-XXGF	Flow, Mag, 4", Hard Rubber Liner, 30'Remote Amp, mA/F/Modbus
BGR-M2-060-R1-A-RAFM-XXGF	M2-060-R1-A-RAFM-XXGF	Flow, Mag, 6", Hard Rubber Liner, 30'Remote Amp, mA/F/Modbus
BGR-M2-080-R1-A-RAFM-XXGF	M2-080-R1-A-RAFM-XXGF	Flow, Mag, 8", Hard Rubber Liner, 30'Remote Amp, mA/F/Modbus

Note: Other meter sizes and configurations are available. Consult Veris for availability.



# TFX5000 SERIES

Accurate Readings from Outside the Pipe



2+ Transducers



BGR-TFX5000 Meter



3/4" & 1" Transducers



Temperature Sensors for BTU Models

Transit time flow meters measure the time difference between the travel time of an ultrasound wave going with the fluid flow and against the fluid flow. The time difference is used to calculate the velocity of the fluid traveling in a closed-pipe system. The transducers used in transit time measurements operate alternately as transmitters and receivers. Transit time measurements are bi-directional and are most effective for fluids that have low concentrations of suspended solids and are sonically conductive.

An ultrasonic meter equipped with heat flow capabilities measures the rate and quantity of heat delivered or removed from devices such as heat exchangers. By measuring the volumetric flow rate of the heat exchanger liquid, the temperature at the inlet pipe and the temperature at the outlet pipe, the energy usage can be calculated.

## SPECIFICATIONS

SYSTEM	
Flow Accuracy	3/4 in. (20 mm) ±1% of full scale 1 in. (25 mm) ±1% ± 0.03 ft/s (0.009 m/s) of reading 2+ in. (50mm+) ± 0.5% ± 0.025 ft/s (0.008 m/s) of reading
Velocity	3/4 and 1 in. up to 20 ft/s, depending on pipe and fluid 2+ in. (50mm+) up to 40 ft/s, depending on pipe and fluid
Repeatability	0.2% above 1.5 ft/s
Straight Run Requirements	10 diameters upstream, 5 diameters downstream from single elbow
MONITOR	
Power	85 to 264V AC 47 to 63 Hz @ 24VA max. 1 Amp slow-blow fuse, manually field replaceable. Over-Voltage Rating Category II (CAT II)
Display	128 × 64 pixel LED backlit graphical display; adjustable brightness and timeout; polycarbonate window Flow rate/total: 8-digit
Keypad	4-button navigation, keypad with tactile feedback; polyester film
Housing	Aluminum construction, EPDM Gasket, NEMA Type 4X, IP67

## Wide range of measurable fluids

Water, brine, sewage, ethylene glycol, glycerin, and more... flexibility in commercial and industrial applications

## Bi-directional

Measure forward flow, reverse flow, and net total

## No fluid contact

Safe from fouling and damage from system pressure

## APPLICATIONS

- Liquid flow meter for water delivery, sewage, cooling water, glycol, alcohol and chemicals
- Heating/cooling energy flow meter ideal for hydronic process and HVAC

## Communicating

Modbus RTU or BACnet MS/TP over EIA-485 and Modbus TCP/IP

## Rugged housing

Compact, rugged aluminum housing... long service in harsh environments

## LCD display

Easy to read

Ambient Temperature Range	-4 to 140 ° F (-20 to 60 °C)
Humidity	0 to 85%, non-condensing
Velocity	feet/second, meters/second
Engineering Units (User Configured)	Gal, liters, million gal, ft3, m3, acre-ft, oil barrels (42 gal); liquor barrels (31.5 gal), ft, m, lb, kg*
Energy Version	BTU, MBTU, MMBTU, Ton, Kwh, Kcal*
Outputs	4 to 20mA: 1 for Flow Model, 2 for Energy Model; Frequency Output, Pulse (totalizer, programmable)
Communication Protocols	EIA-485: Modbus RTU or BACnet MS/TP Ethernet: 10/100 Base T RJ45, communication via Modbus TCP/IP

## TRANSDUCERS

Construction	3/4 in. (20 mm) and 1 in. (25 mm): CPVC, Ultem®, Nylon cord grip, PVC cable jacket; -40 to 194° F (-40 to 90°C) 2+ in. (50mm+): PBT glass filled, Ultem®, Nylon cord grip; PVC cable jacket; -40 to 250° F (-40 to 121° C)
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## WARRANTY

Limited Warranty	1 year
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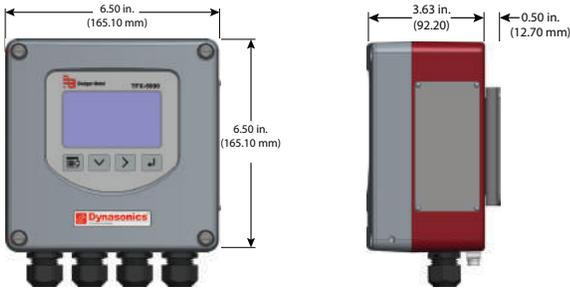
## AGENCY APPROVALS



\* Additional non-HVAC units available in display menu.

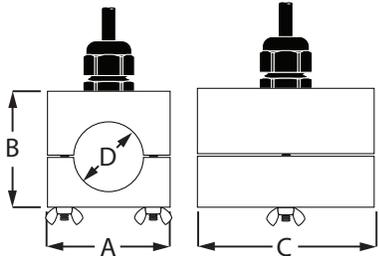
**BGR-TXF5000 METER**

Dimensional Drawing

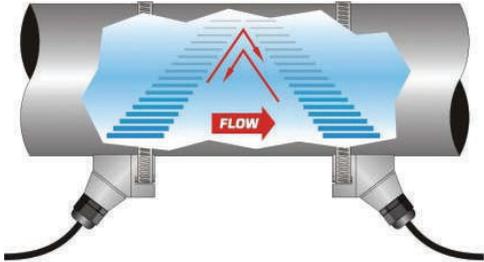


**TRANSDUCERS FOR PIPES AND TUBING 3/4" AND 1"**

Dimensional Drawing

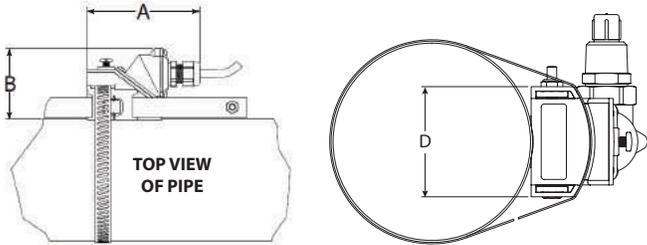


**OPERATING EXAMPLE**



**TRANSDUCERS FOR PIPES LARGER THAN 2"**

Dimensional Drawing



PIPE SIZE	PIPE MATERIAL	A	B	C	D
3/4"	ANSI	2.46" (63 mm)	2.57" (66 mm)	2.66" (68 mm)	1.050" (27 mm)
	Copper	2.46" (63 mm)	2.50" (64 mm)	3.56" (91 mm)	0.875" (23 mm)
1"	ANSI	2.46" (63 mm)	2.92" (75 mm)	2.86" (73 mm)	1.315" (34 mm)
	Copper	2.46" (63 mm)	2.87" (73 mm)	3.80" (97 mm)	1.125" (29 mm)
2"+	Multi	3.75" (95 mm)	3.35" (60 mm)		2.19" (56 mm)

Note: Other transducer sizes available. Consult Veris for availability.

**ORDERING INFORMATION**

VERIS PART #	DESCRIPTION
BGR-DQ-G-RZ-R-S-AK-WW-N-XX-TGRF	Flow Meter, 2+'' Pipe, 110-220V, Keypad, 50' Cables, 4-20mA, Freq, Pulse, BACnet/Modbus
BGR-DR-G-RZ-R-S-AKW-WCAKNXXTGRF	Flow Meter, BTU, 2+'' Pipe, 110-220V, Keypad, 50' Cables, 4-20mA, Freq, Pulse, BACnet/Modbus
BGR-DR-G-CB-R-S-AKW-WCAKNXXTGRF	Flow Meter, BTU, 3/4'' Steel Pipe, 110-220V, Keypad, 50' Cables, 4-20mA, Freq, Pulse, BACnet/Modbus
BGR-DR-G-CH-R-S-AKW-WCAKNXXTGRF	Flow Meter, BTU, 3/4'' Copper Pipe, 110-220V, Keypad, 50' Cables, 4-20mA, Freq, Pulse, BACnet/Modbus
BGR-DR-G-CC-R-S-AKW-WCAKNXXTGRF	Flow Meter, BTU, 1'' Steel Pipe, 110-220V, Keypad, 50' Cables, 4-20mA, Freq, Pulse, BACnet/Modbus
BGR-DR-G-CT-R-S-AKW-WCAKNXXTGRF	Flow Meter, BTU, 1'' Copper Pipe, 110-220V, Keypad, 50' Cables, 4-20mA, Freq, Pulse, BACnet/Modbus

Note: Other meter sizes and configurations are available. Consult Veris for availability.



# NUTATING DISC SERIES

Cost-effective Metering for Industrial Applications



Nutating Disc positive displacement meters are a cost-effective solution for industrial flow monitoring. These devices are available in sizes from 1/2" to 2" and are capable of handling flows up to 170 gallons per minute. Maintenance is fast, easy, and rarely required. The meter houses a measurement chamber that contains a disc. Liquid flowing through the chamber causes this disc to nutate, or wobble. This motion is sensed by a magnet, which transmits flow data.

## SPECIFICATIONS

Max. Flow Rate	170 GPM
Max. Operating Pressure	150 psi
Max. Operating Temp.	49 °C (120 °F)
Operating Temp. Range	0 to 49 °C (32 to 120 °F), optional to 121 °C (250 °F)
Accuracy	±1.5% of full scale
Repeatability	±0.5%
Wetted Materials	Brass, SAN, Noryl, Nylon, Polyethylene, Polypropylene

## WARRANTY

Limited Warranty	1 year
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## Wide flow range

Increased accuracy at high and low flow rates

## Durable components

Minimal maintenance required

## Rugged construction

Rugged bronze or plastic construction

## Increased versatility

Optional pulse output transmitter

## Easy maintenance

No need to remove from the line... reduce costly downtime

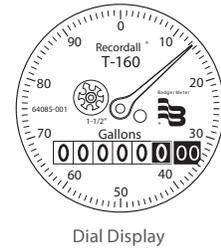
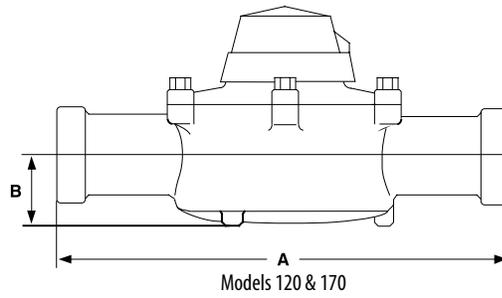
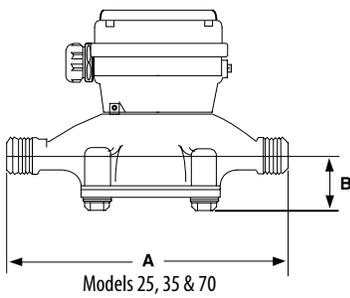
## Simple operation

Mechanical dial display

## APPLICATIONS

- Industrial flow systems
- Inventory and process control of cold and hot systems
- Fuel consumption

**DIMENSIONAL DRAWINGS**



DIMENSIONS IN INCHES WITHOUT REGISTER					FLOW RATE IN GALLONS	
Meter Model	Meter Size	Housing Material	A: Meter Length	B: Center to Baseline	Cold Liquids: 32 to 120°F	Approx. Weight
BGR-M25	5/8"	Bronze	7-1/2"	1-3/8"	1/2 to 25 gpm	5 lbs.
BGR-M35	3/4"	Bronze	9"	1-3/4"	3/4 to 35 gpm	6 lbs.
BGR-M70	1"	Bronze	10-3/4"	2-1/4"	1 to 70 gpm	12 lbs.
BGR-M120	1-1/2"	Bronze	12-5/8"	2-5/8"	2 to 120 gpm	20 lbs.
BGR-M170	2"	Bronze	15-1/4"	3-3/8"	2 to 170 gpm	30 lbs.

Note: Other meter sizes and configurations are available. Consult Veris for availability.

**ORDERING INFORMATION**

Common configurations are shown below with Veris part numbers. For custom configurations, consult Veris for custom configuration part numbers.

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-M25-625LNSA-TS-GAXX	M25-625LNSA-TS-GAXX	Flow, Disc, 1/2"Line, Connections, Pulse Output with Dial Display
BGR-M35-750LNSB-TS-GAXX	M35-750LNSB-TS-GAXX	Flow, Disc, 3/4"Line, Connections, Pulse Output with Dial Display
BGR-M70-100LNSC-TS-GAXX	M70-100LNSC-TS-GAXX	Flow, Disc, 1"Line, Connections, Pulse Output with Dial Display
BGR-M120-150LNSF-TS-GAXX	M120-150LNSF-TS-GAXX	Flow, Disc, 1-1/2"Line, Connections, Pulse Output with Dial Display
BGR-M170-200LNSG-TS-GAXX	M170-200LNSG-TS-GAXX	Flow, Disc, 2"Line, Connections, Pulse Output with Dial Display

Note: Other meter sizes and configurations are available. Consult Veris for availability.



## TURBO SERIES

For Pipe Sizes 2", 3", 4", 6", 8", 10", 12", 16" & 20"



Turbo Series meters are built for long term service with minimal maintenance. The meter is designed to reduce wear by reducing the friction between the moving parts of the rotor and bearing system, resulting in a longer product life.

Water flows into the meter's measuring element, contacting the multi-vaned rotor. The resulting rotor revolutions give flow readings, which are transmitted by magnetic drive couplings.

### SPECIFICATIONS

Flow Range	450: 5 to 450 GPM; 1000: 10 to 1000 GPM (continuous)
Max. Operating Pressure	150 psi
Max. Operating Temp	49 °C (120 °F)
Accuracy	±1.5% of full scale
Repeatability	±0.5%

### WARRANTY

Limited Warranty	1 year
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### Increased versatility

Optional pulse output transmitter

### Low flow sensitivity

Direct drive mechanism...highest low flow sensitivity

### Service in-line

Easy to service in-line...minimize downtime

### Easy operation

Mechanical dial display

### Wide flow range

Suitable for a wide flow range... application flexibility

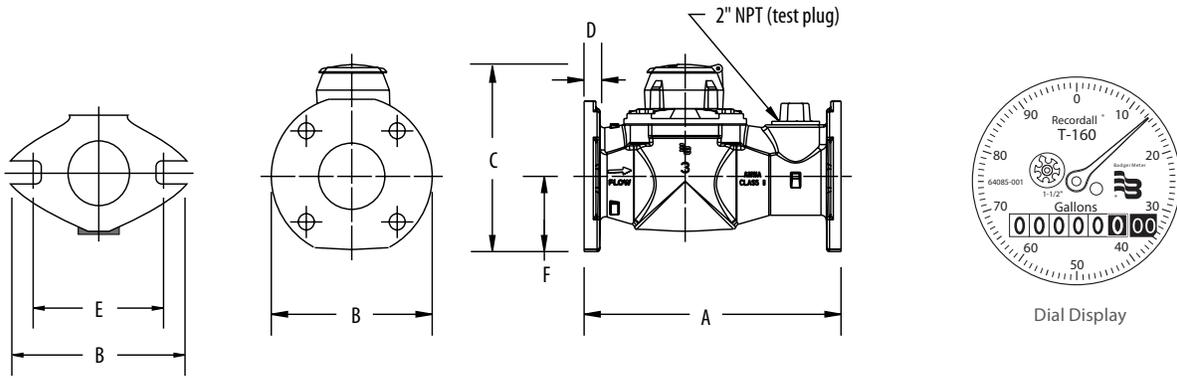
### Reliable bearings

Long lasting ceramic bearings

### APPLICATIONS

- Chemical or industrial fluid monitoring
- Potable cold water with flow in one direction only

**DIMENSIONAL DRAWING**



	2"	4"	6"	8"
Meter Flanges	2" Elliptical	4" Round	6" Round	8" Round
Qty. of Bolts	2	8	8	8
Length (A)	10" (254 mm)	14" (356 mm)	18" (457 mm)	20" (508 mm)
Width (B)	5-27/32" (148 mm)	9" (229 mm)	11" (280 mm)	13-1/2" (343 mm)
Height (C)	6-1/2" (165 mm)	9-21/32" (245 mm)	13-5/16" (338 mm)	15-3/16" (385 mm)
Flange (D)	25/32" (20 mm)	13/16" (21 mm)	7/8" (22 mm)	1" (25 mm)
Bolt Circle (E)	4-1/2" (114 mm)	7-1/2" (191 mm)	9-1/2" (241 mm)	11-3/4" (298 mm)
Centerline (F)	2-1/16" (52 mm)	4-5/16" (109 mm)	5-1/4" (133 mm)	6-3/8" (162 mm)

Note: Other meter sizes and configurations are available. Consult Veris for availability.

**ORDERING INFORMATION**

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-RT-0300BRWPNSC-TS-GA-XXXX	RT-0300BRWPNSC-TS-GA-XXXX	Flow, Turbine, 3", w Conn, RTR Pulser, Gal, Pulse Output with Dial Display
BGR-RT-0400BRWPNSC-TS-GA-XXXX	RT-0400BRWPNSC-TS-GA-XXXX	Flow, Turbine, 4", w Conn, RTR Pulser, Gal, Pulse Output with Dial Display
BGR-RT-0600BRWPNSC-TS-GA-XXXX	RT-0600BRWPNSC-TS-GA-XXXX	Flow, Turbine, 6", w Conn, RTR Pulser, Gal, Pulse Output with Dial Display
BGR-RT-0800BRWPNSC-TS-GA-XXXX	RT-0800BRWPNSC-TS-GA-XXXX	Flow, Turbine, 8", w Conn, RTR Pulser, Gal, Pulse Output with Dial Display

Note: Other meter sizes and configurations are available. Consult Veris for availability.



# B142 SERIES/B3000 MONITOR

Accurately Measures Gas Flow



B142

B3000

B142 Series gas turbine flow meter offers reliable measurement of natural gas flow rates in boiler systems. The stainless steel housing and tungsten carbide shaft and bearings are durable in any compatible environment. The unique wafer style design is fast and easy to install between two 2" ANSI flanges, reducing costly downtime. The B142 meter is compatible with the B3000 flow monitor for a complete flow monitoring system. The B142 is also compatible with most standard computers, simplifying configuration within existing systems.

## B142 METER SPECIFICATIONS

### FLOW MEASUREMENT RANGE

B142-20L	7 to 70 ACFM*; 10 to 100 MCFD**; 423 to 4230 MBH† 365 pulses per ACF (12900 pulses per m³)
B142-20M	14 to 210 ACFM*; 20 to 300 MCFD**; 846 to 12690 MBH† 190 pulses per ACF (6710 pulses per m³)
B142-20H	35 to 350 ACFM*; 50 to 500 MCFD**; 2115 to 21150 MBH† 85 pulses per ACF (3000 pulses per m³)

### SYSTEM

Working Pressure	Vacuum to 2220 psig (15.3 MPa)
Pressure Drop	3" of water column (7.5 mbar) at maximum rated flow rate (dry air)
Pressure Port	1/8" NPTF (plugged)
Operating Temperature Range	-40 to +165 °C (-40 to +330 °F)
Output Voltage	100 mVP-P minimum when used with B111113 magnetic pickup

### ACCURACY

Linearity	±2% of reading over the specified measurement range
Uncertainty	±1% of reading when calibration data is entered into an intelligent monitor/transmitter
Repeatability	±0.5%

## Consistent

Consistent, reliable gas flow measurement

## Wafer mount

Better fit in limited spaces

## Quick response

Lightweight balanced rotor...quick response to changes in flow rate

## No mating flange design

Allows quick and easy installation

## Durable

Reliable performance in harsh environmental conditions

## APPLICATIONS

- Monitor natural gas flow in boilers and other industrial systems

### CONSTRUCTION

Body and Cartridge	316/316L stainless steel
Bearing Mounts	304 stainless steel
Set Screws and Pressure Port Plug	316 stainless steel
Bearings and Rotor Shaft	Tungsten carbide
Rotor	410 stainless steel

### CONNECTIONS

Pickup	Mates with AN3106A-10SL connector
Conduit	1" NPT (25 mm)

### WARRANTY

Limited Warranty	1 year
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### COMPLIANCE INFORMATION

Agency Approvals	UL913; CSA 22.2 No. 157-92; Class 1 Division 1 Groups C, D
Explosion Proof	UL1203; CSA 22.2 No. 30-M1986; Class 1 Division 1 Groups C, D
Seal	ANSI/ISA 12.27.01-2003

### AGENCY APPROVALS



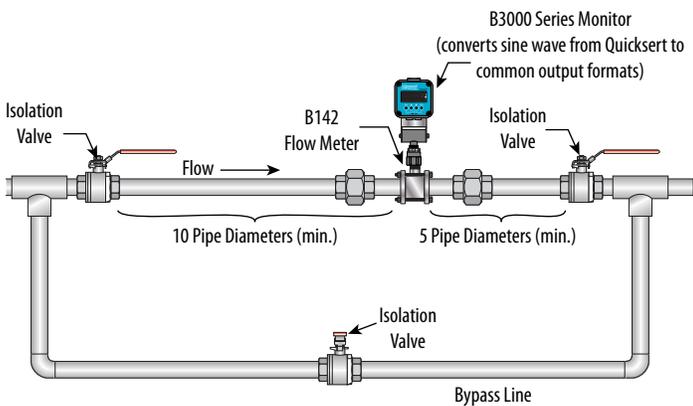
### B3000 MONITOR SPECIFICATIONS

Input Power	Auto switching between internal battery and external loop power; Advanced output models include isolation between loop power and other I/O Battery: 3.6VDC lithium "D Cell" gives up to 6 years of service life Loop: 4 to 20 mA, two-wire, 25 mA limit, non-polarity sensitive, 7 Vdc loop loss
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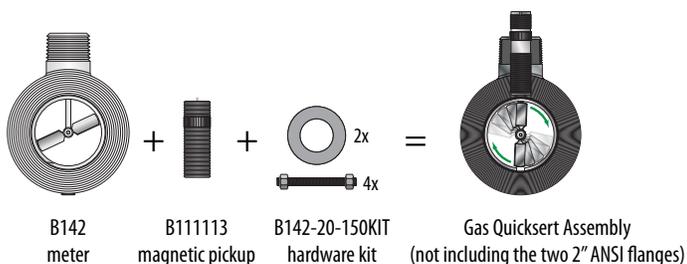
<b>OUTPUTS</b>	
Analog 4 to 20mA	4 to 20 mA, two-wire current loop; 25 mA current limit
Totalizing Pulse	Pulse Type: (selected by circuit board jumper) Opto-isolated (Iso) open collector transistor, Non-isolated open drain FET Maximum Voltage: 28 Vdc Maximum Current Capacity: 100 mA Maximum Output Frequency: 16 Hz Pulse Width: 30 msec fixed
Modbus (Advanced Output Models Only)	Modbus RTU over RS-485, 127 addressable units/2-wire network, 9600 baud, long integer and single precision IEEE754 formats; retrieve: flow rate, job totalizer, grand totalizer, alarm status and battery level; write: reset job totalizer, reset grand totalizer

<b>ENGINEERING UNITS</b>	
Gas	Cubic Feet, Thousand Cubic Feet, Million Cubic Feet, Standard Cubic Feet, Actual Cubic Feet, Normal Cubic Meters, Actual Cubic Meters, Liters
Rate Time	Seconds, minutes, hours, days
Totalizer Exponents	0.00, 0.0, X1, x10, x100, x1000
K Factor Units	Pulses/Gallon, Pulse/cubic meter, pulses/liter, pulses/cubic foot

### APPLICATION EXAMPLE

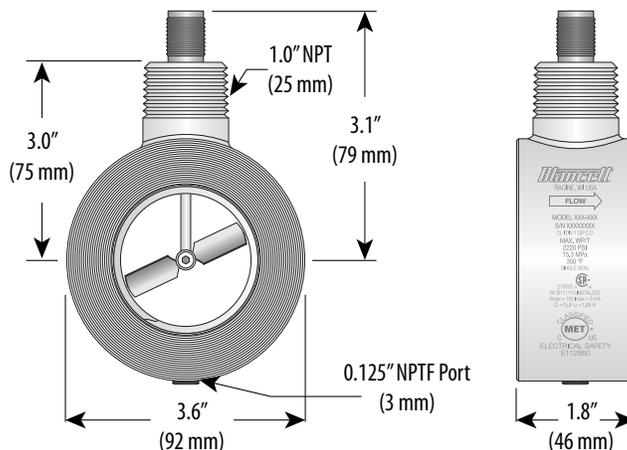


### B142 METER REQUIRED PARTS



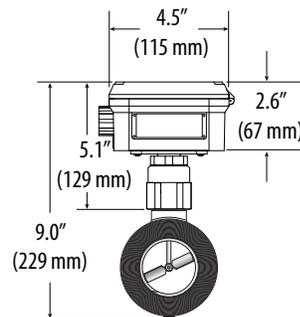
### B142 METER WITH B111113 MAGNETIC PICKUP INSTALLED

Dimensional Drawing



### B142 METER WITH B3000 DISPLAY INSTALLED

Dimensional Drawing



### ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-B142-20L	B142-20L	Flow, Gas, Quicksert, 2", SS, Low Rate, Pulse
BGR-B142-20M	B142-20M	Flow, Gas, Quicksert, 2", SS, Med Rate, Pulse
BGR-B142-20H	B142-20H	Flow, Gas, Quicksert, 2", SS, High Rate, Pulse
BGR-B111113	B111113	Flow, Gas, Quicksert, Magnetic Pickup, SS
BGR-B142-20-150KIT	B142-20-150KIT	Flow, Gas, Quicksert, Bolt and Gasket Kit
BGR-B30AM-CS	B30AM-CS	Flow Monitor, B3000, Advanced Output
BGR-B30BM-CS	B30BM-CS	Flow Monitor, B3000, Standard Output



## VN2000 SERIES

Accurately Measure Steam



The VN2000 Compact Insertion Vortex Flow Meter measures the flow of steam over a large flow range. The meter includes a mounting assembly alignment pin to simplify the installation. The meter is designed for specific pipe sizes and includes parts for installation. The vortex sensing element is CNC machined out of one piece of solid stainless steel and engineered to stand up to abusive environments inside and outside the pipe. The dual ceramic piezoelectric sensors are bonded inside the vortex element, which is press-fit to the stainless steel insertion bar and completely welded together. There are no internal o-rings or seals of any kind and absolutely no leak paths into the sensors or electronics. These sensors do not touch the process fluid, which gives them an almost unlimited life span.

### SPECIFICATIONS

Flow Accuracy	±1% of reading
Repeatability	±0.25% of reading
Straight Run Requirements	Upstream 10 diameters; downstream 5 diameters with one 90° elbow before the meter
Media Temperature	-250 to 400 °F (-120 to 204 °C)
Maximum Pressure	1000 psi (68.9 bar)
Wetted Materials	Stainless steel 304L
Connections	"1-1/2 in. carbon steel mounting assembly Sealing assembly: Two ethylene propylene O-rings"
Sensors	Dual piezo vortex sensors
Units of Measure	Pounds, kilograms, tons, metric tons, cubic feet, cubic meters, gallons, liters
Measurement interval	Second, minute, hour, day

### TRANSMITTER

Display	2×16 characters reflective display, Rotatable display
	Flow rate: 6 digits with decimal; Totalizer
Keypad	4 membrane buttons
Power	14 to 36 V DC; loop powered with 4 to 20 mA option, 28V DC max
Operating Temperature	32 to 140° F (0 to 60° C)
Operating Humidity	5 to 95% relative humidity non-condensing

### Onboard display

Provides several units of measure

### Easy installation

Insertion meter and pipe mounting assembly designed for specific pipe sizes

### Stainless steel construction

Vortex assembly is machined from a single piece and stands up to the abusive environment inside the pipe

### APPLICATIONS

- Steam flow rate or volumetric measurement

### Multiple outputs

4-20mA and pulse outputs standard with optional BACnet and Modbus

### No moving parts or o-rings

No parts to service means long product life

### High temperature

Standard model handles process temperatures up to 400° F (204° C)

Analog Output	One 4 to 20 mA, 10 to 36V max load, 24-bit resolution
Digital Output	One min. input resistance 1000 Ohm; Max output frequency = 12.5 Hz; Opto isolator 5 to 24 Vdc
Communications	Optional via special order: EIA-485 with Modbus RTU or BACnet MS/TP*
Enclosure	General Purpose
Mounting	Integral meter mount; remote mount available via special order*

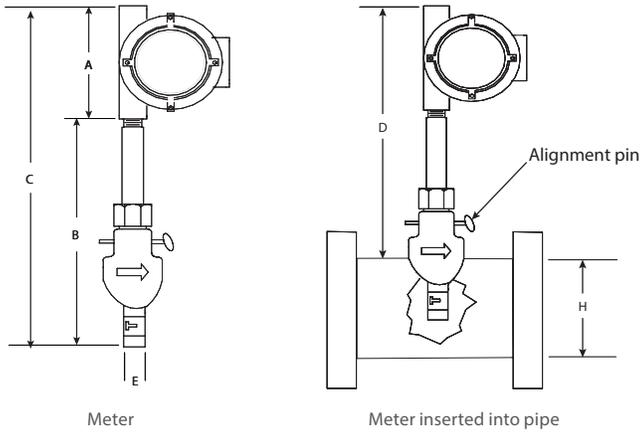
### WARRANTY

Limited warranty	1 year
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\*Other meter sizes and configurations are available. Consult Veris for availability.

### VN2000 METER WITH 1-1/2" NPT CONNECTION

Dimensional Drawing



H	A	B	C	D	E
2" (51 mm)	5" (127 mm)	11" (279 mm)	16" (406 mm)	15" (381 mm)	1.25" (32 mm)
3" (76 mm)	5" (127 mm)	11" (279 mm)	16" (406 mm)	14.5" (368 mm)	1.25" (32 mm)
4" (102 mm)	5" (127 mm)	12" (305 mm)	17" (432 mm)	15" (381 mm)	1.25" (32 mm)
6" (152 mm)	5" (127 mm)	13" (330 mm)	18" (457 mm)	15" (381 mm)	1.25" (32 mm)
8" (203 mm)	5" (127 mm)	14" (356 mm)	19" (483 mm)	15" (381 mm)	1.25" (32 mm)

### SATURATED STEAM FLOW RATES (LBS/HR)

PIPE LINE SIZE	5 PSIG 0.0486 LB/FT <sup>3</sup>	50 PSIG 0.1503 LB/FT <sup>3</sup>	100 PSIG 0.2577 LB/FT <sup>3</sup>	150 PSIG 0.3614 LB/FT <sup>3</sup>	200 PSIG 0.4688 LB/FT <sup>3</sup>	300 PSIG 0.6481 LB/FT <sup>3</sup>	400 PSIG 0.8613 LB/FT <sup>3</sup>
2"	58.38 (min.) 1019 (max.)	124.0 (min.) 3152 (max.)	177.7 (min.) 5404 (max.)	222.7 (min.) 7580 (max.)	264.9 (min.) 9832 (max.)	328.7 (min.) 13592 (max.)	397.4 (min.) 18064 (max.)
3"	128.6 (min.) 2244 (max.)	273.2 (min.) 6945 (max.)	391.4 (min.) 11905 (max.)	490.5 (min.) 16698 (max.)	583.5 (min.) 21662 (max.)	724.2 (min.) 29944 (max.)	875.5 (min.) 39797 (max.)
4"	221.5 (min.) 3865 (max.)	470.5 (min.) 11959 (max.)	674.0 (min.) 20501 (max.)	844.7 (min.) 28755 (max.)	1005 (min.) 37302 (max.)	1247 (min.) 51565 (max.)	1508 (min.) 68531 (max.)
6"	502.6 (min.) 8771 (max.)	1068 (min.) 27140 (max.)	1530 (min.) 46525 (max.)	1917 (min.) 65256 (max.)	2280 (min.) 74653 (max.)	2830 (min.) 117021 (max.)	3421 (min.) 155525 (max.)
8"	870.4 (min.) 15188 (max.)	1849 (min.) 46997 (max.)	2649 (min.) 80564 (max.)	3319 (min.) 112999 (max.)	3949 (min.) 146586 (max.)	4900 (min.) 202637 (max.)	5924 (min.) 269310 (max.)

Note: Other meter sizes and configurations are available. Consult Veris for availability.

### ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
BGR-VCA020-C-S-S-W-V-E-WW-SSSG	VCA020-C-S-S-W-V-E-WW-S-S-S-G	Flow,Vortex,2",Steam,Insertion,4-20mA/Pulse
BGR-VCA030-C-S-S-W-V-E-WW-SSSG	VCA030-C-S-S-W-V-E-WW-S-S-S-G	Flow,Vortex,3",Steam,Insertion,4-20mA/Pulse
BGR-VCA040-C-S-S-W-V-E-WW-SSSG	VCA040-C-S-S-W-V-E-WW-S-S-S-G	Flow,Vortex,4",Steam,Insertion,4-20mA/Pulse
BGR-VCA060-C-S-S-W-V-E-WW-SSSG	VCA060-C-S-S-W-V-E-WW-S-S-S-G	Flow,Vortex,6",Steam,Insertion,4-20mA/Pulse
BGR-VCA080-C-S-S-W-V-E-WW-SSSG	VCA080-C-S-S-W-V-E-WW-S-S-S-G	Flow,Vortex,8",Steam,Insertion,4-20mA/Pulse

Note: Other meter sizes and configurations are available. Consult Veris for availability.



# FC-5000 SERIES

Displays Flow Rate, Flow Total and Energy



FC-5000

The Badger Meter® FC-5000 is a microprocessor-driven device designed for energy/BTU and flow monitoring. The FC-5000 BTU Monitor is compatible with the complete line of Badger Meter industrial flow meters and temperature sensors, creating a solution to monitor hydronic energy usage, flow rate and totals. Many years of experience in the industrial market has allowed Badger Meter to incorporate features indispensable in control operations

## SPECIFICATIONS

FC-5000 Series

<b>Power Supply</b>	
Input Range	10 to 40Vdc, 9 to 28Vac RMS (50 to 60 Hz)
Max. Power Consumption	8 W (power supply must provide 8 W min.)
Additional Parameters	Isolated from power ground Over-voltage, transient and reverse polarity protected
<b>Flow Meter Inputs</b>	
Independent Channels	1
Input Range	0.3 Hz to 10 kHz
Configuration Options	Square wave 0 to 30V pulse with 2.5V threshold, Sine wave, zero-centered with 45 mV threshold, Configurable debounce
Excitation Output	12 Vdc source
Voltage	Low: -0.3 to 1.85 Vdc High: 2.5 to 25 Vdc
Impedance	Pullup to 12 Vdc
Vdc Current	±50 mA, short circuit current
Response	100 µs/3.5 ms min pulse (high/low speed)
<b>Temperature Inputs</b>	
Independent Channels	2
RTD Specifications	50 µA/1000 µA excitation current source 2, 3 and 4-wire compatible (Platinum, 100 and 1000 Ω RTDs, optional two-point or customizable calibration configuration) Callendar-Van Dusen coefficients
Thermistor Specs	Type II thermistors or customizable calibration configuration, Steinhart-Hart coefficients

## Enhanced viewing

Large, backlit graphical display

## Intuitive navigation

Integrated softkeys and full numeric keypad

## Programmable scaled outputs

Outputs transmit rate, total or temperature data via dedicated output channels

## Programmable relays

Enables alarms or totalizing output capabilities for rates, totals and temperatures

## Plug & play terminals

Easy, user-friendly installation

## Rugged application

Robust enclosure, keypad and mechanical relays

## APPLICATIONS

- Interfacing and displaying sensor data
- Energy monitoring, communication, and management

### Scaled Outputs

Independent Channels	2
Analog Output (Option A)	Configurable to 0 to 5V, 0 to 10V or 4 to 20 mA; Uncertainty: ±0.1% of reading; 16-bit resolution (0 to 10V and 4 to 20 mA), 15-bit resolution (0 to 5V); 200 ms, 90-10% step response; Sourcing analog output signal
Frequency Output (Option F)	TTL, 1 to 4000 Hz, square wave; Uncertainty: ±0.01% reading; Resolution: 0.01 Hz
Additional Parameters	Isolated from power ground Over-voltage, transient and reverse polarity protected Output is multiplexed on the process out pins

### Digital I/O

Independent Channels	6
Additional Parameters	Isolated from power ground Over-voltage, transient and reverse polarity protected 0 to 30V as input Debounce 0 to 5V, TTL, 200 ms 90-10% step response, driving < 0.1 uF

### CALCULATIONS

Flow Calculation	Uncertainty: ± 0.01% Adjustable FIR/IIR filtering
BTU Calculation	Meets EN 1434 requirements

**SPECIFICATIONS (CONT.)**

FC-5000 Series

**RELAY OUTPUTS**

Configuration (Option C)	Two Form C mechanical relays
Configuration (Option A)	One Form C mechanical relay One Form A solid state relay
Form C Relay	Load: Resistive Rated carry current: 5A (N.C. or N.O.) Max. switching voltage: 250 Vac, 30 Vdc Min. permissible load: 10 mA at 5 Vdc Coil rating: 5 to 24 Vdc Life expectancy: 5,000,000 operations
Form A Relay (N.O. SPST)	Switching speed: On (0.25 ms), Off (0.02 ms) Current rating (IO): 1A Max. output voltage (VO): 60V Output On-Resistance (R(ON)): 0.5 Ω @ IF = 5 mA, IO = 1 A Output Withstand Voltage (VO(OFF)): 60-65V @ VF = 0.8V, IO = 250 μA, TA = 77° F (25° C)
Additional Parameters	Isolated coil drivers Over-voltage, transient and reverse polarity protected

**NETWORK COMMUNICATIONS**

Protocols	Modbus RTU, Modbus ASCII or BACnet
Physical Layer	EIA-485 (RS-485)
Baud Rates	1200 to 115.2K
Additional Parameters	Two-wire (half-duplex) Over-voltage/ESD Protection Isolated from power ground

**USB COMMUNICATIONS**

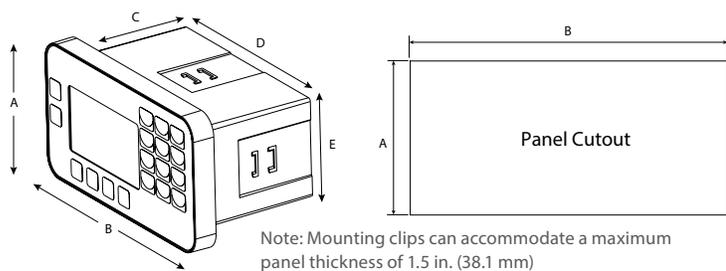
USB (Host)	Type A receptacle (currently not supported)
USB (Device)	Mini-B receptacle (used for field updates)
Additional Parameter	Over-voltage/ESD/transient protected

**DISPLAY/USER INTERFACE**

Keypad	Membrane overlay, domed tactile response keys, keypad interface is protected from ESD
Display	128 x 64 pixel LCD graphical display, LED backlit
Additional Parameter	Protected from EMI/RFI

**PANEL MOUNT**

Dimensional Drawing



**ENVIRONMENTAL RATINGS**

Pollution Degree	2
Altitude	Up to 2000 m (6561 ft)
Over-Voltage Rating	Category II
Ambient Temp.	32 to 130° F (0 to 55° C)
Storage Temp.	-40 to 160° F (-40 to 70° C)
Humidity	0 to 85%, non-condensing

**WEIGHTS (APPROX.)**

Panel Mount	1.25 lb (0.57 kg)
Wall Mount (Including Unit)	4.54 lb (2.06 kg)

**OPERATOR FUNCTIONS**

Operator Functions	Unlatch relays, reset totalizers, unlatch relays and reset totalizers
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**PARAMETERS**

Max. Displayed Digits	Rates: Max 8 (7 with decimal) Totals: Max 9 (8 with decimal)
Resolution/Display Precision	Configurable, 0 to 4
Volumetric Flow Rate Units	US Gallons (US GAL), Imperial Gallons (I GAL), Mega US Gallons (US MGAL), Mega Imperial Gallons (I MGAL), Liters (L), Mega Liters (ML), Cubic Meters (M3), Cubic Feet (FT3), Acre Feet (AC-FT), Oil Barrels (OBBL), Liquid Barrels (LBBL), US Ounces (US OZ), Imperial Ounces (I OZ), Custom (user-specified)
Energy Units	kBTU, BTU, KW, TONS (RT), Custom (user-defined)
Temperature Units	° F (Fahrenheit), ° C (Celsius), R (Rankine) or K (Kelvin)

**WARRANTY**

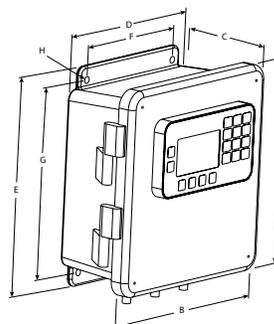
Limited Warranty	1 year
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**AGENCY APPROVALS**

Approvals	CE Marked for Low Voltage Directive and RoHS CSA Marked per Class C225286 and C225206, Process Control Equipment CSA C22.2 No. 61010-1-12, General requirements CAN/CSA-C22.2 No. 61010-1-12 Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements — Tri-national standard with UL 61010-1 and ANSI/ISA-61010-1 (82.02.01)
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**WALL MOUNT**

Dimensional Drawing



	A	B	C	D	E	F	G	H
	HEIGHT	WIDTH	DEPTH	WIDTH	HEIGHT	WIDTH	HEIGHT	HOLE DIA.
Panel Cutout	2.65 (67.31)	5.40 (137.16)	-	-	-	-	-	-
FC-5000 Unit	3.50 (89.00)	6.22 (158.00)	3.07 (78.00)	5.38 (136.65)	2.54 (64.52)	-	-	-
Wall Mount Unit	9.38 (238.25)	9.38 (238.25)	4.88 (123.95)	8.00 (203.20)	9.56 (242.83)	6.00 (152.40)	8.75 (222.25)	0.31 (7.87)

Note: All measurements: in. (mm)

**CONTINUED NEXT PAGE**



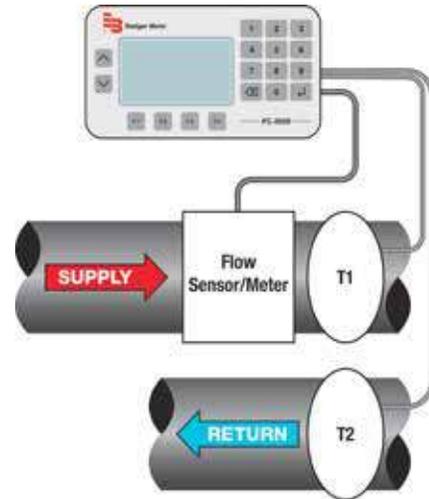
**FC-5000 SERIES, CONTINUED**

**OPERATION**

Input signal—in the form of sine waves or pulses from open collector transistors or dry contact closures—can be scaled to any unit of measure for totalization and instantaneous rate-of-flow indication. Energy rate and flow totals are examples of parameters that can be viewed on the panel display or through communications protocols such as BACnet or Modbus.

Two temperature sensor inputs can be configured to read RTDs or thermistors and are fully customizable to adapt to application needs. When used in conjunction with fluid flow, hydronic energy rates and total usage are achieved, while conforming to EN1434 standards.

Additionally, dedicated analog or frequency output channels provide scaled outputs that are assignable to parameters such as energy rate, total and temperature. A user defined damping function can be applied for improved stability of the flow readings.



**VIEWING CAPABILITIES**

Single Display



- Flow Rate
- Flow Total
- Energy/BTU Rate
- Energy/BTU Total

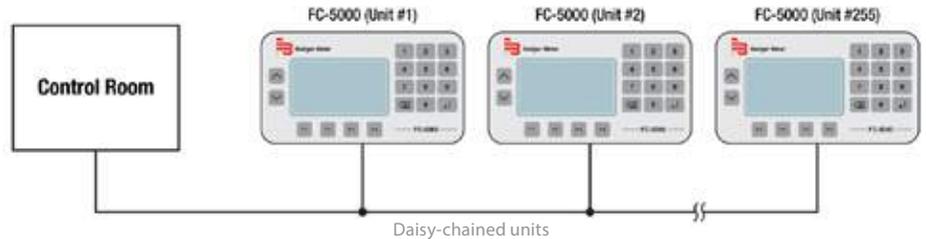
Dual Display



- Flow Rate and Flow Total
- Energy/BTU Rate and Energy/BTU total

**EIA-485 (RS-485) NETWORK**

All FC-5000 BTU Monitors come equipped with an EIA-485 (RS-485) physical layer, and use BACnet or Modbus RTU protocols, selectable and programmed in the firmware. Up to 255 FC-5000 products can be run on a single daisy-chain network and be individually queried for flow/energy rate, positive flow/energy accumulator, supply temperature, return temperature and other information.



**ORDERING INFORMATION**

FC-5000 Flow Display, Frequency Output

Frequency Output	Flow Display	Sensor Inputs	Scaled Outputs	Relay Outputs	Digital I/O	Comm.	Mount
BGR - <input type="checkbox"/> FC5	- <input type="checkbox"/> FD	- <input type="checkbox"/>	- <input type="checkbox"/> F	- <input type="checkbox"/>	- <input type="checkbox"/> 6	- <input type="checkbox"/> A	- <input type="checkbox"/>
		P0 = 1 Pulse P3 = 2 Pulse*	F = 2 Frequency Outputs	A = 1 Form C Relay/ 1 Form A Relay C = 2 Form C Relays*		A = EIA-485 (RS-485), Modbus, BACnet, USB	P = Panel Mount W = Wall Mount (includes NEMA 4X IP67 rated enclosure)
<p>Example: <input type="checkbox"/> BGR - <input type="checkbox"/> FC5 - <input type="checkbox"/> FD - <input type="checkbox"/> P3 - <input type="checkbox"/> F <input type="checkbox"/> A <input type="checkbox"/> 6 <input type="checkbox"/> A - <input type="checkbox"/> P *Special order.</p>							

FC-5000 Flow Display, Analog Output

Frequency Output	Flow Display	Sensor Inputs	Scaled Outputs	Relay Outputs	Digital I/O	Comm.	Mount
BGR - <input type="checkbox"/> FC5	- <input type="checkbox"/> FD	- <input type="checkbox"/>	- <input type="checkbox"/> A	- <input type="checkbox"/>	- <input type="checkbox"/> 6	- <input type="checkbox"/> A	- <input type="checkbox"/>
		P1 = 1 Pulse P2 = 2 Pulse*	A = 2 Analog Outputs	A = 1 Form C Relay/ 1 Form A Relay C = 2 Form C Relays*		A = EIA-485 (RS-485), Modbus, BACnet, USB	P = Panel Mount W = Wall Mount (includes NEMA 4X IP67 rated enclosure)
<p>Example: <input type="checkbox"/> BGR - <input type="checkbox"/> FC5 - <input type="checkbox"/> FD - <input type="checkbox"/> P2 - <input type="checkbox"/> A <input type="checkbox"/> A <input type="checkbox"/> 6 <input type="checkbox"/> A - <input type="checkbox"/> W *Special order.</p>							

## O2 SERIES

### Electronic Flow Meter with Scaled Pulse Output



O2 Series

The FLOMEC® O2 Series is a lightweight, accurate and reliable turbine meter. Choose the O2 Series for thin viscosity fluid applications.

- Aluminum or nylon housing
- Virtually maintenance free
- Display powered by two AAA batteries
- Offers one pulse per unit (gallons or liters)

#### SPECIFICATIONS

Fitting Size / Fitting Type	1 inch / BSPT (female) 1 inch / NPT (female)
Flow Rate	3 to 30 GPM 11 to 113 LPM
Accuracy (% of Reading)	± 5.0%
Pressure Rating	150 PSIG / 10.3 BAR
Operating Temperature Range	14 to 130 °F (-10 to 55 °C)
Pulse Out Description	Open Collector (also known as NPN or Current Sinking)
Pulse Duration	250 msec
Pulse Amplitude	5 to 30 Vdc
Scaling	One pulse per gallon or liter
Cable Length	5 ft. (1.5 m)
Wetted Materials (Aluminum)	Housing: Aluminum Bearings: Ceramic Shaft: Tungsten carbide Rotor: Nylon Rings: 316 stainless steel Signal generator: Ferrite
Wetted Materials (Nylon)	Housing: Nylon Bearings: Ceramic Shaft: Tungsten carbide Rotor: Nylon Rings: 316 stainless steel Signal generator: Ferrite
Limited Warranty	2 years
Approvals	CE



Note: FLOMEC is a registered trademark of Great Plains Industries, Inc., the manufacturer of the devices shown.

### Complete meter

Includes turbine assembly, microprocessor and LCD readout

### Easy installation

Lightweight, compact design

### Remote monitor

Remote monitor option to connect to an external system (NPN Open Collector Pulse)

### Battery powered

Display powered by two AAA alkaline batteries that are easy to replace, with the meter installed

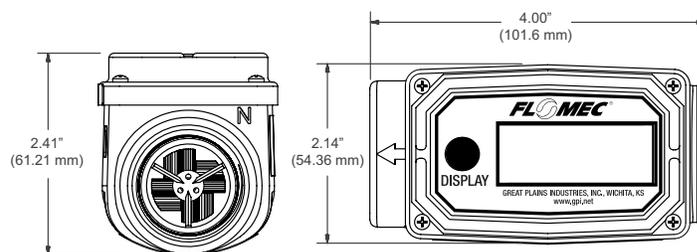
### Totalization

Batch (resettable to measure flow during a single use) and Cumulative (non-resettable, to provide continuous measurement)

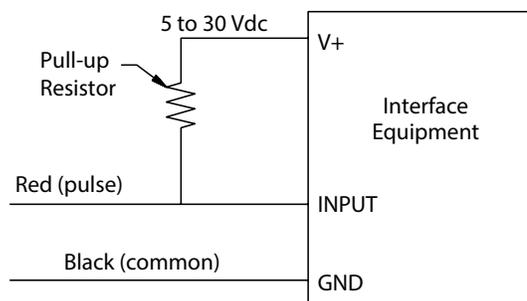
#### APPLICATIONS

- Building automation (chillers)
- Consumption baselining

#### DIMENSIONAL DRAWING



#### INTERNAL PULL-UP RESISTOR



Note: Some interface devices may not have an internal pull-up resistor. Use a minimum 820 Ω resistor if necessary.

#### ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
FLO-02N31GM	02N31GM	Nylon flow meter, digital pulse, 1-inch NPT inner, gallons, display
FLO-02N12LM	02N12LM	Nylon flow meter, digital pulse, 1 inch BSPT inner, liters, display
FLO-02A31GM	02A31GM	Aluminum flow meter, digital pulse, 1-inch NPT inner, gallons, display
FLO-02A12LM	02A12LM	Aluminum flow meter, digital pulse, 1-inch BSPT inner, liters, display



## QSE SERIES

### Electromagnetic Flow Meter



The FLOMEC® QSE Mag Series is a dependable, highly accurate electromagnetic flow meter designed for flow and usage monitoring in commercial applications.

The Noryl® housing and flow tube offer a lightweight, easy-to-install mag meter that is resistant to heat (210 °F / 99 °C) and is compatible with many water-based liquid solutions.

The QSE Mag Meter monitors flow rate and total flow in a wide variety of applications including HVAC and water reclamation.

Meters without display are configured wirelessly using the FLOMEC app. The app is available through the Google Play™ store, for Android systems only.

### SPECIFICATIONS

Fitting Size/Fitting Type	NPT, BSP 1/2" to 2" - NPT (male), BSP (male) (Rc thread) 3" and 4" 150# ANSI flanged, polymer
Recommended Plastic Flange Bolt Torque	25 ft.-lbs. (33.89 N-m)
Pipe Sizes	1/2", 3/4", 1", 1-1/2", 2", 3", 4"
Pressure Rating	150 PSI @ 73 °F (10 BAR @ 23 °C)
Accuracy	±0.5% of reading between 0.25 fps and 15 fps (reference owner's manual for complete accuracy specifications)
Operating Temperature Range	1/2" to 2": 32 to 210 °F (0 to 98 °C) 3" to 4": 32 to 180 °F (0 to 82 °C)
Ambient Temperature Range	0 to 140 °F (-18 to 60 °C)
Power Supply	Externally powered Voltage supply (min.): 12 Vdc or Vac Voltage supply (max.): 30 Vdc or Vac
Consumption	Max. current consumption: 150mA
Wetted Materials	Body: Noryl Electrodes: 316L SS Seals: NBR o-rings

### Economical

Low investment and operating costs

### Modified bore

Slightly modified bore permits unobstructed flow, minimizes flow disturbances and straight pipe requirements

### 7 line sizes

1/2", 3/4", 1", 1-1/2", 2", 3" and 4"

### Highly accurate

± 0.5% accuracy of reading (from 0.25 fps to 15 fps)

### Durable

Non-intrusive, no moving parts to wear out, maintenance, repair costs low and tolerates high flows without damage

### Wireless

Configure and monitor meters without display through Android app

### APPLICATIONS

- HVAC
- EMS (Energy Management Systems)
- BAS (Building Automation Systems)
- Chilled water
- Domestic water (hot and cold)
- Energy sub-metering (BTU hot and cold)
- Process (blow down, make up, boiler feed, etc.)

Frequency Range (all sizes)	10 Hz min. 3,000 Hz max. (with blind pulse out)
Calibration Report	Standard NIST available
Limited Warranty	2 years
Approvals	NEMA 6P (pending), IP67, CE, NIST, NSF, Canadian Standards Association



Note: FLOMEC is a registered trademark of Great Plains Industries, Inc., the manufacturer of the devices shown.

## ORDERING INFORMATION

VERIS PART #	MANUF. PART #	DESCRIPTION
<b>FLOW WITH DISPLAY</b>		
FLO-QSE05NPT42XXXA	QSE05NPT42XXXA	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,1/2inch,NPT_outer-thd
FLO-QSE05BSP42XXXA	QSE05BSP42XXXA	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,1/2inch,BSP_outer-thd
FLO-QSE07NPT42XXXA	QSE07NPT42XXXA	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,3/4inch,NPT_outer-thd
FLO-QSE07BSP42XXXA	QSE07BSP42XXXA	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,3/4inch,BSP_outer-thd
FLO-QSE10NPT42XXXA	QSE10NPT42XXXA	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,1inch,NPT_outer-thd
FLO-QSE10BSP42XXXA	QSE10BSP42XXXA	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,1inch,BSP_outer-thd
FLO-QSE15NPT42XXXD	QSE15NPT42XXXD	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,1-1/2inch,NPT_outer-thd
FLO-QSE15BSP42XXXD	QSE15BSP42XXXD	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,1-1/2inch,BSP_outer-thd
FLO-QSE20NPT42XXXD	QSE20NPT42XXXD	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,2inch,NPT_outer-thd
FLO-QSE20BSP42XXXD	QSE20BSP42XXXD	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,2inch,BSP_outer-thd
FLO-QSE30FAP42XXXB	QSE30FAP42XXXB	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,3inch,flange
FLO-QSE40FAP42XXXC	QSE40FAP42XXXC	Noryl,MagFlowmeter,Display,pulse+4-20mA-out,4inch,flange
<b>BTU WITHOUT DISPLAY*</b>		
FLO-QSE05NPTQBQ11A	QSE05NPTQBQ11A	Noryl,MagBTUFlowmeter,Modbus+pulse-out,1/2inch,NPT_outer-thd
FLO-QSE05BSPQBQ11A	QSE05BSPQBQ11A	Noryl,MagBTUFlowmeter,Modbus+pulse-out,1/2inch,BSP_outer-thd
FLO-QSE07NPTQBQ11A	QSE07NPTQBQ11A	Noryl,MagBTUFlowmeter,Modbus+pulse-out,3/4inch,NPT_outer-thd
FLO-QSE07BSPQBQ11A	QSE07BSPQBQ11A	Noryl,MagBTUFlowmeter,Modbus+pulse-out,3/4inch,BSP_outer-thd
FLO-QSE10NPTQBQ11A	QSE10NPTQBQ11A	Noryl,MagBTUFlowmeter,Modbus+pulse-out,1inch,NPT_outer-thd
FLO-QSE10BSPQBQ11A	QSE10BSPQBQ11A	Noryl,MagBTUFlowmeter,Modbus+pulse-out,1inch,BSP_outer-thd
FLO-QSE15NPTQBQ11D	QSE15NPTQBQ11D	Noryl,MagBTUFlowmeter,Modbus+pulse-out,1-1/2inch,NPT_outer-thd
FLO-QSE15BSPQBQ11D	QSE15BSPQBQ11D	Noryl,MagBTUFlowmeter,Modbus+pulse-out,1-1/2inch,BSP_outer-thd
FLO-QSE20NPTQBQ11D	QSE20NPTQBQ11D	Noryl,MagBTUFlowmeter,Modbus+pulse-out,2inch,NPT_outer-thd
FLO-QSE20BSPQBQ11D	QSE20BSPQBQ11D	Noryl,MagBTUFlowmeter,Modbus+pulse-out,2inch,BSP_outer-thd
FLO-QSE30FAPQBQ12B	QSE30FAPQBQ12B	Noryl,MagBTUFlowmeter,Modbus+pulse-out,3inch,Flange
FLO-QSE40FAPQBQ12C	QSE40FAPQBQ12C	Noryl,MagBTUFlowmeter,Modbus+pulse-out,4inch,Flange

\*Products without display are configured wirelessly using the FLOMEC app.





# HUMIDITY MONITORING

Veris offers a complete line of sensors for commercial/industrial relative humidity monitoring applications. Our sensors include a factory-calibrated humidity sensing element, fully replaceable (on deluxe models) for long-term cost savings. All humidity sensors provide superior accuracy, excellent stability, and easy serviceability. Accuracy choices include 2%, 3%, and 5%, with 1% or 2% NIST traceability available on selected units. LCD displays are available on some models for easy viewing. Add temperature sensing for greater application flexibility.

MODEL	DESCRIPTION	PAGE
HW2	Wall Mount Analog Humidity Sensors	125
HW2xP	Wall Mount Protocol Humidity Sensors	127
HEW	Economy Wall Humidity Sensors	129
HD/HO	Deluxe Duct and Outdoor Humidity Sensors	131
HN/HP	Specialty Humidity Sensors	133
HED	Economy Duct Humidity Sensors	135
HS	Replaceable Humidity Elements	137

## HUMIDITY SENSOR SELECTION GUIDE

	WALL MOUNT	DUCT MOUNT	OUTDOOR MOUNT	PROBE
Analog Output	HW2, HEW pages 125, 129	HD, HED pages 131, 135	HO page 131	HN/HP page 133
Protocol Communication	HW2xP page 127			
NIST Traceable Accuracy Down to 1%	HW2, HW2xP pages 125, 127	HD page 131	HO page 131	HN/HP page 133
Resistive Temperature Sensing	HW2 page 125	HD page 131	HO page 131	HN/HP page 133
LCD Display	HW2L, HW2xPL pages 125, 127			
Touchscreen Display	HW2T, HW2xP pages 125, 127			



# TOUCHSCREEN DISPLAY FOR OPTIMAL ENVIRONMENTAL CONTROL

HW2 Series Wall Humidity Sensors

## APPLICATIONS

- » Control HVAC systems for improved comfort and energy savings
- » Facilitate ASHRAE compliance standards for environmental control and indoor air quality
- » Flexible housing can also be used to measure Temperature, CO<sub>2</sub> and VOC



TOUCHSCREEN

LCD

NON-DISPLAY

## FEATURES

### INTERCHANGEABLE FIELD-REPLACEABLE ELEMENT

Fully interchangeable element (1%-2% accuracy) with no calibration required!  
Field replaceable to maintain accuracy while minimizing downtime

### MODERN AESTHETIC WITH THREE DISPLAY OPTIONS

Touchscreen, LCD, or Non-Display

### MULTI-SENSOR FLEXIBILITY

Humidity and temperature sensors included with all HW2 Series sensors  
Save time in the field and stock fewer devices  
Suitable for new construction and retrofit/remodel

### EASY TO INSTALL

Large wiring terminals and snap-on covers simplify installation and servicing  
Calibration-free interchangeable NIST traceable HS element



# HW2 SERIES

## Wall Mount Humidity Sensors



The HW2 Series of humidity sensors for living space is a flexible multisensor platform for use with BAS controllers designed to accept 4 to 20mA, 0 to 5Vdc or 0 to 10Vdc outputs. HW2 Series sensors are available with three user interface options: touchscreen, LCD with three buttons and blank. Humidity and temperature sensors are included with all HW2 Series sensors.

### SPECIFICATIONS

OPERATING ENVIRONMENT	
Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Analog Output	Selectable 4 to 20 mA, 0 to 5 V, 0 to 10 V
Operating Temperature Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing Material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)

RH TRANSMITTER	
HS Sensor	Thin-film capacitive, replaceable
Accuracy	±2% from 10 to 80% RH @ 25°C (77 °F)
Hysteresis	1.5% typical
Stability	±1% @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (77 °F) typical

TEMPERATURE TRANSMITTER OPTION	
Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)

DISPLAY MODELS	
Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240x300 px Setpoint: 0-10 Vdc. Temperature, humidity or fan speed selectable Timeout override: Display timeout* Lockout override: Touchscreen/button lockout*
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: 0-10Vdc. Temperature, humidity or fan speed selectable Timeout override: Display timeout* Lockout override: Touchscreen/button lockout*

## Sensor element

Thin-film capacitive sensor element recovers from 100% saturation

## Field replaceable

Replace element in the field... maintain accuracy and minimize downtime

## Interchangeable element

Fully interchangeable element to 1% or 2% accuracy with NIST calibration certificate...no calibration

## Easy to install

Large wiring terminals on baseplate and snap-on covers with security screw simplify installation and service

## Flexible

Polarity insensitive, two-wire 4 to 20 mA or 3-wire 0-5/0-10 Vdc versions...flexible systems compatibility...save time in the field, stock fewer devices

## Calibration free

Calibration-free interchangeable NIST traceable HS element

### APPLICATIONS

- Controlling HVAC systems for improved comfort and energy savings
- Museums, schools, printing shops, and other locations requiring humidity control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

SETPOINTS**	
Temperature Setpoint	0 to 10V output Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Humidity Setpoint	0 to 10V output Scale: 0 to 100% RH
Fan Speed Setpoint	0 to 10V output Off 0V, Low 3.3V, Med. 6.7V, High 10.0V

OVERRIDE	
Override Button	Display models feature momentary-to-ground override button

WIRING TERMINALS	
Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbf) max.

WARRANTY	
Limited Warranty	5 years

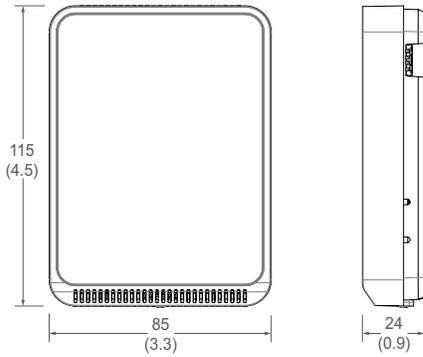
COMPLIANCE INFORMATION	
Agency Approvals	UL 916, European conformance CE: EN61000-6-2, EN61000-6-3, EN61000 Series - industrial immunity EN 61326-1, FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)



\*DIP switch selectable.  
\*\* One setpoint type is selectable via DIP switch on display models only.



**DIMENSIONAL DRAWING**

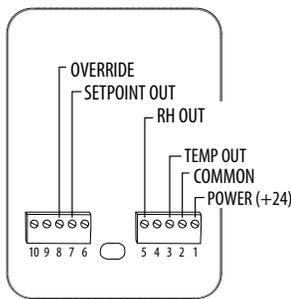


**USER INTERFACE TYPES**



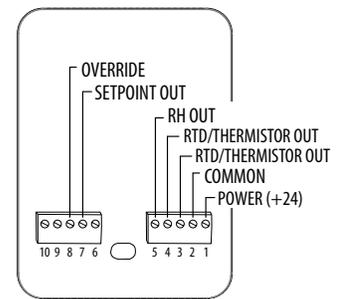
**HW2L/HW2T DISPLAY MODELS WITH TEMP TRANSMITTER**

Wiring Diagram



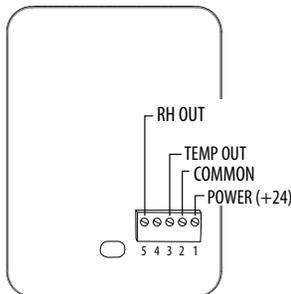
**HW2L/HW2T DISPLAY MODELS WITH RTD/THERMISTOR**

Wiring Diagram



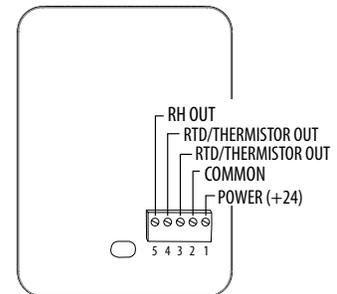
**HW2X WITH TEMP TRANSMITTER**

Wiring Diagram



**HW2X WITH RTD/THERMISTOR**

Wiring Diagram



**ORDERING INFORMATION**

<p>HW2</p> <p>User Interface</p> <p>T = Color touchscreen L = 3-button LCD display X = None</p>	<p>Output</p> <p>A = Analog output</p>	<p>RH Accuracy*</p> <p>2 = 2%</p>	<p>Temperature</p> <p>A = Transmitter only C = 1000 PT RTD D = 10K T2 thermistor G = 10K CPC thermistor** H = 10K T3 thermistor K = 10K curve G/11K shunt M = 20K NTC thermistor N = 1.8K TAC thermistor R = 10K curve G***</p>	<p>Example:</p> <p>HW2 T A 2 A</p> <p>* Replaceable 1% with NIST certificate, 2% with NIST certificate and 2% elements available. ** Available in HW2XA2G only. *** Available in HW2XA2R only.</p>
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**REPLACEABLE RH ELEMENTS**

MODEL	RH ACCURACY	CALIBRATION CERTIFICATE	DESCRIPTION
HS1N	±1%	X	Replaceable RH sensor, 1% with NIST certification
HS2N	±2%	X	Replaceable RH sensor, 2% with NIST certification
HS2X	±2%		Replaceable RH sensor, 2%



# HW2 PROTOCOL SERIES

## Wall Mount Humidity Sensors



The HW2 Protocol Series of humidity sensors for living space is a flexible multisensor platform for use with BAS controllers designed to accept BACnet and Modbus outputs. HW2 Protocol Series sensors are available with three user interface options: touchscreen, LCD with three buttons and blank. Humidity and temperature sensors are included with all HW2 Protocol Series sensors.

### SPECIFICATIONS

#### OPERATING ENVIRONMENT

Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Protocol Output	BACnet or Modbus via RS-485, selectable
Operating Temperature Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)

#### RH TRANSMITTER

HS Sensor	Thin-film capacitive, replaceable
Accuracy	±2% from 10 to 80% RH @ 25°C (77 °F)
Hysteresis	1.5% typical
Stability	±1% @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (77 °F) typical

#### TEMPERATURE TRANSMITTER

Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)

#### DISPLAY MODELS

Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240x300 px Setpoint: Temperature, humidity or fan speed selectable Timeout override: Display timeout Lockout override: Touchscreen/button lockout
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: Temperature, humidity or fan speed selectable Timeout override: Display timeout Lockout override: Touchscreen/button lockout

## BACnet & Modbus Field replaceable

Embedded BACnet and Modbus communication protocols...easy systems integration

Replace element in the field... maintain accuracy and minimize downtime

## Sensor element

Thin-film capacitive sensor element recovers from 100% saturation

## Easy to install

Large wiring terminals on baseplate and snap-on covers with security screw simplify installation and service

## Interchangeable element

Fully interchangeable element to 1% or 2% accuracy with NIST calibration certificate...no calibration

## Calibration free

Calibration-free interchangeable NIST traceable HS element

### APPLICATIONS

- Controlling HVAC systems for improved comfort and energy savings
- Museums, schools, printing shops, and other locations requiring humidity control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

#### SETPOINTS

Temperature Setpoint	Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Humidity Setpoint	Scale: 0 to 100% RH
Fan Speed Setpoint	Off, Low, Medium, High

#### OVERRIDE

Override Button	Display models feature momentary-to-ground override button
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#### WIRING TERMINALS

Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbf) max.

#### WARRANTY

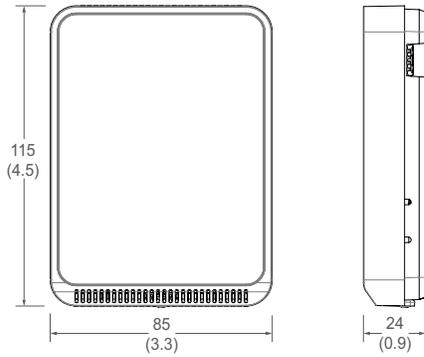
Limited Warranty	5 years
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#### COMPLIANCE INFORMATION

Agency Approvals	UL 916, European conformance CE: EN61000-6-2, EN61000-6-3, EN61000 Series - industrial immunity EN 61326-1, FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)
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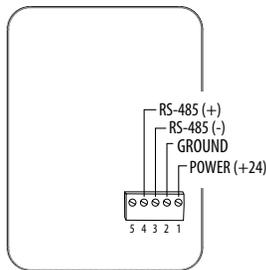
### DIMENSIONAL DRAWING



### USER INTERFACE TYPES



### WIRING DIAGRAM



### ORDERING INFORMATION

MODEL	USER INTERFACE	RH*	TEMP	SETPOINT	OVERRIDE
HW2TP2A	Touchscreen	X	X	X	X
HW2LP2A	LCD / 3 Buttons	X	X	X	X
HW2XP2A	Blank	X	X		

\* Replaceable 1% with NIST certificate, 2% with NIST certificate and 2% elements available.

### REPLACEABLE RH ELEMENTS

MODEL	RH ACCURACY	CALIBRATION CERTIFICATE	DESCRIPTION
HS1N	±1%	X	Replaceable RH sensor, 1% with NIST certification
HS2N	±2%	X	Replaceable RH sensor, 2% with NIST certification
HS2X	±2%		Replaceable RH sensor, 2%



Replaceable RH Element

## HEW SERIES

2%, 3%, and 5% Accuracies



HEW Economy Series wall mount humidity transmitters offer high performance in an easy to install housing at an affordable price. The thin-film capacitive sensor element provides high accuracy and performance, great long-term stability, and full recovery from saturation. Temperature sensing options are also available.

The wall housing was created using sophisticated thermal analysis techniques for optimum airflow. It is ideal for schools and other applications requiring exceptional durability and a discrete appearance. All Economy models come with a standard one-year warranty.

### SPECIFICATIONS

INPUT POWER	
Voltage Model	Class 2; 12 to 24 Vdc or 24 Vac
mA Model	Class 2; 12 to 24 Vdc
AC Voltage Tolerance	±10%
AC Frequency	50/60 Hz
Max. Inrush Current after 1 msec (mA version)	25 mA
OUTPUT	
mA Output	4 to 20mA, 2-wire, not polarity sensitive
mA Max. Loop Resistance	500 Ω at 24 Vdc input voltage; 250 Ω at 12 Vdc input voltage
Voltage Output	0 to 5 V or 0 to 10 V (jumper selectable)
Voltage Min. Load Resistance	5 kΩ
Voltage Min. Sinking Current	0.2 mA
HUMIDITY	
RH Element	Digitally profiled thin-film capacitive, non-removable
Accuracy	±2%, 3%, or 5% (10 to 90% RH, 20 to 30 °C)
Temperature Effect (Outside 20° to 30°C)	≤0.1% RH per °C
Response Time (to 90% change at 20°C)	110 sec
Annual Drift	≤1%
Output Scaling	0 to 100% RH

## RH & temperature Low profile

Monitor humidity and temperature with a single device... reduces installation costs

Housing is low-profile...perfect for schools and museums

### Sensor options

Semiconductor temperature transmitter, or popular thermistor/RTD sensors available

### APPLICATIONS

- HVAC economizer control
- Managing energy systems
- Facilitating ASHRAE standards for environmental control

### TEMPERATURE OPTION

Active Output Accuracy	±0.5 °C (±.9 °F)
Active Output Temp Scaling	10 to 35 °C (50 to 95 °F)
Self-Heating Error (Resistive temperature only)	≤±0.5 °C at 20 to 30 °C (68 to 86 °F); ≤±0.75 °C outside of 20 to 30 °C (68 to 86 °F)

### OPERATING ENVIRONMENT

Operating Temperature	0 to 50 °C (32 to 122 °F)
Operating Humidity	0 to 100% RH non-condensing (Unit will recover from saturation)

### HOUSING

Material	ABS plastic with UL V-0 5VB Flame Class
Mounting Holes	US and European junction box

### WARRANTY

Limited Warranty	1 year
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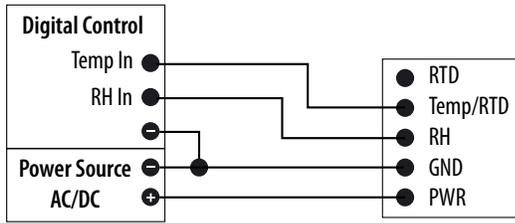
### AGENCY APPROVALS



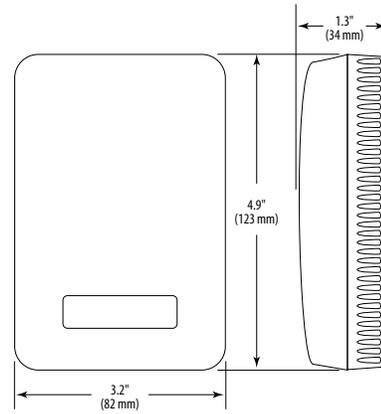
EMC Conformance: Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU.

### 0-5V/0-10V MODELS, TEMPERATURE TRANSMITTER

Wiring Diagram

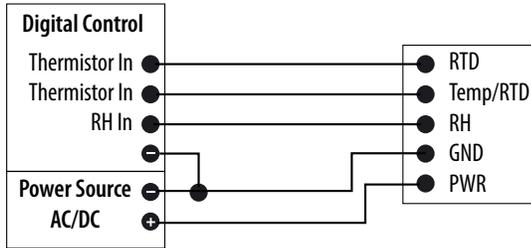


### DIMENSIONAL DRAWING



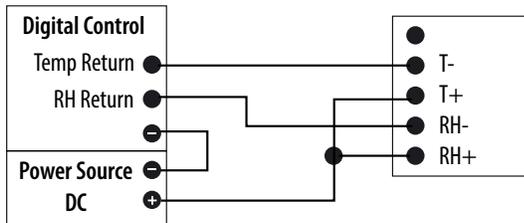
### 0-5V/0-10V MODELS, TEMPERATURE TRANSMITTER

Wiring Diagram



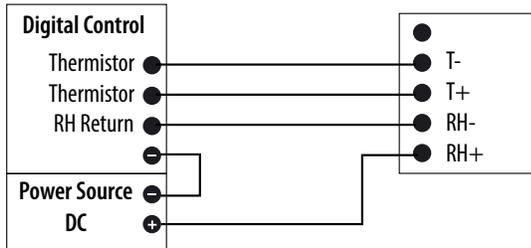
### 4-20 mA MODELS, TEMPERATURE TRANSMITTER

Wiring Diagram



### 4-20 mA MODELS, THERMISTOR

Wiring Diagram



### ORDERING INFORMATION

Accuracy	Output	US or EU	Temp.	Sensor Type	Temp Cert
HEW <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 = 2% 3 = 3% 5 = 5%	M = 4-20mA V = 0-5 Vdc/0-10 Vdc	= Standard	T = Temp X = No Temp (Stop here)	A = Temp. Transmitter B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k with 11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm TAC, Thermistor R = 10k US, Thermistor S = 10k 3A 221 Thermistor T = 100k, Thermistor U = 20k "D", Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor	Blank = None 1 = 1 pt cal* 2 = 2 pt cal*

Examples:

With Temp:

HEW  3  M  S  T  C

Without Temp:

HEW  3  V  S  X Stop Here

\*Not available with W and Y high-accuracy thermistors.



## HD & HO SERIES

1% & 2% NIST, or Standard 2%, 3%, or 5%



HD and HO Series deluxe humidity transmitters provide an ideal solution for measuring relative humidity in a wide range of conditions. All devices are equipped with a thin-film capacitive sensor that is easily replaceable in the field. These sensors are calibrated to NIST standards, with certificates available (see Ordering Information; choose “N” in NIST block). Temperature sensing options are also available. The duct mounted HD is encased in a die cast metal housing for extra strength. The outdoor HO housing is completely weather proof – the most rugged sensor available. All deluxe HD and HO models come with a standard five-year warranty.†

### SPECIFICATIONS

INPUT POWER	
Voltage Model*	Class 2; 12 to 30 Vdc/24 Vac, 15 mA max.
mA Model	Class 2; Loop powered 12 to 30 Vdc only, 30 mA max.
OUTPUT	
Voltage Model	3-wire, observe polarity
mA Model	2-wire, not polarity sensitive (clipped and capped)
HUMIDITY	
HS Element†	Digitally profiled thin-film capacitive (32-bit mathematics) U.S. Patent 5,844,138
Accuracy at 25°C from 10-80% RH** (Multi-point calibration, NIST traceable)	HD only: ±1% at 20 to 40% RH in mA output mode; (multi-point calibration, NIST traceable) All models: 2%, 3%, or 5% (specify)
Temperature Effect, Duct Model	±0.1% RH/°C above or below 25 °C (typical)
Temperature Effect, Outdoor Model	4 to 20 mA version: (0.0013x%RHx(T°C-25)); 0-5V/0-10V versions: (0.0015x%RHx(T°C-25)) – (%RHx0.0008xabs(T°C-25))
Scaling	0 to 100% RH
Hysteresis	1.5% typical
Linearity	Included in accuracy spec.
Reset Rate***	24 hours
Stability	±1%@20 °C (68 °F) annually, for two years

### Sensor element

Thin-film capacitive sensor element recovers from 100% saturation

### Accuracy

Fully interchangeable element to 1%, 2%, 3%, or 5% accuracy...no calibration

### Field replaceable

Replace element in the field... maintain accuracy and minimize downtime

### Easy servicing

Duct sensor element can be serviced without disturbing conduit

### Potted circuitry

Prevents costly condensate shorts

### Flexibility

Polarity insensitive, two-wire 4 to 20 mA or 3-wire 0-5/0-10 Vdc versions...flexible systems compatibility...save time in the field, stock fewer devices

### APPLICATIONS

- Controlling HVAC systems for improved comfort and energy savings
- Museums, schools, printing shops, and other locations requiring humidity control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

### TEMPERATURE

Optional Temp. Transmitter Output	Digital, 4 to 20 mA (clipped & capped) or 0-5/0-10 V output
HO Transmitter Accuracy	±1.3 °C (±2.3 °F) typical;
HD Transmitter Accuracy	±0.5 °C (1.0 °F) typical

### OPERATING ENVIRONMENT

Operating Humidity Range	0 to 100% RH non-condensing
Operating Temp. Range	-40 to 50 °C (-40 to 122 °F)

### WARRANTY

Limited Warranty	5 years †
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### AGENCY APPROVALS



\* One side of transformer secondary is connected to signal common, so an Isolation transformer or dedicated power supply may be required.

\*\* Specified accuracy with 24 Vdc supplied power with rising humidity. RTD/Thermistors are not compensated for internal heating of product.

\*\*\* Reset Rate is the time required to recover to 50% RH after exposure to 90% RH for 24 hours.

† All deluxe models come with a standard five-year warranty. The HS sensing element has a 1-year warranty. The element is not a part of the 5-year product warranty.

Shielded cabling is required for conformance to EMC standards. Technical information is available from the factory upon request or from the Veris website at [www.veris.com](http://www.veris.com). EMC Conformance - CE Option: Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU.

EMC note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).



# HN & HP SERIES

Pendant and Insertion



HN and HP Series probe type humidity transmitters are easy to install and exceptionally accurate. Their long-term stability and trouble-free serviceability make them among the best in the industry. The electronics are embedded inside the probe, protecting them from condensation-related failures. The thin-film capacitive HS sensor elements are factory calibrated using NIST traceable calibration equipment, eliminating the need for field calibration. Field replacement of the sensor element is a snap with the patented removable sensor, lowering costs and reducing downtime.

## SPECIFICATIONS

INPUT POWER	
Voltage Model	Class 2; 12 to 30 Vdc/24 Vac, 15 mA max.
mA Model	Class 2; Loop powered 12 to 30 Vdc only, 30 mA max.
OUTPUT	
Voltage Model	3-wire, observe polarity
mA Model	2-wire, not polarity sensitive (clipped & capped)
HUMIDITY	
HS Element†	Digitally profiled thin-film capacitive (32-bit mathematics) U.S. Patent 5,844,138
Accuracy @ 25°C**	±1%, 2%, 3%, or 5% (specify)@10 to 80% RH; Multi-point calibration, NIST traceable
Reset Rate***	24 hours
Stability	±1%@20 °C (68 °F) annually, for two years
Hysteresis	1.5% typical
Linearity	Included in accuracy spec.
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (typical)
Scaling	0 to 100% RH
TEMPERATURE OPTION	
Optional Temperature Transmitter Output	Digital, 4 to 20 mA (clipped & capped) or 0-5/ 0-10 V output; accuracy ±0.5 °C (±1 °F) typical

## Sensor element

Thin-film capacitive sensor element recovers from 100% saturation

## Corrosion resistant

Electronics are encapsulated in stainless steel probe to resist corrosion

## Interchangeable

Fully interchangeable element to 1%, 2%, 3%, or 5% accuracy...no calibration

## Flexible

Pendant and insertion versions for application flexibility

## Compatibility

Polarity insensitive two-wire 4 to 20 mA or 3-wire 0-5/0-10 Vdc versions...flexible systems compatibility

## Calibration free

Calibration-free interchangeable NIST traceable HS element

## APPLICATIONS

- HVAC control for improved comfort and energy savings
- Museums, schools, printing shops, and other locations requiring humidity control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

## OPERATING ENVIRONMENT

Operating Humidity Range	0 to 100% RH non-condensing
Operating Temp Range	-40 to 50 °C (-40 to 122 °F)

## WARRANTY

Limited Warranty	5 years †
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## AGENCY APPROVALS



\* One side of transformer secondary is connected to signal common, so an Isolation transformer or dedicated power supply may be required.

\*\* Specified accuracy with 24 Vdc supplied power with rising humidity. RTD/Thermistors are not compensated for internal heating of product.

\*\*\* Reset Rate is the time required to recover to 50% RH after exposure to 90% RH for 24 hours.

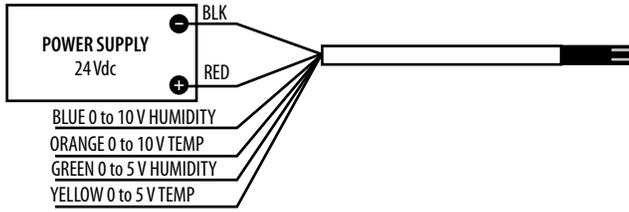
† The HS sensing element has a 1-year warranty. The element is not a part of the 5-year product warranty.

Shielded cabling is required for conformance to EMC standards. Technical information is available from factory upon request or is available on our website: [www.veris.com](http://www.veris.com). EMC Conformance - CE Option: Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU.

EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).

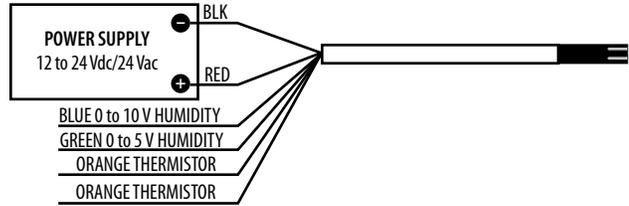
**HN/HP (0-5V/0-10V VERSIONS)**

Wiring Diagram



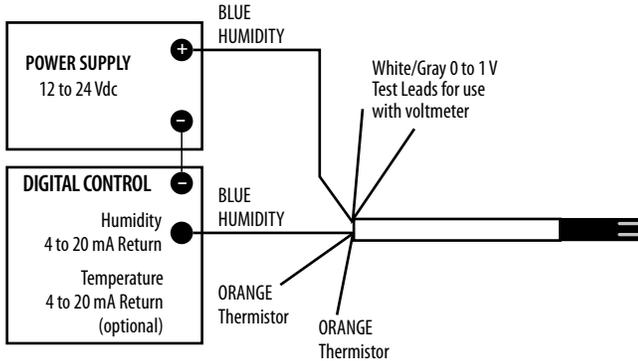
**HN/HP WITH RTD/THERMISTOR (0-5V/0-10V VERSIONS)**

Wiring Diagram



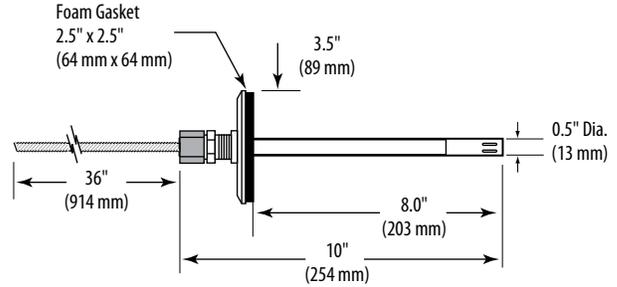
**HN/HP WITH RTD/THERMISTOR (4-20 mA VERSIONS)**

Wiring Diagram



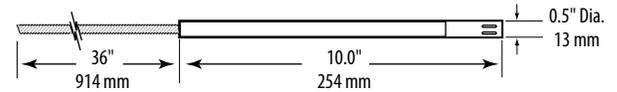
**HN SERIES**

Dimensional Drawing



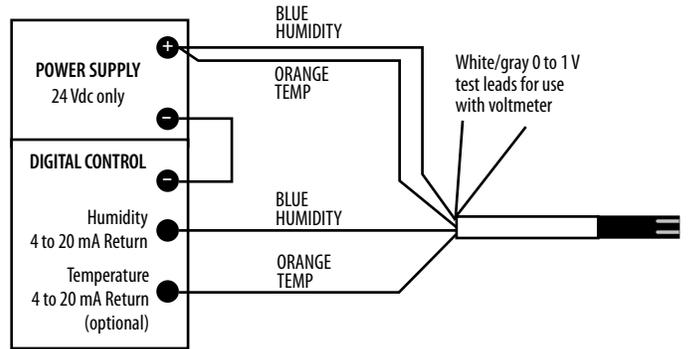
**HP SERIES**

Dimensional Drawing



**HN/HP (4-20 mA VERSIONS)**

Dimensional Drawing



**ORDERING INFORMATION**

<p>Enclosure</p> <p>H <input type="checkbox"/></p> <p>N = RH Insertion P = RH Pendant</p>	<p>Accuracy</p> <p><input type="checkbox"/></p> <p>1 = 1% 2 = 2% 3 = 3% 5 = 5%</p>	<p>NIST</p> <p><input type="checkbox"/></p> <p>N = NIST 1%, &amp; 2% only X = None 2%, 3%, 5% only</p>	<p>Output</p> <p><input type="checkbox"/></p> <p>M = 4 to 20 mA V = 0-5V/0-10 Vdc</p>	<p>US or EU</p> <p><input type="checkbox"/></p> <p>S = Standard C = CE</p>	<p>Temp.</p> <p><input type="checkbox"/></p> <p>T = Temp X = No Temp (Stop here)</p>	<p>Humidity Transmitter Combination</p> <p>Sensor Type: <input type="checkbox"/> A = Transmitter</p> <p>Range: <input type="checkbox"/> 1 = -40 to 122 °F (-40 to 50 °C) <input type="checkbox"/> 2 = 32 to 122 °F (0 to 50 °C)</p> <p>OPTION Temp Cert: <input type="checkbox"/> Blank = None <input type="checkbox"/> 1 = 1pt Cal <input type="checkbox"/> 2 = 2pt Cal</p>	<p>Humidity RTD/Thermistor Combination</p> <p>Sensor Type: <input type="checkbox"/></p> <p>B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k with 11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm TAC, Thermistor Q = 1uA/°C, Linitemp R = 10k US, Thermistor S = 10k 3A 221, Thermistor T = 100k, Thermistor U = 20k "D", Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor</p> <p>OPTION Temp Cert: <input type="checkbox"/> Blank = None <input type="checkbox"/> 1 = 1pt cal* <input type="checkbox"/> 2 = 2pt cal*</p>
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Example: (No Temp)

H  P  2  X  V  S  X Stop Here

Example: (With Temp)

H  N  2  X  V  S  T  C  2

\* Not available with W and Y high-accuracy thermistors.

**ACCESSORIES**



**AA42**  
Water Guard, Humidity Sensor Protection Shield

## HED SERIES

2%, 3%, and 5% Accuracies



HED

HED Economy Series duct mount humidity transmitters offer high performance in an easy-to-install housing at an affordable price. The thin-film capacitive sensor element provides high accuracy and performance, great long-term stability, and full recovery from saturation. Temperature sensing options are also available.

The duct-mounted HED includes a rugged all plastic housing with a tool-less gasketed entry lid, large cage clamp terminal blocks, and sturdy ABS material. All Economy models come with a standard one-year warranty.

### SPECIFICATIONS

INPUT POWER	
Voltage Version	Class 2; 12 to 24 Vdc or 24 Vac
mA Version	Class 2; 12 to 24 Vdc
AC Voltage Tolerance	±10%
AC Frequency	50/60 Hz
Max. Inrush Current after 1 msec (mA version)	25 mA
OUTPUT	
mA Output	4 to 20 mA, 2-wire, not polarity sensitive
mA Max. Loop Resistance	500 Ω at 24 Vdc input voltage; 250 Ω at 12 Vdc input voltage
Voltage Output	0 to 5 V or 0 to 10 V (jumper selectable), observe polarity
Voltage Min. Load Resistance	5 kΩ
Voltage Min. Sinking Current	0.2 mA
HUMIDITY	
RH Element	Digitally profiled thin-film capacitive, non-removable
Accuracy	±2%, 3%, or 5% (10 to 90% RH, 20 to 30 °C)
Temp Effect (Outside 20° to 30°C)	≤0.1% RH per °C
Response Time (to 90% change at 20°C)	110 sec

## RH & temperature Easy hook-up

Monitor humidity and temperature with a single device... reduces installation costs

Large cage clamp terminal blocks...easy hook-up with no wire nuts

## Sensor options

Semiconductor temperature transmitter, or popular thermistor/RTD sensors available

## Embedded circuitry

Circuitry is embedded in the probe for durability and protection

## No lost screws

Tool-less gasketed entry lid

### APPLICATIONS

- HVAC economizer control
- Managing energy systems
- Facilitating ASHRAE standards for environmental control

Annual Drift	≤1%
Output Scaling	0 to 100% RH
TEMPERATURE OPTION	
Active Output Accuracy	±0.5 °C (±.9 °F)
Active Output Temperature Scaling	Type 1: -40 to 50 °C (-40 to 122 °F); Type 2: 0 to 50 °C (32 to 122 °F)
Self-Heating Error (Resistive Temperature Only)	≤±0.5 °C at 20 to 30 °C (68 to 86 °F); ≤±0.75 °C outside of 20 to 30 °C (68 to 86 °F)
OPERATING ENVIRONMENT	
Operating Temperature	-40 to 50 °C (-40 to 122 °F)
Operating Humidity	0 to 100% RH non-condensing (unit will recover from saturation)
HOUSING	
Material	ABS plastic with UL V-0 5 VA Flame Class
WARRANTY	
Limited Warranty	1 year

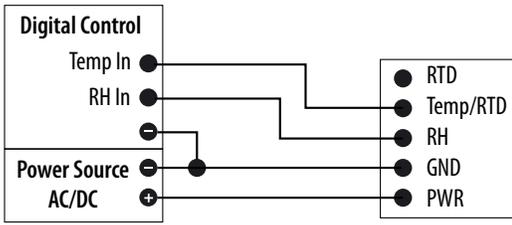
### AGENCY APPROVALS



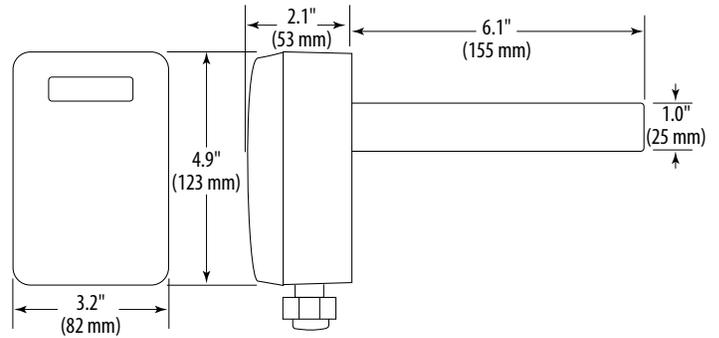
EMC Conformance: Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU. Meets UL requirements for plenum rating.

**0-5V/0-10V MODELS, TEMPERATURE TRANSMITTER**

Wiring Diagram

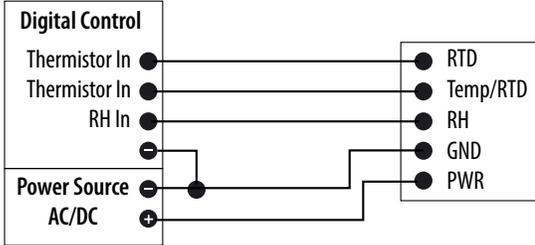


**DIMENSIONAL DRAWING**



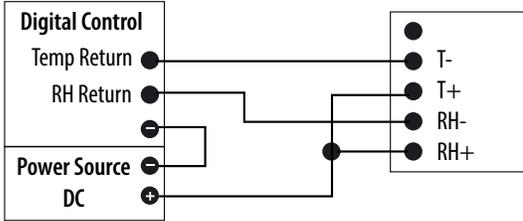
**0-5V/0-10V MODELS, THERMISTOR**

Wiring Diagram



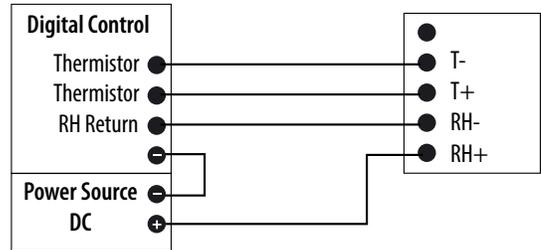
**4-20 mA MODELS, TEMPERATURE TRANSMITTER**

Wiring Diagram



**4-20 mA MODELS, THERMISTOR**

Wiring Diagram



**ORDERING INFORMATION**

Accuracy: 2 = 2%, 3 = 3%, 5 = 5%

Output: M = 4 to 20 mA, V = 0-5/0-10 Vdc

US or EU: S = Standard

Temp.: T = Temp, X = No Temp (Stop here)

Sensor Type: A = Temp. transmitter

Temp Range: 1 = -40 to 50 °C (-40 to 122 °F), 2 = 0 to 50 °C (32 to 122 °F)

Temp Cert: Blank = None, 1 = 1 pt cal, 2 = 2 pt cal

Examples:

HED	3	M	S	T	C
HED	3	V	S	X	

\* Not available with W and Y high-accuracy thermistors.

Sensor Type:

- B = 100R Platinum, RTD
- C = 1k Platinum, RTD
- D = 10k T2, Thermistor
- E = 2.2k, Thermistor
- F = 3k, Thermistor
- G = 10k CPC Thermistor
- H = 10k T3, Thermistor
- J = 10k Dale, Thermistor
- K = 10k with 11k shunt, Thermistor
- M = 20k NTC, Thermistor
- N = 1800 ohm TAC, Thermistor
- R = 10k US, Thermistor
- S = 10k 3A 221 Thermistor
- T = 100k, Thermistor
- U = 20k \*D\*, Thermistor
- W = 10k T2 high accuracy, Thermistor
- Y = 10k T3 high accuracy, Thermistor

Temp Cert:

- Blank = None
- 1 = 1 pt cal\*
- 2 = 2 pt cal\*



# HS SERIES

## Easy Field Replacement for Veris Deluxe Humidity Sensors



HS Generation 1  
U.S. Patent No. 5,844,138



HS Generation 2

The HS replaceable humidity element is designed to lower costs and reduce downtime. It features thin-film capacitive technology for superior accuracy and exceptional resistance to contaminants. It is compatible with all Veris deluxe sensors, making replacement quick and easy. No need to install a new humidity sensing device, just insert a new element into the unit and resume operation.

These humidity elements are calibrated in a high accuracy, NIST traceable, humidity generator. Each sensor is digitally calibrated at four different relative humidity levels over an eight-hour period. Calibration data is programmed into the replaceable sensing element. This computer-controlled digital calibration eliminates errors associated with manual "trimming." A certificate of calibration is provided with NIST versions of the HS.

Veris' calibration system produces known humidity values using the fundamental principle of the "two pressure" generator developed by NIST (H-4622). The two-pressure method involves saturating air with water vapor at a given pressure and temperature. Saturated gas then flows through an expansion valve where it is isothermally reduced to chamber pressure. Gas temperature is held constant during pressure reduction, so relative humidity at chamber pressure is calculated as the ratio of two absolute pressures.

Temperature uniformity in the chamber is maintained by circulating a temperature controlled fluid through a shell surrounding the test space. Highly accurate pressure measurements are made using NIST traceable piezoresistive transducers. The resulting system accuracy is better than 0.5% RH over all ranges and temperatures.

This system is capable of continuously supplying accurate humidity values for instrument calibration, evaluation, and verification.

### ORDERING INFORMATION

Generation 1 HS elements work with HD, HN, HP, HO and legacy HWL/HWX and CWL sensors models.

	Accuracy	NIST	
HS	<input type="checkbox"/>	<input type="checkbox"/>	X
	1 = 1%*	N = NIST	
	2 = 2%	(1% & 2% models only)	
	3 = 3%	X = None (2%, 3%, & 5% models only)	
	5 = 5%		

Example:

HS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5	X	X

\*1% HS sensors used in outdoor applications are limited by the device to 2% accuracy.

Note: 1-year limited warranty.

Generation 2 HS elements work with HW2 and CW2 sensor models.

	Accuracy	NIST
HS	<input type="checkbox"/>	<input type="checkbox"/>
	1 = 1%	N = NIST
	2 = 2%	X = None (2% models only)

Example:

HS	<input type="checkbox"/>	<input type="checkbox"/>
	2	X

Note: 1-year limited warranty.

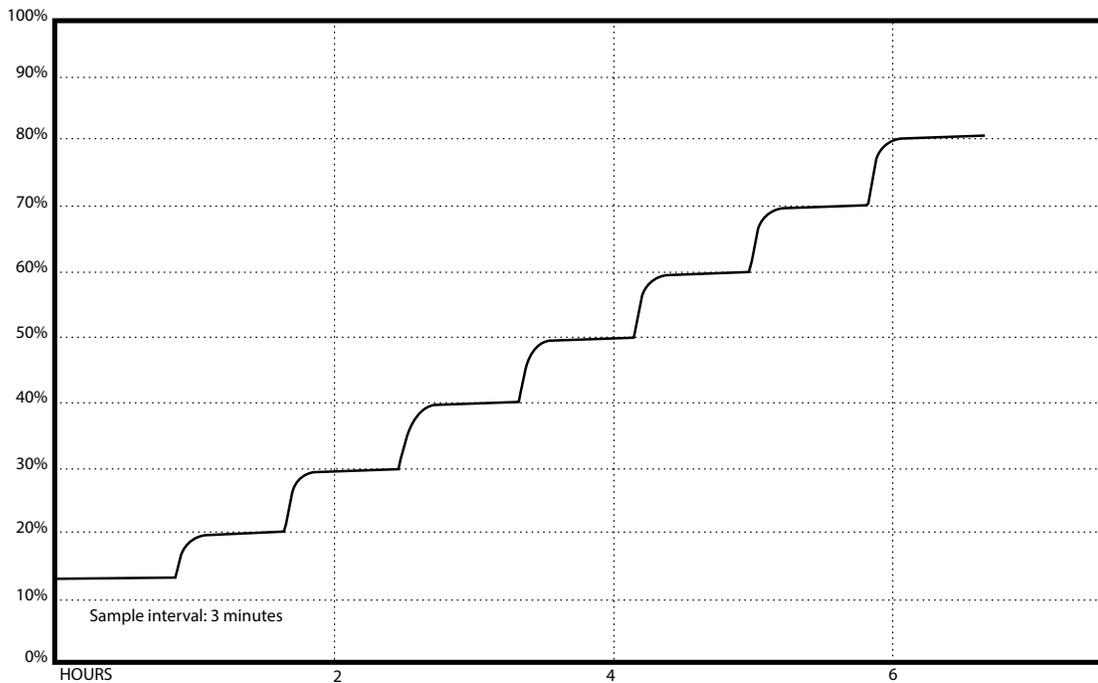
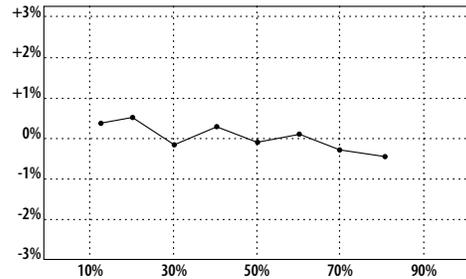
# HS Digital Humidity Sensor Certificate of Performance

Serial Number:     SAMPLE     Date: \_\_\_\_\_ Accepted by: \_\_\_\_\_

This sensor has been computer profiled and calibrated at multiple relative humidity levels using standards traceable to the National Institute of Standards and Technology through test #H-4622.

The humidity standard produces atmosphere of known humidity based on the "two-pressure" principal which is to saturate an air stream with water vapor at a given pressure and temperature. The saturated air stream is then reduced to test pressure. The humidity at test pressure is then the ratio of the two absolute pressures, corrected for vapor pressure and enhancement factor ratios.

Reference	Reading	Difference
12.0%	12.39%	+0.39%
20.0%	20.43%	+0.42%
30.0%	29.93%	-0.07%
40.0%	40.21%	+0.21%
50.0%	49.98%	-0.02%
60.0%	60.05%	+0.05%
70.0%	69.87%	-0.13%
80.0%	79.67%	-0.33%





# LEAK DETECTION

To protect expensive electronics from costly water damage, Veris offers complete leak detection systems. Monitor either a single location or a large area with our selection of highly reliable sensing devices and controller systems.

MODEL	DESCRIPTION	PAGE
LD310, LD1000 & LDRA6	Zone Leak Detection Panels	141
LD1500 & LD2100	Distance Read Panels	143
LD5200	Distance Read Panel, Touch Screen	145
SD, SD-R01 & MX1B	Spot Leak Detectors	147
SC & NSC	Cables	149
LC-KIT	Leak Detection Kit	151

## LEAK DETECTION SENSOR SELECTION GUIDE

### SENSORS AND CONTROL PANELS

	SPOT DETECTION	SINGLE ZONE	MULTI-ZONE	DISTANCE READ
Basic Model	SD/MX1B <a href="#">page 147</a>			
Leak Detection with Relay Output	SD-R01 <a href="#">page 147</a>	LD310/LD1000 <a href="#">page 141</a>	LDRA6 <a href="#">page 141</a>	LD1500/LD2100 <a href="#">page 143</a> LD5200 <a href="#">page 145</a>
Modbus Output			LDRA6 <a href="#">page 141</a>	LD1500/LD2100 <a href="#">page 143</a> LD5200 <a href="#">page 145</a>

### CABLES

	CABLE KITS	CONDUCTIVE FLUIDS	NON-SENSING LEADER CABLE
Basic Model	LC-KIT <a href="#">page 151</a>	SC <a href="#">page 149</a>	NSC <a href="#">page 149</a>

# PROTECT CRITICAL EQUIPMENT WITH EARLY LEAK DETECTION

LD and SC SERIES Liquid and Chemical Sensors and Controllers

## APPLICATIONS

- » Suitable for areas where water damage is a concern
- » Detect exact location of leaks in sprinkler systems
- » Detect chiller leaks in critical areas before becoming a major problem
- » Single location or large area monitoring



## FEATURES

### EASY TO SPECIFY AND INSTALL

Zone controller kits pre-configured in convenient lengths

Easily expand an existing system using mating end connectors

### QUIET AND EASY TROUBLESHOOTING

LED indicator for alarm status

Fault LED indicates connectivity loss (some models)

### VERSATILE APPLICATION

Detect the presence of specific fluids only

Plenum rated and UL listed

Strong, durable, and abrasion resistant

### DETECTION ACCURACY

Added control with sensitivity setting for each zone

Adjustable leak and contamination alarm thresholds

Reduced false alarms due to high humidity

### PC CONFIGURATION

Summary alarm relay output for faster response



# LD310, LD1000, & LDRA6

## Zone Leak Detection Controllers



LD310, LD1000, and LDRA6 control panels continuously monitor up to 1,000 ft. (300 ft. for the LD310) of SC detection cable per zone. If the cable detects fluid at any point along its length, the detection panel illuminates the corresponding zone LED, clearly indicating which zone is affected. An alarm (visual for LD310, audible for all others) signals the presence of a leak. Additionally, if the cable loses continuity, the panel will activate a cable fault LED. The detection sensitivity can be set independently for each zone. A summary alarm relay output is standard.

The LDRA6 can interface with a computer via an RS-232 port, through which 117 days of cable current level readings and the last 100 alarms can be accessed for analysis. The LDRA6 also offers a Modbus slave port allowing other devices to communicate with it.

### SPECIFICATIONS

Input Power: LD310 LD1000 LDRA6	5 Vdc ±10% 24 Vac/dc (±10%)@300 mA max. (AC: 50/60 Hz) 24 Vac/dc (±10%)@600 mA max. (AC: 50/60 Hz)
Relay Output: LD310  LD1000  LDRA	2 Form C relays (leak and fault); 1 A@24 Vdc, 0.5 A resistive@120 Vac 2 Form C relays (leak and fault); 1 A@24 Vdc, 0.5 A resistive@120 Vac 1 Form C summary alarm relay, 1 Form C relay for each zone/alarm; 1 A@24 Vdc, 0.5 A Resistive@120 Vac

### INPUTS

Water Leak Detection Cable	Requires 15 ft. (4.5 m) leader cable kit (LC-Kit) per zone.
Maximum Cable Length: LD310 LD1000, LDRA6	300 ft. (91 m) 1000 ft. (305 m)
Detection Response Time: LD310 LD1000 LDRA6	< 20 sec (10 sec typical) Configurable for 10 sec or 2 min, ± 10% 20 to 3600 sec, software adjustable in 10 sec increments, ± 2%

### COMMUNICATION PORTS (LDRA6 ONLY)

RS-232 & RS-485	1200, 2400, 9600, or 19200 selectable; no parity; 8 data bits, 1 stop bit
Terminal Emulation (RS-232)	VT100 Compatible (configuration)
Modbus (RS-485) (LDRA6 only)	Slave; RTU Mode; Supports function codes 03, 04, 06 and 16

## Application flexibility

Monitor up to 1,000 ft. (300 m) of water leak detection cable per zone with the LD1000 and LDRA6 or 300 ft. per zone with the LD310

## LED indicators

Two LED indicators per zone, for easy troubleshooting...leak and cable fault (LD1000 and LDRA6)

## Sensitivity settings

Sensitivity settings for each zone reduce false alarms...maximum detection accuracy

### APPLICATIONS

- Monitoring data centers, computer room under-floor areas, mechanical rooms, and electrical control centers
- Protecting records storage
- Monitoring plumbing
- Monitoring chilled beams
- Monitoring chemical/fuel storage

## Output versatility

Alarm and trend logs of the last 100 alarms and 117 days of cable current levels, plus RS-232 and Modbus RS-485 ports (LDRA6 only)

## Fast response

Summary alarm relay output... fast response

### NOTIFICATION

Alarm Notification: Audible Alarm LD1000 LDRA6	85 dBA@2 ft. (0.6 m) 85dBA@2 ft. (0.6 m) re-sound disabled, 8, 16, or 24 hrs.
Push Buttons: LD1000, LDRA6	1 for reset, quiet, and test

### OPERATING ENVIRONMENT

Temperature	0 to 50 °C (32 to 122 °F)
Humidity	5% to 95% RH non-condensing
Altitude	15,000 ft. (4,572 m) max
Storage Environment	-20 to 70 °C (-4 to 158 °F)
Weight: LD310 LD1000 LDRA6	3 oz. (85 g) 27 oz. (766 g) 4 lbs. (2 kg)

### AGENCY APPROVALS

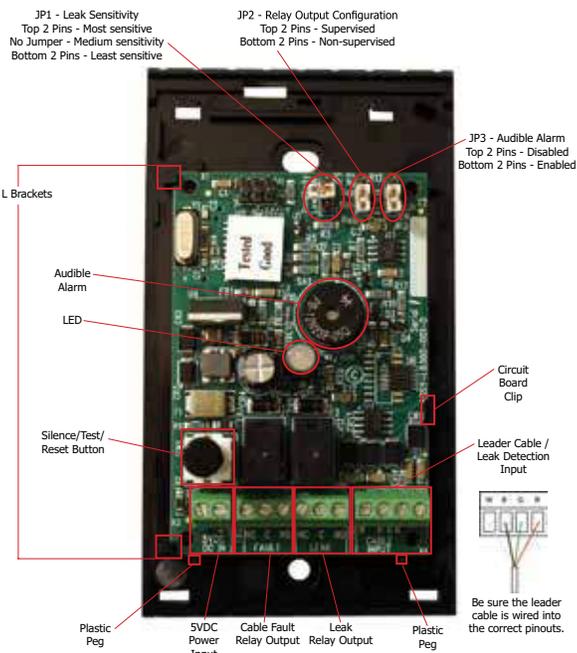
Agency Approvals: LD310 LD1000  LDRA6	CE, RoHS compliant CE, ETL listed; conforms to UL 61010-1, RoHS compliant CE ETL Listed; conforms to UL 61010-1, EN 61010-1, CAN/CSA C22.2 No. 1010.1, RoHS compliant
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### WARRANTY

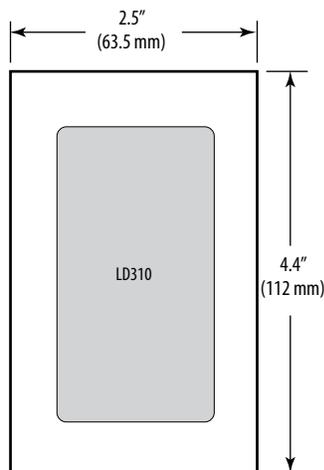
Limited Warranty	2 years
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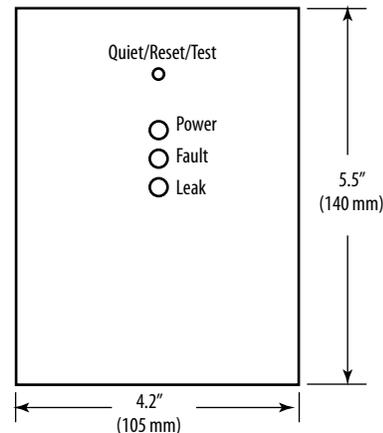
**LD310**  
Wiring Diagram



**LD310**  
Dimensional Drawing

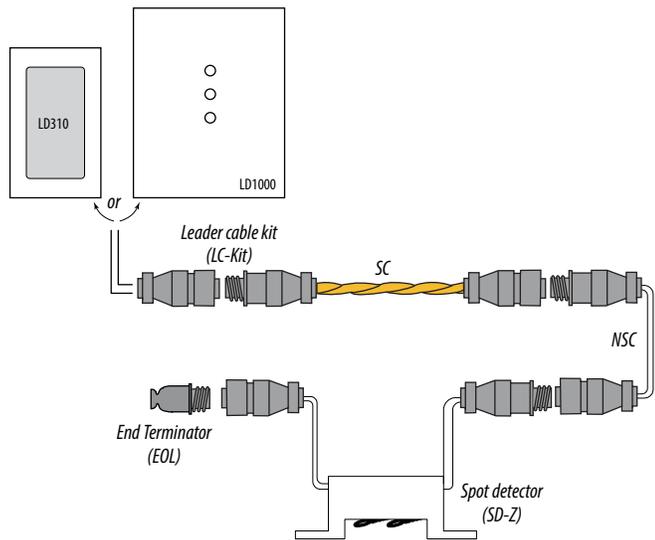


**LD1000**  
Dimensional Drawing

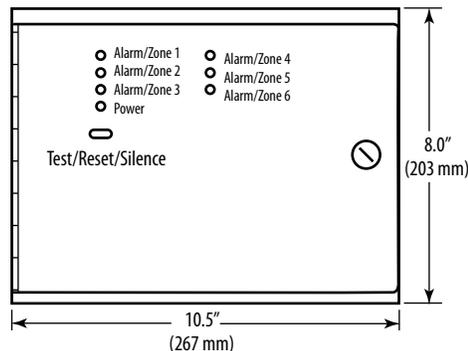


**LD310 OR LD1000 BASIC INSTALLATION WITH SC SENSING CABLE AND SD-Z SPOT DETECTOR**

Wiring Diagram



**LDRA6**  
Dimensional Drawing



**ORDERING INFORMATION**

MODEL	MANUF. PART #	DESCRIPTION
U006-0080*	LD310*	Leak Panel, 1 zone, LED, 2 relay outputs
U006-0001**	LD1000**	Leak Panel/Remote Annunciator, 1 zone, supervised, relay output
U006-0036**	LDRA6**	Leak Panel, up to 6 zones, supervised, relay output, Modbus RTU
U006-0035	LC-KIT***	Leader cable kit for SC cables (connects from leak panel to SC or NSC cable)
U006-0037	WA-DC-05	Power Supply for LD300
U006-0084	PS-WA-DC-24	Power Supply for LD1000 and LDRA6

\* Power supply not included; requires U006-0037 power supply.  
 \*\* Power supply not included; requires U006-0084 power supply.  
 \*\*\* Included with LD310 and LD1000.

**BLINK CODE KEY**

MODEL	LED INDICATION	DEVICE STATUS
LD310	Solid green (on or off)	Normal operation
LD310	Flashing green (0.5 sec on/2.5 sec off)	Cable fault
LD310	Flashing green (0.5 sec on/0.5 sec off)	Leak detected
LD1000	Solid green (on or off)	Normal operation
LD1000	1 amber	Cable fault
LD1000	1 red	Leak detected
LDRA6	Solid green (on or off)	Normal operation
LDRA6	1 green	Power on
LDRA6	1 red	Leak detected
LDRA6	1 yellow	Cable fault

ACCESSORIES P. 153



## LD1500 & LD2100

Helps Eliminate High Humidity False Alarms



LD2100



LD1500

Together with the SC sensing cable, the LD1500 and LD2100 panels detect and report the presence and location of the cable-specific fluid. When the fluid comes in contact with the patented cable, the monitoring panel quickly pinpoints the location of the leak, triggering an alarm and displaying the location.

### SPECIFICATIONS

Input Power	24 Vac@600 mA max., 50/60 Hz
<b>INPUTS</b>	
Water Leak Detection Cable	Requires 15 ft. (4.5 m) leader cable kit (LC-KIT or LC-KIT-M)
Maximum Length	LD1500: 1500 ft. (457 m); LD2100: 5000 ft. (1524 m)
Detection Accuracy	±2 ft (0.6 m) + 0.5% of the cable length
Detection Repeatability	±2 ft (0.6 m) + 0.25% of the cable length
Detection Response Time	5 to 995 sec ± 2 sec, configure in 5 steps
<b>OUTPUTS</b>	
Relay (LD2100 only)	1 A@24 Vdc, 0.5 A resistive@120 Vac
<b>COMMUNICATIONS PORTS</b>	
RS-232	9600 baud, No parity, 8 data bits, 1 stop bit
RS-485	1200, 2400, 9600, or 19200 baud (selectable); No parity, 8 data bits, 1 stop bit
<b>PROTOCOLS</b>	
Terminal Emulation: RS-232	VT100 compatible
Modbus RS-485	Slave; RTU Mode; Supports function codes 03, 04, 06, and 16; Johnson N2 (LD2100 only)
<b>EXPANDED PROTOCOLS</b>	
TCP/IP, HTML, TFTP	IPv4.0
SNMP	V1: V2C MIB-2 compliant; NMS Manageable with Get, Set, Traps
SMTP email, LD2100 only	Supports client authentication (plain and login); compatible with ESMTP servers
Modbus TCP/IP	Modbus slave; TCP/IP transmission protocol
BACnet/IP	ASHRAE Std 135-2004 Annex J
<b>ALARM NOTIFICATION</b>	
Audible Alarm: LD2100	70 dBA@2 ft. (0.6 m); re-sound configurable (disabled, 0 to 24 hours, integer values only)
Visual Alarm: LD1500 LD2100	Red, 4-digit; 7 segment LED display; bi-color status LED Bi-color status LED

## High detection accuracy

Adjustable leak and contamination alarm thresholds reduce false alarms due to high humidity... high detection accuracy

## PC configuration

Summary alarm relay output... fast response

Email LD1500/LD2100	4 email recipients; email sent on Alarm and Return to Normal
SNMP Traps LD1500, LD2100	4 community strings

### LOGGING CAPABILITIES

Event Log LD1500 LD2100	Last 10 events Last 500 events
Trend Log LD2100	Cable current level every day, for the last 288 days

### LOGIN SECURITY

Display Access	1 Administrator (password for configuration, no password required to view panel status)
----------------	---

### FRONT PANEL INTERFACE

Display LD2100	Green alphanumeric dot matrix
Push Buttons LD2100	Test/Reset
LED Indicator LD1500 LD2100	1 tri-color Power/Status (green = power on; red = alarm; yellow = cable fault) 1 bi-color Power/Status (green=power on, red=alarm)

### OPERATING ENVIRONMENT

Temperature	0 to 50 °C (32 to 122 °F)
Humidity	5 to 95% RH non-condensing
Altitude	15000 ft. (4572 m) max.
Mounting	Vertical wall mount (DIN rail mounting option available on LD2100 only)

### WARRANTY

Limited Warranty	2 years
------------------	---------

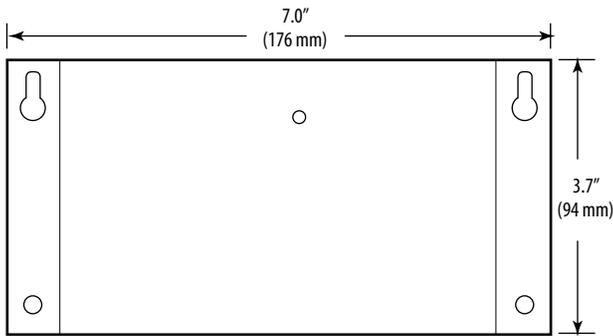
### AGENCY APPROVALS

Agency Approvals	CE; ETL listed: conforms to UL 61010-1, EN 61010-1; CSA C22.2; RoHS compliant
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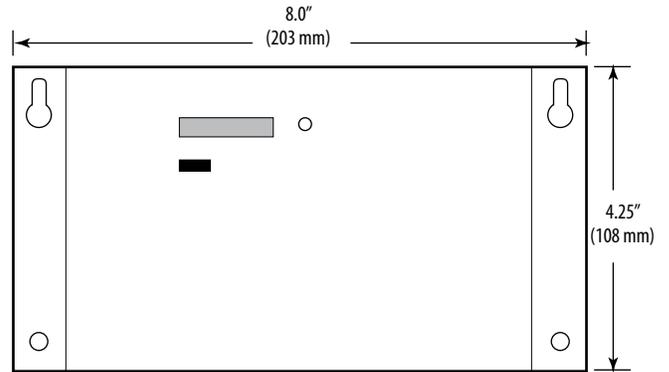
**LD1500**

Dimensional Drawing



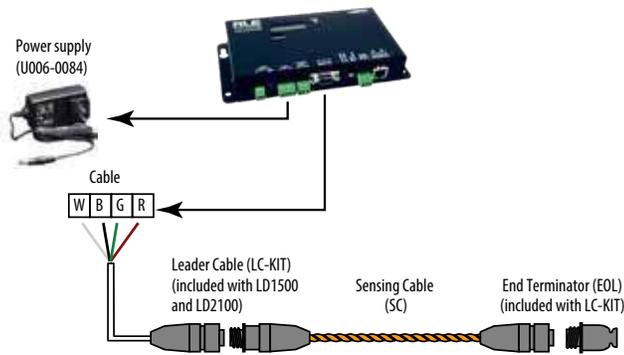
**LD2100**

Dimensional Drawing



**LD1500/LD2100 BASIC SC INSTALLATION**

Wiring Diagram



**ORDERING INFORMATION**

MODEL	MANUF. PART #	DESCRIPTION
U006-0038*	LD1500*	Leak Panel, 1500' Distance Read, Modbus, BACnet, SNMP, SMTP, and relay outputs
U006-0047*	LD2100*	Leak Panel, 5000' Distance Read, Modbus, BACnet, SNMP, SMTP, and relay outputs
U006-0035**	LC-KIT**	Leader cable kit for SC cables (connects from leak panel to SC or NSC cable)
U006-0084	PS-WA-DC-24	24 Vdc isolated power supply for LD1500 and LD2100

\* Power supply not included. Isolated power supply must be used. Use LD-ENC (U006-0045) wall mount enclosure with built-in power supply or U006-0084 power supply.

\*\* Included with LD1500 and LD2100.



## LD5200

Minimizes High Humidity False Alarms



LD5200 distance read panel has an innovative touch screen interface that accesses all basic functions. The LD5200 can operate as a stand-alone device, with the user configuring, monitoring, locating, and acknowledging leaks at the panel. It can also be connected to the building network and accessed via a web interface, which expands the capabilities of the unit, adding a convenient interactive facility mapping tool. When a leak is detected, the mapping tool displays the location in the building where the alarm occurred. Multiple communication protocols make the LD5200 readily compatible with existing building systems. Use with our SC sensing cable for a complete solution to leak detection.

### SPECIFICATIONS

Input Power	100 to 240 Vac@500 mA max., 50/60 Hz
<b>INPUTS</b>	
Water Leak Detection Cable LC-KIT or LC-KIT-M	Requires 15 ft. (4.5 m) leader cable kit
Maximum Length	10000 ft. (3048 m)
Minimum Length	35 ft. (1037 m)
Detection Accuracy	± 2 ft (0.6 m) + 0.5% of the cable length
Detection Repeatability	± 2 ft (0.6 m) + 0.25% of the cable length
Detection Response Time	5 to 990 sec ± 2 sec, software adjustable in 5-sec increments
<b>OUTPUTS</b>	
Analog	4 to 20 mA Loop Powered, 18 to 36 Vdc, RL = 500 Ω max.
Relay	2 Form C Leak Relays, 2 Form C Cable Break Relays; 1 A @ 24 Vdc, 0.5 A resistive@120 Vac;configurable for supervised or non-supervised, latched or non-latched
Maintenance Relay	1 A@24 Vdc, 0.5 A resistive @120 Vac; configurable for supervised or non-supervised, latched or non-latched
<b>COMMUNICATIONS PORTS</b>	
EIA-232	9600 baud, No parity, 8 data bits, 1 stop bit
EIA-485 (Port 1, Port 2, Port 3)	9600, 19200, or 38400 baud (selectable); No parity, 8 data bits, 1 stop bit
RJ-45	10/100 Bast T Ethernet port (TCP/IP)
<b>PROTOCOLS</b>	
Terminal Emulation EIA-232	VT100 compatible
Modbus RTU EIA-485	Master and slave; RTU Mode; BACnet MS/TP; N2, slave

## Touch screen

Touch screen interface allows access to basic functions... stand-alone configuration and monitoring

## Pinpoint leaks

Web interface offers expanded capabilities through the building mapping tool...pinpoint leaks quickly and accurately

## Easy integration

Multiple communication protocols available...easy integration into building systems

RJ-45	Ethernet, TCP/IP; Modbus/TCP/UDP, Master and slave; SNMP V1, V2, V3, NTP, SMTP, DNS, BACnet/IP
-------	--

### ALARM NOTIFICATION

Audible Alarm	85 dBA@2 ft. (0.6 m); re-sound 0 to 999 min.
Visible Alarm	Indicated on LCD touch screen & through web interface

### LOGGING CAPABILITIES

Event Log	Last 1024 events, downloadable to .txt files
Trend Log	Cable current level every day for the last 365 days, downloadable to .txt files

### LOGIN SECURITY

LCD Touch Screen	No password required to view controller status & data. Administrator password limits access to configuration options.
Web Interface	Username and password can be configured

### FRONT PANEL INTERFACE

Display	480 x 272 pixel color backlit LCD touch screen; 95.04 mm x 53-85 mm
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### OPERATING ENVIRONMENT

Temperature	0 to 50 °C (32 to 122 °F)
Humidity	5 to 95% RH non-condensing
Altitude	15000 ft. (4572 m) max.
Mounting	NEMA 1 wall mount enclosure

### WARRANTY

Limited Warranty	2 years
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### AGENCY APPROVALS

Agency Approvals	CE; ETL listed: conforms to UL 61010-1, EN 61010-1; CAN/CSA C22.2 No. 61010-1; RoHS compliant
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## Troubleshooting

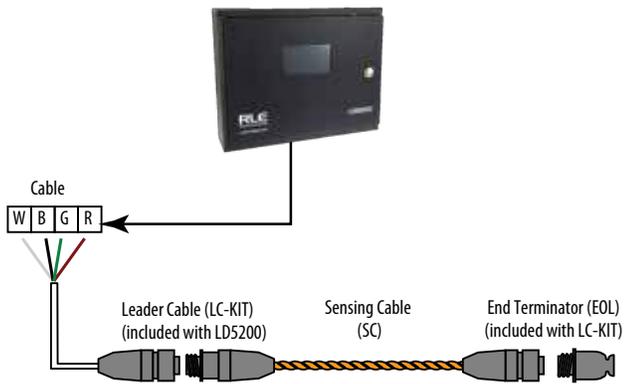
Detailed alarm history with time and date stamps...assists in troubleshooting

## One device

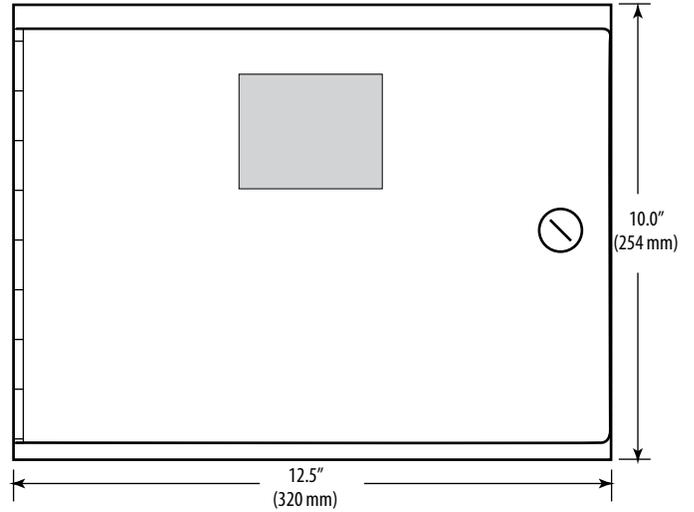
Acts as a master device for up to 127 leak detection units with up to 10,000 feet of SC cable ... monitor large areas with only one device

## LD5200 BASIC SC INSTALLATION

Wiring Diagrams



## DIMENSIONAL DRAWING



## WEB INTERFACE



## ORDERING INFORMATION

MODEL	MANUF. PART #	DESCRIPTION
U006-0079	LD5200	Leak Panel, Distance Read, supervised, multiple outputs: relay, 4 to 20 mA, Modbus RTU, leader cable and EOL terminator
U006-0035*	LC-KIT	Leader cable kit for SC cables (connects from leak panel to SC or NSC cable)

\*Included with LD5200.

# SD, SD-R01 & MX1B

## Spot Leak Detectors



SD, SD-R01 and MX1B Spot Detectors detect conductive fluids at a single point for the most economical way to detect fluids in small, confined areas. These devices are commonly used in small rooms and in air-conditioning drip pans. Use only with SC conductive fluid leak detection cables.

Veris offers three spot detector models which can integrate with various building management systems.

MODEL	DESCRIPTION
SD Spot Detector	<ul style="list-style-type: none"> <li>Operates on either 12 to 36 Vac or 18 to 36 Vdc power</li> <li>Includes a 14 ft. (4.2 m) leader cable</li> </ul>
SD-R01 Spot Detector with Relay Output	<ul style="list-style-type: none"> <li>Works with any system that accepts dry contacts</li> <li>Operates on 24 Vac/dc <math>\pm 10\%</math></li> <li>Automatically resets when conductive fluid is no longer present (AC power only; if DC power is used, device must be reset by disconnecting power momentarily)</li> <li>Includes a 14 ft (4.2 m) leader cable</li> </ul>
MX1B Spot Detector	<ul style="list-style-type: none"> <li>Battery operated</li> </ul>

### SPECIFICATIONS

SD & SD-R01

Input Power: SD-R01 Only	24 Vac/dc $\pm 10\%$ ; 0.1 A max. (AC: 50/60 Hz)
Storage Environment	-20 to 70 °C (-4 to 158 °F)

#### OUTPUTS

Solid-state: SD Only	12 to 36 Vac@0.01 A min., 0.1 A max., 50/60 Hz; 18 to 36 Vdc@0.01 A min., 0.1 A max.
Relay: SD-R01 Only	Dry Contact, Form C; 1 A@24 Vdc, 0.5 A @120 Vac resistive

#### LEADER CABLE (NSC)

Length: SD	14 ft. (4.2 m)
SD-R01	14 ft. (4.2 m)

#### OPERATING ENVIRONMENT

Temperature	0 to 50 °C (32 to 122 °F)
Humidity	5% to 95% RH non-condensing
Altitude	10,000 ft. (3,048 m) max.

#### WARRANTY

Limited Warranty	2 years
------------------	---------

## Simple installation

Simple installation – screw, or ram-set to floor (SD & SD-R01)

## Simple operation

Simple operation...no maintenance

## Solid-state design

No moving parts to fail

## Polymer coated

SD & SD-R01 models have polymer-coated sensing probes... no exposed metal that will rust

## Durability

All models are fully potted for water resistance...maximum durability

### SPECIFICATIONS

MX1B

Input Power	Typical 10-year life lithium battery
Output	N.C. solid-state, (opens on alarm)
Output Rating	30 Vac/dc@0.1 A max., not polarity sensitive
Sensing Electrodes	Gold plated

#### OPERATING ENVIRONMENT

Temperature	-20 to 80 °C (-4 to 176 °F)
Humidity	0 to 100% RH
Water Resistance	Not for continuous submersion

#### WARRANTY

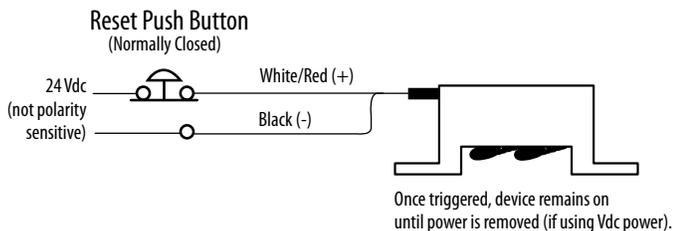
Limited Warranty	5 years
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#### AGENCY APPROVALS



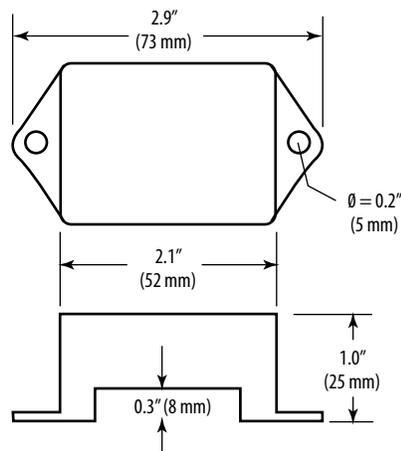
**SD**

Wiring Diagram



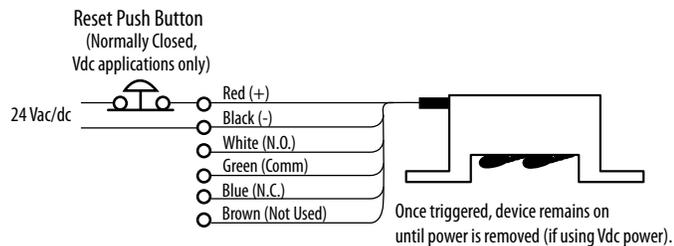
**SD SERIES**

Dimensional Drawing



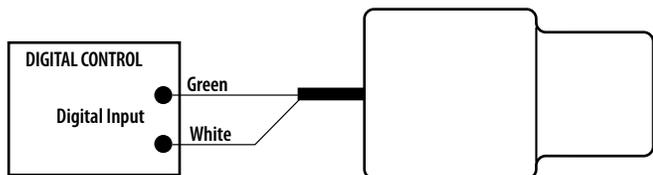
**SD-R01**

Wiring Diagram



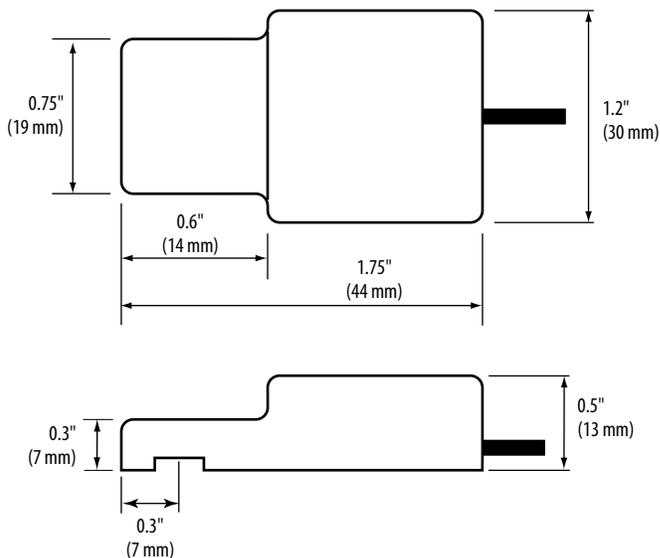
**MX1B**

Wiring Diagram



**MX1B**

Dimensional Drawing



**ORDERING INFORMATION**

MODEL	MANUF. PART #	DESCRIPTION	CE	ETL
U006-0006	SD	Spot Detector, 14' leader cable	•	•
U006-0007	SD-R01	Spot Detector, 14' leader cable, relay out	•	•
MX1B	MX1B	Spot Detector, battery		



## SC & NSC

Highly Flexible, Resists Bends and Kinks, Abrasion Resistant



Sensing and non-sensing cables are designed for use with Zone and Distance Read panels. The sensing cables detect the presence of detectable liquid, and send a signal to the panel. The panel generates an alarm and pinpoints the location of the leak or spill along the cable's length. Sensing cables are designed for high accuracy and maximum reliability.

SC water detection cable senses the presence of water or other conductive fluid.

NSC non-sensing cable is used to extend the control panel's leader cable to an area where SC detection cable is needed. It also bridges lengths of SC detection cable in areas where sensing is not required. Invisible to the control panel, the non-sensing cable does not affect the accuracy of readings or limit the amount of detection cable that can be connected to a control panel. NSC cables are only compatible with systems using SC water detection cables.

All cables are highly flexible, durable, and kink-resistant. They lie flat after installation, and are abrasion resistant. The cables are plenum rated and UL Listed, making them ideal for use under raised floors and areas where plenum rated cable is required. Choose a pre-specified cable length or a custom length for your convenience and installation flexibility.

### SPECIFICATIONS

Plenum Rating:	
SC	CL2P/CMP C(UL)
NSC	CL3P/CMP C(UL) California State Fire Marshall approved
Shear Strength:	>180 lbs (>81.65 kg)
Cut Through Resistance	>40 lbs (>18.2 kg) with 0.005" (0.13 mm) blade
Abrasion Resistance	60 cycles per UL 719
Connector	4-pin, 1" (25.4 mm) dia., circular, locking, 4-pin

#### OPERATING ENVIRONMENT

Temperature	0 to 75 °C (32 to 167 °F)
Humidity	5 to 95% RH non-condensing
Altitude	15,000 ft. (4,572 m) max.

#### STANDARD LENGTHS

SC-10/NSC-10	10 ft. (3.1 m)
SC-17	17 ft. (5.1 m)
SC-25/NSC-25	25 ft. (7.7 m)

### Strong

Strong, durable, and abrasion resistant

### Easy installation

Expansion with mating end connectors...easy installation

### Installation flexibility

Available in pre-measured and custom lengths with pre-installed end connectors

### Plenum rated

Plenum rated and UL Listed

### Accurate

Highly accurate alarm notification...fewer false alarms

SC-50/NSC-50	50 ft. (15.3 m)
SC-100/NSC-100	100 ft. (30.5 m)
Storage Environment	-30 to 85 °C (-22 to 185 °F)
Weight	0.02 lbs/ft (29.7 g/m)
Agency Approvals:	
SC	CE; UL; RoHS compliant
NSC	UL E118871; UL 13, power limited circuit cable; UL 444, communication cables; NFPA 262; plenum flame test (UL 910); NEC Articles 725 and 800; RoHS compliant

#### WARRANTY

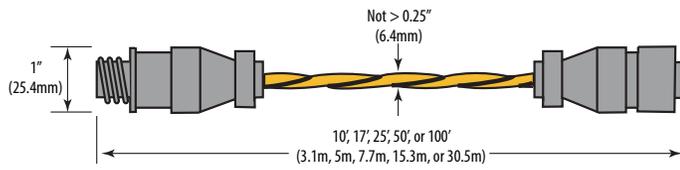
Limited Warranty	2 years
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#### AGENCY APPROVALS



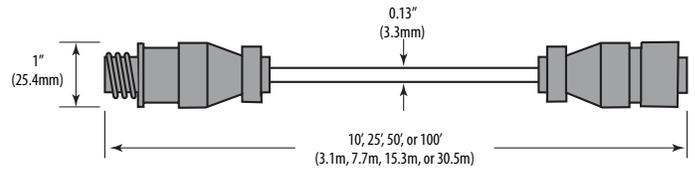
**SC**

Dimensional Drawing



**NSC**

Dimensional Drawing



**ORDERING INFORMATION**

Sensing Cable

MODEL	MANUF. PART #	DESCRIPTION
U006-0009	SC-10	Sensing Cable, Water, 10 feet
U006-0048	SC-17	Sensing Cable, Water, 17 ft
U006-0013	SC-25	Sensing Cable, Water, 25 feet
U006-0014	SC-50	Sensing Cable, Water, 50 feet
U006-0010	SC-100	Sensing Cable, Water, 100 feet

**ORDERING INFORMATION**

Non-sensing Cable

MODEL	MANUF. PART #	DESCRIPTION
U006-0017	NSC-10	Non-Sensing Cable, 10 feet
U006-0021	NSC-25	Non-Sensing Cable, 25 feet
U006-0022	NSC-50	Non-Sensing Cable, 50 feet
U006-0018	NSC-100	Non-Sensing Cable, 100 feet

ACCESSORIES P. 153



# LC-KIT

## Single Zone Leak Detection Controller Kit



Single zone leak detection controller kits are pre-configured in popular lengths for monitoring single areas or rooms. Kits come with everything needed for a complete system, including an LD310 single zone control panel, a leader cable kit with end-of-line terminator, sensing cable, and a WA-DC-05 power supply. LD310 control panels continuously monitor up to 300 ft. of leak detection cable. If the cable detects compatible fluid at any point along its length, the detection panel LED illuminates and an alarm signals the presence of a leak. Additionally, if the cable loses continuity, the panel will activate a cable fault LED pattern.

### SPECIFICATIONS

#### LD310 Controller

Input Power	5 Vdc ±10%
Storage Environment	-20 to 70 °C (-4 to 158 °F)
Weight	3 oz. (85 g)

#### INPUTS

Water Leak Detection Cable	Requires 15 ft. (4.5 m) leader cable (kit included)
Maximum Cable Length	300 ft. (91 m)
Detection Response Time	<20 sec (10 sec typical)
Relay Output	2 Form C relays (leak and fault); 1 A@24 Vdc, 0.5 A resistive@120 Vac

#### OPERATING ENVIRONMENT

Temperature	0 to 50 °C (32 to 122 °F)
Humidity	5 to 95% RH non-condensing
Altitude	15,000 ft. (4,572 m) max

## Application flexibility

Monitor up to 10', 17', 25' or 50' of leak detection cable

## LED indicator

Bi-color LED indicator for alarm status and cable fault...easy indication of leaks or equipment problems

## Audible alert

Selectable on/off audible alert

### APPLICATIONS

- Monitoring data centers, computer room under-floor areas, mechanical rooms, and electrical control centers
- Protecting records storage rooms
- Monitoring plumbing in facilities
- Monitoring chilled beams
- Monitoring chemical and fuel storage areas

### SPECIFICATIONS

#### Cables

Plenum Rating (SC)	CL2P/CMP C(UL) California State Fire Marshall approved
Shear Strength	>180 lbs (>81.65 kg)
Cut Through Resistance	>40 lbs (>18.2 kg) w/0.005" (0.13 mm) blade
Abrasion Resistance	60 cycles per UL 719
Connector	4 pin, 1" (25.4 mm) dia., circular, locking,

#### OPERATING ENVIRONMENT

Temperature	0 to 75 °C (32 to 167 °F) 90 °C (194 °F) max.
Humidity	5 to 95% RH non-condensing
Altitude	15,000 ft. (4,572 m) max.
Storage Environment: SC NSC	-30 to 85 °C (-22 to 185 °F) 0 to 75 °C (32 to 167 °F)
Agency Approvals: LD300 SC NSC	CE; RoHS compliant CE; UL; RoHS compliant UL E118871; UL 13, power limited circuit cable; UL 444, communication cables; NFPA 262; plenum flame test (UL 910); NEC Articles 725 and 800; RoHS compliant

#### WARRANTY

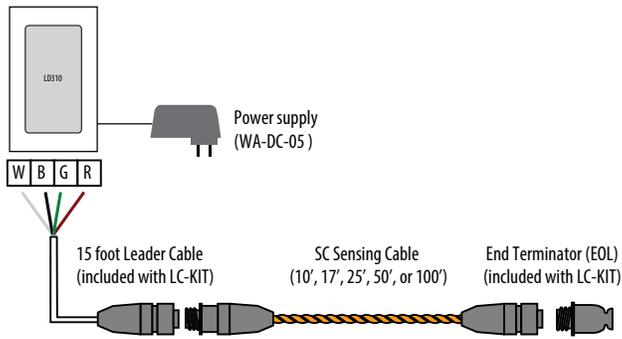
Limited Warranty	2 years
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#### AGENCY APPROVALS



**SINGLE ZONE KIT WITH SC SENSING CABLE**

Wiring Diagram

**BLINK CODE KEY**

LED INDICATION	DEVICE STATUS
Solid green (on or off)	Normal operation
Flashing green (0.5 sec on/2.5 sec off)	Cable fault
Flashing green (0.5 sec on/0.5 sec off)	Leak detected

**ORDERING INFORMATION**

MODEL	DESCRIPTION	KIT INCLUDES THESE MANUF. PART #S
U006-0062	Kit, LeakDet, LD310, 10' Conductive Fluid	LD310, LC-Kit, SC-10 & WA-DC-05
U006-0063	Kit, LeakDet, LD310, 17' Conductive Fluid	LD310, LC-Kit, SC-17 & WA-DC-05
U006-0064	Kit, LeakDet, LD310, 25' Conductive Fluid	LD310, LC-Kit, SC-25 & WA-DC-05
U006-0065	Kit, LeakDet, LD310, 50' Conductive Fluid	LD310, LC-Kit, SC-50 & WA-DC-05

Cables, EOL, and power supply only.

## ACCESSORIES: LEAK DETECTION



**U006-0024**  
Cross connector  
(1 cable input to 3 outputs)



**U006-0026**  
Replacement cable end terminators



**U006-0030** - J-clips (qty 10)  
**U006-0031** - J-clips (qty 25)  
**U006-0032** - J-clips (qty 50)  
**U006-0033** - J-clips (qty 200)



**U006-0035**  
Leader cable kit for SC cables  
(connects from leak panel to SC or NSC cable)



**U006-0037**  
5 Vdc isolated power supply for LD300



**U006-0084**  
24 Vdc isolated power supply for  
LD1000, LD1500, LD2100 and LDR06





# PRESSURE MONITORING

Veris pressure sensing devices include sensors for both wet and dry media, as well as a series of electropneumatic transducers. Our products are known for their accuracy, versatility, and labor-saving installation.

MODEL	DESCRIPTION	PAGE
PX3	Bluetooth® Differential Pressure/Air Velocity Transducers	157
PASxx	Differential Air Pressure Switches	159
AFS-460	Air Pressure Sensing Switches	161
EP3	Electropneumatic Transducers, Analog Output (V or mS, Selectable)	163
EP2	Electropneumatic Transducers, psi Output	165
PW	Wet Media Differential Pressure Transducers (Selectable Pressure Units)	167
PW2	Wet Media Differential Pressure Transducers (Dual Pressure Units)	169
PWR	Wet Media Differential Pressure Remote Transducers	171
PH	Digitally Controlled Gauge Pressure Transducers	173
PG	Gauge Pressure Sensors	175
PD	Display Digital Pressure/Vacuum Gauges	177

## PRESSURE SENSOR SELECTION GUIDE

	WET MEDIA	DRY MEDIA
Analog Output	PW, PW2, PH, PG, PD <a href="#">pages 167, 169, 173, 175, 177</a>	PX3, PG, PD <a href="#">pages 157, 175, 177</a>
Differential Pressure Sensing (Uni- and Bidirectional Operation)	PW, PW2, PWR <a href="#">pages 167, 169, 171</a>	PX3 <a href="#">page 157</a>
LCD Display Option Available	PD, PW, PW2, PWR <a href="#">pages 167, 169, 171, 177</a>	PX3, PD <a href="#">pages 157, 177</a>
Duct Mount		PX3D/PX3U <a href="#">page 157</a>
Panel Mount	PASxx, PW, PW2, PWR <a href="#">pages 159, 167, 169, 171</a>	PX3P/PX3U <a href="#">page 157</a>
Remote Mount	PWR <a href="#">page 171</a>	
Transmitter Only (No local display)	PH, PG <a href="#">pages 173, 175</a>	PX3, PG <a href="#">pages 157, 175</a>
Switch		PASxx <a href="#">page 159</a>
Pneumatic Systems		EP3, EP2 <a href="#">pages 163, 165</a>

## ELECTROPNEUMATIC TRANSDUCERS

	WET MEDIA	DRY MEDIA
Pneumatic Systems		EP2, EP3 <a href="#">pages 163, 165</a>

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# PRECISE PRESSURE OR VELOCITY MEASUREMENT IN ONE DEVICE

PX3 Bluetooth® Differential Pressure/Air Velocity Sensor



**WITH EASY  
BLUETOOTH  
CONFIGURATION!**

## APPLICATIONS

- » Duct static pressure
- » Building or room pressure
- » Filter status
- » Air flow measurement



## FEATURES

### VERSATILE APPLICATIONS

Measure either differential air pressure or velocity with the flip of a switch

### HIGH ACCURACY

High accuracy digital sensor with seven selectable pressure and eight velocity sub-ranges maintains calibration and reduces callbacks

### MAINTENANCE FREE

High reliability sensor technology for long-term, maintenance-free operation

### REDUCE FIELD FAILURES

Excellent tolerance to overpressure and vibration reduces field failures

### REDUCE SETUP

Selectable ranges and scales reduce setup time and number of models to stock

### WATER-RESISTANT HOUSING

IP6 /NEMA 4 housing allows for mounting in wash-down locations

### CIRCUIT PROTECTION

Circuit protection avoids damage due to incorrect input wiring

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## PX3 SERIES

Bluetooth® Differential Pressure/Air Velocity Transducers



PX3  
Patent Pending

The PX3 transducer can measure either air pressure or velocity with the flip of a switch. The PX3 is available in three installation configurations: duct, panel or universal. Duct and panel models have two pressure and velocity options: 0-1 in. WC / 0-3,000 ft/min or 1-10 in. WC / 3,000-6,000 ft/min with four field-selectable sub-ranges. The universal model comes in one pressure/velocity range: 0-10 in. WC / 0-7,000 ft/min with seven field-selectable sub-ranges for pressure and eight for velocity. All variants are available with and without display. The PX3 has an IP65/NEMA 4 environmental rating and a 5-year limited warranty.

The Veris Sensors App provides the ability to connect to a device and configure a variety of field-selectable parameters remotely from a smartphone via Bluetooth wireless technology. The app allows users to create and store commonly used parameters that will reduce commissioning time and provide assurance that all parameters are properly configured with no call backs. The app can also create a trend log while connected, providing critical data for troubleshooting purposes. iOS® users can download the app through the iOS App Store on their smart device. Android users can download the app through the Google Play™ store.

Note: The Bluetooth word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. Any use of such marks is under license.

### SPECIFICATIONS

GENERAL	
Media Compatibility	Dry air or inert gas
Input Power	Three-wire Volt mode: 24 Vac or 12-30 Vdc* Two-wire mA mode: 12-30 Vdc*
Output Power	Field-selectable: 2-wire, loop-powered 4-20 mA Minimum input voltage for 4 to 20 mA operation: 250 Ω loop = 12 Vdc; 500 Ω loop = 19 Vdc (DC only, clipped and capped), 24 Vac/dc or 3-wire 0-5V/0-10V Minimum load resistance for Volt operation: 5 kΩ

PRESSURE RANGES	
01 Pressure Range	Pressure Mode: Unidirectional: 0.1/0.25/0.5/1 in. WC, switch selectable Bidirectional: ±0.1/±0.25/±0.5/±1 in. WC, switch selectable Unidirectional: 25/50/100/250 Pa, switch selectable Bidirectional: ±25/±50/±100/±250 Pa, switch selectable  Velocity Mode: 500/1,000/2,000/3,000 ft/min 2.5/5/10/15 m/s

## Wireless configuration

View and configure all field-selectable parameters via smartphone. No ladder necessary for duct mount applications.

## High accuracy

High accuracy digital sensor with seven selectable pressure and eight velocity sub-ranges, maintains calibration and reduces callbacks

## Maintenance free

High reliability sensor technology for long-term, maintenance-free operation

## Reduce field failures

Excellent tolerance to overpressure and vibration reduces field failures

## Water-resistant housing

IP65/NEMA 4 housing allows for mounting in wash-down locations

## Circuit protection

Circuit protection avoids damage due to incorrect input wiring

### APPLICATIONS

- Duct static pressure (Pressure mode)
- Building or room pressure (Pressure mode)
- Filter status (Pressure mode)
- Air flow measurement (Velocity mode)

02 Pressure Range	Pressure Mode: Unidirectional: 1.0/2.5/5/10 in. WC, switch selectable Bidirectional: ±1.0/±2.5/±5/±10 in. WC, switch selectable Unidirectional: 250/500/1,000/2,500 Pa, switch selectable Bidirectional: ±250/±500/±1,000/±2,500 Pa, switch selectable  Velocity Mode: 3,000/4,000/5,000/6,000 ft/min 15/20/25/30 m/s
05 Pressure Range	Pressure Mode: Unidirectional: 0.1/0.25/0.5/1/2.5/5/10 in. WC, switch selectable Bidirectional: ±0.1/±0.25/±0.5/±1/±2.5/±5/±10 in. WC, switch selectable Unidirectional: 25/50/100/250/500/1,000/2,500 Pa, switch selectable Bidirectional: ±25/±50/±100/±250/±500/±1,000/±2,500 Pa, switch selectable  Velocity Mode: 500/1,000/2,000/3,000/4,000/5,000/6,000/7,000 ft/min 2.5/5/10/15/20/25/30/35 m/s

SENSOR	
Response Time	Standard: T95 in 20 sec, Fast: T95 in 2 sec, DIP switch selectable
Mode	Unidirectional or bidirectional, DIP switch selectable
Display (option)	Pressure mode: Signed 3-1/2 digit LCD, indicates pressure, overrange indicator Velocity mode: Signed 4-1/2 digit LCD, indicates velocity, overrange indicator
Proof Pressure	3 psid (20,600 Pa)
Burst Pressure	5 psid (34,500 Pa)
Pressure Mode Accuracy	±1% FS (combined linearity and hysteresis)
Velocity Mode Accuracy	±90 ft/min (±0.45 m/s) plus 5% of measured value**

**SPECIFICATIONS (CONT.)**

Temperature Effect	1" (250 Pa) models: 0.05%/°C; 10" (2,500 Pa) models: 0.01%/°C (Relative to 25 °C) 0 to 50 °C (32 to 122 °F)
Zero Drift (1-year)	1" (250 Pa) models: 2.0% max.; 10" (2,500 Pa) models: 0.5% max.
Zero Adjust	Pushbutton auto-zero and digital input (2-pos terminal block)
Operating Env.	-20 to 60 °C (-4 to 140 °F)***
Altitude of Operation	0 to 3,000 m
Humidity Range	100% RH, non-condensing
Mounting Location	For indoor or outdoor use (display will not function below 0 °C (32 °F))
Fittings	Brass barb; 0.24" (6.1 mm) o.d.
Bluetooth Frequency Range	2.402 to 2.480 GHz (Bluetooth version 4.2, enabled by DIP switch)
Environmental Rating	IP65, NEMA 4
Flammability Rating	UL 94 5VA fire retardant ABS, plenum rated

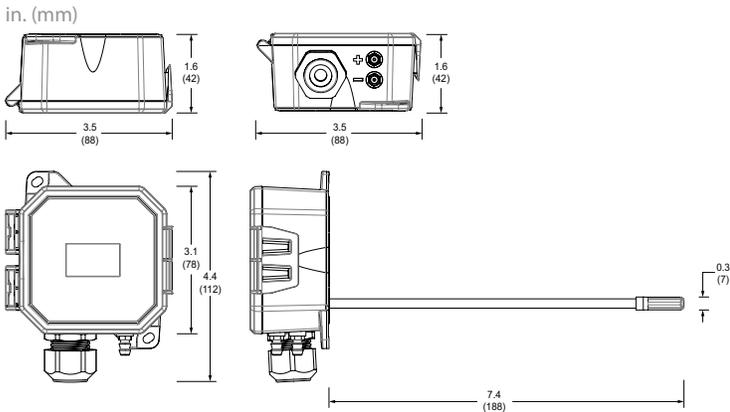
**WARRANTY**

Limited Warranty	5 years
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**AGENCY APPROVALS**

**CE** EMC Conformance: EN 61000-6-3 and A1, Class B, EN 61000-6-1, EN61326-1 and EN61326-2-3.  
 \* Class 2/II power source.  
 \*\* For measured values between 200 and 7,000 ft/min (1 and 35 m/s).  
 \*\*\* Display will not function below 0 °C (32 °F).

**DIMENSIONAL DRAWING**



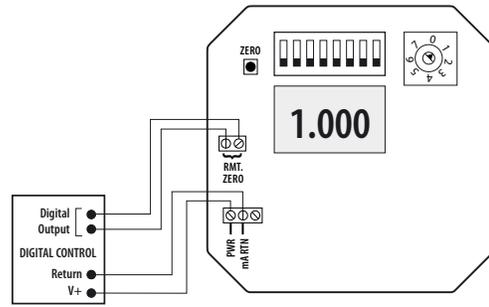
**SMART PHONE APP**

The Veris Sensors App allows for remote viewing and adjustment of settings. A great tool for reducing commissioning time.



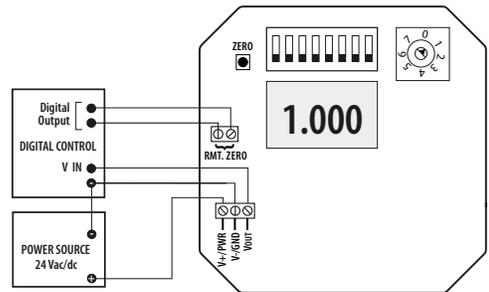
**WIRING DIAGRAM**

2-wire, 4-20 mA Current Loop Output



**WIRING DIAGRAM**

3-wire, 0-5 V/0-10 V Voltage Output



**ORDERING INFORMATION**

Enclosure	Local Display	NIST Certificate*	Range
PX3			
D = Duct P = Panel	L = LCD Display X = No Display	N = NIST X = None	01 = Pressure: 0 to 1 in. WC / 0 to 250 Pa Velocity: 0 to 3,000 ft/min / 0 to 15 m/s 02 = Pressure: 0 to 10 in. WC / 0 to 2500 Pa Velocity: 0 to 6,000 ft/min / 0 to 30 m/s
Example: PX3 D L X 01			
*8-point calibration			
Local Display	NIST Certificate*	Range	
PX3U			
L = LCD Display X = No Display	N = NIST X = None	05 = Pressure: 0 to 10 in. WC / 0 to 2,500 Pa Velocity: 0 to 7,000 ft/min / 0 to 35 m/s	
Example: PX3U L X 05			*16-point calibration

**ACCESSORIES**

- VFXP Series Air Velocity Measurement Probe\*
- Velocity Pitot Tubes, 8-5/8", 12-5/8", 18-5/8" (AA18, AA19, AA20)\*
- Static-04 Pick-up - 4" Duct Static Pickup Probe (AA06)
- Static-08 Pick up - 8" Duct Static Pickup Probe (AA07)
- Wall Plate Remote Pickup (AA56)

\*For use with the PX3P (panel) and PX3U (universal) models in Velocity mode only.



**ACCESSORIES P. 179**



# PASXX SERIES

Monitor Air Ducts, Filters and Fans



PASxx

PASxx differential air flow switches are intended for use in air handling systems for the monitoring of air ducts, filters and fans.

The enclosure is plastic with a rating of IP54. A set-point adjustment is provided under the clip-on clear plastic cover.

Supplied complete with mounting adaptor ring, two straight duct probes and a 6-foot length of clear tubing.

## SPECIFICATIONS

Medium	Air and neutral gases	
Pressure range	See Ordering Information table	
Set-point scale	Inches WC	
Tolerable overload on one side	20 in. WC at -22 to +185 °F	
Repeatability	PAS01	±2.5 (0.01 in. WC)
	PAS02	±5 (0.02 in. WC)
	PAS03	±5 (0.02 in. WC)
	PAS04	±5 (0.02 in. WC)
Switching load	Resistive load	5 A at 250 Vac 4 A at 30 Vdc
	Inductive	0.8 A at 250 Vac 0.7 A at 30 Vdc
Materials in contact with the medium	Case: PC 10% GF Cover: PC Diaphragm: Silicone LSR tempered 200 °C, free of gas emissions	
Operating temperature	Medium/ambient	-22 to +185 °F (-30 to +85 °C)
	Storage	-40 to +185 °F (-40 to +85 °C)
Service life	Mechanical > 10 <sup>6</sup> = 1,000,000 switching cycles	
Electrical connection	Screw terminals Cable gland type PG11 (DIN 40430) complete with cable strain relief	
Switch contact type	SPDT (change-over)	
Protection standard	Without cover	IP00
	With cover	IP54
Pressure connections	Pipe Ø 6.2 mm	

## Easy cable lead-in

Case geometry allows easy cable lead-in

## Integrated cable strain relief

Cable strain relief integrated in PG11 (DIN 40430)

## High accuracy

High adjustment accuracy through individual laser etched scale

## Snap cover

User-friendly snap cover

## Stable switching points

Long-term stability of switching points through trapezoidal bead diaphragm

## APPLICATIONS

- High pressure monitoring
- Filter monitoring
- Vacuum pressure monitoring
- Fan monitoring

Tests/admissions	EU Conformity, Electromagnetic Compatibility: CE <sup>1</sup> conformity according to EN 60730-2-6:2008 Low Voltage Directive: 2014/35/EU Gas Appliance Directive: 2009/142/EC Pressure Sensing Devices for Gas Burners and Gas Burning Appliances: EN 1854:2010 EU Directive on RoHS: 2011/65/EU
<b>WARRANTY</b>	
Limited Warranty	5 years
<b>AGENCY APPROVALS</b>	





## AFS-460

Manual Reset DPDT Air Pressure Sensing Switch for 120 Vac or 24 Vac Applications



The AFS-460 is a general purpose airflow proving switch designed for 120 Vac (AFS-460-136) or 24 Vac (AFS-460-137) HVAC and Energy Management applications where a manual reset switch with DPDT contacts is desirable. It may be used to sense positive, negative, or differential air pressure.

The plated housing contains a diaphragm, a calibration spring, a snap-acting switch with manual reset button, and a DPDT relay. The sample connections located on each side of the diaphragm accept 0.25" OD tubing via the integral compression ferrule and nut.

An enclosure cover guards against accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover will accept a 0.5" conduit connection. The manual reset button is located on the top surface of the enclosure cover.

### SPECIFICATIONS

Sample Media	Air or combustion by-products that will not degrade silicone
Mounting Position (to meet lowest operating specifications)	Diaphragm in any vertical plane
Field Adjustable Range	0.40 ± 0.06" WC to 12.0" WC
Maximum Pressure	0.5 psi (0.03 bar)
Operating Temperature Range	-40 to 180 °F (-40 to 82 °C)
Electrical Rating	AFS-460-136: 4.5 VA @ 120 Vac, 50/60 Hz AFS-460-137: 0.5 VA @ 24 Vac, 50/60 Hz
Contacts	DPDT, 2 form-C rated 8 A @ 250 Vac
Electrical Connections	Screw terminals
Sample Line Connections	Ferrule and nut compression type connectors will accept 0.25" OD rigid tubing
Shipping Weight	1.2 pounds
Agency Approvals	Pending
Limited Warranty	2 years

### Multi-purpose

Sense positive, negative or differential air pressure

### Field adjustable

Field adjustable set point range of 0.40 ± 0.06" WC to 12.0" WC

### Durable

Housed in a plated enclosure with removable metal guard protecting set point screw and snap action switch terminals

### Enclosure cover

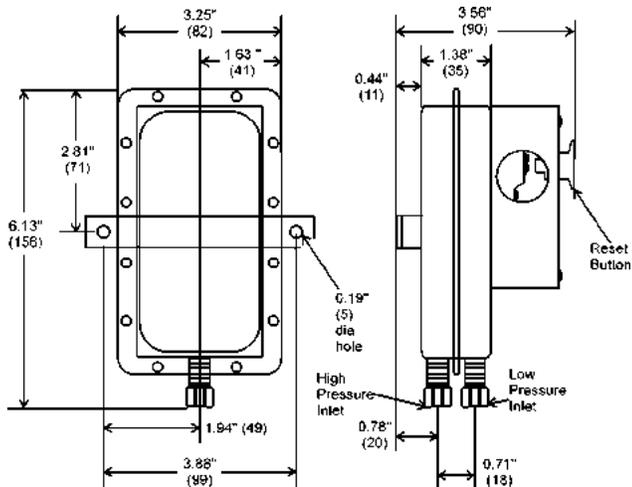
Avoid accidental contact with the live switch

### APPLICATIONS

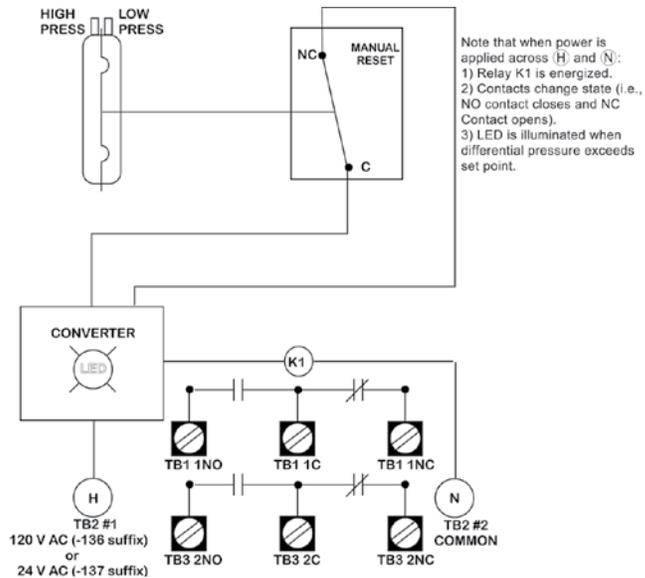
- Proving fan status
- Monitoring filter for excess pressure drop
- Monitoring duct static pressure
- Proving air flow
- Monitoring damper status

### DIMENSIONAL DRAWING

in. (mm)



### WIRING DIAGRAM



### ORDERING INFORMATION

AFS-460 - Voltage

136 = 120 Vac applications  
137 = 24 Vac applications

Example:  
AFS-460- 136



## EP3 SERIES

Micro-Controlled with High-Performance, Low-Power Coil Poppet Valve Technology



EP3

**ATTENTION**  
EP Series transducers are sold as an open device. Observe handling precautions for static sensitive devices to avoid damage to the circuitry which would not be covered under the factory warranty.

The EP3 Series combines a microcontroller with high performance, low power coil poppet valve technology to create a system with unparalleled accuracy and proven reliability. The poppet valves used in the EP3 consume no air, eliminating unnecessary air losses in the system and allowing for efficient, long-term operation. The EP3 permits versatility, since all models feature manual override and a tri-state control option. The LCD provides easy visibility and the LED indicators provide visual status of valve operation in manual or automatic mode. All models come with SnapTrack housing and optional covers are available.

### SPECIFICATIONS

#### GENERAL

Input Power	Class 2; 22 to 30 Vdc/20 to 30 Vac, 47 to 63 Hz, 150 mA max. average, 350 mA peak
Control Input	Class 2; 4 to 20 mA/0-5 V/0-10 Vdc; switch-selectable, Tri-State, PWM
Input Impedance	4 to 20 mA, 250 Ω; 0-5 V/0-10 Vdc, 10 kΩ
Manual Override	Digital pushbutton adjust, jumper-selectable mode
Alarm Contact	100 mA@30 Vac/dc (Pressure loss, manual mode, jumper selectable)
Accuracy	1% FS; combined linearity, hysteresis, repeatability @20 °C (68 °F) ambient
Temperature Coefficient	±0.1%/°C
Operating Temp Range	41 to 140 °F (5 to 60 °C)
Operating Hum. Range	10 to 90% RH non-condensing
SCIM	523 in3/min @ 45 psi; (8570 cm3/min @ 310.3 kPa); 333 in3/min @ 20 psi (5457 cm3/min @ 137.9 kPa)
Supply Pressure	Min (0.1 psi + user F.S. pressure); Max 45 psig

### Field-selectable

Field-selectable 4 to 20 mA/ 0-5 V/0-10 Vdc input for application flexibility

### Multi-point calibration

3 to 15 psi (5-point calibration) and 0 to 20 psi (6-point calibration)

### Quiet operation

Poppet valve technology for quiet operation

### Pressure loss alarm

Pressure loss alarm provides a contact closure if the EP3 is unable to achieve the desired output within a fixed length of time

### Manual override

Manual override with set and hold feature...great for commissioning leaky systems

### Fail-safe vent

Fail-safe vent solenoids bleed branch pressure on power failure for added safety

### APPLICATIONS

- Hospitals
- Schools
- Pneumatic dampers/actuators

Control Range	User programmable zero selectable from 0 to 25 psi: Full scale 0 to 25 psi
Pressure Differential	0.1 psig (supply to branch)
Pressure Indication	Electronic, 3-½ digit backlit LCD
Min. Tubing Length	15 feet*
Port Connection	1/8" I.D. poly tubing
Media Connection	Clean, dry air, or inert gas. Do not use with oxygen service

#### WARRANTY

Limited Warranty 5 years

#### AGENCY APPROVALS

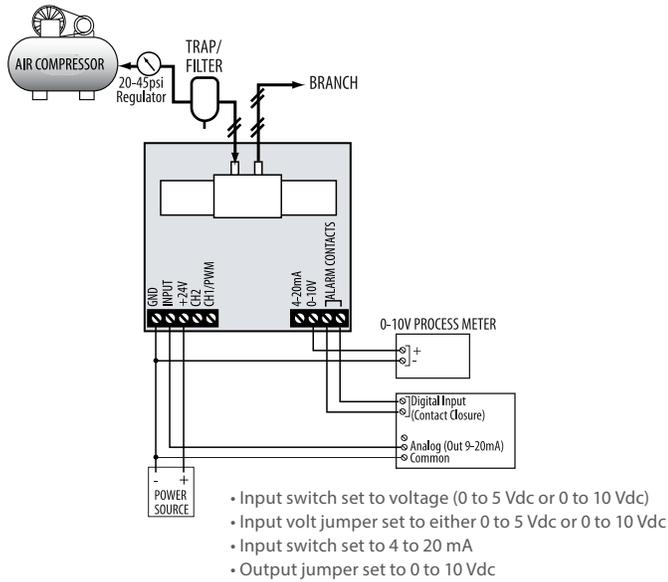


\*For shorter tubing runs use the Veris AA45 Pneumatic Capacitor  
EMC Conformance: Low voltage directive 2014/35/EU; EMC directive 2014/30/EU.  
EMC Special Note - CE option: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).

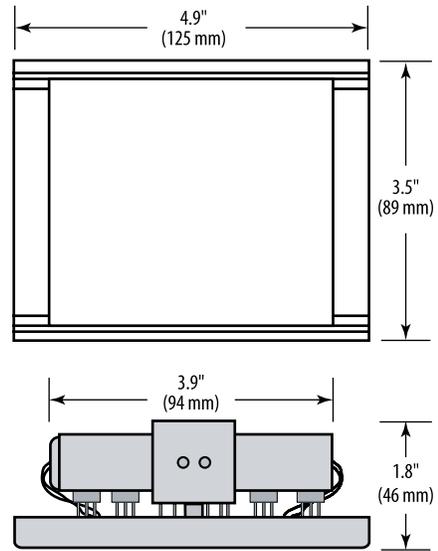
\*\*The CE mark applies to models with cover only.

### CURRENT/VOLTAGE CONTROL

Wiring Diagrams

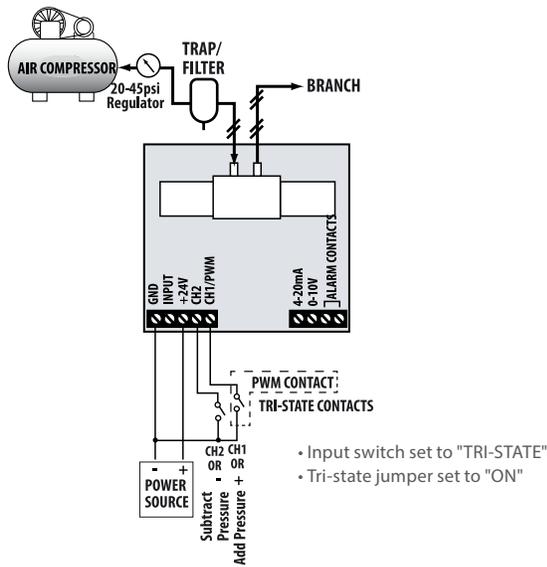


### DIMENSIONAL DRAWINGS



### TRI-STATE CONTROL

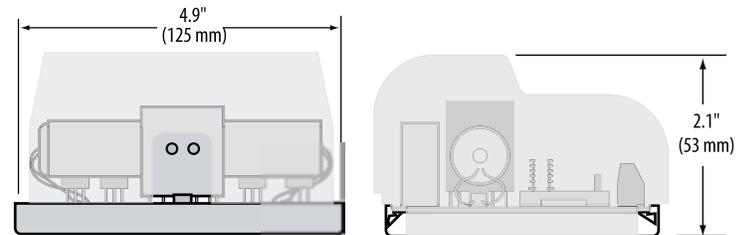
Wiring Diagrams



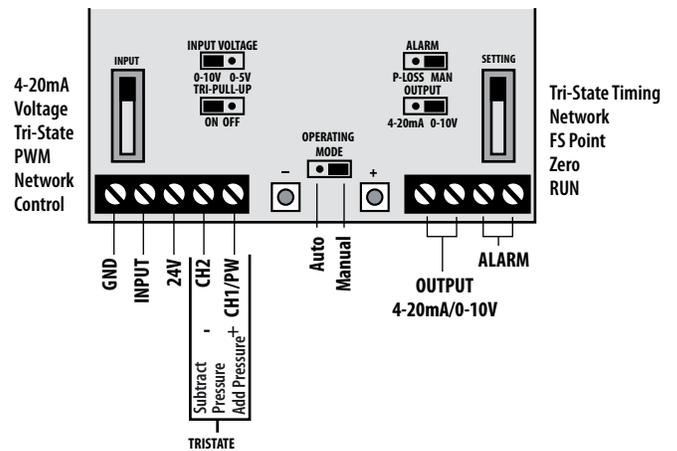
### DUST COVER

Dimensional Drawings (Front View)

Side View



### CONFIGURATION



### ORDERING INFORMATION

Output	Failsafe	Option
EP3	3	S
0 = None 3 = Analog output: 0-10VDC, or 4-20mA, selectable	0 = None 1 = Vent on Power Fail	Blank = None 2 = EP Cover Plate*

\*Sold separately as AA43.

Example:  
 EP3 0 3 0 S 2 Option = Cover Plate

### ACCESSORIES

- Dust Cover (AA43)
- Pneumatic Capacitor(AA45)
- Triac adapter (AA49)



ACCESSORIES P. 179



## EP2 SERIES

Micro-Controlled with High-Performance, Low-Power Coil Poppet Valve Technology



EP2



EP Series transducers are sold as an open device. Observe handling precautions for static sensitive devices to avoid damage to the circuitry which would not be covered under the factory warranty.

The EP2 Series electropneumatic pressure transducer uses micro-controlled poppet valve technology for highly accurate pressure sensing in multiple applications. The poppet valves consume no air, eliminating unnecessary air losses in the system and allowing for stable and reliable operation. The EP2 comes installed on standard SnapTrack, and an optional dust cover is available to protect from the environment. An LCD display and LED indicators make it easy to read system status at a glance.

### SPECIFICATIONS

#### GENERAL

Input Power	Class 2; 24 Vac/dc nominal, 30 Vac max.; 150 mA max.
Control Input	Class 2; 4 to 20mA/0-5 V/0-10 Vdc; jumper-selectable
Input Impedance	4 to 20 mA, 250 Ω; 0-5 V/0-10 Vdc, 10 kΩ
Manual Override	Jumper-selectable mode, digital pushbutton adjust
Alarm Contact	100 mA@30 Vac/dc (pressure loss, manual mode, jumper selectable)
Accuracy	1% FS; combined linearity, hysteresis, repeatability
Compensated Temp Range	-4 to 65 °C (25 to 140 °F)
Temperature Coefficient	±0.05%/°C
Operating Environment	10 to 90% RH non-condensing
Air Capacity	523 in3/min @ 45 psi (8570 cm3/min @ 310.3 kPa); 333 in3/min @ 20 psi (5456 cm3/min @ 137.9 kPa)
Supply Pressure	45 psig max.
Control Range	0 to 20 psig or 3 to 15 psig, jumper-selectable
Pressure Differential	0.1 psig (supply to branch)
Pressure Indication	Electronic, 3-1/2 digit LCD

### Field selectable

Field-selectable 4 to 20 mA/ 0-5 V/0-10 Vdc input for application flexibility

### Multi-point calibration

Multi-point calibration; 3 to 15 psi (5-point calibration) and 0 to 20 psi (6-point calibration)

### Quiet operation

Poppet valve technology for quiet operation

### Pressure loss alarm

Pressure loss alarm provides a contact closure if the EP2 is unable to achieve the desired output within a fixed length of time

### Manual override

Manual override with set and hold feature...great for commissioning leaky systems

### Fail-safe vent

Fail-safe vent solenoids bleed branch pressure on power failure for added safety

### APPLICATIONS

- Hospitals
- Schools
- Pneumatic dampers/actuators

Minimum Tubing Length	15 feet*
Port Connection	1/8" I.D. poly tubing
Media Connection	Clean, dry air, or inert gas. Do not use with oxygen service

#### WARRANTY

Limited Warranty	5 years
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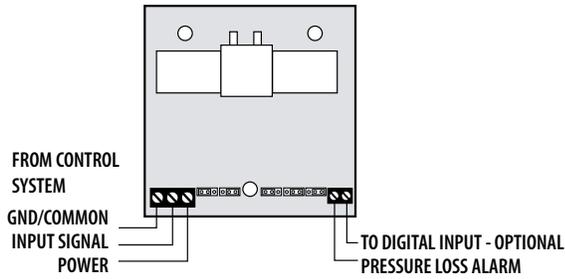
#### AGENCY APPROVALS



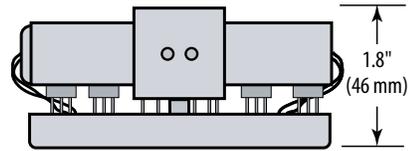
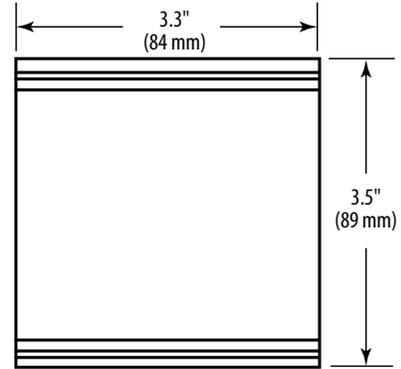
\*For shorter tubing runs use AA45 Pneumatic Capacitor  
EMC Conformance - CE option: Low voltage directive 2014/35/EU; EMC directive 2014/30/EU.  
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).

\*\*The CE mark applies to models with cover only.

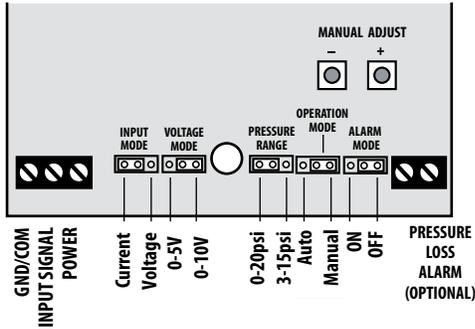
### WIRING DIAGRAM



### DIMENSIONAL DRAWINGS



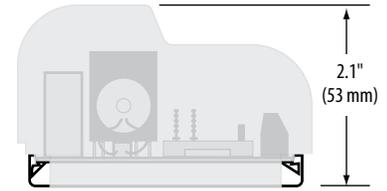
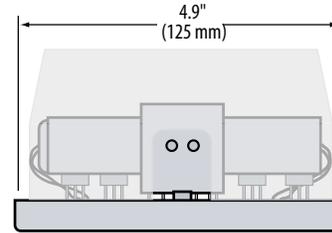
### CONFIGURATION



### DUST COVER

Dimensional Drawings (Front View)

Side View



If the dust cover is ordered, the EP2 is mounted to a longer Snaptrack.

### ORDERING INFORMATION

Output	Feedback	Failsafe		Option
EP2 <input type="checkbox"/> 1 = Selectable 3-15/0-20 psi	<input type="checkbox"/> 0 = None <input type="checkbox"/> 1 = Pressure Loss Alarm <input type="checkbox"/> 2 = Manual Mode Alarm	<input type="checkbox"/> 0 = None <input type="checkbox"/> 1 = Vent on <input type="checkbox"/> Power Fail	S	<input type="checkbox"/> Blank = none <input type="checkbox"/> 2 = EP Cover Plate*

\*Sold separately as AA43.

Example: EP2  1  0  0  S  2 Option = EP cover plate

### ACCESSORIES

- Dust Cover (AA43)
- Pneumatic Capacitor(AA45)



## PW SERIES

### DIP Switch Selectable Port Swap Feature



PWxxxS



PWxxxBP

The PW Series wet pressure transducers incorporate microprocessor profiled sensors for exceptional accuracy and reliability. Easy to use and designed to provide exceptional installation savings, the PW Series is ideal for measuring pressure across pumps, filters, heat exchangers, compressors, and other non-corrosive wet media applications.

The DIP switch selectable port swap feature eliminates costly replumbing when the high and low ports are improperly plumbed, allowing the DIP switch position to be changed from normal to swap.

The optional pre-assembled bypass valve is designed for easy maintenance and one-step installation.

### SPECIFICATIONS

#### GENERAL

Input Power	Class 2; 15 to 30 Vdc, 24 Vac nom. 50/60 Hz*
Max. Current Draw	DC: 125 mA; AC: 280 mA
Output	3-wire transmitter; user selectable 4 to 20 mA (clipped & capped)/0-5 V/0-10 V*
Surge Damping	Electronic; 1 or 5 second averaging
Test Mode	Overrides output to full-scale (20 mA, 5 V, 10 V)
Zero Adjust	Pushbutton auto-zero & digital input (2-pos terminal block)
Status Indication	Dual-color LED: Green = Normal, Green Blinking = Low > High Red = Overrange, Red Blinking = Overpressure Green/Red Blinking = Underpressure
Zero Offset (Bidirectional and Port Swap modes only)	0.5%
Housing Material	White powder-coated aluminum NEMA 4, IP65
Fittings	1/8" NPT female thread, 17 to 4 PH stainless steel

#### PRESSURE RANGES (SELECTABLE)

0 to 50 psig (Gauge)	0 to 5/10/25/50 psid (Differential)
0 to 100 psig (Gauge)	0 to 10/20/50/100 psid (Differential)
0 to 250 psig (Gauge)	0 to 25/50/125/250 psid (Differential)

#### SENSOR

Accuracy @ 25 °C**	Ranges A and B: ±1% F.S. typical***; Range C: ±1.5% F.S. typical***; Range D: ±2% F.S. typical***
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## Flexible

The DIP switch selectable output switch for normal (4 to 20 mA) or reverse (20 to 4 mA) operation provides application flexibility

## Rugged

Rugged, die-cast enclosure provides NEMA 4 sealing

## Zero calibration

Pushbutton and remote zero adjustment...maintain accuracy and reduce callbacks with automatic zero calibration

### APPLICATIONS

- Monitoring and controlling pump differential pressure
- Chiller/boiler differential pressure drop
- CW/HW system differential pressure

## Switch-selectable

Switch-selectable pressure ranges...fewer models to order and stock

## High stability

DIP switch controlled electronic surge dampening

Long Term Stability	±0.25% per year
Media Compatibility	Media compatible with 17 to 4 PH stainless steel
Proof Pressure	2x max. F.S. range***
Burst Pressure	5x max. F.S. range***
Temperature Compensated Range	0 to 50 °C (32 to 122 °F); TC Zero <±1.5% of product F.S.*** per sensor ; TC Span <±1.5% of product F.S.*** per sensor, (2 sensors per unit)
Media Temp. Limits	-20 to 85 °C (-4 to 185 °F); 0 to 90% RH non-condensing
Operating Environment	-10 to 50 °C (14 to 122 °F); 10 to 90% RH non-condensing

#### WARRANTY

Limited Warranty	5 years
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#### AGENCY APPROVALS



\*VFD systems and system wiring generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor or sensor wiring.

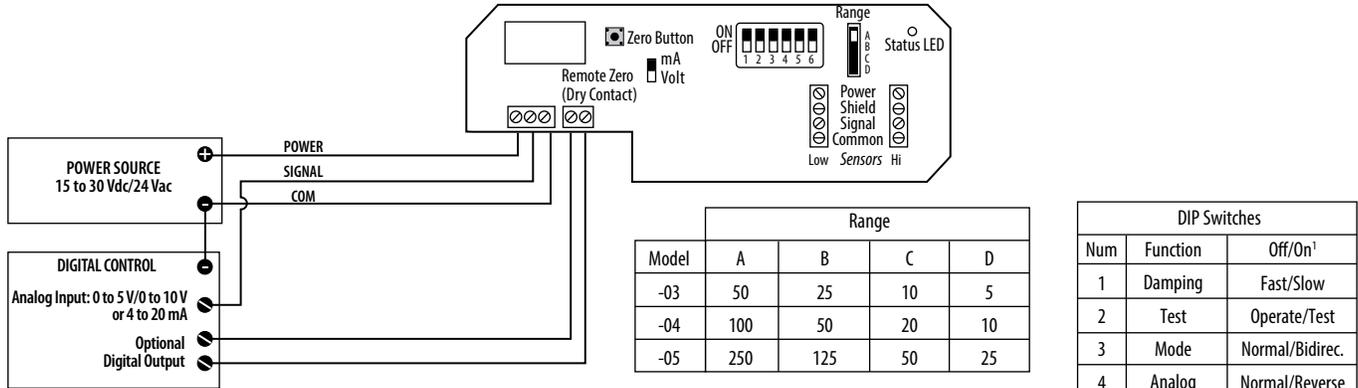
\*\*Accuracy combines linearity, hysteresis, and repeatability.

\*\*\* FS is defined as full span of selected range in bi-directional mode.

EMC Conformance - Low voltage directive 2014/35/EU; EMC directive 2014/30/EU.

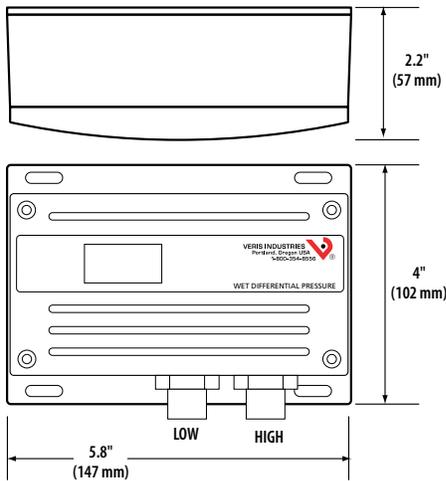
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).

### WIRING DIAGRAM



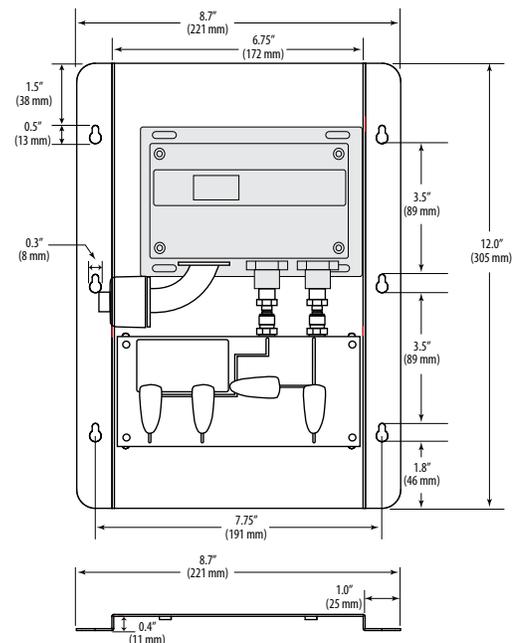
### DIMENSIONAL DRAWING

PW Series (PWxxxS)



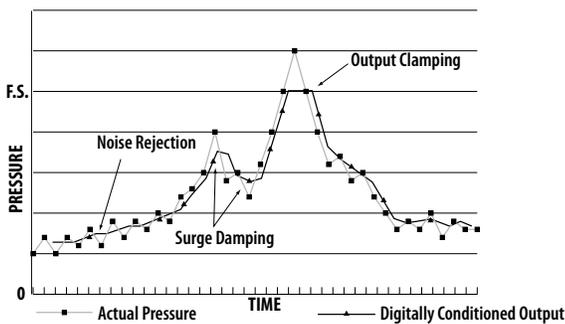
### DIMENSIONAL DRAWING

PW Series with Optional Mounted Bypass Assembly (PWxxxBP)\*



### MICROPROCESSOR PROVIDES DIGITAL SIGNAL CONDITIONING

- Noise rejection reduces fluctuating readings due to noise or turbulence
- Surge damping prevents false alarms by averaging fast peaks



### ORDERING INFORMATION

Local Display	NIST	Operational Range*	Options
PW <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L = LCD display X = No display	N = NIST X = None	03 = 0-50 psig 04 = 0-100 psig 05 = 0-250 psig	S = Standard BP = With mounted bypass assembly**
Example: PW <input type="checkbox"/> L <input type="checkbox"/> X <input type="checkbox"/> 04 <input type="checkbox"/> S			

\* Select operational range according to maximum gauge pressure, NOT differential pressure.  
\*\* Bypass valve assembly also sold separately as AA14A.

### ACCESSORIES

- Brass Snubber, 1/8" NPT (AA11)
- Brass Snubber, 1/4" NPT (AA69)
- Stainless Steel Snubber, 1/8" NPT (AA12)
- Stainless Steel Snubber, 1/4" NPT (AA70)
- Pigtail Steam Siphon (AA13)



ACCESSORIES P. 179



# PW2 SERIES

4 to 20 mA, 2-Wire Devices



PW2xxxS



PW2xxxBP

The PW2 Series 2-wire, 4 to 20 mA wet pressure transducers incorporate microprocessor profiled sensors for exceptional accuracy and reliability. Easy to use and designed to provide exceptional installation savings, the PW2 Series is ideal for measuring pressure across pumps, filters, heat exchangers, compressors, and other non-corrosive wet media applications.

The optional pre-assembled bypass valve is designed for easy maintenance and a one-step installation.

## SPECIFICATIONS

### GENERAL

Input Power	Class 2; 12 to 24 Vdc, loop powered (polarity insensitive)
Maximum Current Draw	29 mA
Output	2-wire transmitter; user selectable 4 to 20 mA (clipped & capped)*
Surge Damping	Electronic; 5-second averaging
Zero Adjust	Pushbutton auto-zero terminals
Housing Material	White powder-coated aluminum

### PRESSURE RANGES (SELECTABLE)

0 to 50 psi (0 to 3.45 barg) (Gauge)	0-5/10/25/50 psid (0-0.34/0.69/1.72/3.45 bard) (Differential)
0 to 100 psig (0 to 6.89 barg) (Gauge)	0-10/20/50/100 psid (Differential) (0-0.69/1.38/3.45/6.89 bard) (Differential)
0 to 250 psi (0 to 17.24 bar) (Gauge)	0-25/50/125/250 psid (Differential) (0-1.72/3.45/8.62/17.24 bard) (Differential)

### SENSOR

Accuracy @ 25 °C**	Range A, B, C: ±1% F.S.; Range D: ±2% F.S.***
Media Compatibility	Media compatible with 17-4 PH stainless steel
Long Term Stability	±0.25% per year
Proof Pressure	Max. 2x F.S. range
Burst Pressure	Max. 5x F.S. range
Temperature Compensated Range	0 to 50 °C (32 to 122 °F); TC Zero <±1.5% of product F.S. per sensor; TC Span <±1.5% of product F.S. per sensor, (2 sensors per unit)
Media Temperature Limits	-20 to 85 °C (-4 to 185 °F); 0 to 90% RH non-condensing

## Jumper selectable Dual sensor

The jumper-selectable output switch for normal (4 to 20 mA) or reverse (20 to 4 mA) operation provides application flexibility

Dual sensor design for improved overpressure tolerance... eliminates the requirement for a bypass valve assembly in most applications

## Rugged

Rugged, die-cast enclosure provides NEMA 4 sealing

## High stability

Jumper-controlled electronic surge damping for high stability

## Selectable

Selectable differential units: psid or bard

## Zero calibration

Pushbutton zero calibration – no trim pots to adjust... maintain accuracy and reduce callbacks with automatic zero calibration

## APPLICATIONS

- Monitoring and controlling pump differential pressure
- Chiller/boiler differential pressure drop
- CW/HW system differential pressure

Product Operating Environment	-10 to 55 °C (14 to 130 °F); 0 to 90% RH non-condensing
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### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS



\* Minimum input voltage: 250 Ω loop = 12 Vdc; 500 Ω loop = 17 Vdc

\*\*Accuracy combines linearity, hysteresis, and repeatability.

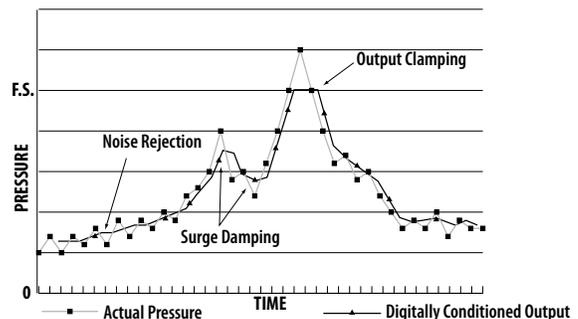
\*\*\*FS is defined as full span of selected range in bi-directional mode.

EMC Conformance - Low voltage directive 2014/35/EU; EMC directive 2014/30/EU.

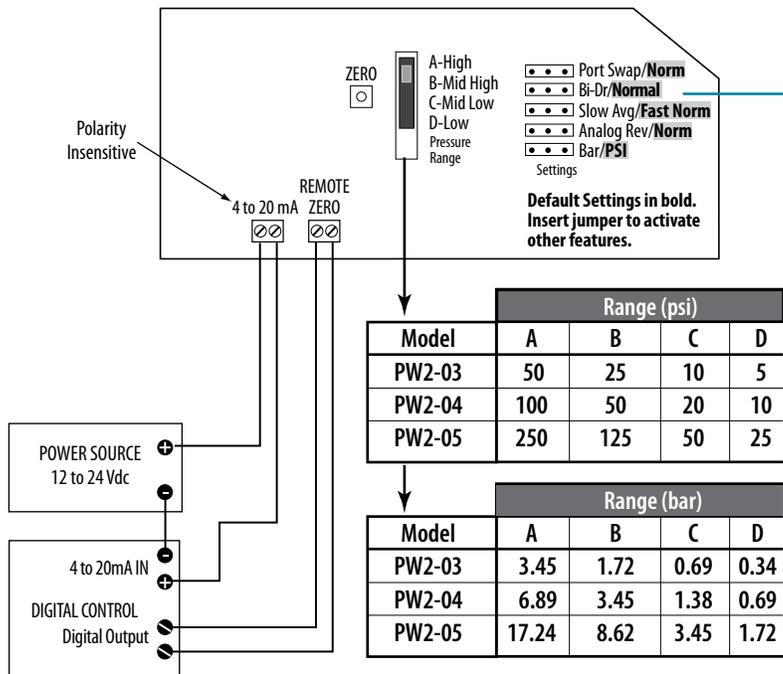
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1 specification requirements).

## MICROPROCESSOR PROVIDES DIGITAL SIGNAL CONDITIONING

- Noise rejection reduces fluctuating readings due to noise or turbulence
- Surge damping prevents false alarms by averaging fast peaks



WIRING DIAGRAM



Bidirectional Operation

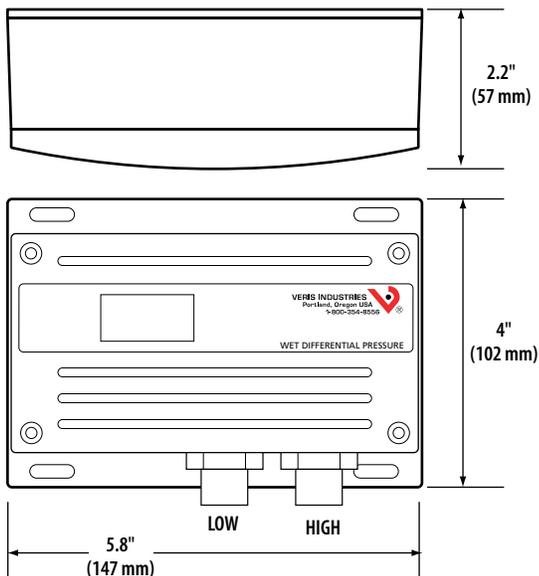
Input Conditions		Result	Outputs Read
HI PORT	LO PORT	DP	4-20mA
100 psi	0 psi	+100 psi	20mA
100 psi	50 psi	+50 psi	16mA
50 psi	50 psi	0 psi	12mA
50 psi	100 psi	-50 psi	8mA
0 psi	100 psi	-100 psi	4mA

Model	Range (psi)			
	A	B	C	D
PW2-03	50	25	10	5
PW2-04	100	50	20	10
PW2-05	250	125	50	25

Model	Range (bar)			
	A	B	C	D
PW2-03	3.45	1.72	0.69	0.34
PW2-04	6.89	3.45	1.38	0.69
PW2-05	17.24	8.62	3.45	1.72

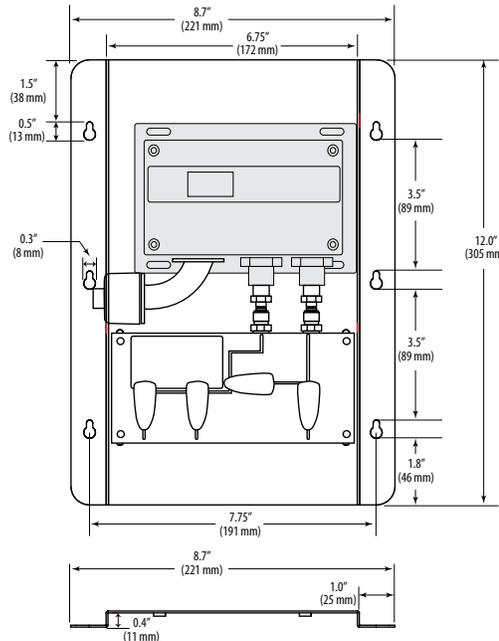
DIMENSIONAL DRAWING

PW2xxxS



DIMENSIONAL DRAWING

PW2xxxBP\*



\* Bypass valve assembly also sold separately as AA14A.

ORDERING INFORMATION

Local Display	NIST	Operational Range*	Options
PW2 <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L = LCD Display X = No Display	N = NIST X = None	03 = 0 to 50 psig/3.45 barg 04 = 0 to 100 psig/6.89 barg 05 = 0 to 250 psig/17.24 barg	S = Standard BP = With mounted bypass assembly**
<p>Example:</p> <p>PW2 <input type="checkbox"/> L <input type="checkbox"/> X <input type="checkbox"/> 04 <input type="checkbox"/> S</p>			
<p>*Select operational range according to max. gauge pressure, NOT differential pressure. Example: High gauge pressure =90 psig, Select 100 psig model (04). ** Bypass valve assembly also sold separately as AA14A.</p>			

ACCESSORIES

- Brass Snubber, 1/8" NPT (AA11)
- Brass Snubber, 1/4" NPT (AA69)
- Stainless Steel Snubber, 1/8" NPT (AA12)
- Stainless Steel Snubber, 1/4" NPT (AA70)
- Pigtail Steam Siphon (AA13)



ACCESSORIES P. 179



# PWR SERIES

3-Wire Device, User-Selectable Output



The PWR Series remote wet media pressure transducers allow remote pressure sensing capability using existing plumbing runs. With no need to run plumbing lines all the way to the transducer, the installation time and cost is greatly reduced. Select either armored (6 ft.) or shielded (10 or 20 ft.) cable, depending on the application.

## SPECIFICATIONS

### GENERAL

Input Power	Class 2; 15 to 30 Vdc, 24 Vac nom. 50/60 Hz*
Maximum Current Draw	DC: 125 mA; AC: 280 mA
Output	3-wire transmitter; user-selectable 4 to 20mA/ 0 to 5 V/0 to 10 V
Status Indication	Dual color LED
Surge Damping	Electronic; 1 or 5 second averaging
Zero Adjust	Pushbutton auto-zero and digital input (2-position terminal block)
Fittings	1/4" NPT male thread, stainless steel 17-4 PH Overall thread length: 0.5946" (conforms to ANSI/ASME B1.20.1 standard)

### SENSOR

Media Compatibility	17-4 PH stainless steel
Proof Pressure	2x max. F.S. range**
Burst Pressure	5x max. F.S. range**
Accuracy at 25 °C***	Ranges A and B: ±1% F.S. typical; Range C: ±1.5% F.S. typical; Range D: ±2% F.S. typical. (For less than or equal to 20 ft. (6.1 m) cable length)
Long Term Stability	±0.25%
Zero Offset (Bidirectional and Port Swap Modes Only)	±0.5%
Temperature Compensated Range	0 to 50 °C (32 to 122 °F); TC Zero <1.5% of product F.S. per sensor; TC Span <1.5% of product F.S. per sensor

## Armor cable

Armor cable or conduit connector minimizes the need for field customization

## Zero calibration

Pushbutton zero calibration – no trim pots to adjust...maintain accuracy and prevent callbacks with automatic zero calibration

## Lower costs

Remote probes reduce need for plumbing or bypass assemblies... lower costs and reduced labor for installation

## Switch-selectable

Switch-selectable pressure ranges...fewer models to order and stock

## APPLICATIONS

- Monitoring and controlling pump differential pressure
- Chiller/boiler differential pressure drop
- CW/HW system differential pressure

### PRESSURE RANGES

0 to 50 psig (Gauge)	5/10/25/50 psid (Differential)
0 to 100 psig (Gauge)	10/20/50/100 psid (Differential)
0 to 250 psig (Gauge)	25/50/125/250 psid (Differential)

### OPERATING CONDITIONS

Sensor Operating Range	-20 to 85 °C (-4 to 185 °F)
Operating Environment	-10 to 50 °C (14 to 122 °F); 10 to 90% RH non-condensing

### WARRANTY

Limited Warranty	5 years
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### COMPLIANCE INFORMATION

Approvals	RoHS, CE, NEMA4, IP65 at sensor
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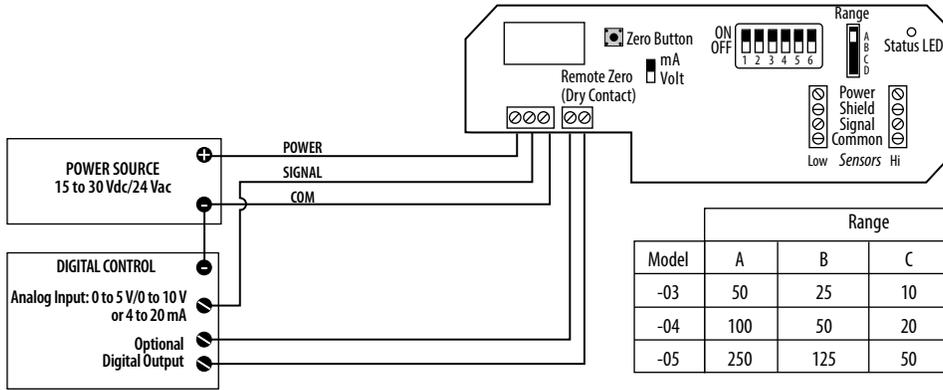


\*VFD systems and system wiring generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor or sensor wiring.

\*\*F.S. is defined as full span of selected range.

\*\*\*Accuracy combines linearity, hysteresis, and repeatability.

### WIRING DIAGRAM

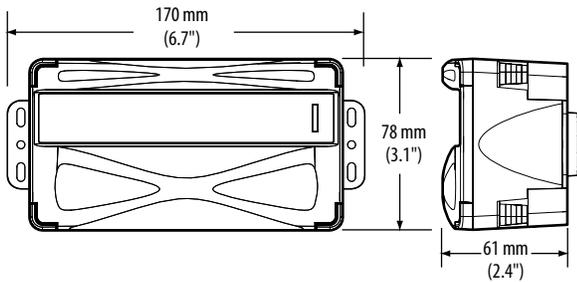


	Range			
Model	A	B	C	D
-03	50	25	10	5
-04	100	50	20	10
-05	250	125	50	25

DIP Switches		
Num	Function	Off/On <sup>1</sup>
1	Damping	Fast/Slow
2	Test	Operate/Test
3	Mode	Normal/Bidirec.
4	Analog	Normal/Reverse
5	Port	Normal/Swap
6	Voltage Out <sup>2</sup>	0 to 10 V/0 to 5 V

1. "Off" position is the default setting for all DIP switches.  
2. Ignored in mA mode.

### DIMENSIONAL DRAWING



### ORDERING INFORMATION

Display	NIST	Operational Range*	Media	Cable Length	Cable
PWR <input type="checkbox"/> L	<input type="checkbox"/> X	<input type="checkbox"/>	<input type="checkbox"/> S	<input type="checkbox"/>	<input type="checkbox"/>
= LCD Display	= None	03 = 0-50 psig 04 = 0-100 psig 05 = 0-250 psig	= Water	006 = 6 ft. (1.8 m) 010 = 10 ft. (3.1 m) 020 = 20 ft. (6.1 m)	Blank = Standard** A = Armored***

Example:  
PWRLX  03  S  006  A

\* Select operational range according to maximum gauge pressure, NOT differential pressure.  
Example: High gauge pressure=90 psig, Select 100 psig model (04).  
\*\* Standard cable available only in 10 ft and 20 ft lengths.  
\*\*\* Armored cable available only in 6 ft length.  
Note: Extension of total cable length greater than 20 feet may result in reduced accuracy.

### ACCESSORIES

- Brass Snubber, 1/4" NPT (AA69)
- Stainless Steel Snubber, 1/4" NPT (AA70)
- Pigtail Steam Siphon (AA13)
- 1/4" Ball Valve (AA68)



## PH SERIES

Three Switch-Selectable Ranges with Test Mode



The PH Series pressure transducers are designed for steam, air, gas, and liquid pressure measurement in all media compatible with 17-4PH N8 stainless steel. They utilize a microprocessor controlled sensor profiled for exceptional accuracy and reliability. All models feature three switch-selectable ranges and a “test mode” to verify wiring and panel input scaling. A pushbutton and digital input terminal is used to automatically zero the output, and the microprocessor guards against accidental zero adjustment during operation. The field-selectable output, offering options of 0 to 5 V, 0 to 10 Vdc, or 4 to 20 mA, ensures excellent systems compatibility. Jumper controlled surge damping is provided on all models to reduce false alarms.

### SPECIFICATIONS

GENERAL	
Input Power	Class 2; 12 to 30 Vdc/24 Vac
Output	3-wire transmitter; user selectable 4 to 20 mA (clipped & capped)/0-5 V/0-10 V*
Surge Damping	Electronic; 5-second averaging
Test Mode	Overrides output to full-scale (20 mA, 5 V, 10 V)
Zero Adjust	Pushbutton auto-zero and digital input (2-pos terminal block)
Status Indication	Dual-color LED: Green = Normal, Red = Overpressure, Flashing Red = Fault
Housing Material	White powder-coated steel
PRESSURE RANGES	
0 to 100 psi	25/50/100 psig switch selectable
0 to 250 psi	62.5/125/250 psig switch selectable
0 to 500 psi	125/250/500 psig switch selectable
0 to 1000 psi	250/500/1000 psig switch selectable
OTHER SPECS	
Product Operating Environment	-10 to 55 °C (-4 to 130 °F); 0 to 90% RH non-condensing

### Reduces failures

Micromachined silicon sensor design...improves overpressure capacity and reduces failures

### Switch-selectable

Switch-selectable pressure ranges...fewer models to order and stock

### High stability

Electronic surge damping for high stability

### Pushbutton

Pushbutton and remote zero adjustment...maintain accuracy and prevent callbacks with automatic zero calibration

### Zero calibration

Pushbutton zero calibration...no trim pots to adjust, saves installation time

### Microprocessor

Microprocessor controlled signal conditioning (see graph)

### APPLICATIONS

- Chilled and hot water pump monitoring
- HVAC and industrial gas monitoring
- Instrument air pressure
- Hydraulic oil pressure

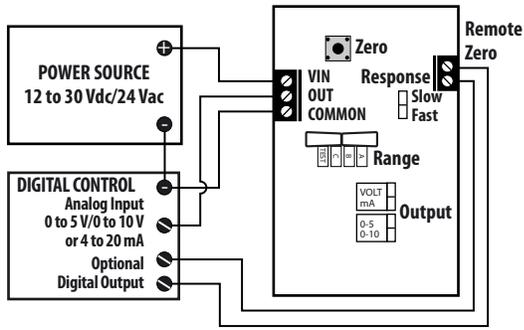
SENSOR	
Accuracy	±1% F.S. Combined linearity, hysteresis, and repeatability
Long Term Stability	±0.25% per year
Media Compatibility	Media compatible with 17-4 PH stainless steel
Proof Pressure	Max. 2x F.S. range
Burst Pressure	Max. 5x F.S. range
Temp Compensated Range	0 to 50 °C (32 to 122 °F)
Media Temperature Limits	-20 to 85 °C (-4 to 185 °F); 0 to 90% RH non-condensing
Fittings	1/4" NPT male thread, 17-4 PH stainless

WARRANTY	
Limited Warranty	5 years

\*Minimum input voltage for 4 to 20 mA operation:  
 250 Ω loop (1 to 5 V) = 12 Vdc  
 500 Ω loop (2 to 10 V) = 15 Vdc

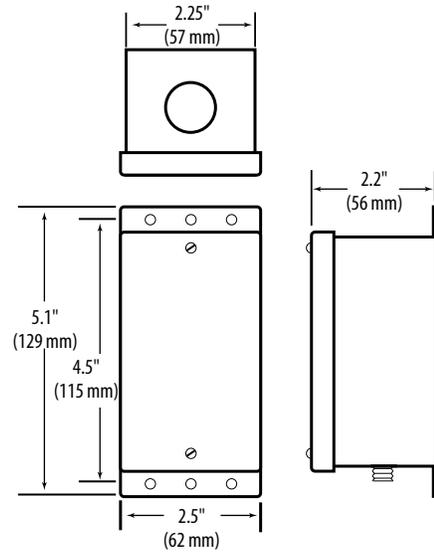


### WIRING DIAGRAM

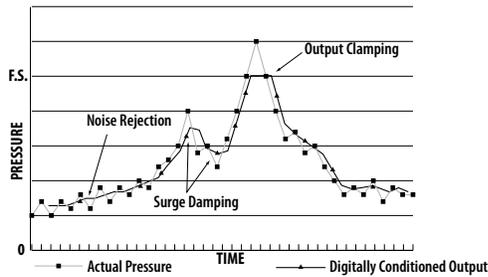


MODEL	RANGE		
	A	B	C
07	25	50	100
08	62.5	125	250
09	125	250	500
10	250	500	1000

### DIMENSIONAL DRAWING



### SIGNAL CONDITIONING DIAGRAM



### ORDERING INFORMATION

NIST      Range

PH              S

N = NIST      07 = 0-100 psig      = Standard  
 X = None      08 = 0-250 psig  
                   09 = 0-500 psig  
                   10 = 0-1000 psig

Example:

PH  X  07  S

### ACCESSORIES

- Brass Snubber, 1/4" NPT (AA69)
- Stainless Steel Snubber, 1/4" NPT (AA70)
- Pigtail Steam Siphon (AA13)



AA69



AA70



AA13

ACCESSORIES P. 179



## PG SERIES

### Rugged Stainless Steel Construction



PG

The PG Series pressure transducers are compatible with a variety of HVAC and industrial applications, such as refrigeration measurement, pneumatic pressure measurement, gas pressure measurement, pump inlet, and outlet fluid pressure. They are also compatible with extreme applications, such as aerospace and motor sports equipment.

Volt and mA output options ensure integration with building systems. A wide selection of pressure ranges offers application flexibility.

The PG Series offers a stainless steel housing and all models are warranted for a period of five years.

### SPECIFICATIONS

#### GENERAL

Supply Voltage	Class 2; 12 to 30 Vdc
Output	0 to 5 Vdc (3-wire), 0 to 10 Vdc (3-wire) or 4 to 20 mA (2-wire)
Load Impedance	Volt models >10 kΩ mA models ≤250 Ω with 12 Vdc min. supply voltage mA models ≤500 Ω with 17 Vdc min. supply voltage
Standard Connection	Cable gland 59" (1.5 m) length
Pressure Port	1/4" NPT Male

#### PERFORMANCE AT 25 °C (77 °F)

Accuracy *	±0.5% FS
Media Compatibility	Fluids & gases compatible with 316L stainless steel
Pressure Cycles	>100 million cycles
Over Pressure	2.5x FS with no change in calibration

#### ENVIRONMENTAL

Shock	100G, 11 msec, 1/2 sine
Vibration	20G peak, 20 to 2400 Hz
EMI/RFI Protection	Yes
Rating	IP66
Operating Temp. Range	-30 to 120 °C (-22 to 248 °F)
Compensated Temp Range	0 to 55 °C (32 to 130 °F)
Total Error Band Over Temp	<±3% of FS

### Versatile

A wide operating temperature range of -40 to 85 °C (-40 to 185 °F) for operation versatility

### Sturdy construction

Suitable for high shock and vibration applications

### Fewer parts to fail Rugged

No silicon oil, no internal O-rings, no welds

Stainless steel wetted construction

### APPLICATIONS

- Pump inlet/outlet and compressors
- Refrigeration equipment, fluids
- Hydraulic/pneumatic systems
- Gas pressure measurement
- Energy and water management

Humidity	0 to 95% RH non-condensing
<b>WARRANTY</b>	
Limited Warranty	5 years

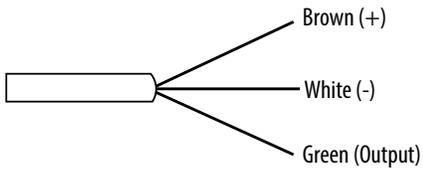
#### AGENCY APPROVALS



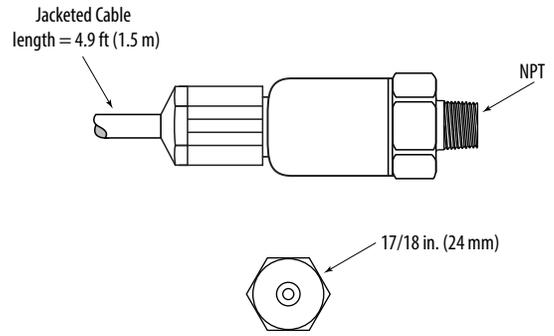
\* Accuracy includes nonlinearity and hysteresis.

### 3-WIRE, 0-5 VDC/0-10 VDC

Wire Color Coding

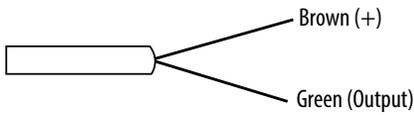


### DIMENSIONAL DRAWING



### 2-WIRE, 4 TO 20 MA

Wire Color Coding



### ORDERING INFORMATION

PG	Range	Wetted Material	Output
	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div> 03 = 0 to 15 psig 04 = 0 to 25 psig 05 = 0 to 50 psig 06 = 0 to 75 psig 07 = 0 to 100 psig 08 = 0 to 250 psig 09 = 0 to 500 psig	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto; text-align: center; line-height: 20px;">A</div> = 316L stainless steel	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div> M = 4 to 20 mA V = 0-10 Vdc J = 0-5 Vdc

Call factory for ranges not shown.

Example:

PG 07 A V

### ACCESSORIES

- Brass Snubber, 1/4" NPT (AA69)
- Stainless Steel Snubber, 1/4" NPT (AA70)
- Pigtail Steam Siphon (AA13)



## PD SERIES

Rugged, One-Piece Construction



PD

The versatile PD Digital Pressure Gauge can be used with any gas, liquid, or solid that is compatible with 17-4 stainless steel. The one-piece construction employs no silicone oil, welds, O-rings, or seals, making it the ideal universal pressure measurement device. The large LCD display shows the current reading, the selected scale, and the maximum and minimum pressure. All functions are easily controlled from the four panel push buttons located below the display.

### SPECIFICATIONS

#### GENERAL

Input Power: 4 to 20mA Output Models Voltage Output Models	7.5 to 32 Vdc 15 to 32 Vdc
Pressure	See ordering table; consult factory for additional ranges
Measurement Units	psi, bar, kg/cm <sup>2</sup> , atm, in. of Hg, in. of H <sub>2</sub> O* (selectable)
Accuracy**	<± 0.5% BFSL***
Stability (1 yr)	±0.25% of FS Typical
Over Range Protection	2x Rated Pressure
Burst Pressure	5x Rated Pressure or 5000 psi, whichever is less
Pressure Cycles	>100 Million

#### TEMPERATURE RANGES

Media	-55 to 125 °C (-65 to 257 °F)
Operating (Ambient)	-10 to 70 °C (15 to 158 °F)
Storage: 4 to 20mA and Voltage Output Models	-40 to 65 °C (-40 to 150 °F)

#### THERMAL LIMITS

Compensated Range	0 to 55 °C (32 to 130 °F)
TC Zero	<±1.5% of FS
TC Span	<±1.5% of FS

### Multiple pressure range options

Fits a wide variety of application needs

### Switch-selectable

Switch-selectable scales... for maximum resolution and versatility

### Rugged

Rugged one-piece construction... provides long product life

### Pushbutton zero

Maximizes accuracy and prevents callbacks

### Large LCD display

Clear readings at a distance

### NEMA 4/IP65

NEMA 4/IP65 housing

### APPLICATIONS

- Pump inlet/outlet and compressors
- Inert gas pressure measurement
- Hydraulic/pneumatic systems
- Energy and fluid management
- Refrigeration equipment/fluids/test stands
- Industrial process control
- Vacuum chambers
- Lab and research
- Irrigation

Connection	¼" NPT Male
Update Rate 4 to 20mA and Voltage Output Models	32 times per second
Housing	NEMA 4, IP65, Polycarbonate
Output: Analog Output Models	4 to 20 mA loop powered or 0-5/0-10 Vdc

#### WARRANTY

Limited Warranty	1 year
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\*Inches H<sub>2</sub>O units available on ≤250 psi range devices only

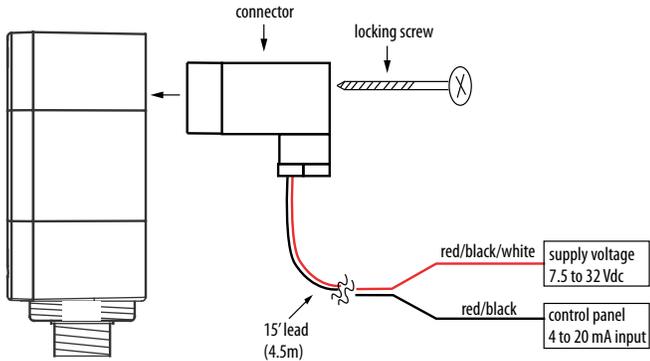
\*\*Accuracy includes non-linearity, hysteresis, and non-repeatability, measured at 25 °C (77 °F)

\*\*\*Best fit straight line

Note: Select a loop power supply and total loop resistance so that when the loop current is 20 mA, the gauge will have at least 7.5 Vdc at its terminals.

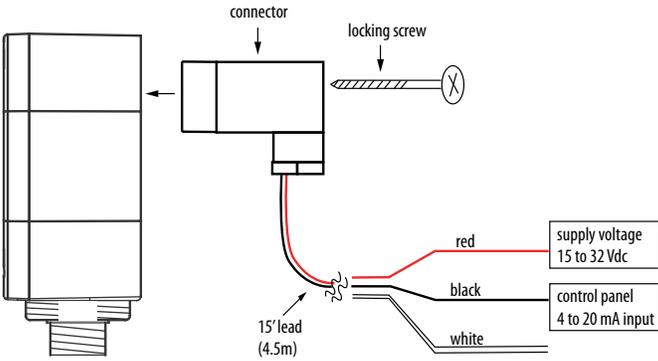
**4 TO 20 mA OUTPUT VERSION**

Wiring Diagram

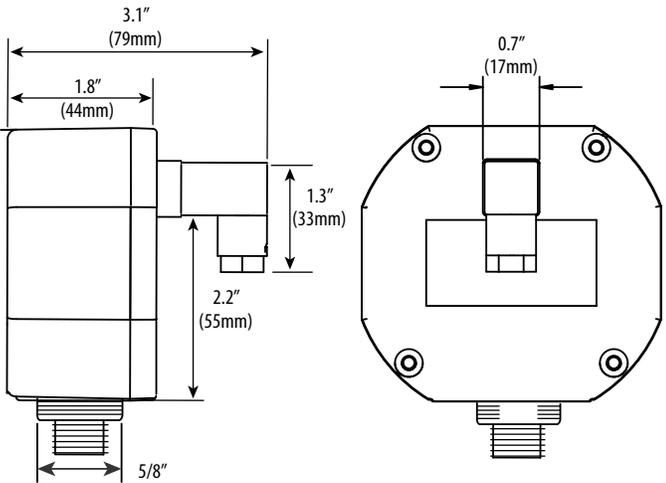


**VOLTAGE OUTPUT VERSION**

Wiring Diagram



**DIMENSIONAL DRAWING**



**ORDERING INFORMATION**

Pressure Range	Material	Output
PD <input type="checkbox"/> 50 = 0 to 50 psig 100 = 0 to 100 psig 250 = 0 to 250 psig	A <input type="checkbox"/> = 17 - 45S	<input type="checkbox"/> M = 4 to 20 mA V = 0-5Vdc/0-10Vdc

# ACCESSORIES SELECTION GUIDE: PRESSURE MONITORING

Product	Description	PX3	PAS	PH	PG	EP2	EP3	PW	PW2	PWR
<b>DRY PRESSURE</b>										
AA05	Remote Wall Static Pickup Tube	•	•							
AA06	Static-04 Pick-up - 4" Duct Static Pickup Probe	•	•							
AA07	Static-08 Pick up - 8" Duct Static Pickup Probe	•	•							
AA18	Velocity Pitot Tube Kit - 8" Velocity Duct Probe	•								
AA19	Velocity Pitot Tube Kit - 12" Velocity Duct Probe	•								
AA20	Velocity Pitot Tube Kit - 18" Velocity Duct Probe	•								
AA43	Dust Cover					•	•			
AA45	Pneumatic Capacitor					•	•			
AA49	Triac Adaptor						•			
AA56	Wall Plate Remote Pickup	•								
<b>WET PRESSURE</b>										
AA11	Brass Snubber, 1/8" NPT							•	•	
AA12	Stainless Steel Snubber, 1/8" NPT							•	•	
AA13	Pigtail Steam Siphon			•	•			•	•	•
AA14A	Bypass Valve Assembly Bracket							•	•	
AA68	1/4" Ball Valve				•					•
AA69	Brass Snubber, 1/4" NPT			•	•			•	•	•
AA70	Stainless Steel Snubber, 1/4" NPT			•	•			•	•	•





**AA05**  
Remote Wall Static Pickup Tube



**AA06**  
Static-04 Pick-up - 4" Duct Static Pickup Probe



**AA07**  
Static-08 Pick up - 8" Duct Static Pickup Probe



**AA11/AA69**  
Brass Snubber, 1/8" NPT (AA11)  
Brass Snubber, 1/4" NPT (AA69)



**AA12/AA70**  
Stainless Steel Snubber, 1/8" NPT (AA12)  
Stainless Steel Snubber, 1/4" NPT (AA70)



**AA13**  
Pigtail Steam Siphon



**AA14A**  
Bypass Valve Assembly and Bracket



**AA18/AA19**  
Velocity Pitot Tube Kit 8" (AA18),  
Velocity Pitot Tube Kit 12" (AA19)



**AA20**  
Velocity Pitot Tube Kit 18".



**AA43**  
Dust Cover



**AA45**  
Pneumatic Capacitor



**AA49**  
Triac Adapter



**AA56**  
Wall Plate Remote Pickup



**AA68**  
1/4" Ball Valve



# TEMPERATURE MONITORING

Veris offers a wide range of temperature sensing products for commercial building applications. Control and maintain a comfortable environment with our thermistor, RTD, and transmitter devices. We offer an array of mounting options for installation flexibility, including duct, wall, ceiling, pendant, and immersion. All devices carry the Veris reputation for accuracy and reliability, as well as an aesthetically pleasing housing, making them ideal for monitoring temperature in any setting.

MODEL	DESCRIPTION	PAGE
TW2	Deluxe Wall Mount Temperature Sensors	183
TW2xP	Deluxe Wall Mount Temperature Sensors, Protocol Communication	185
TE & TP	Flush Mount Temperature Sensors	187
TC/TS	Ceiling and Recessed Mount Temperature Sensors	189
TD/TF/TG/TDDA/TK	Duct Mount Temperature Sensors	191
TI	Immersion Temperature Sensors	193
TB/TRA	Specialty Temperature Sensors	195
TJ	VAV Discharge Temperature Sensors	197
TA	Averaging Temperature Sensors	199
TO	Outdoor Temperature Sensors	201
TZ	Manual and Automatic Freeze Stats with Relays	203

## TEMPERATURE SENSOR SELECTION GUIDE

	WALL MOUNT	DUCT MOUNT	CEILING MOUNT	OUTDOOR MOUNT	FLUSH MOUNT	REMOTE	STRAP-ON	IMMERSION	VAV
Analog Transmitter Output	TW2, TEA <a href="#">page 183, 187</a>	TDDA <a href="#">page 191</a>							
Resistive Output	TW2 <a href="#">page 183</a>	TD/TF/TG/TK <a href="#">page 191</a>	TC/TS <a href="#">page 189</a>	TO <a href="#">page 201</a>	TE/TP <a href="#">page 187</a>	TRA <a href="#">page 195</a>	TB <a href="#">page 195</a>	TI <a href="#">page 193</a>	TJ <a href="#">page 197</a>
LCD Display*	TW2L <a href="#">page 183</a>								
Touchscreen Display	TW2T <a href="#">page 183</a>								
Averaging Sensor		TW2 <a href="#">page 183</a>							
Protocol Communication	TW2xP <a href="#">page 185</a>								
Relay Out Analog Display		TZ <a href="#">page 203</a>							

\*Requires AA04 Remote Display accessory, see page 205.



# MONITOR AND MAINTAIN A COMFORTABLE ENVIRONMENT

Temperature Sensors and Monitors

## TW2 SERIES

### TEMPERATURE SENSORS

- » Modern aesthetic with color touchscreen (also available in LCD and non-display)
- » Field-replaceable and interchangeable
- » Flexible housing can also be used to measure Humidity, VOC, and CO<sub>2</sub>



## TD SERIES

### DUCT TEMPERATURE SENSOR

Cost-effective high-accuracy RTDs available with or without junction box  
Ideal for duct systems in industrial applications  
No calibration required



TD SERIES

## TA SERIES

### AVERAGING TEMPERATURE SENSOR

Flexible or fixed probe options cover all averaging applications with one line  
Ideal for duct temperature measurements



TA SERIES

## TID SERIES

### PIPE/IMMERSION TEMPERATURE SENSOR

Corrosion-resistant stainless steel probe, ideal for tanks, pipes, chillers  
Cost-effective high accuracy thermistors/RTDs



TID SERIES



# TW2 SERIES

## Wall Mount Temperature Sensors



The TW2 Series of temperature sensors for living space is a versatile sensor platform for use with BAS controllers designed to accept 4 to 20mA, 0 to 5Vdc or 0 to 10Vdc outputs. TW2 Series sensors are available with three user interface options: touchscreen, LCD with three buttons and blank.

### SPECIFICATIONS

OPERATING ENVIRONMENT	
Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Analog Output	Selectable 4 to 20 mA, 0 to 5 V, 0 to 10 V
Operating Temperature Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)
TEMPERATURE TRANSMITTER OPTION	
Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)
display models	
Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240x300 px Setpoint: 0-10Vdc. Temperature, humidity or fan speed selectable Timeout override: Display timeout* Lockout override: Touchscreen/button lockout*
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: 0-10Vdc. Temperature, humidity or fan speed selectable Timeout override: Display timeout* Lockout override: Touchscreen/button lockout*
SETPOINTS**	
Temperature Setpoint	0 to 10V output Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Fan Speed Setpoint	0 to 10V output Off 0V, Low 3.3V, Med. 6.7V, High 10.0V

### Flexible

Polarity insensitive, two-wire 4 to 20 mA or 3-wire 0-5/0-10 Vdc versions...flexible systems compatibility...save time in the field, stock fewer devices

### Easy to install

Large wiring terminals on baseplate and snap-on covers with security screw simplify installation and service

### Calibration-free

No calibration required

### APPLICATIONS

- Controlling HVAC systems for improved comfort & energy savings
- Museums, schools, printing shops, hospitals, data centers, & other locations that require temperature control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

### OVERRIDE

Override Button	Display models feature a momentary-to-ground override button
-----------------	--

### WIRING TERMINALS

Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbf) max.

### WARRANTY

Limited Warranty	5 years
------------------	---------

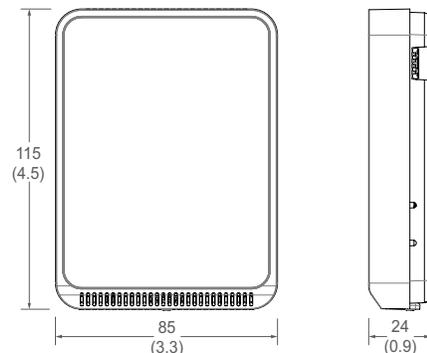
### COMPLIANCE INFORMATION

Agency Approvals	UL 916, European conformance CE: EN61000-6-2 EN61000-6-3 EN61000 Series - industrial immunity EN 61326-1 FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)
------------------	--



\*DIP switch selectable.  
\*\* One setpoint type is selectable via DIP switch on display models only.

### DIMENSIONAL DRAWING





# TW2 PROTOCOL SERIES

## Wall Mount Temperature Sensors



TW2TPXx

TW2LPXx

TW2XPXx

The TW2 Protocol Series of temperature sensors for living space is a versatile sensor platform for use with BAS controllers designed to accept BACnet or Modbus outputs. TW2 Protocol Series sensors are available with three user interface options: touchscreen, LCD with three buttons and blank.

### SPECIFICATIONS

#### OPERATING ENVIRONMENT

Input Power	Class 2; 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Protocol Output	BACnet or Modbus via RS-485, selectable
Operating Temperature Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH non-condensing
Housing material	High-impact ABS plastic
Terminal Block Torque	0.5 to 0.6 N-m (0.37 to 0.44 in-lbf)

#### TEMPERATURE TRANSMITTER

Sensor Type	Solid state, integrated circuit
Accuracy	±0.2 °C (±0.4 °F) typical
Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 122 °F)

#### DISPLAY MODELS

Touchscreen	61 mm (2.4 in), color, backlit, capacitive, 240x300 px Setpoint: Temperature or fan speed selectable Timeout override: Display timeout Lockout override: Touchscreen/button lockout
LCD	52mm (2.05 in), segmented with 3 buttons Setpoint: Temperature or fan speed selectable Timeout override: Display timeout Lockout override: Touchscreen/button lockout

#### SETPOINTS

Temperature Setpoint	Scale: 10 to 35 °C (50 to 95 °F) / 0 to 50 °C (32 to 122 °F)
Fan Speed Setpoint	Off, Low, Medium, High

#### OVERRIDE

Override Button	Display models feature a momentary override button
-----------------	--

## BACnet & Modbus

Embedded BACnet and Modbus communication protocols...easy systems integration

## Network configuration

Eliminates the cost of home run wiring and analog inputs required by traditional sensors

### APPLICATIONS

- Controlling HVAC systems for improved comfort & energy savings
- Museums, schools, printing shops, hospitals, data centers, & other locations that require temperature control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

#### WIRING TERMINALS

Terminal Blocks	Screw terminals, 18-24 AWG
Screw Terminal Torque	0.2 N-m (2.0 in-lbf) max.

#### WARRANTY

Limited Warranty	5 years
------------------	---------

#### COMPLIANCE INFORMATION

Agency Approvals	UL 916, European conformance CE: EN61000-6-2 EN61000-6-3 EN61000 Series - industrial immunity EN 61326-1 FCC Part 15 Class B, REACH, RoHS, RCM (Australia), ICES-003 (Canada)
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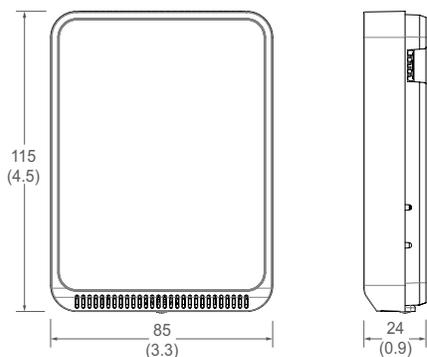
## Multiple baud rates

Configurable baud rates... ensures network compatibility

## Displays have setpoint

Selectable temperature or fan speed setpoint...easy to use

**DIMENSIONAL DRAWING**



**USER INTERFACE TYPES**



Touchscreen

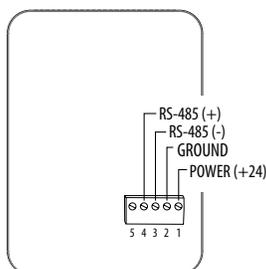


LCD with Buttons



Blank

**WIRING DIAGRAM**



**ORDERING INFORMATION**

MODEL	USER INTERFACE	SETPOINT	OVERRIDE	TEMPERATURE SENSOR
TW2TPXA	Touchscreen	X	X	Temperature Transmitter
TW2LPXA	LCD / 3 Buttons	X	X	Temperature Transmitter
TW2XPXA	Blank			Temperature Transmitter



## TE & TP SERIES

Durable Devices for Temperature Monitoring



TE Series wall mounted temperature sensors feature a discreet appearance combined with high accuracy and reliability. These devices are aesthetically pleasing in any interior environment. Flexible mounting options include flush and single-gang for ease of installation.

TP Series flush mounted temperature sensors are designed to monitor the temperature of the air in areas where sensor durability and security are needed. They are ideal for spaces where moisture and water vapor are concerns. The back of the TP is insulated to reduce interior wall temperature influence. The TP is for indoor use only, and it is warranted for a period of five years.

### SPECIFICATIONS

TP Series

Wiring	22 AWG; 2-wire: RTD/Thermistor
Housing	Brushed 430 stainless steel
Mounting Location	Not suitable for wet locations. For indoor use only.
Operating Temperature	-25 to 105 °C (-13 to 221 °F)*

#### WARRANTY

Limited Warranty	5 years
------------------	---------

#### AGENCY APPROVALS



\*Room temperature offset documented on each unit.

## Moisture resistant

Potted sensor element (TP Series)

## Durable

Stainless steel construction (TP Series)

## Easy installation

Mounts to standard duplex wall mount box

## Flexible

Available with RTD and thermistors. TE Series also available with transmitter and linitemp outputs.

## Simple maintenance

Easy to clean

### SPECIFICATIONS

TE Series

Wiring	22 AWG; 2-wire: RTD Thermistor, 4 to 20 mA; 3-wire: voltage output models
Housing	Black or white ABS plastic
Operating Temp	-25 to 105 °C (-13 to 221 °F)

#### LINITEMP OPTION

Input Power	Class 2; 5 to 30 Vdc
Output	10 mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Offset	1.5 °C (2.7 °F) typ.; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)*
Offset over Temp	1.8 °C (3.24 °F) typical; 3.0 °C (5.4 °F) max. over 0 to 70 °C (32 to 158 °F) range; 2.0 °C (3.6 °F) typical, 3.5 °C (6.3 °F) max. over -25 to 105 °C (-13 to 221 °F) range

#### WARRANTY

Limited Warranty	5 years
------------------	---------

### SPECIFICATIONS

TEA Series

Input Power	4 to 20 mA mode; loop powered Class 2; 24 Vdc only; 0-10 V, 3-wire, observe polarity; 12-30 Vdc; 0-5 V, 3-wire, observe polarity; 24 Vac, 50/60 Hz, 12-30 Vdc
-------------	---

#### RANGES

TEA Model	10 to 35 °C (50 to 95 °F)
Analog Output TEA 4 to 20 mA model	2-wire, not polarity sensitive (clipped & capped)
Transmitter Type	Solid-state, integrated circuit
Transmitter Accuracy	±0.5 °C (±0.9 °F) typical

#### WARRANTY

Limited Warranty	5 years
------------------	---------

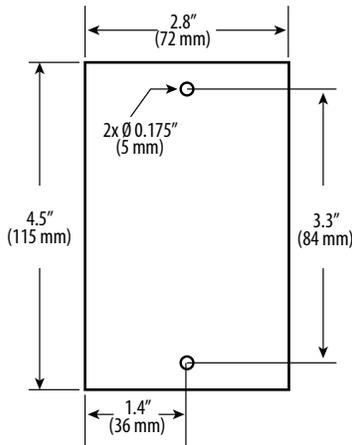
#### AGENCY APPROVALS



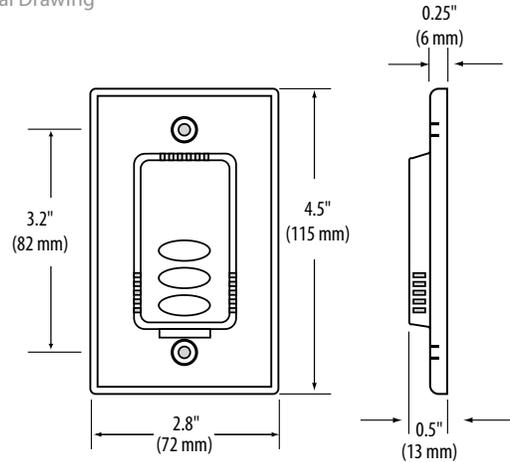
\*Room temperature offset documented on each unit.

Note: RTD/Thermistors in wall packages are not compensated for internal heating of product.

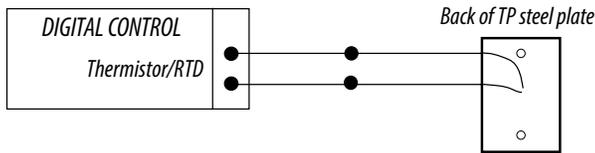
**TP**  
Dimensional Drawing



**TE/TEA**  
Dimensional Drawing



**TP**  
Wiring Diagram



**ORDERING INFORMATION**

<p><b>TP</b></p> <p>Sensor Type</p> <p>B = 100R Platinum, RTD C = 1k Platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor H = 10k T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor T = 100k, Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor</p> <p>0 = None 2 = 3-point NIST calibration</p> <p>Example: TP W 2</p>	<p><b>TEA</b></p> <p>Output M = 4 to 20 mA V = 0-10 Vdc J = 0-5 Vdc</p> <p>US or EU S = Standard</p> <p>Housing Color None = Cloud White B = Black</p> <p>Example: TEA J S</p>
<p><b>TE</b></p> <p>Sensor Type B = 100R platinum, RTD C = 1k platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor P = 10mV/°C, Linitemp R = 10k US, Thermistor S = 10k 3A221, Thermistor T = 100k, Thermistor U = 20k "D", Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor</p> <p>Setpoint/Override 0 = None 1 = Override* 2 = 1k Setpoint 3 = 10k Setpoint 4 = 1k Setpoint with override* 5 = 10k Setpoint with override*</p> <p>Cal Certificate 0 = None 1 = 1-point cal validation** 2 = 2-point cal validation**</p> <p>Housing Color None = Cloud white B = Black</p> <p>Example: TE D 5 2</p> <p>*Pushbutton override short circuits RTD/thermistor output ** Not available with W and Y high-accuracy thermistors.</p>	



## TC & TS SERIES

Low Profile Housing with a Variety of RTD and Thermistor Options



### Ceiling mount

Ceiling mount probe for more accurate readings...ideal for open office environments

### Recessed sensor

Recessed press-fit sensor virtually "disappears"...great for museums and galleries

#### APPLICATIONS

- Hospitals and operating rooms, pharmaceutical labs
- Clean rooms
- Food processing plants
- Environmental testing facilities and other institutional applications

TC and TS sensors are ceiling-mounted in an unobtrusive housing. The easy-to-install units are ideal for office environments, as well as museums, galleries, or any other open indoor setting. These sensors are highly accurate, reliable, and come with a five-year warranty. Choose from a variety of RTD or thermistor sensor types to suit any need.

#### SPECIFICATIONS

TC & TS Series

Wiring	22 AWG; 2-wire: RTD/Thermistor; 3-wire: Linitemp
Housing	White ABS plastic (black available for TS only)
Operating Temp	-25 to 105 °C (-13 to 221 °F)*

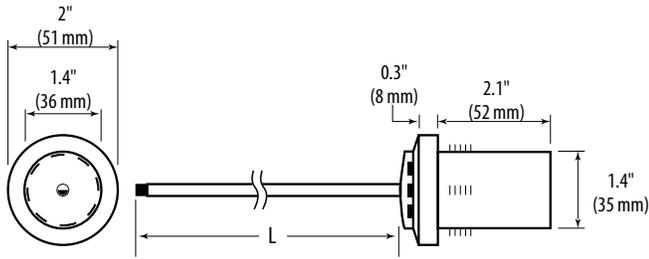
#### WARRANTY

Limited Warranty	5 years
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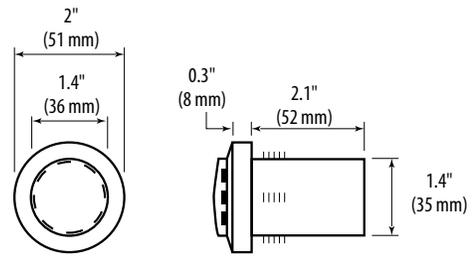
\* For RTD and thermistor accuracies and ranges, see the thermistor table on page 190.

\*\*Room temperature offset documented on each unit.

**TC**  
Dimensional Drawing



**TS**  
Dimensional Drawing



**ORDERING INFORMATION**

TC	Probe Length	Sensor Type	Calibration Certificate	TS	Sensor Type	Calibration Certificate	Housing Color
	B = 4" (102mm) C = 6" (152mm) D = 8" (203mm) E = 12" (305mm) F = 18" (457mm) G = 24" (610mm)	B = 100R platinum, RTD C = 1k platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor R = 10k US, Thermistor S = 10k 3A221, Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor	0 = None 1 = 1-point cal validation* 2 = 2-point cal validation*		B = 100R platinum, RTD C = 1k platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor G = 10k CPC, Thermistor H = 10k T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor R = 10k US, Thermistor S = 10k 3A221, Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor	0 = None 1 = 1-point cal validation* 2 = 2-point cal validation*	None = Cloud White B = Black
	Example: TC [D] [D] [2]				Example: TS [D] [2]		

\* Not available with W and Y high-accuracy thermistors.

**TABLE OF STANDARD RTD AND THERMISTOR VALUES**

Class	Pt RTD		Balco RTD	THERMISTOR											
	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	10k 3A221	10k "G" US	20k	20k "D"	100k	10k Type 2	10k Type 3
Accuracy	±0.3°C 0.00385 curve	±0.3°C 0.00385 curve	±1% @70°C	±0.2°C 0/70°C	±0.2°C 0/70°C	±1.0°C -50/150°C	±0.2°C 0/70°C	±0.2°C -20/70°C	±1.1°C 0/70°C	±0.2°C 0/70°C	Consult	Consult	Consult	±0.1°C 20/70°C	±0.1°C ±0.2°C 0/20°C 0/70°C
Temp. Response*	PTC	PTC	PTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC

\*PTC: Positive Temperature Coefficient \*NTC: Negative Temperature Coefficient

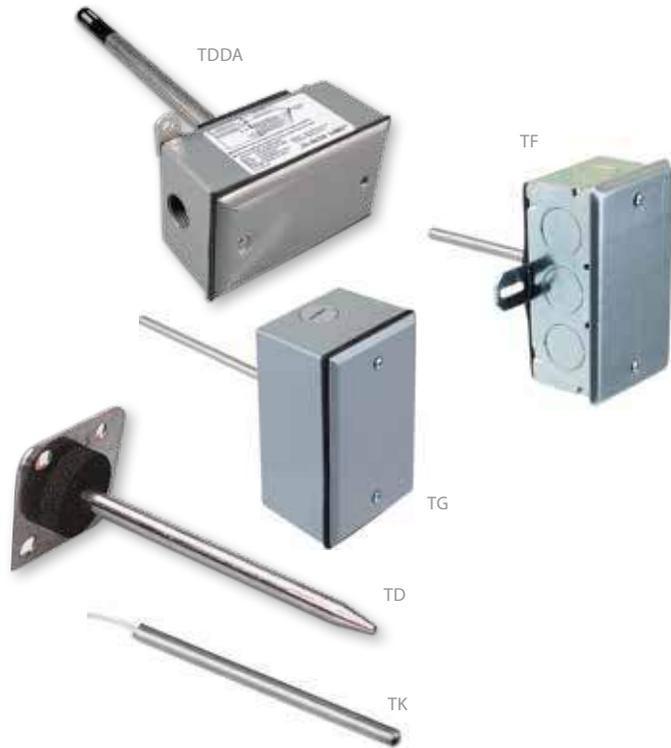
STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	10k 3A221	10k "G" US	20k NTC	20k "D"	100k	10k Type 2	10k Type 3
-50	-58	80.306	803.06	740.46	154,464	205,800	692,700	454,910	672,300	-	441,200	1,267,600	-	-	692,700	454,910
-40	-40	84.271	842.71	773.99	77,081	102,690	344,700	245,089	337,200	333,562	239,700	643,800	803,200	3,366,000	344,700	245,089
-30	-22	88.222	882.22	806.02	40,330	53,730	180,100	137,300	177,200	176,081	135,300	342,000	412,800	1,770,000	180,100	137,307
-20	-4	92.160	921.60	841.00	22,032	29,346	98,320	79,729	97,130	96,807	78,910	189,080	220,600	971,200	98,320	79,729
-10	14	96.086	960.86	877.46	12,519	16,674	55,790	47,843	55,340	55,252	47,540	108,380	122,400	553,400	55,790	47,843
0	32	100.000	1,000.00	913.66	7,373	9,822	32,770	29,588	32,660	32,639	29,490	64,160	70,200	326,600	32,770	29,588
10	50	103.903	1,039.03	952.25	4,487	5,976	19,930	18,813	19,900	19,901	18,780	39,440	41,600	199,000	19,930	18,813
20	68	107.794	1,077.94	991.82	2,814	3,750	12,500	12,272	12,490	12,493	12,260	24,920	25,340	124,900	12,500	12,272
25	77	109.735	1,097.35	1,013.50	2,252	3,000	10,000	10,000	10,000	10,000	10,000	20,000	20,000	100,000	10,000	10,000
30	86	111.673	1,116.73	1,035.18	1,814	2,417	8,055	8,195	8,056	8,055	8,194	16,144	15,884	80,580	8,055	8,195
40	104	115.541	1,155.41	1,077.68	1,199	1,598	5,323	5,593	5,326	5,324	5,592	10,696	10,210	53,260	5,323	5,593
50	122	119.397	1,193.97	1,120.52	811.5	1,081	3,599	3,894	3,602	3,600	3,893	7,234	6,718	36,020	3,599	3,894
60	140	123.242	1,232.42	1,166.13	561.0	747	2,486	2,763	2,489	2,486	2,760	4,992	4,518	24,880	2,486	2,763
70	158	127.075	1,270.75	1,210.75	395.5	527	1,753	1,994	1,753	1,751	1,990	3,512	3,100	17,510	1,753	1,994
80	176	130.897	1,308.97	1,254.55	284.0	378	1,258	1,462	1,258	1,255	1,458	2,516	2,168	12,560	1,258	1,462
90	194	134.707	1,347.07	1,301.17	207.4	-	919	1,088	917	915	1,084	1,833	1,542	9,164	919	1,088
100	212	138.506	1,385.06	1,348.38	153.8	-	682	821	679	678	816.8	1,356	1,134	6,792	682	821
110	230	142.293	1,422.93	1,397.13	115.8	-	513	628	511	509	623.6	1,016	816	5,108	513	628
120	248	146.068	1,460.68	1,447.44	88.3	-	392	486	389	388	481.8	770	606	3,894	392	486
130	266	149.832	1,498.32	1,496.28	68.3	-	303	380	301	299	376.4	591	456	3,006	303	380
Sensor Codes		B	C	I	E	F	D	H	J	S	R	M	U	T	W	Y



# T SERIES

Sensor Housed in Probe, Protects Against Corrosion



Duct mount temperature sensors from Veris are pre-calibrated and housed in sturdy stainless steel probes. The devices are easy to install, durable, and highly accurate.

## SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor, 4 to 20 mA
Mounting Location	Not suitable for wet locations. For indoor use only.

### TEMPERATURE TRANSMITTER OPTION

Input Power	4 to 20 mA models: Loop powered Class 2, 12 to 30 Vdc only, 30 mA max; 0-5/0-10 V models: Class 2, 12 to 30 Vdc/24 Vac, 50/60 Hz, 15 mA max
Temp. Output	2-wire, loop powered 4 to 20 mA 3-wire, 0-5V/0-10Vdc
Sensor Type	Solid-state, integrated circuit
Transmitter Accuracy	±0.5 °C (±0.9 °F) typical*
Ranges	Selectable 0 to 50 °C (32 to 122 °F) or -40 to 50 °C (-40 to 122 °F)

### RESISTIVE OPTION

Operating Temp	-25 to 105 °C (-13 to 221 °F)
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### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS



\*Room temperature offset documented on each unit.

## Cost effective

Cost-effective, high accuracy thermistors or RTDs available with or without a junction box

## Durable

Corrosion resistant stainless steel probe design

## No calibration

No calibration required

## APPLICATIONS

- Duct systems
- Industrial

## ORDERING INFORMATION

RTD/Thermistor Models

Enclosure	Immersion Probe Length "L"	Sensor Type	Output	Calibration Certificate
T			R0	
D = Duct	B = 4" (102mm)*	B = 100R platinum, RTD	= Resistive Output	0 = None
K = Probe only (no mounting hardware)	C = 6" (152mm)	C = 1k platinum, RTD		2 = 3-point NIST calibration
F = Duct with mounting box	D = 8" (203mm)	D = 10k T2, Thermistor		
G = Duct with water resistant housing	E = 12" (305mm)**	E = 2.2k, Thermistor		
	F = 18" (457mm)**	F = 3k, Thermistor		
	G = 24" (610mm)**	H = 10k T3, Thermistor		
	K = 36" (914mm)**	I = 1k Balco (Nickel-iron) RTD		
		J = 10k Dale, Thermistor		
		K = 10k w/11k shunt, Thermistor		
		M = 20k NTC, Thermistor		
		N = 1800 ohm, Thermistor		
		T = 100k, Thermistor		
		W = 10k T2 high accuracy, Thermistor		
		Y = 10k T3 high accuracy, Thermistor		

\* TK model is 4 1/2" (115 mm)  
\*\* Not available with TK model

Example: T D B D R0 2

### Transmitter Models

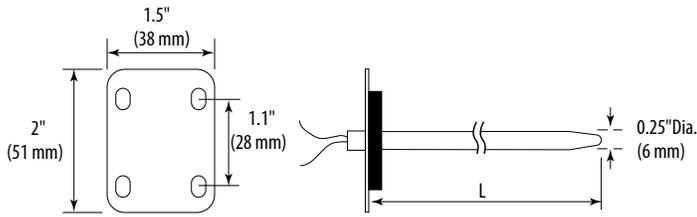
Output	Range	Cal Certificate	Example:
TDDA			TDDA V 2 0
M = 4 to 20mA V = 5/10 V	1 = -40 to 50 °C (-40 to 122 °F) 2 = 0 to 50 °C (32 to 122 °F)	0 = None 2 = 3-point NIST certification	

## ACCESSORIES

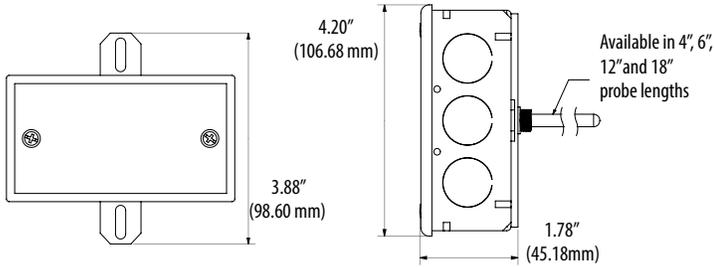
AA64 Klipet Mounting Clip



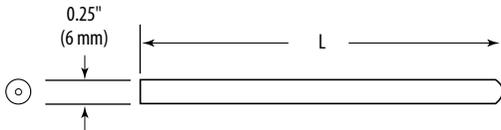
**TD**  
Dimensional Drawing



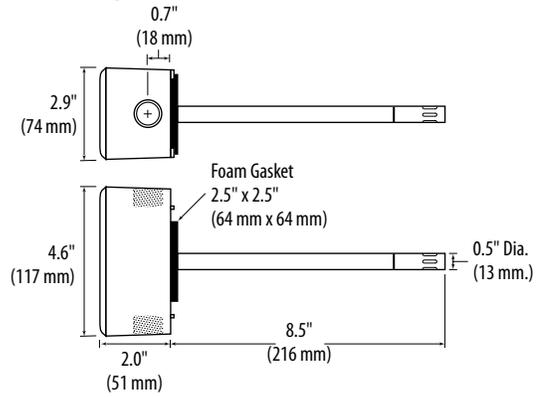
**TF**  
Dimensional Drawing



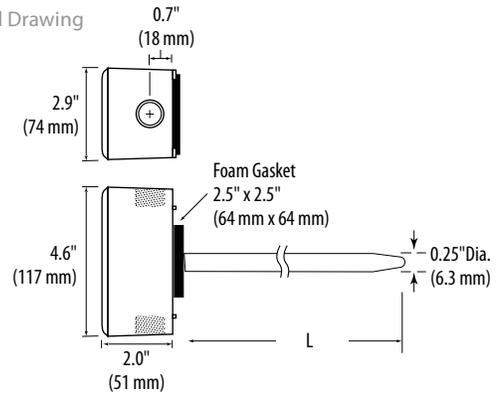
**TK**  
Dimensional Drawing



**TDDA**  
Dimensional Drawing



**TG**  
Dimensional Drawing



**STANDARD RTD AND THERMISTOR VALUES**

Class	Pt RTD		Balco RTD	THERMISTOR									
	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k	100k	10k Type 2	10k Type 3	
Accuracy	±0.3°C 0.00385 curve	±0.3°C 0.00385 curve	±1% @70°C	±0.2°C 0/70°C	±0.2°C 0/70°C	±1.0°C -50/150°C	±0.2°C 0/70°C	±0.2°C -20/70°C	Consult Factory	Consult Factory	±0.1°C 20/70°C ±0.2°C 0/20°C	±0.1°C 0/70°C	
Temp. Response*	PTC	PTC	PTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	
											High Accuracy		

\*PTC: Positive Temperature Coefficient  
\*NTC: Negative Temperature Coefficient

**STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)**

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k NTC	100k	10k Type 2	10k Type 3
-50	-58	80.306	803.06	740.46	154,464	205,800	692,700	454,910	672,300	1,267,600	-	692,700	454,910
-40	-40	84.271	842.71	773.99	77,081	102,690	344,700	245,089	337,200	643,800	3,366,000	344,700	245,089
-30	-22	88.222	882.22	806.02	40,330	53,730	180,100	137,307	177,200	342,000	1,770,000	180,100	137,307
-20	-4	92.160	921.60	841.00	22,032	29,346	98,320	79,729	97,130	189,080	971,200	98,320	79,729
-10	14	96.086	960.86	877.46	12,519	16,674	55,790	47,843	55,340	108,380	553,400	55,790	47,843
0	32	100.000	1,000.00	913.66	7,373	9,822	32,770	29,588	32,660	64,160	326,600	32,770	29,588
10	50	103.903	1,039.03	952.25	4,487	5,976	19,930	18,813	19,900	39,440	199,000	19,930	18,813
20	68	107.794	1,077.94	991.82	2,814	3,750	12,500	12,272	12,490	24,920	124,900	12,500	12,272
25	77	109.735	1,097.35	1,013.50	2,252	3,000	10,000	10,000	10,000	20,000	100,000	10,000	10,000
30	86	111.673	1,116.73	1,035.18	1,814	2,417	8,055	8,195	8,056	16,144	80,580	8,055	8,195
40	104	115.541	1,155.41	1,077.68	1,199	1,598	5,323	5,593	5,326	10,696	53,260	5,323	5,593
50	122	119.397	1,193.97	1,120.52	811.5	1,081	3,599	3,894	3,602	7,234	36,020	3,599	3,894
60	140	123.242	1,232.42	1,166.13	561.0	747	2,486	2,763	2,489	4,992	24,880	2,486	2,763
70	158	127.075	1,270.75	1,210.75	395.5	527	1,753	1,994	1,753	3,512	17,510	1,753	1,994
80	176	130.897	1,308.97	1,254.55	284.0	378	1,258	1,462	1,258	2,516	12,560	1,258	1,462
90	194	134.707	1,347.07	1,301.17	207.4	-	919	1,088	917	1,833	9,164	919	1,088
100	212	138.506	1,385.06	1,348.38	153.8	-	682	821	679	1,356	6,792	682	821
110	230	142.293	1,422.93	1,397.13	115.8	-	513	628	511	1,016	5,108	513	628
120	248	146.068	1,460.68	1,447.44	88.3	-	392	486	389	770	3,894	392	486
130	266	149.832	1,498.32	1,496.28	68.3	-	303	380	301	591	3,006	303	380
Sensor Codes		B	C	I	E	F	D	H	J	M	T	W	Y



# TI SERIES

## Corrosion Resistant Stainless Steel Probe



These immersion probe type temperature sensors are both highly accurate and cost effective. Installation could not be easier. The sensor is encased in a corrosion-resistant stainless steel probe for durability, with a choice of service entry body, indoor junction box, or threaded enclosures. A variety of RTD or thermistor sensor options and probe lengths are available for maximum application versatility.

### SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor
Probe	Stainless steel
Test Pressure	200 psi
Operating Temp	-25 to 105 °C (-13 to 221 °F)*

#### WARRANTY

Limited Warranty	5 years
------------------	---------

\*Room temperature offset documented on each unit.

### Cost effective

Cost-effective, high-accuracy thermistors/RTDs

### Easy selection

1/2" NPT threads standard

### Durable

Corrosion resistant stainless steel probe design

### Easy servicing

Thermowells available

### Variety of enclosures

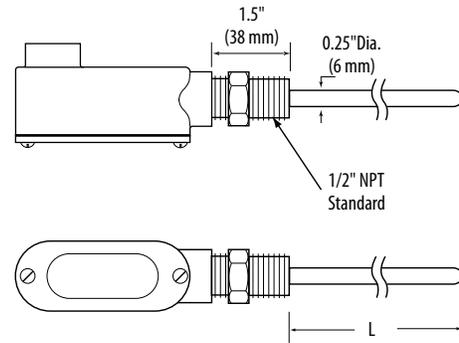
Duct mount, service entry body, threaded, and water resistant to fit your application

### APPLICATIONS

- Tanks
- Pipes
- Chillers

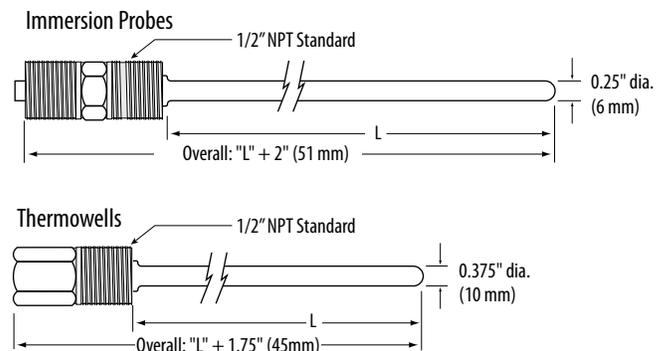
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Dimensional Drawing

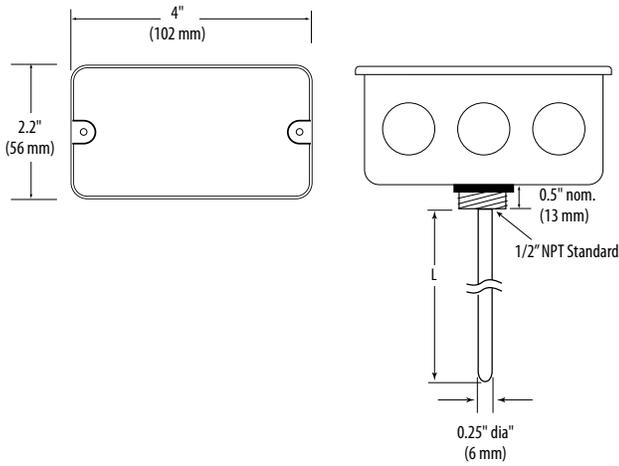


### TIH

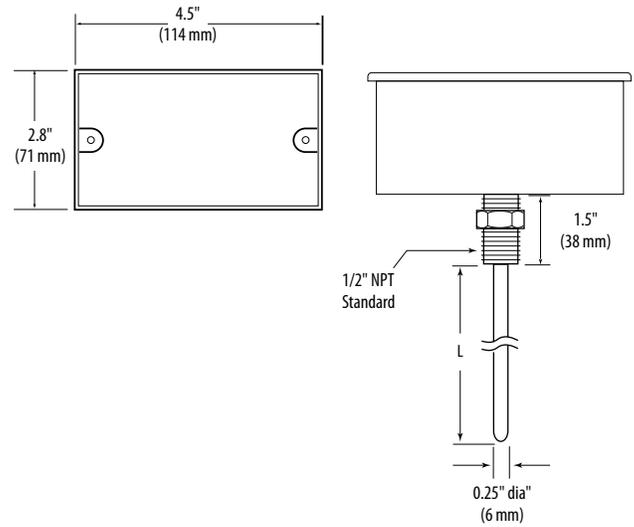
Dimensional Drawing



**TI**  
Dimensional Drawing



**TIW**  
Dimensional Drawing



**ORDERING INFORMATION**

<p><b>TI</b></p> <p>Enclosure</p> <p>D = Duct G = Service Entry Body H = Threaded NPT Only W = Water Resistant Housing</p>	<p>Immersion Probe Length "L"</p> <p>A = 3 1/2" (89 mm) B = 5" (127 mm) C = 7" (178 mm) E = 13" (330 mm)</p>	<p>Thermowell</p> <p>0 = None 1 = Add Thermowell</p>	<p>Sensor Type</p> <p>B = 100R platinum, RTD C = 1k platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor H = 10k T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k Dale, Thermistor</p>	<p>Options</p> <p>Calibration Certificate</p> <p>0 = None 2 = 3-point NIST calibration</p> <p>Threads</p> <p>Blank = NPT</p>	<p>Example:</p> <p>TI W D O H O</p> <p>Thermowell Sizing</p> <table border="1"> <thead> <tr> <th>Probe Length</th> <th>Thermowell Length</th> </tr> </thead> <tbody> <tr> <td>A (3 1/2") (89 mm)</td> <td>2 1/2" (64 mm)</td> </tr> <tr> <td>B (5") (127 mm)</td> <td>4" (102 mm)</td> </tr> <tr> <td>C (7") (178 mm)</td> <td>6" (152 mm)</td> </tr> <tr> <td>E (13") (330 mm)</td> <td>12" (305 mm)</td> </tr> </tbody> </table> <p>Thermowells can be ordered as an option on all TI Series sensors. They can also be ordered separately using the table below.</p> <table border="1"> <tbody> <tr> <td>AA24</td> <td>2-1/2" (64 mm) thermowell</td> </tr> <tr> <td>AA22</td> <td>4" (102 mm) thermowell</td> </tr> <tr> <td>AA25</td> <td>6" (152 mm) thermowell</td> </tr> </tbody> </table>	Probe Length	Thermowell Length	A (3 1/2") (89 mm)	2 1/2" (64 mm)	B (5") (127 mm)	4" (102 mm)	C (7") (178 mm)	6" (152 mm)	E (13") (330 mm)	12" (305 mm)	AA24	2-1/2" (64 mm) thermowell	AA22	4" (102 mm) thermowell	AA25	6" (152 mm) thermowell
Probe Length	Thermowell Length																				
A (3 1/2") (89 mm)	2 1/2" (64 mm)																				
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AA24	2-1/2" (64 mm) thermowell																				
AA22	4" (102 mm) thermowell																				
AA25	6" (152 mm) thermowell																				

**STANDARD RTD AND THERMISTOR VALUES**

Class	Pt RTD		Balco RTD		THERMISTOR								
	100 Ohm	1000 Ohm	1000 Ohm		2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k	100k	10k Type 2	10k Type 3
Accuracy	±0.3°C	±0.3°C	±1% @70°C		±0.2°C	±0.2°C	±1.0°C	±0.2°C	±0.2°C	Consult	Consult	±0.1°C 20/70°C	±0.1°C
	0.00385 curve	0.00385 curve			0/70°C	0/70°C	-50/150°C	0/70°C	-20/70°C	Factory	Factory	±0.2°C 0/20°C	0/70°C
Temp. Response*	PTC	PTC	PTC		NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC
												High Accuracy	

\*PTC: Positive Temperature Coefficient  
\*NTC: Negative Temperature Coefficient

**STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)**

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k NTC	100k	10k Type 2	10k Type 3
-50	-58	80.306	803.06	740.46	154,464	205,800	692,700	454,910	672,300	1,267,600	-	692,700	454,910
-40	-40	84.271	842.71	773.99	77,081	102,690	344,700	245,089	337,200	643,800	3,366,000	344,700	245,089
-30	-22	88.222	882.22	806.02	40,330	53,730	180,100	137,307	177,200	342,000	1,770,000	180,100	137,307
-20	-4	92.160	921.60	841.00	22,032	29,346	98,320	79,729	97,130	189,080	971,200	98,320	79,729
-10	14	96.086	960.86	877.46	12,519	16,674	55,790	47,843	55,340	108,380	553,400	55,790	47,843
0	32	100.000	1,000.00	913.66	7,373	9,822	32,770	29,588	32,660	64,160	326,600	32,770	29,588
10	50	103.903	1,039.03	952.25	4,487	5,976	19,930	18,813	19,900	39,440	199,000	19,930	18,813
20	68	107.794	1,077.94	991.82	2,814	3,750	12,500	12,272	12,490	24,920	124,900	12,500	12,272
25	77	109.735	1,097.35	1,013.50	2,252	3,000	10,000	10,000	10,000	20,000	100,000	10,000	10,000
30	86	111.673	1,116.73	1,035.18	1,814	2,417	8,055	8,195	8,056	16,144	80,580	8,055	8,195
40	104	115.541	1,155.41	1,077.68	1,199	1,598	5,323	5,593	5,326	10,696	53,260	5,323	5,593
50	122	119.397	1,193.97	1,120.52	811.5	1,081	3,599	3,894	3,602	7,234	36,020	3,599	3,894
60	140	123.242	1,232.42	1,166.13	561.0	747	2,486	2,763	2,489	4,992	24,880	2,486	2,763
70	158	127.075	1,270.75	1,210.75	395.5	527	1,753	1,994	1,753	3,512	17,510	1,753	1,994
80	176	130.897	1,308.97	1,254.55	284.0	378	1,258	1,462	1,258	2,516	12,560	1,258	1,462
90	194	134.707	1,347.07	1,301.17	207.4	-	919	1,088	917	1,833	9,164	919	1,088
100	212	138.506	1,385.06	1,348.38	153.8	-	682	821	679	1,356	6,792	682	821
110	230	142.293	1,422.93	1,397.13	115.8	-	513	628	511	1,016	5,108	513	628
120	248	146.068	1,460.68	1,447.44	88.3	-	392	486	389	770	3,894	392	486
130	266	149.832	1,498.32	1,496.28	68.3	-	303	380	301	591	3,006	303	380
Sensor Codes		B	C	I	E	F	D	H	J	M	T	W	Y

ACCESSORIES P. 205



## TB & TRA SERIES

High Accuracy Specialty Sensors



### Secondary measurement

Secondary measurement of water temperature...ideal for retrofit applications (TB)

### Long sensor life

Durable copper sensing probe (TRA)

### Easy installation

Pipe clamps allow for easy installation on pipes up to 12" in diameter (TB)

### Multiple cable lengths

Multiple cable lengths for application flexibility (TRA)

The TB strap-on sensor uses a clamp to secure the unit to a pipe and a copper sensing plate for fast temperature response. The TB is perfect for secondary measurement of water temperature typical in retrofit applications. It includes a steel mounting box for wire termination and easy conduit connection.

The TRA Series copper remote probe is designed for high accuracy in remote temperature sensing applications. The TRA can be used in numerous refrigeration applications or can be mounted on pipes for chilled or heated water temperature sensing. It is easily installed and includes a durable copper sensing probe with a two-wire cable. Multiple cable lengths are available for added flexibility.

### SPECIFICATIONS

TB & TRA Series

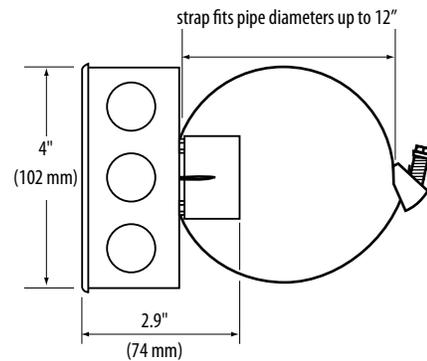
Wiring	22 AWG; 2-wire: RTD/Thermistor
Operating Temperature	-25 to 105 °C (-13 to 221 °F)*
TB	Probe: -25 to 105 °C (-13 to 221 °F),
TRA	Wiring: -20 to 80 °C (-4 to 176 °F)

#### WARRANTY

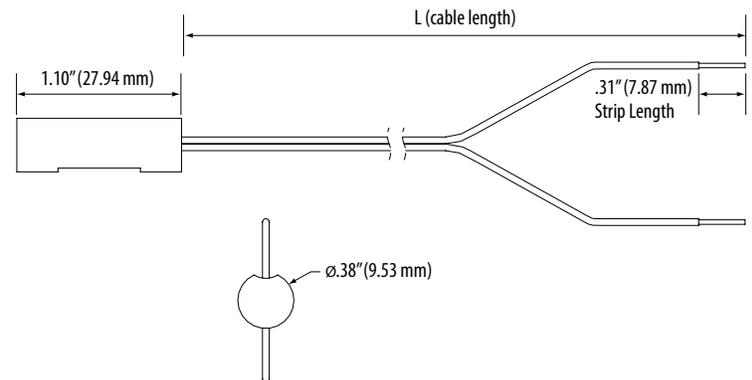
Limited Warranty	5 years
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\*Room temperature offset documented on each unit.

**TB**  
Dimensional Drawing



**TRA**  
Dimensional Drawing



Note: The TRA Series is optimized for strapping to pipe.

**ORDERING INFORMATION**

Strap-on Bracket

**Diameter**  
 TB   
 A = 2" to 5" (5.1 to 12.7 cm) max.  
 E = 2" to 12" (5.1 to 30.5 cm) max.

**Sensor Type**  
  
 B = 100R platinum, RTD  
 C = 1k platinum, RTD  
 D = 10k T2, Thermistor  
 E = 2.2k, Thermistor  
 F = 3k, Thermistor  
 H = 10k T3, Thermistor  
 I = 1k Balco (Nickel-iron) RTD  
 J = 10k Dale, Thermistor  
 K = 10k w/11k shunt, Thermistor  
 M = 20k NTC, Thermistor  
 N = 1800 ohm, Thermistor  
 T = 100k, Thermistor  
 W = 10k T2 high accuracy, Thermistor  
 Y = 10k T3 high accuracy, Thermistor

**Calibration Certificate**  
  
 0 = None  
 2 = 3-point NIST calibration

Remote Probe

**Sensor Type**  
 TRA   
 B = 100R platinum, RTD  
 C = 1k platinum, RTD  
 D = 10k T2, Thermistor  
 E = 2.2k, Thermistor  
 F = 3k, Thermistor  
 H = 10k T3, Thermistor  
 I = 1k Balco (Nickel-iron) RTD  
 J = 10k Dale, Thermistor  
 K = 10k w/11k shunt, Thermistor  
 M = 20k NTC, Thermistor  
 N = 1800 ohm, Thermistor  
 T = 100k, Thermistor  
 W = 10k T2 high accuracy, Thermistor  
 Y = 10k T3 high accuracy, Thermistor

**Calibration Certificate**  
  
 0 = None  
 2 = 3-point NIST calibration

**Cable Length**  
  
 None = 3 ft (0.9 m)  
 A = 6 ft (1.8 m)\*\*  
 B = 10 ft (3.1 m)\*  
 C = 20 ft (6.1 m)\*\*  
 D = 25 ft (7.6 m)\*\*  
 E = 50 ft (15 m)\*\*  
 F = 100 ft (30 m)\*\*

Examples:

TB 

A	C	2
---	---	---

TRA 

F	2
---	---

\*Not available for sensor types B, C & P.  
 \*\*Not available for sensor types B, C, E, F, N & P.  
 \*\*\*Not available for sensor types B & P.

**STANDARD RTD AND THERMISTOR VALUES**

Class	Pt RTD		Balco RTD	THERMISTOR									
	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k	100k	10k Type 2	10k Type 3	
<b>Accuracy</b>	±0.3°C 0.00385 curve	±0.3°C 0.00385 curve	±1% @70°C	±0.2°C 0/70°C	±0.2°C 0/70°C	±1.0°C -50/150°C	±0.2°C 0/70°C	±0.2°C -20/70°C	Consult Factory	Consult Factory	±0.1°C 20/70°C ±0.2°C 0/20°C	±0.1°C 0/70°C	
<b>Temp. Response*</b>	PTC	PTC	PTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	
											High Accuracy		

\*PTC: Positive Temperature Coefficient  
 \*\*NTC: Negative Temperature Coefficient

**STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)**

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k NTC	100k	10k Type 2	10k Type 3
-50	-58	80.306	803.06	740.46	154,464	205,800	692,700	454,910	672,300	1,267,600	-	692,700	454,910
-40	-40	84.271	842.71	773.99	77,081	102,690	344,700	245,089	337,200	643,800	3,366,000	344,700	245,089
-30	-22	88.222	882.22	806.02	40,330	53,730	180,100	137,307	177,200	342,000	1,770,000	180,100	137,307
-20	-4	92.160	921.60	841.00	22,032	29,346	98,320	79,729	97,130	189,080	971,200	98,320	79,729
-10	14	96.086	960.86	877.46	12,519	16,674	55,790	47,843	55,340	108,380	553,400	55,790	47,843
0	32	100.000	1,000.00	913.66	7,373	9,822	32,770	29,588	32,660	64,160	326,600	32,770	29,588
10	50	103.903	1,039.03	952.25	4,487	5,976	19,930	18,813	19,900	39,440	199,000	19,930	18,813
20	68	107.794	1,077.94	991.82	2,814	3,750	12,500	12,272	12,490	24,920	124,900	12,500	12,272
25	77	109.735	1,097.35	1,013.50	2,252	3,000	10,000	10,000	10,000	20,000	100,000	10,000	10,000
30	86	111.673	1,116.73	1,035.18	1,814	2,417	8,055	8,195	8,056	16,144	80,580	8,055	8,195
40	104	115.541	1,155.41	1,077.68	1,199	1,598	5,323	5,593	5,326	10,696	53,260	5,323	5,593
50	122	119.397	1,193.97	1,120.52	811.5	1,081	3,599	3,894	3,602	7,234	36,020	3,599	3,894
60	140	123.242	1,232.42	1,166.13	561.0	747	2,486	2,763	2,489	4,992	24,880	2,486	2,763
70	158	127.075	1,270.75	1,210.75	395.5	527	1,753	1,994	1,753	3,512	17,510	1,753	1,994
80	176	130.897	1,308.97	1,254.55	284.0	378	1,258	1,462	1,258	2,516	12,560	1,258	1,462
90	194	134.707	1,347.07	1,301.17	207.4	-	919	1,088	917	1,833	9,164	919	1,088
100	212	138.506	1,385.06	1,348.38	153.8	-	682	821	679	1,356	6,792	682	821
110	230	142.293	1,422.93	1,397.13	115.8	-	513	628	511	1,016	5,108	513	628
120	248	146.068	1,460.68	1,447.44	88.3	-	392	486	389	770	3,894	392	486
130	266	149.832	1,498.32	1,496.28	68.3	-	303	380	301	591	3,006	303	380
<b>Sensor Codes</b>		<b>B</b>	<b>C</b>	<b>I</b>	<b>E</b>	<b>F</b>	<b>D</b>	<b>H</b>	<b>J</b>	<b>M</b>	<b>T</b>	<b>W</b>	<b>Y</b>

Z202030-0U



## TJ SERIES

VAV Discharge Air Sensor for Reheat Applications



The TJ Series temperature sensors are highly accurate and cost effective, with trouble-free installation. The sensor is encased in a sturdy corrosion-resistant stainless steel probe. A variety of RTD/thermistor sensor and probe length options are available for maximum versatility in applications.

### SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor
Probe	Stainless steel
Operating Temp	Probe: -25° to 105 °C (-13 to 221 °F) Wiring side: Up to 75 °C (167 °F)

### WARRANTY

Limited Warranty	5 years
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Increased cable length affects the readings of lower resistance RTDs (100R platinum, RTD).  
\* Room temperature offset documented on each unit.

### Easy installation

Stainless steel duct probe with mounting flange

### Two wires

2-wire installation (optional quick disconnect)...installs in minutes

### VAV systems

Installation-ready for VAV systems and plenum areas...saves money on job commissioning and warranty service

### Plenum rated

Plenum rated cable standard

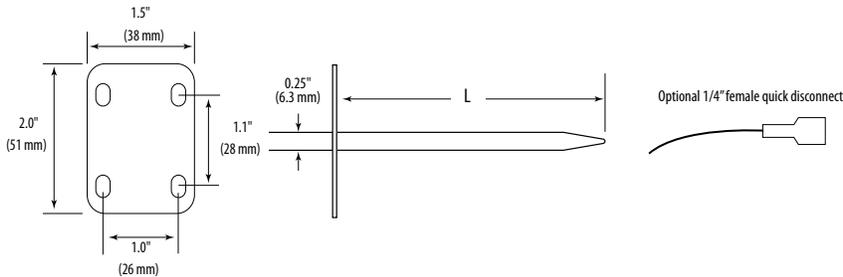
### Application flexibility

4" or 8" (102 mm or 204 mm) duct probes

### APPLICATIONS

- VAV reheat boxes
- Dual duct boxes
- Fan coils
- Prove that hot water valve or electric heat is functioning properly
- Check individual reheating stages
- Check for hot water valve leaks
- Determine if damper actuators are functioning on dual duct boxes

**DIMENSIONAL DRAWING**



**ORDERING INFORMATION**

<p>Probe Length "L"</p> <p>TJ</p> <p>B = 4" (102mm) D = 8" (203mm)</p>	<p>Sensor Type</p> <p>B = 100R platinum, RTD C = 1k platinum, RTD D = 10k T2, Thermistor E = 2.2k, Thermistor F = 3k, Thermistor H = 10k T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k Dale, Thermistor K = 10k w/11k shunt, Thermistor M = 20k NTC, Thermistor N = 1800 ohm, Thermistor T = 100k, Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor</p>	<p>Output</p> <p>R = Resistive</p>	<p>Cal Certificate</p> <p>0 = None 2 = 3-point NIST calibration</p>	<p>Option</p> <p>0 = Standard 5 ft. cable, No QDs 1 = 1/4" Female Quick Disconnects (QD) 2 = 1/4" QDs with 8 ft. leadwires 3 = 10 ft. cable, no QDs</p>
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Example: TJ B D R 2 1

**STANDARD RTD AND THERMISTOR VALUES**

Class	Pt RTD		Balco RTD	THERMISTOR								
	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k	100k	10k Type 2	10k Type 3
Accuracy	±0.3°C 0.00385 curve	±0.3°C 0.00385 curve	±1% @70°C	±0.2°C 0/70°C	±0.2°C 0/70°C	±1.0°C -50/150°C	±0.2°C 0/70°C	±0.2°C -20/70°C	Consult Factory	Consult Factory	±0.1°C 20/70°C ±0.2°C 0/20°C	±0.1°C 0/70°C
Temp. Response*	PTC	PTC	PTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC	NTC
											High Accuracy	

\*PTC: Positive Temperature Coefficient  
\*NTC: Negative Temperature Coefficient

**STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)**

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	2.2k	3k	10k Type 2	10k Type 3	10k Dale	20k NTC	100k	10k Type 2	10k Type 3
-50	-58	80.306	803.06	740.46	154,464	205,800	692,700	454,910	672,300	1,267,600	-	692,700	454,910
-40	-40	84.271	842.71	773.99	77,081	102,690	344,700	245,089	337,200	643,800	3,366,000	344,700	245,089
-30	-22	88.222	882.22	806.02	40,330	53,730	180,100	137,307	177,200	342,000	1,770,000	180,100	137,307
-20	-4	92.160	921.60	841.00	22,032	29,346	98,320	79,729	97,130	189,080	971,200	98,320	79,729
-10	14	96.086	960.86	877.46	12,519	16,674	55,790	47,843	55,340	108,380	553,400	55,790	47,843
0	32	100.000	1,000.00	913.66	7,373	9,822	32,770	29,588	32,660	64,160	326,600	32,770	29,588
10	50	103.903	1,039.03	952.25	4,487	5,976	19,930	18,813	19,900	39,440	199,000	19,930	18,813
20	68	107.794	1,077.94	991.82	2,814	3,750	12,500	12,272	12,490	24,920	124,900	12,500	12,272
25	77	109.735	1,097.35	1,013.50	2,252	3,000	10,000	10,000	10,000	20,000	100,000	10,000	10,000
30	86	111.673	1,116.73	1,035.18	1,814	2,417	8,055	8,195	8,056	16,144	80,580	8,055	8,195
40	104	115.541	1,155.41	1,077.68	1,199	1,598	5,323	5,593	5,326	10,696	53,260	5,323	5,593
50	122	119.397	1,193.97	1,120.52	811.5	1,081	3,599	3,894	3,602	7,234	36,020	3,599	3,894
60	140	123.242	1,232.42	1,166.13	561.0	747	2,486	2,763	2,489	4,992	24,880	2,486	2,763
70	158	127.075	1,270.75	1,210.75	395.5	527	1,753	1,994	1,753	3,512	17,510	1,753	1,994
80	176	130.897	1,308.97	1,254.55	284.0	378	1,258	1,462	1,258	2,516	12,560	1,258	1,462
90	194	134.707	1,347.07	1,301.17	207.4	-	919	1,088	917	1,833	9,164	919	1,088
100	212	138.506	1,385.06	1,348.38	153.8	-	682	821	679	1,356	6,792	682	821
110	230	142.293	1,422.93	1,397.13	115.8	-	513	628	511	1,016	5,108	513	628
120	248	146.068	1,460.68	1,447.44	88.3	-	392	486	389	770	3,894	392	486
130	266	149.832	1,498.32	1,496.28	68.3	-	303	380	301	591	3,006	303	380
Sensor Codes		B	C	I	E	F	D	H	J	M	T	W	Y

Z202030-0U



# TA SERIES

## High Accuracy Averaging Sensors



The TA Series is a flexible TA sensor which averages the temperature read across the entire length of the copper tubing, making it ideal for duct temperature measurements.

TA Series sensors average the measured temperature across the duct in 6', 12', or 24' (1.8 m, 3.6 m, or 7.3 m) lengths. This allows you to cover all your averaging applications with one line.

### SPECIFICATIONS

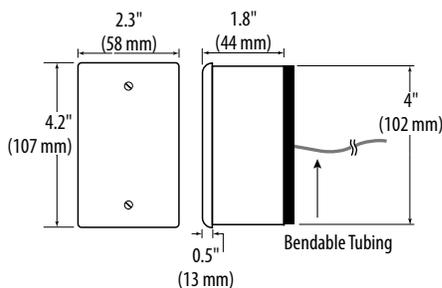
Wiring	22 AWG; 2-wire: RTD/Thermistor
Operating Temp	-25 to 105 °C (-13 to 221 °F)*
<b>LINITEMP OPTION</b>	
Input Power	Class 2; 5 to 30 Vdc
Output	10mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Error	1.5 °C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)*
Error Over Temp	1.8 °C (3.24 °F) typical; 3.0 °C (5.4 °F) max. over 0 to 70 °C (32 to 158 °F) range; 2.0 °C (3.6 °F) typical, 3.5 °C (6.3 °F) max. over -25 to 105 °C (-13 to 221 °F) range

### WARRANTY

Limited Warranty	5 years
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\* Room temperature offset documented on each unit.

### DIMENSIONAL DRAWING



### APPLICATIONS

- Heat exchangers
- Chillers

### ORDERING INFORMATION

	Flexible Probe Length	Sensor Type	Calibration Certificate
TA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	M = 6' (1.8m)* H = 12' (3.6m) J = 24' (7.3m)	B = 100R platinum, RTD C = 1k platinum, RTD D = 10k, T2, Thermistor H = 10k, T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k, Dale, Thermistor M = 20k, NTC N = 1800 ohm, Thermistor P = 10mV/C, Linitemp R = 10k US, Thermistor	0 = None 2 = 3-point NIST calibration
Example: TA <input type="checkbox"/> H <input type="checkbox"/> C <input type="checkbox"/> 2			
* Available with sensor types I, J, N, P.			

### ACCESSORIES

AA64 Klipet Mounting Clip



## STANDARD RTD AND THERMISTOR VALUES

Class	Pt RTD		Balco RTD					
	100 Ohm	1000 Ohm	1000 Ohm	10k Type 2	10k Type 3	10k Dale	10k "G" US	20k
<b>Accuracy</b>	±0.3°C 0.00385 curve	±0.3°C 0.00385 curve	±1% @70°C	±1.0°C -50/150°C	±0.2°C 0/70°C	±0.2°C -20/70°C	±0.2°C 0/70°C	Consult Factory
<b>Temp. Response*</b>	PTC	PTC	PTC	NTC	NTC	NTC	NTC	NTC

\*PTC: Positive Temperature Coefficient

\*NTC: Negative Temperature Coefficient

### STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	10k Type 2	10k Type 3	10k Dale	10k "G" US	20k NTC
-50	-58	80.306	803.06	740.46	692,700	454,910	672,300	441,200	1,267,600
-40	-40	84.271	842.71	773.99	344,700	245,089	337,200	239,700	643,800
-30	-22	88.222	882.22	806.02	180,100	137,307	177,200	135,300	342,000
-20	-4	92.160	921.60	841.00	98,320	79,729	97,130	78,910	189,080
-10	14	96.086	960.86	877.46	55,790	47,843	55,340	47,540	108,380
0	32	100.000	1000.00	913.66	32,770	29,588	32,660	29,490	64,160
10	50	103.903	1039.03	952.25	19,930	18,813	19,900	18,780	39,440
20	68	107.794	1077.94	991.82	12,500	12,272	12,490	12,260	24,920
25	77	109.735	1097.35	1,013.50	10,000	10,000	10,000	10,000	20,000
30	86	111.673	1116.73	1,035.18	8,055	8,195	8,056	8,194	16,144
40	104	115.541	1155.41	1,077.68	5,323	5,593	5,326	5,592	10,696
50	122	119.397	1193.97	1,120.52	3,599	3,894	3,602	3,893	7,234
60	140	123.242	1232.42	1,166.13	2,486	2,763	2,489	2,760	4,992
70	158	127.075	1270.75	1,210.75	1,753	1,994	1,753	1,990	3,512
80	176	130.897	1308.97	1,254.55	1,258	1,462	1,258	1,458	2,516
90	194	134.707	1347.07	1,301.17	919	1,088	917	1,084	1,833
100	212	138.506	1385.06	1,348.38	682	821	679	816.8	1,356
110	230	142.293	1422.93	1,397.13	513	628	511	623.6	1,016
120	248	146.068	1460.68	1,447.44	392	486	389	481.8	770
130	266	149.832	1498.32	1,496.28	303	380	301	376.4	591
<b>Sensor Codes</b>		<b>B</b>	<b>C</b>	<b>I</b>	<b>D</b>	<b>H</b>	<b>J</b>	<b>R</b>	<b>M</b>



# TO SERIES

Sleek Design, Reduces Solar Heating



RTD/Thermistor Model



Temperature Transmitter Model

TO Series outdoor temperature sensors feature a sleek, weather resistant design, and provide easy installation. The durable probe is encased in a radiation shield to reduce the effects of solar heating. Choose from a variety of RTD, thermistor, or transmitter outputs to suit any application.

## SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor, 4 to 20 mA; 3-wire: voltage output models
Junction Box	Weather resistant
Mounting Location	For outdoor use

### TEMPERATURE TRANSMITTER OPTION

Input Power	4 to 20 mA version - Loop powered Class 2, 12 to 30 Vdc only, 30 mA max; 1-5/2-10 V versions - 12-30 Vdc/24 Vac, 50/60 Hz, 15 mA max
Temp. Output	2-wire, loop powered Class 2, 4 to 20mA; 3-wire, 1-5 V/2-10 Vdc
Sensor Type	Solid-state, integrated circuit (Transmitter)
Accuracy	±0.5°C (±.9°F) typical
Ranges	0 to 50 °C (32 to 122 °F), -40 to 50 °C (-40 to 122 °F)*

### RESISTIVE OPTION

Operating Temp	-25 to 105 °C (-13 to 221 °F)
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### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS



## Sleek design

Reduces solar heating...reliable and accurate

## Flexible

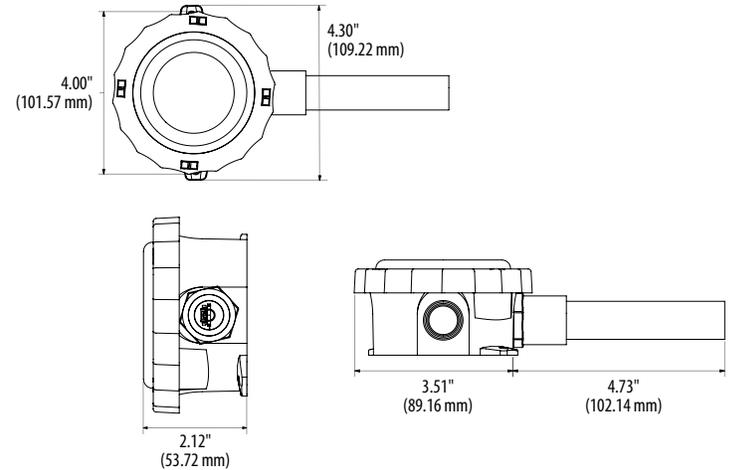
Available with transmitter, linitemp, RTDs, or thermistors

## APPLICATIONS

- Outdoor reference

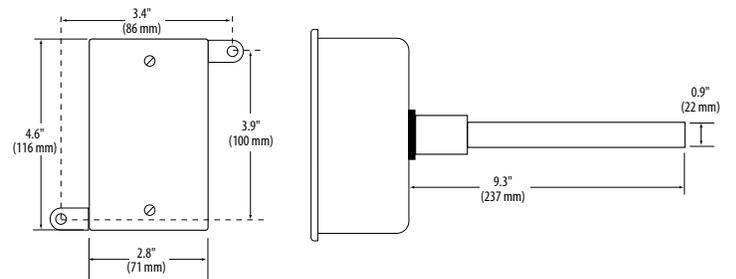
## RTD/THERMISTOR MODELS

Dimensional Drawing



## TEMPERATURE TRANSMITTER MODELS

Dimensional Drawing



## ORDERING INFORMATION

### RTD/Thermistor Models

Sensor Type

TO

- B = 100R platinum, RTD
- C = 1k platinum, RTD
- D = 10k T2, Thermistor
- E = 2.2k, Thermistor
- F = 3k, Thermistor
- H = 10k T3, Thermistor
- I = 1k Balco (Nickel-iron) RTD
- J = 10k Dale, Thermistor
- K = 10k w/11k shunt, Thermistor
- M = 20k NTC, Thermistor
- N = 1800 ohm, Thermistor
- T = 100k, Thermistor
- W = 10k T2 high accuracy, Thermistor
- Y = 10k T3 high accuracy, Thermistor

Output

RØ

= Resistive Output

Cal Certificate

- 0 = None
- 2 = 3-point NIST calibration

Example:

TO  C  RØ  2

### Temperature Transmitter Models

Output

TOA

- M = 4 to 20 mA
- V = 0-5/10 Vdc

Range

- 1 = -40 to 50 °C (-40 to 122 °F)
- 2 = 0 to 50 °C (32 to 122 °F)

Calibration Certificate

- 0 = None
- 1 = 1-point Cal validation
- 2 = 2-point Cal validation

Example:

TOA  M  1  0



## TZ SERIES

### Manual & Automatic Freeze Stats with Relay(s)



The TZ Series are low limit controllers, also known as “freeze stats”. These devices are designed for use on HVAC equipment that require low-temperature cutout protection to prevent cooling coils from freezing. They are mounted between the heating and cooling coils on the supply side of a fan unit and respond to the lowest temperature sensed along any one-foot section of the sensing element. The TZ Series offers manual and automatic reset versions, as well as, models that feature one or two sets of SPDT contacts. Numerous capillary lengths are also available.

### SPECIFICATIONS

Thermostat Type	Self-contained, electromechanical
Sensing Element	Vapor-filled capillary
Sensing Media	Temperature in air
Sensing Temp. Operating Range	14 to 54 °F (-10 to 12 °C)
Sensing Capillary Overload Temp.	392 °F (200 °C), maximum 60 minutes
Sensing Response	To lowest temperature sensed by any 1’ section of the capillary element
Sensing Capillary Material	Copper
Sensing Capillary Installation	Duct and across coil mounted
Sensing Capillary Length	See Ordering Information
Sensing Capillary Diameter	Ø 0.08 in. (2 mm) (6’ models have a larger bulb at the end)
Type of Control	ON/OFF, low-level single-stage or cut-out control, with one (1) microswitch output
Low-Level Setpoint (Factory Set)	At 39 °F (4 °C), and safety-lock secured
Low-Level Setpoint Visual Range	14 to 54 °F
Low-Level Setpoint Adjustment	Over full operating range, via screwdriver slot
Contact Form	Form 1C (SPDT Contact)
Number of Relays	See Ordering Information
Max. Contact Switching Voltage	250 Vac
Max. Contact Switching Current	15 (8) A
Switching Differential	1.8 °F (1 °K), auto- or manual reset

### Reset options

Available in manual or automatic reset options

### Relay options

All models feature one or two 15A SPDT relays

### APPLICATIONS

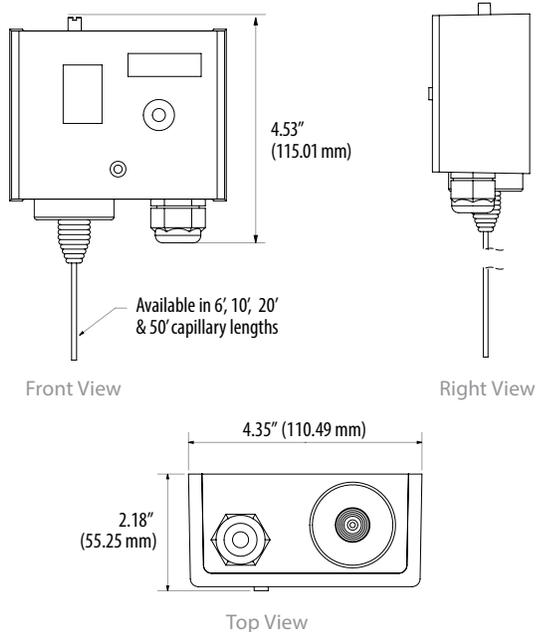
- Cooling coil frost monitoring
- HVAC systems

Enclosure Operating Temperature Range	14 to 131 °F (-10 to 55 °C)
Operating Humidity Range	0 to 95% RH, non-condensing
Storage Temperature Range	14 to 158 °F (-10 to 70 °C)
Enclosure Base Material	Steel, galvanized
Enclosure Cover Material	ABS, re retardant
Enclosure Color	Silver /light gray
Enclosure NEMA Rating	NEMA 1 (IP40)
Cable Entry	One (1) M20 compression fitting, removable, hole ts 1/2” conduit connector
Wire Connections	Terminal with wire-retaining screws
Maximum Wire Size	14 AWG (2.5 mm <sup>2</sup> )
Agency Approvals	CE
Product Weight	1.6 lbs (0.7 kg)
Enclosure Product Dimensions (L x W x H)	4.1” (105 mm) x 3.3” (83 mm) x 2.1” (53 mm)
Limited Warranty	2 years



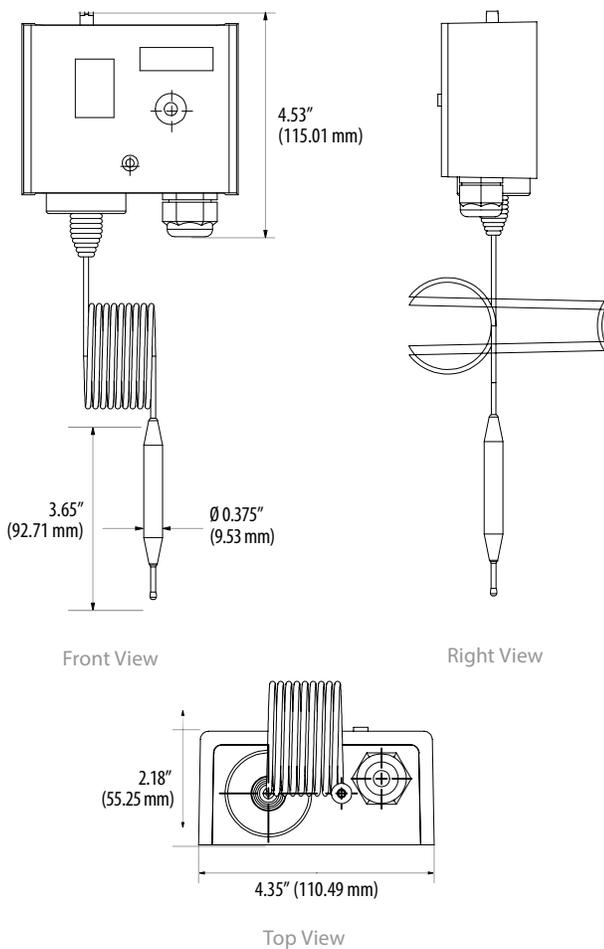
**TZ10, TZ20, TZ50**

Dimensional Drawing



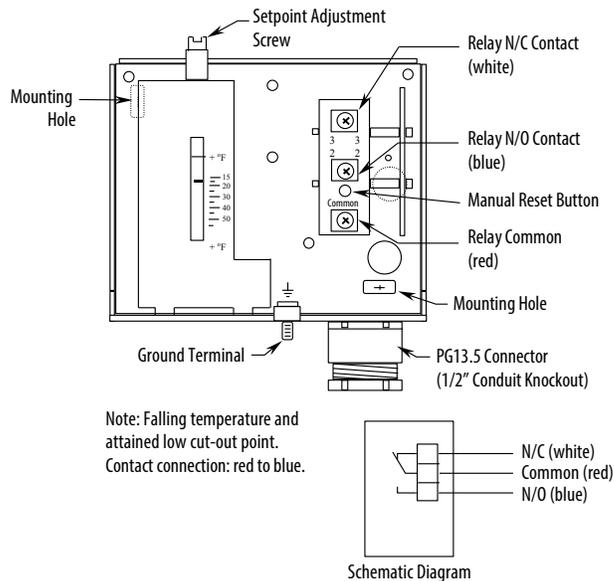
**TZ06**

Dimensional Drawing



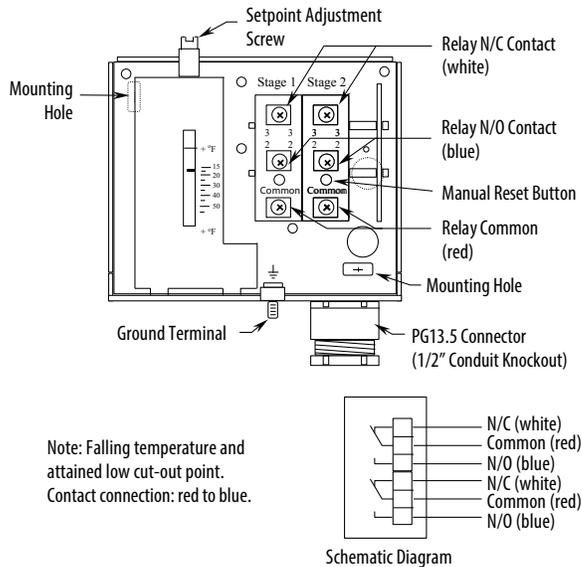
**1-RELAY MODELS**

Wiring Drawing



**2-RELAY MODELS**

Wiring Drawing



**ORDERING INFORMATION**

TZ	Probe Length	Number of Relays	Reset	Example:
	06 = 6' (1.8 m) 10 = 10' (3 m) 20 = 20' (6 m) 50 = 50' (16 m)	1 = 1 relay* 2 = 2 relays	A = Automatic M = Manual	TZ 20 1 M

\* Not available in 50' (16 m) version.

**ACCESSORIES**

Klipet Mounting Clip (AA64)



# ACCESSORIES: TEMPERATURE MONITORING



### AA22, AA24, AA25

- AA24 2-1/2" (64 mm) thermowell
- AA22 4" (102 mm) thermowell
- AA25 6" (152 mm) thermowell



### AA64

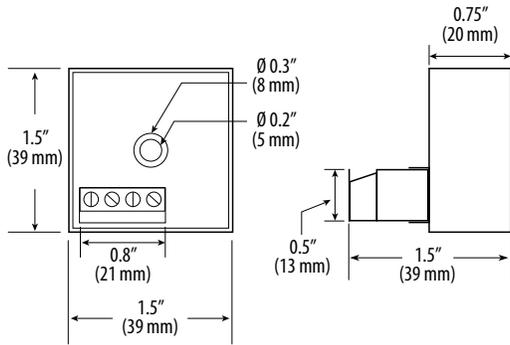
Klipet Mounting Clip



### AA10

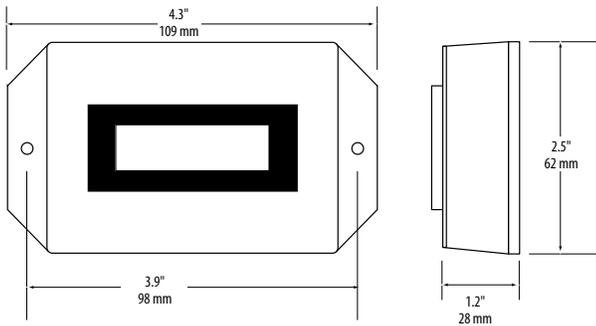
The AA10 Series temperature-to-current transmitter is designed for use with 100R platinum, 1k platinum, 10k Type 2, and 10k Type 3 external resistive output devices. When the resistive output from the external device is connected to the AA10 input terminal, the resistive value is converted to a 4-20 mA signal compatible with most building control systems.

Dimensional Drawing



### AA04

The AA04 remote display converts a standard 4-20 mA output from an environmental sensor into a convenient digital readout.

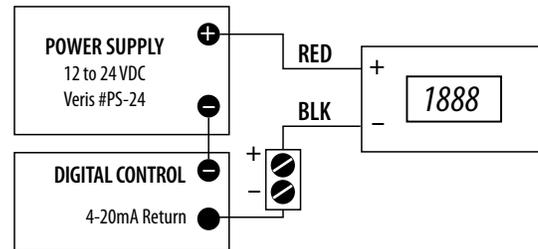


### Ordering Information

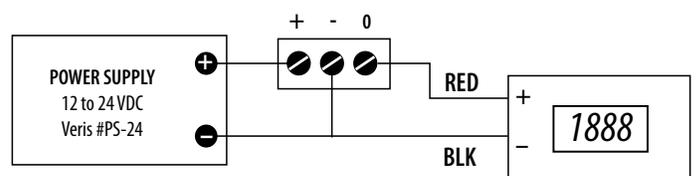
4-20mA Temperature Sensor Output Range*			
Sensor Type	Bottom Range Temp	Temp Scale	Top Range Temp
AA10			
B = 100R platinum, RTD C = 1k platinum, RTD D = 10k T2, Thermistor H = 10k T3, Thermistor W = 10k T2 high accuracy, Thermistor Y = 10k T3 high accuracy, Thermistor	= (choose a valid temp value)	C = Celsius F = Fahrenheit	= (choose a valid temp value)

\* Temperature output range must be whole numbers where the bottom value is less than the top value in the range. Output temperature ranges:  
 B and C sensor types: -50° to 150°C (-58° to 302°F);  
 D, H, W and Y sensor types: -25° to 105°C (-13° to 221°F)

### Wiring Diagram, 2-Wire, Loop powered, Sinking Transmitter



### Wiring Diagram, 3-Wire, Sourcing Transmitter







# OCCUPANCY SENSORS

Veris offers a selection of motion-activated lighting control devices for commercial building applications. Keep costs down by preventing wasteful and unnecessary use of energy. With two mounting styles and an adjustable time delay, these sensors provide control over the lighting of rooms up to 2000 square feet. The installation is simple and the housings are low profile.

MODEL	DESCRIPTION	PAGE
MSC	Ceiling Mount Occupancy Sensors	209
MSB	Wall Switch Occupancy Sensors	211

## LIGHTING CONTROL SELECTION GUIDE

CEILING MOUNT	WALL MOUNT
<a href="#">MSC page 209</a>	<a href="#">MSB page 211</a>

# LIGHT UP A SPACE ONLY WHEN IT'S OCCUPIED

MSX Series Occupancy Sensors

## APPLICATIONS

- » Lighting control based on occupancy
- » Reduces energy usage
- » Key component for LEED® certification programs, retrofit installations
- » MSC1000—best for conference rooms, classrooms and other general applications
- » MSD2000—best for multi-stall restrooms, large conference rooms and warehouses
- » MSCU2000—best for lobbies, aisles, and great for multi-stall restrooms

Note: Leadership in Energy and Environmental Design (LEED) is a registered mark of the US Green Building Council



## FEATURES

### WIDE COVERAGE

Up to 2000 square foot coverage area and 360-degree field of view for application versatility

### ADJUSTABLE TIME DELAY

Adjustable time delay presets provide ultimate flexibility

### AUXILIARY RELAY

Easily communicates with building control system

### DAYLIGHT SENSING

Daylight level sensing avoids unnecessary lighting

### ADJUSTABLE COVERAGE

Adjustable coverage sensitivity from 60 to 100%

### TAMPER RESISTANT COVER

Tamper resistant adjustment compartment cover



## MSC SERIES

Uses the Latest Passive Infrared and Ultrasonic Technologies



MSC Series Occupancy Sensors employ passive infrared (PIR) and/or ultrasonic technologies to accurately detect occupancy and automatically switch room lighting.

The low-profile sensor is ceiling-mounted to maximize motion sensitivity in large areas with obstructions. With a 360 degree field of view, and up to 2000 square feet of coverage area, the ceiling-mounted occupancy sensor is ideal for conference rooms, classrooms, multi-stall bathrooms, and large office areas.

The MSC series also incorporates an integral photosensor to prevent lights from switching on when sufficient ambient light is present, as commonly found in windowed areas.

Installation and configuration are simple. The sensor readily mounts to drop ceilings, and it features front adjustments for setting sensitivity and time delay. The sensor also features an auxiliary relay for use with building automation and HVAC systems.

### SPECIFICATIONS

Standards	UL and cUL Listed; FCC part 15 (Class B) for home and office use
Input Voltage	24 Vdc
Isolated Relay	Contact rating: 1 A@24 Vdc Resistive
Temperature	0 to 50 °C (32 to 122 °F)
Humidity	Max. 90% RH non-condensing

#### CURRENT CONSUMPTION @ 24 VDC\*

PIR	21 mA nominal
Ultrasonic	34 mA nominal
Dual	37 mA nominal

#### DIMENSIONS

MSCU	4.6" (117 mm) diameter, 1.4" (35.1 mm) high
MSCD/MSCP	4.6" (117 mm) diameter, 1.8" (45.7 mm) high

#### WARRANTY

Limited Warranty	5 years
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#### AGENCY APPROVALS



\* For local line switching control, power must be provided by AA47 power pack or an approved equivalent.

## Wide coverage

Up to 2000 square foot coverage area and 360-degree field of view for application versatility

## Daylight sensing

Daylight level sensing (from 0.5 to 250 foot-candles)... avoids unnecessary lighting

## Adjustable time delay

Adjustable time delay (preset time delays from 15 seconds [test] to 30 minutes)...provides ultimate flexibility

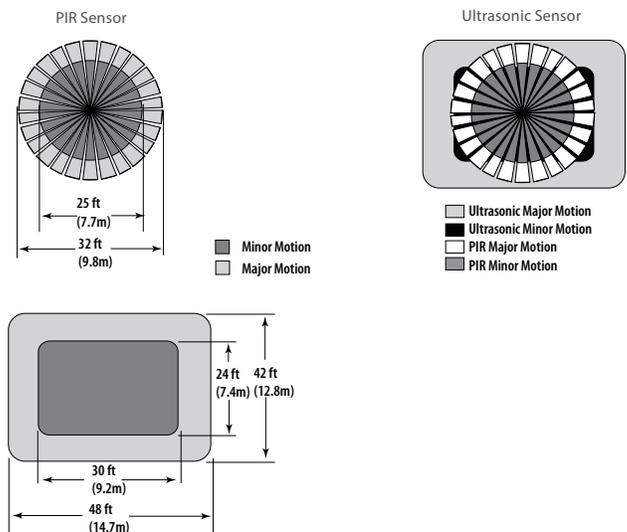
### APPLICATIONS

- Lighting control based on occupancy
- Reducing energy usage
- Key component for LEED\* certification programs retrofit installations
- MSC1000 – best for conference rooms, classrooms, and other general applications
- MSCD2000 – best for multi-stall bathrooms, large conference rooms, and warehouses
- MSCU2000 – best for lobbies, aisles, and great for multi-stall bathrooms

\*Leadership in Energy and Environmental Design (LEED) is a registered mark of the US Green Building Council

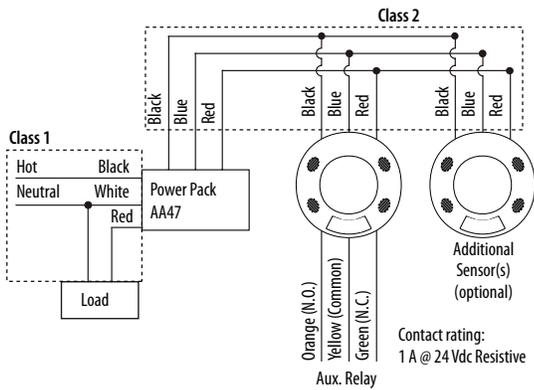
### MSC SERIES

Coverage Patterns for 9 ft (2.8 m) Ceiling Height



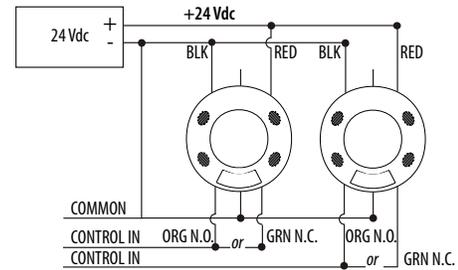
### LOCAL LINE-POWER CONTROL MSC

Wiring Diagram



### BUILDING CONTROL PANEL

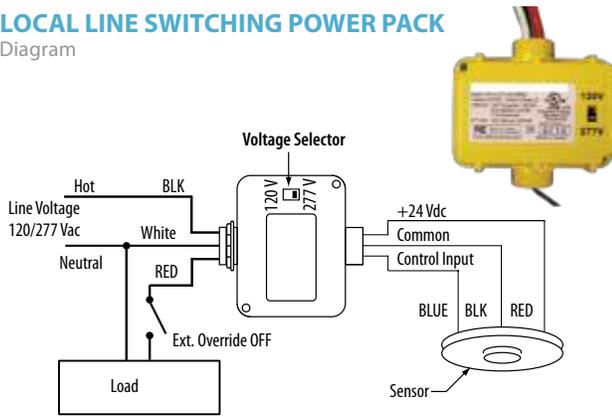
Wiring Diagram



The AA47 Line-Switching Power Pack provides local switching capability to control loads at a signal from MSC Series occupancy sensors, independent of any connection to building control systems. The AA47 routes 120/277 Vac, 60 Hz line power directly to a Form A relay contact (SPST) to control a load and generates full-wave, 24 Vdc to power up to four MSC sensors (dependent on model). The AA47 can be mounted either inside or outside an electrical box, and sensor power can be routed via plenum-rated cable to the sensor(s).

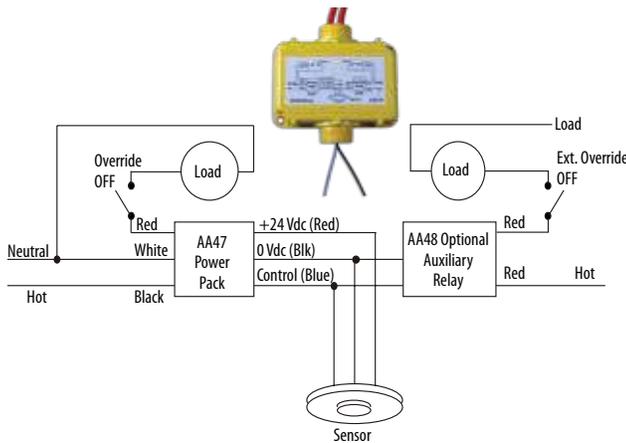
### AA47 LOCAL LINE SWITCHING POWER PACK

System Diagram



### AA48 AUXILIARY RELAY (OPTIONAL)

System Diagram



### SPECIFICATIONS

AA47

Storage Temp.	-29 to 65 °C (-20 to 150 °F)
Operating Temp.	0 to 40 °C (32 to 104 °F)
Maximum Humidity	90% RH non-condensing
AC Power Input	120/277 Vac ± 10%, 60 Hz
Output Voltage	24 Vdc
Output Current	100 mA max.
Dimensions	3.2" (81.3 mm) x 3" (76.2 mm) x 1.75" (44.5 mm)

### RELAY CONTACTS

Horsepower Rating	1HP@120 V
Switching Capacity	120 Vac, 60 Hz; 15 A tungsten 1800 W 277 Vac, 60 Hz; 20 A ballast

The AA48 Auxiliary Relay is a low-voltage relay device for expanding the switching capacity of an AA47. It can be used to control loads connected to additional circuits in response to a signal from a connected sensor. It is essentially a relay with a SPST output controlled directly by the occupancy sensor. The auxiliary relay can be mounted inside or outside of an electrical junction box.

### SPECIFICATIONS

AA48

Storage Temperature	-29 to 65 °C (-20 to 150 °F)
Operating Temperature	0 to 40 °C (32 to 104 °F)
Maximum Humidity	90% RH non-condensing
Control Input	24 Vdc, 36 mA nominal
Dimensions	3.2" (81.3 mm) x 3" (76.2 mm) x 1.75" (44.5 mm)

### RELAY CONTACTS

Horsepower Rating	1HP@120 V
Switching Capacity	120 Vac, 60 Hz; 15 A tungsten 1800 W 120/277 Vac, 60 Hz; 20 A ballast

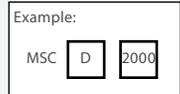
### ORDERING INFORMATION

Sensing Technology

- MSC  U = Ultrasonic  
 D = PIR + Ultrasonic  
 P = Passive Infrared (PIR)

Coverage

- 1000 = 1000 Sq. Ft. (Passive Infrared only)  
 2000 = 2000 Sq. Ft. (Ultrasonic or Dual technology only)



## MSB SERIES

Employs a Low-Energy Switch Circuit to Maximize Contact Life



MSBP

The MSB Series employs the latest passive infrared (PIR) technology to automatically control lighting for areas up to 1000 square feet, achieving energy savings and convenience.

Each sensor employs a special 180° multi-segmented lens and PIR motion detector circuit to sense when a person enters the area and automatically activate the lights. The sensor will automatically switch the lights off after a preset delay if motion is no longer detected.

The MSB Series fits in place of existing wall switches, connecting to existing wiring, similar to a typical wall switch. The MSB Series is the simplest way to achieve energy saving lighting control with minimal installation time.

To assure long relay life, the MSB Series employs a low energy switch circuit to assure maximum contact life. These sensors are compatible with electronic and magnetic ballast loads.

### SPECIFICATIONS

Standards	UL and cUL Listed; FCC part 15 (Class B) for home and office use
Input	120 or 277 Vac±10% 60 Hz
Output	120 Vac, 1000 W max. tungsten incandescent load; 1000 VA max. ballast load; ¼ HP max. motor load; 277 Vac; 1800 VA max. ballast load
Temperature	0 to 50 °C (32 to 122 °F)
Humidity	Max. 90% RH non-condensing

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS



## Adjustable

Adjustable time delay

## Line powered

No separate supply needed

## Bypass button

Bypass button for “always on” operability...simplifies commissioning 180-degree motion detection

## Ballast compatibility

Compatible with magnetic and electronic ballasts...provides ultimate flexibility

## 180 degrees

180-degree motion detection

## Loading

No minimum loading requirement

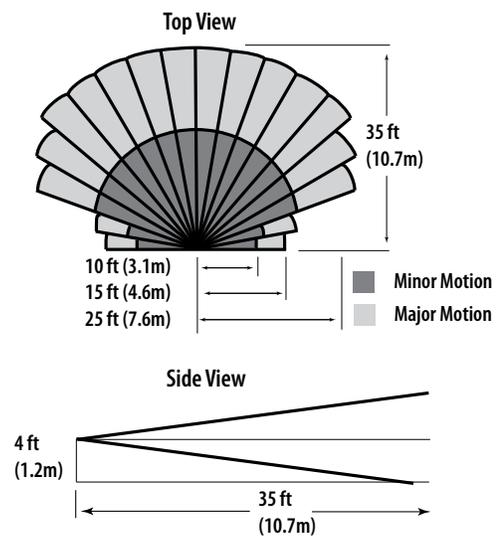
### APPLICATIONS

- Lighting control for LEED\* programs and reduced energy usage
- Use in offices, copy rooms, common building areas, storage closets, small conference rooms, and more
- Fits in place of existing wall switches connecting to the existing active line and ground wiring...great for retrofit installations

\*Leadership in Energy and Environmental Design (LEED) is a registered mark of the US Green Building Council

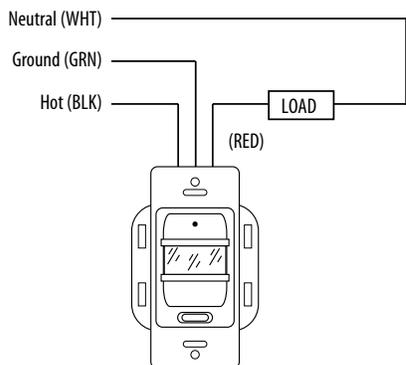
### MSB SERIES

Coverage Patterns



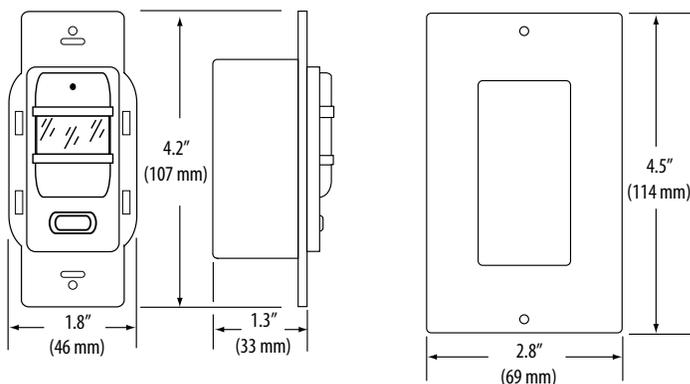
### SINGLE-LEVEL LIGHTING

Wiring Diagram



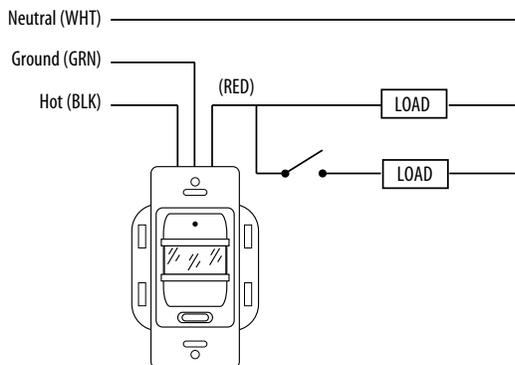
### MSB SERIES

Dimensional Drawings



### BI-LEVEL LIGHTING

Wiring Diagram



### ORDERING INFORMATION

<p>Sensing Technology</p> <p>MSB <span style="border: 1px solid black; padding: 2px;">P</span></p> <p>= Passive Infrared (PIR)</p>	<p>Turn On</p> <p><span style="border: 1px solid black; padding: 2px;"> </span></p> <p>A = Automatic M = Manual</p>	<p># of Circuits</p> <p><span style="border: 1px solid black; padding: 2px;">1</span></p>	<p>Color</p> <p><span style="border: 1px solid black; padding: 2px;"> </span></p> <p>W = White V = Ivory</p>	<p>Example:</p> <p>MSB <span style="border: 1px solid black; padding: 2px;">P</span> <span style="border: 1px solid black; padding: 2px;">A</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">V</span></p>
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# SETPPOINT DEVICES

The Veris line of thermostats and humidistats will help you guarantee accurate climate control in buildings with or without a central BAS controller. These devices can be programmed for independent control of dedicated mechanical equipment and can interface with a control system to report status via analog, protocol, or wireless communications.

MODEL	DESCRIPTION	PAGE
VIC-VT7200	Zoning Thermostats	215
VIC-VT7300	Fancoil Thermostats	217
VIC-VT8350	Room Temperature Controllers	219
VIC-VT7600	Rooftop Unit Thermostats	221
VIC-VT8650	Room Temperature and Indoor Air Quality Controllers	223
VIC-VTR835X0A5X/ VIC-VC3XXE5000	Fancoil Thermostats, Retrofit Solution	225
VIC-VH7200	Communicating Humidistat Series	227
VZ7000	Zone Terminal Equipment Controllers	229
VZ8250	Variable Air Volume (VAV) Unit Controllers	231

# ACCURATE, OPTIMAL CLIMATE CONTROL

Rooftop Unit, Heat Pump, and Indoor Air Quality Controller

## APPLICATIONS

» Commercial and hospitality buildings as a standalone device or integrated into a Building Management System



## FEATURES

### TOUCHSCREEN

Customizable digital interface with multi-language support

### COMMUNICATIONS

BACnet MSTP

Modbus RTU

Optional Zigbee Pro Wireless

### CONFIGURABLE

Sequence of operations

Economizer and scheduler

Control sequences using scripting

### WIDE RANGE OF SENSORS

Temperature

Humidity with on-board humidification strategy

Optional occupancy (PIR)



## VIC-VT7200 SERIES

BACnet, LonWorks, Zigbee and Zigbee Pro Models Available



VT7200



VT7200

Smart energy management has never been easier than with the VIC-VT7200. Designed for new construction or retrofit projects, the controllers dramatically decrease total costs by reducing installation time, configuration and commissioning time. The VIC-VT7200 provides the advanced features and monitoring functions required by modern building automation systems without the use of software and commissioning tools. This application is known as Variable Air Volume (VAV).

### SPECIFICATIONS

Thermostat Power Requirements	19 to 30 Vac; 50 or 60 Hz; 2 VA Class 2
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC thermistor
Resolution	± 0.1 °C (± 0.2 °F)
Control Accuracy Temp.	±0.5 °C (±0.9 °F) @ 21 °C (70 °F) typical, calibrated
Occupied and Unoccupied Setpoint Range Cooling	12 to 38 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	4.5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Binary Inputs	Dry contact across terminal BI1, BI2 & UI3 to Scom
Outputs Rating	Triac output: 30 Vac, 1 A max., 3 A in-rush; Analog: 0 to 10 Vdc into 2k Ω resistance min.

### Advanced occupancy functions

Advanced occupancy functions through the network or smart local occupancy sensing

### Auxiliary output

Can be used for lighting or reheating

### Pre-configured sequences

Pre-configured sequences of operation...one model meets more applications and reduces project delivery cost

### APPLICATIONS

- Heating/Cooling valves
- Electric duct heaters
- Changeover sensors

### Minimize parameter tampering

Unique local configuration utility

### Lockable keypad

Tamper resistant, no need for thermostat guards

### Configurable inputs

Three configurable inputs for added functionality

Economizer Analog Output Rating	0 to 10 Vdc into 2k Ω resistance min.
Economizer Analog Output Accuracy	±3% typical
Wire Gauge	18 gauge maximum, 22 gauge recommended
Dimensions	4.94" x 3.38" x 1.13"
Approximate Shipping Weight	0.75 lb (0.34 kg)

### WARRANTY

Limited Warranty	2 years
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### AGENCY APPROVALS



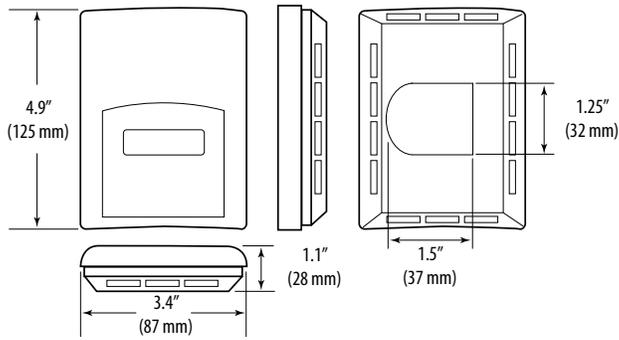
UL: 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN, XAPX (US) and XAPX7 (Canada)

FCC: Compliant to CFR 47, Part 15, Subpart B, Class A (US)

Industry Canada: ICES-003 (Canada)

CE: EMC Directive 2004/108/EC (European Union)

## DIMENSIONAL DRAWING



## ORDERING INFORMATION

PART #	DESCRIPTION	COMM.
VIC-VT7200C5031	Zone Controller: Net Ready, Floating Outputs, VAV PD	Standalone
VIC-VT7200C5031B	Zone Controller: BACnet, Floating Outputs, VAV PD	BACnet MS/TP
VIC-VT7200C5531B	PIR Zone Controller: 2 On/Off or Floating Outputs	BACnet MS/TP
VIC-VT7200C5531E	PIR Zone Controller: 2 On/Off or Floating Outputs	LonWorks
VIC-VT7200C5531P	PIR Zone Controller: 2 On/Off or Floating Outputs	Zigbee Pro
VIC-VT7200C5531W	PIR Zone Controller: 2 On/Off or Floating Outputs	Zigbee
VIC-VT7200F5031	Zone Controller: Net Ready, 2 Analog 0-10V Outputs, VAV PD	Standalone
VIC-VT7200F5031B	Zone Controller: BACnet, 2 Analog 0-10V Outputs, VAV PD	BACnet MS/TP
VIC-VT7200F5531B	PIR Zone Controller: 2 Analog 0-10V Outputs	BACnet MS/TP
VIC-VT7200F5531E	PIR Zone Controller: 2 Analog 0-10V Outputs	LonWorks
VIC-VT7200F5531P	PIR Zone Controller: 2 Analog 0-10V Outputs	Zigbee Pro
VIC-VT7200F5531W	PIR Zone Controller: 2 Analog 0-10V Outputs	Zigbee

Note: For combinations not listed here, a SKU with PIR and com can be purchased as:  
1 Room Controller + 1 Com Module + 1 Cover with PIR.

## VIC-VT7300 SERIES

BACnet, LonWorks, Zigbee and Zigbee Pro Models Available



VIC-VT7350C5031



VIC-VT7350C5531

The VIC-VT7300 provides the advanced features and monitoring functions required by modern building automation systems without the use of software and commissioning tools. The VIC-VT7300 is a low voltage fan coil terminal equipment controller suitable for commercial and hospitality markets. It can also be used as a zone controller or mixed voltage solution.

### SPECIFICATIONS

Thermostat Power Requirements	VT7350: 19 to 30 Vac; 50 or 60 Hz; 2 VA Class 2 VTR7350: 7.0 Vdc +/- 10%, 2.4 W min.
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC thermistor
Resolution	±0.1 °C (± 0.2 °F)
Control Accuracy: Temperature Humidity	±0.5 °C (±0.9 °F) @ 21 °C (70 °F) typical, calibrated ±3% from 20 to 70% RH at 21 °C (70 °F)
Occupied and Unoccupied Setpoint Range Cooling	12 to 38 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	4.5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Binary Inputs	Dry contact across terminal BI1, BI2 & UI3 to Scom*
Outputs Rating	Triac output: 30 Vac, 1 A max., 3 A in-rush; Analog: 0 to 10 Vdc into 2k Ω resistance min.*
Economizer Analog Output Rating	0 to 10 Vdc into 2k Ω resistance min.
Economizer Analog Output Accuracy	±3% typical

### Available internal humidity sensing

Increased occupant comfort through dehumidification

### Configurable sequences

Configurable sequences of operation...single model meets more applications

### Advanced occupancy functions

Advanced occupancy functions through the network or smart local occupancy sensing

#### APPLICATIONS

- Three-speed fans
- Heating/cooling valves
- Electric duct heaters
- Changeover sensors
- Line Voltage with additional relay pack
- Low voltage room controllers

### Configurable inputs

Three configurable inputs for added functionality

### Configurable fan

Configurable fan functions button including ECM and speed fan control...meets multiple applications with a single model

### Minimize parameter tampering

Unique local configuration utility

Wire Gauge	18 gauge maximum, 22 gauge recommended
Dimensions	4.94" x 3.38" x 1.13"
Approximate Shipping Weight	0.75 lb (0.34 kg)

#### WARRANTY

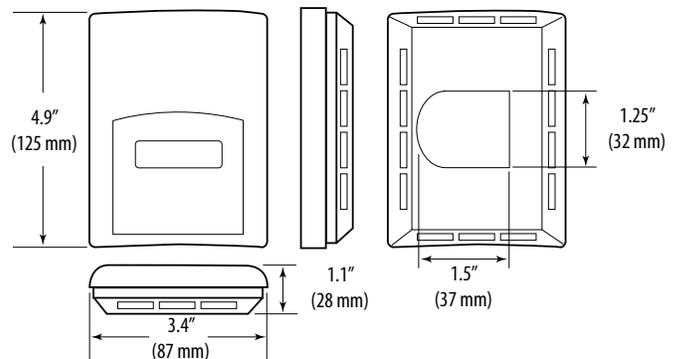
Limited Warranty	2 years
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#### AGENCY APPROVALS



UL: 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN, XAPX (US) and XAPX7 (Canada)  
FCC: Compliant to CFR 47, Part 15, Subpart B, Class A (US)  
Industry Canada: ICES-003 (Canada)  
CE: EMC Directive 2004/108/EC (European Union)

### DIMENSIONAL DRAWING



## ORDERING INFORMATION

PART NUMBER	DESCRIPTION	COMM.
<b>ECM Hotel or Commercial Applications</b>		
VIC-VT7300F5031B-ECM	ECM FCU Room Controller: BACnet, 2 Analog 0-10V Outputs, Commercial Interface	BACnet MS/TP
VIC-VT7305F5031B-ECM	ECM FCU Room Controller: BACnet, 2 Analog 0-10V Outputs, Hotel Interface	BACnet MS/TP
<b>Low Voltage Fan Speed Commercial Applications - Floating Outputs</b>		
VIC-VT7350C5031	Fan Coil Controller: Net Ready, Floating Outputs, with Humidity, Commercial Interface	Standalone
VIC-VT7350C5031B	Fan Coil Controller: BACnet, Floating Outputs, with Humidity, Commercial Interface	BACnet MS/TP
VIC-VT7350C5531B	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Commercial Interface	BACnet MS/TP
VIC-VT7350C5531E	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Commercial Interface	LonWorks
VIC-VT7350C5531P	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Commercial Interface	Zigbee Pro
VIC-VT7350C5531W	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Commercial Interface	Zigbee
<b>Low Voltage Fan Speed Commercial Applications -Analog Outputs</b>		
VIC-VT7350F5031	Fan Coil Controller: Net Ready, 2 Analog 0-10V Outputs, with Humidity	Standalone
VIC-VT7350F5031B	Fan Coil Controller: BACnet, 2 Analog 0-10V Outputs, with Humidity	BACnet MS/TP
VIC-VT7350F5531B	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Commercial Interface	BACnet MS/TP
VIC-VT7350F5531E	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Commercial Interface	LonWorks
VIC-VT7350F5531P	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Commercial Interface	Zigbee Pro
VIC-VT7350F5531W	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Commercial Interface	Zigbee
<b>Low Voltage Fan Speed Hotel Applications - Floating Outputs</b>		
VIC-VT7355C5031	Fan Coil Controller: Net Ready, Floating Outputs, with Humidity, Lodging/Hotel Interface	Standalone
VIC-VT7355C5031B	Fan Coil Controller: BACnet, Floating Outputs, with Humidity, Lodging/Hotel Interface	BACnet MS/TP
VIC-VT7355C5531B	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Lodging/Hotel Interface	BACnet MS/TP
VIC-VT7355C5531E	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Lodging/Hotel Interface	LonWorks
VIC-VT7355C5531P	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Lodging/Hotel Interface	Zigbee Pro
VIC-VT7355C5531W	PIR FCU Room Controller: 2 On/Off or Floating Outputs, with Humidity, Lodging/Hotel Interface	Zigbee
<b>Low Voltage Fan Speed Hotel Applications -Analog Outputs</b>		
VIC-VT7355F5031	Fan Coil Controller: Net Ready, With Humidity, 2 Analog 0-10V Outputs, Lodging/Hotel Interface	Standalone
VIC-VT7355F5031B	Fan Coil Controller: BACnet, 2 Analog 0-10V Outputs, with Humidity, Lodging/Hotel Interface	BACnet MS/TP
VIC-VT7355F5531B	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Lodging/Hotel Interface	BACnet MS/TP
VIC-VT7355F5531E	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Lodging/Hotel Interface	LonWorks
VIC-VT7355F5531P	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Lodging/Hotel Interface	Zigbee Pro
VIC-VT7355F5531W	PIR FCU Room Controller: 2 Analog 0-10V Outputs, with Humidity, Lodging/Hotel Interface	Zigbee
<b>Line Voltage Fan Speed Commercial Applications*</b>		
VIC-VTR7350A5031	Fan Coil Controller: Net Ready, with Humidity, Commercial Interface	Standalone
VIC-VTR7350A5031B	Fan Coil Controller: BACnet, with Humidity, Commercial Interface	BACnet MS/TP
VIC-VTR7350A5531B	PIR FCU Room Controller: with Humidity, Commercial Interface	BACnet MS/TP
VIC-VTR7350A5531P	PIR FCU Room Controller: with Humidity, Commercial Interface	Zigbee Pro
VIC-VTR7350A5531W	PIR FCU Room Controller: with Humidity, Commercial Interface	Zigbee
<b>Line Voltage Fan Speed Hotel Applications*</b>		
VIC-VTR7355A5031	Fan Coil Controller: Net Ready, with Humidity, Lodging/Hotel Interface	Standalone
VIC-VTR7355A5031B	Fan Coil Controller: with Humidity, Lodging/Hotel Interface	BACnet MS/TP
VIC-VTR7355A5531B	PIR FCU Room Controller: with Humidity, Lodging/Hotel Interface	BACnet MS/TP
VIC-VTR7355A5531P	PIR FCU Room Controller: with Humidity, Lodging/Hotel Interface	Zigbee Pro
VIC-VTR7355A5531W	PIR FCU Room Controller: with Humidity, Lodging/Hotel Interface	Zigbee

\* I/O relay pack required for VIC-VTR7350.



## VIC-VT8350 SERIES

BACnet C and BACnet MS/TP with Zigbee Models Available



VIC-VT8350

Smart energy management has never been easier than with the VIC-VT8350 Series Fan Coil Room Controllers. Designed for new construction and retrofit projects, the Room Controllers dramatically decrease project delivery costs by reducing installation, configuration and commissioning time. No complex software or tools are required to customize functionality in order to meet your applications requirements. The Room Controllers provide all the advanced features and monitoring functions required by modern building automation systems in a simple compact enclosure.

The VIC-VT8350 Room Controllers, part of the VIC-VT8000 family, are both application-specific AND programmable. This enables the modification of pre-configured control sequences, or the creation of entirely new control sequences for fan coil applications. Their configurable control sequences, economizer and scheduler functionalities deliver all the flexibility necessary for optimal indoor air quality applications.

### SPECIFICATIONS

Thermostat Power Requirements	7.0 Vdc $\pm$ 10%, 2.4 W min.; 24 Vac $\pm$ 15%; 50/60 Hz; 6 to 100 VA (rating max.)
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC type 2 thermistor
Temp. Sensor Resolution	$\pm$ 0.1 °C ( $\pm$ 0.2 °F)
Temp. Control Accuracy	$\pm$ 0.5 °C ( $\pm$ 0.9 °F) @ 21 °C (70 °F) typical calibrated
Humidity Sensor and Calibration	Single point calibrated bulk polymer sensor
Humidity Sensor Precision	Reading range from 10 to 90% RH non-condensing 10 to 20% precision is 10%; 20 to 80% precision is 5%; 80 to 90% precision is 10%
Humidity Sensor Stability	<1.0% annual drift (typical)
Dehumidification Setpoint Range	30 to 95% RH
Occupied and Unoccupied Setpoint Range Cooling	12 to 38 °C (54 to 100 °F)

### Commercial and hospitality

Suitable for both commercial and hospitality markets and systems

### Wi-Fi option

BACnet/IP and email notification via Wi-Fi (with VCM8002V5031)

### Digital touch screen

Customizable color digital touch screen interface with multi-language support

### Advanced occupancy functions

For commercial and lodging applications

### Optional humidity sensor

Humidity sensor with on-board humidification strategy (optional)

### Optional cover

Optional occupancy sensor cover

### 7-day occupancy scheduling

2 to 4 events

Occupied and Unoccupied Setpoint Range Heating	5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Binary Inputs	Dry contact across terminal B11, B12 and UI3 to Scom
Economizer Analog Output Rating	0 to 10 Vdc into 2k $\Omega$ resistance min.
Economizer Analog Output Accuracy	$\pm$ 3% typical
Wire Gauge	18 gauge maximum, 22 gauge recommended

#### WARRANTY

Limited Warranty	18 months
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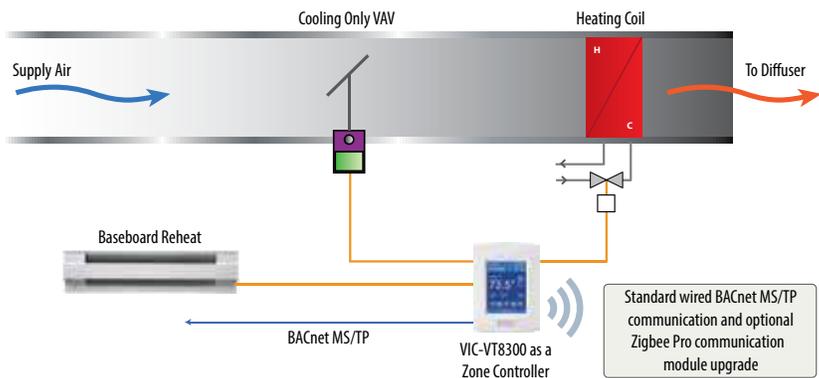
#### AGENCY APPROVALS



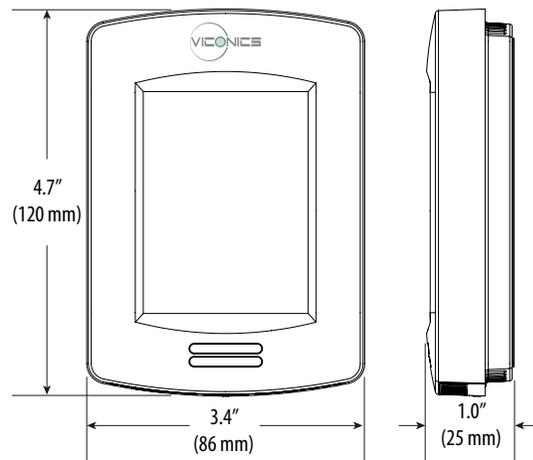
UL: 61010-1 (2nd edition); CSA: 61010-1 (3rd edition); IEC: 61010-1 (3rd edition), EN 60950-1: 2006A2: 2013, UL 873, CSA 22.2 No. 24-93; 61326-1:2005; FCC: Part 15, Subpart B; CE: EMC Directive 2004/108/EC (European Union); wireless models: FCC Part 15, Subpart C; R&TTE Directive 1999/5/EC; EN: 301 489-1 V1.9.2, 301 328 V1.8.1; RSS 210

### TYPICAL ZONE CONTROLLER APPLICATION

Wiring Examples

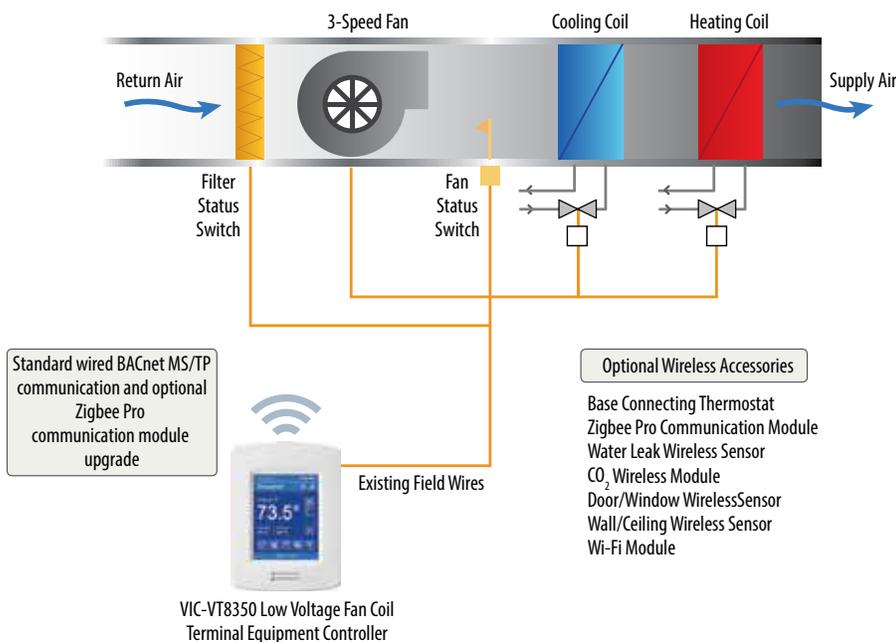


### DIMENSIONAL DRAWING



### TYPICAL LOW VOLTAGE FAN COIL APPLICATION

Wiring Examples



### SELECTABLE COLOR SCHEMES



### ORDERING INFORMATION

PART #	DESCRIPTION
VIC-VT8350U5000B	RH, Fancoil Control, Low Voltage, BACnet MS/TP
VIC-VT8350U5500B	RH, PIR, Fancoil Control, Low Voltage, BACnet MS/TP
VIC-VT8350U5500BP	RH, PIR Room Controller, BACnet MS/TP and Zigbee



## VIC-VT7600 SERIES

BACnet MS/TP, LonWorks, Zigbee and Zigbee Pro Models Available



VIC-VT7600A5000

Primarily designed for use in small to mid-sized commercial building applications, VIC-VT7600 room controllers can be installed in any building using a standard rooftop or heat pump unit with a requirement for advanced fresh air control. Capable of controlling economizer-free cooling and demand-based ventilation strategies, the VIC-VT7600 provides fresh air measurement input right out of the box.

### SPECIFICATIONS

Thermostat Power Requirements	19 to 30 Vac; 50 or 60 Hz; 2 VA Class 2
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC thermistor
Resolution	± 0.1 °C (± 0.2 °F)
Control Accuracy	Temp: ±0.5 °C (±0.9 °F) @ 21 °C (70 °F) typical calibrated
Occupied and Unoccupied Setpoint Range Cooling	12 to 37.5 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	4.5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Binary Inputs	BI2 and UI3 to Sc0m
Output Rating	30 Vac, 1 A max., 3 A in-rush
Economizer Analog Output Rating	0 to 10 Vdc into 2k Ω resistance min.
Economizer Analog Output Accuracy	±3% typical
Wire Gauge	18 gauge maximum, 22 gauge recommended

### PI time proportioning

PI time proportioning algorithm for increased comfort, accuracy, and energy savings

### Local configuration

Unique local configuration utility minimizes parameter tampering

### Two digital inputs Lockable keypad

Two digital inputs for added functionality

Tamper resistant, no need for thermostat guards

### Smart fan

Saves energy during night mode

### Freeze protection

Limits costly freeze damage

### APPLICATIONS

- Single-speed fans
- Outdoor air temperature sensor
- Supply air temperature sensor
- Differential pressure switch

Dimensions	4.94" x 3.38" x 1.13" (12.5 x 86 x 30 mm)
Approximate Shipping Weight	0.75 lb (0.34 kg)

### WARRANTY

Limited Warranty	2 years
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### AGENCY APPROVALS



UL: 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN, XAPX (US) and XAPX7 (Canada)

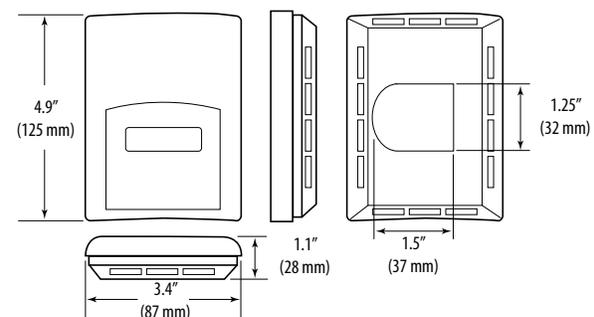
FCC: Compliant to CFR 47, Part 15, Subpart B, Class A (US)

Industry Canada: ICES-003 (Canada)

CE: EMC Directive 2004/108/EMC (European Union).

C-Tick: AS/NZS CISPR 22 Compliant (Australia / New Zealand); Supplier Code Number N10696

### DIMENSIONAL DRAWING



## ORDERING INFORMATION

PART NUMBER	SCHEDULING	ECONOMIZER	HEAT/COOL	HUMIDITY	PIR COVER	COMM.
<b>Rooftop Unit Controller</b>						
VIC-VT7652B5031	X		2H/2C			Standalone
VIC-VT7652B5031B	X		2H/2C			BACnet MS/TP
VIC-VT7652B5531B	X		2H/2C		X	BACnet MS/TP
VIC-VT7652B5531E	X		2H/2C		X	LonWorks
VIC-VT7652B5531P	X		2H/2C		X	Zigbee Pro
VIC-VT7652B5531W	X		2H/2C		X	Zigbee
<b>Rooftop Unit Controller for Modulating Heat</b>						
VIC-VT7652F5031	X		1H (analog)/2C			Standalone
VIC-VT7652F5031B	X		1H (analog)/2C			BACnet MS/TP
VIC-VT7652F5531B	X		1H (analog)/2C		X	BACnet MS/TP
VIC-VT7652F5531P	X		1H (analog)/2C		X	Zigbee Pro
VIC-VT7652F5531W	X		1H (analog)/2C		X	Zigbee
<b>Heat Pump Controllers</b>						
VIC-VT7652H5031	X		3H/2C			Standalone
VIC-VT7652H5031B	X		3H/2C			BACnet MS/TP
VIC-VT7652H5531B	X		3H/2C		X	BACnet MS/TP
VIC-VT7652H5531E	X		3H/2C		X	LonWorks
VIC-VT7652H5531P	X		3H/2C		X	Zigbee Pro
VIC-VT7652H5531W	X		3H/2C		X	Zigbee
<b>Water Source Heat Pump Controller with Humidification Control</b>						
VIC-VT7652W5031	X		3H/2C	X		Standalone
VIC-VT7652W5031B	X		3H/2C	X		BACnet MS/TP
VIC-VT7652W5531B	X		3H/2C	X	X	BACnet MS/TP
VIC-VT7652W5531P	X		3H/2C	X	X	Zigbee Pro
VIC-VT7652W5531W	X		3H/2C	X	X	Zigbee
<b>Rooftop Unit Controller with Economizer</b>						
VIC-VT7656B5031	X	X	2H/2C			Standalone
VIC-VT7656B5031B	X	X	2H/2C			BACnet MS/TP
VIC-VT7656B5531B	X	X	2H/2C		X	BACnet MS/TP
VIC-VT7656B5531E	X	X	2H/2C		X	LonWorks
VIC-VT7656B5531P	X	X	2H/2C		X	Zigbee Pro
VIC-VT7656B5531W	X	X	2H/2C		X	Zigbee
<b>Indoor Air Quality Controller</b>						
VIC-VT7656E5031	X		2H/2C			Standalone
VIC-VT7656E5031B	X		2H/2C			BACnet MS/TP
VIC-VT7656E5531B	X		2H/2C		X	BACnet MS/TP
VIC-VT7656E5531P	X		2H/2C		X	Zigbee Pro
VIC-VT7656E5531W	X		2H/2C		X	Zigbee
<b>Rooftop Unit Controller with Humidification Control</b>						
VIC-VT7657B5031	X		2H/2C	X		Standalone
VIC-VT7657B5031B	X		2H/2C	X		BACnet MS/TP
VIC-VT7657B5531B	X		2H/2C	X	X	BACnet MS/TP
VIC-VT7657B5531E	X		2H/2C	X	X	LonWorks
VIC-VT7657B5531P	X		2H/2C	X	X	Zigbee Pro
VIC-VT7657B5531W	X		2H/2C	X	X	Zigbee



## VIC-VT8650 SERIES

BACnet MS/TP, and BACnet MS/TP with Zigbee Models Available



VIC-VT8650

Smart energy management has never been easier than with the VIC-VT8650 Series Room Temperature and Indoor Air Quality (IAQ) Controller. Designed for new construction and retrofit projects, the temperature and IAC controllers dramatically decrease project delivery costs by reducing installation, configuration and commissioning time. No complex software or tools are required to customize functionality in order to meet your applications requirements. The Room Controllers provide all the advanced features and monitoring functions required by modern building automation systems in a simple compact enclosure.

The VIC-VT8650 Room Controllers, part of the VIC-VT8000 family, are both application-specific AND programmable. This enables the modification of pre-configured control sequences, or the creation of entirely new control sequences for HVAC, lighting and other applications. The VIC-VT8650 Room Controllers provide exceptional control of staged heating and cooling equipment such as packaged roof-top units. Their configurable control sequences, economizer and scheduler functionalities deliver all the flexibility necessary for optimal indoor air quality applications..

### SPECIFICATIONS

Thermostat Power Requirements	24 Vac $\pm$ 15%, 50/60 Hz, 6 VA
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC type 2 thermistor
Temp. Sensor Resolution	$\pm$ 0.1 °C ( $\pm$ 0.2 °F)
Temp. Control Accuracy	$\pm$ 0.5 °C ( $\pm$ 0.9 °F) @ 21 °C (70 °F) typical calibrated
Humidity Sensor and Calibration	Single point calibrated bulk polymer sensor
Humidity Sensor Precision	Reading range from 10 to 90% RH non-condensing 10 to 20% precision is 10%; 20 to 80% precision is 5%; 80 to 90% precision is 10%
Humidity Sensor Stability	<1.0% annual drift (typical)
Dehumidification Setpoint Range	30 to 95% RH

### Commercial and hospitality

Suitable for both commercial and hospitality markets and systems

### Digital touch screen

Customizable color digital touch screen interface with multi-language support

### 7-day occupancy scheduling

2 to 4 events

### Wi-Fi option

BACnet/IP and email notification via Wi-Fi (with VCM8002V5031)

### Optional humidity sensor

Optional humidity sensor with onboard humidification strategy

### Universal inputs and outputs

Including CO<sub>2</sub> sensor and fresh air station input

### Optional cover

Optional occupancy sensor cover

Occupied and Unoccupied Setpoint Range Cooling	12 to 38 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Binary Inputs	Dry contact across terminal B11, B12 and UI3 to Scom
Economizer Analog Output Rating	0 to 10 Vdc into 2k $\Omega$ resistance min.
Economizer Analog Output Accuracy	$\pm$ 3% typical
Wire Gauge	18 gauge maximum, 22 gauge recommended

#### WARRANTY

Limited Warranty	18 months
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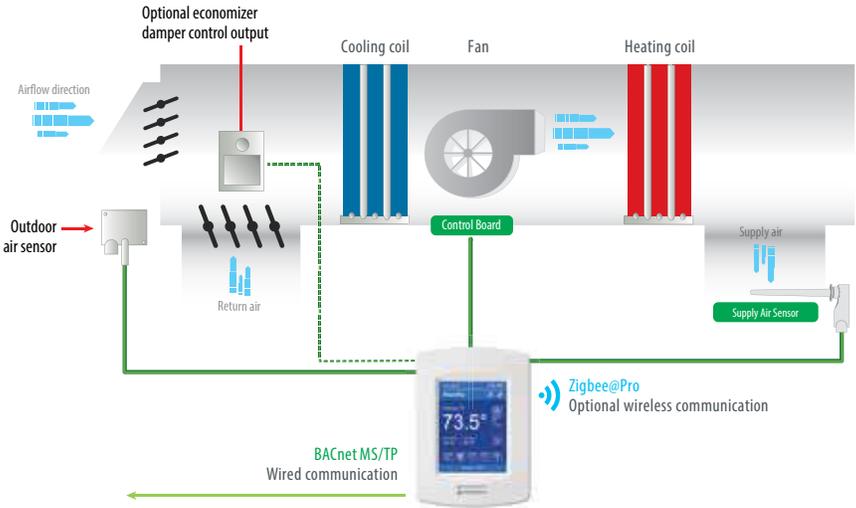
#### AGENCY APPROVALS



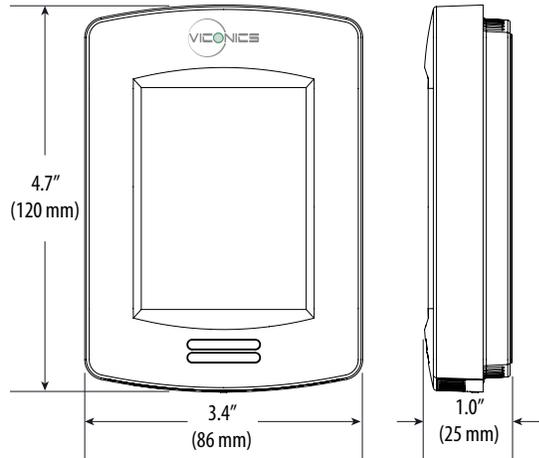
UL: 61010-1 (2nd edition); CSA: 61010-1 (3rd edition); IEC: 61010-1 (3rd edition), EN 60950-1: 2006A2: 2013, UL 873, CSA 22.2 No. 24-93; 61326-1:2005; FCC: Part 15, Subpart B; CE: EMC Directive 2004/108/EC (European Union); wireless models: FCC Part 15, Subpart C; R&TTE Directive 1999/5/EC; EN: 301 489-1 V1.9.2, 301 328 V1.8.1; RSS 210

**TYPICAL ROOFTOP UNIT APPLICATION**

Wiring Examples

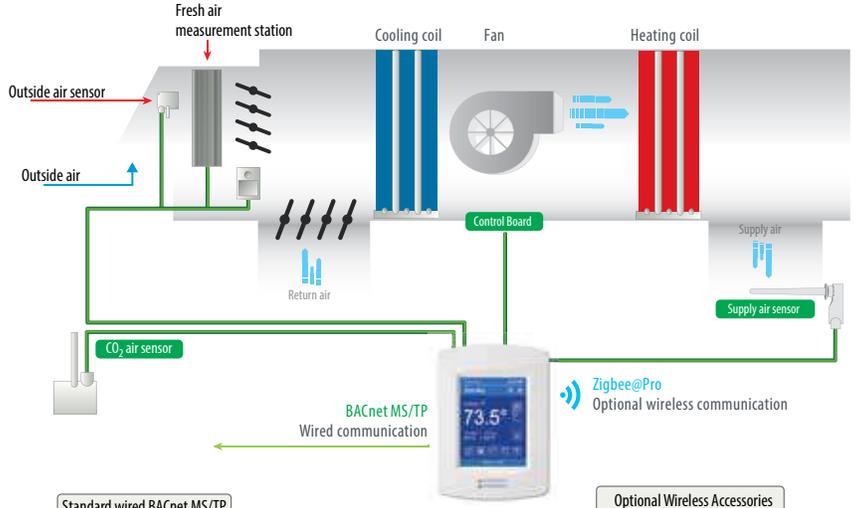


**DIMENSIONAL DRAWING**



**TYPICAL INDOOR AIR QUALITY APPLICATION**

Wiring Examples



Standard wired BACnet MS/TP communication and optional ZigBee Pro communication module upgrade

**Optional Wireless Accessories**

- Base Connecting Thermostat
- Zigbee Pro Communication Module
- Water Leak Wireless Sensor
- CO<sub>2</sub> Wireless Module
- Door/Window Wireless Sensor
- Wall/Ceiling Wireless Sensor
- Wi-Fi Module

**SELECTABLE COLOR SCHEMES**



**ORDERING INFORMATION**

PART #	DESCRIPTION
VIC-VT8650U5000B	Fancoil Control, Low Voltage, RH, BACnet MS/TP
VIC-VT8650U5500B	Fancoil Control, Low Voltage, RH, PIR, BACnet MS/TP
VIC-VT8650U5500BP	RH, PIR Room Controller, BACnet MS/TP and Zigbee

**ACCESSORIES P. 233**

## VIC-VTR835X0A5X SERIES/ VIC-VC3XXxE5000

Network Ready, BACnet MS/TP,  
and Wireless Models Available



VIC-VTR835x0A5x



VIC-VC3xxxE5000

This two component retrofit option consists of the VTR8300 terminal equipment controller and the VC3000 relay pack. Together, they provide an easy solution for retrofitting fan coil unit thermostats without requiring upgrades to other components such as relays, transformers, controllers, sensors, and network wiring. Existing line voltage wiring between the fan coil unit and temperature controller can be reused, further minimizing overall labor and installation costs.

The VC3000 relay pack features an onboard universal voltage power supply and line-voltage relays that directly drive fractional horsepower fan motors and valves. The VTR8350 controller features a fully digital multi-language touch screen display that can be user customized. The controller's built-in commissioning and configuration utility, its temperature sensor, and the optional humidity and occupancy sensor, provide maximum flexibility. The VTR8350 controller is available in Network Ready, BACnet® MS/TP or wireless Zigbee networked models.

### SPECIFICATIONS

Thermostat Power Requirements	7 Vdc, 2.4 W min. (from VC3000)
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC type 2 thermistor
Temp. Sensor Resolution	± 0.1 °C (± 0.2 °F)
Temp. Control Accuracy	±0.5 °C (±0.9 °F) @ 21 °C (70 °F) typical calibrated
Humidity Sensor and Calibration	Single point calibrated bulk polymer sensor
Humidity Sensor Precision	Reading range from 10 to 90% RH non-condensing 10 to 20% precision is 10%; 20 to 80% precision is 5%; 80 to 90% precision is 10%

### Commercial and hospitality

Suitable for both commercial and hospitality markets and systems (VTR8300 Series)

### Extremely compact design

(VC3000 Series)

### Digital touch screen

Customizable color digital touch screen interface with multi-language support (VTR8300 Series)

### 90 to 277 Vac

Line powered from 90 to 277 Vac, 50 to 60 Hz (VC3000 Series)

### 7-day occupancy scheduling

2 to 4 events (VTR8300 Series)

### Wire-leads

Wire-leads for line-voltage connections (VC3000 Series)

### Wi-Fi option

BACnet/IP and email notification via Wi-Fi (with VCM8002V5031)

Humidity Sensor Stability	<1.0% annual drift (typical)
Dehumidification Setpoint Range	30 to 95% RH
Occupied and Unoccupied Setpoint Range Cooling	12 to 38 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Binary Inputs	Dry contact across terminal BI1, BI2 & UI3 to Scom
Economizer Analog Output Rating	0 to 10 Vdc into 2k Ω resistance min.
Economizer Analog Output Accuracy	±3% typical
Wire Gauge	18 gauge maximum, 22 gauge recommended

#### WARRANTY

Limited Warranty 18 months

#### AGENCY APPROVALS



UL: 61010-1 (2nd edition); CSA: 61010-1 (3rd edition); IEC: 61010-1 (3rd edition), EN 60950-1: 2006A2: 2013, UL 873, CSA 22.2 No. 24-93; 61326-1:2005; FCC: Part 15, Subpart B; CE: EMC Directive 2004/108/EC (European Union); wireless models: FCC Part 15, Subpart C; R&TTE Directive 1999/5/EC; EN: 301 489-1 V1.9.2, 301 328 V1.8.1; RSS 210

### WALL CONTROLLERS

Ordering Information

PART #	DESCRIPTION	COMM.
VIC-VTR8350A5000B	Fancoil Terminal Equipment Controller, PIR ready (PIR cover not included), onboard humidity sensor	BACnet
VIC-VTR8350A5500B	Fancoil Terminal Equipment Controller, PIR factory equipped, onboard humidity sensor	BACnet
VIC-VTR8350A5500BP	Fancoil Terminal Equipment Controller, PIR factory equipped, onboard humidity sensor	Wireless (Zigbee Pro)

### RELAY PACKS

Ordering Information

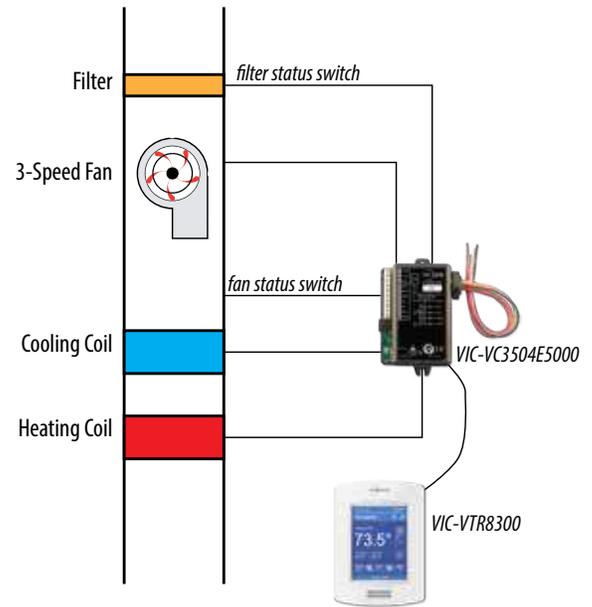
PART #	DESCRIPTION
VIC-VC3500E5000	Transformer relay pack, 5 relay fan outputs
VIC-VC3504E5000	Transformer relay pack, 5 relay fan outputs and 4 outputs
VIC-VC3404E5000	Transformer relay pack, 4 relay fan outputs, smart Vdc output, and 4 inputs
VIC-VC3300E5000	Transformer relay pack, 3 slave fan outputs

### APPLICATIONS

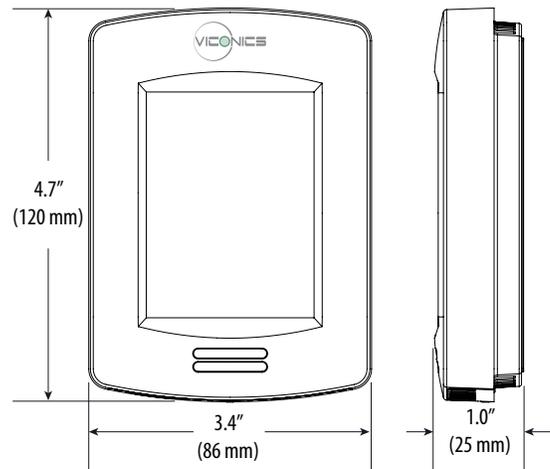
Wall Control and Relay Pack Applications (BACnet models shown, wireless similar)

APPLICATION	OUTPUTS/ INPUTS	CONTROLLER PART #	RELAY PACK PART #
2 or 4 pipe, up to 3 speed fan, humidity control	1H/1C with reheat	VIC-VTR8350A5000B	VIC-VC3500E5000
	1H/1C with 4 inputs and reheat	VIC-VTR8350A5000B	VIC-VC3504E5000
	1H/1C with 4 inputs, reheat, and occ. output	VIC-VTR8350A5000B	-
2 pipe, up to 3 speed fan	1H/1C with pulsed reheat	-	VIC-VC3500E5000
	1H/1C with 4 inputs and pulsed reheat	-	VIC-VC3504E5000
2 or 4 pipe, up to 3 speed fan, humidity control	1H/1C with reheat	VIC-VTR8350A5000B	VIC-VC3500E5000
	1H/1C with 4 inputs and reheat	VIC-VTR8350A5000B	VIC-VC3504E5000
	1H/1C with 4 inputs, reheat, and occ. output	VIC-VTR8350A5000B	-
2 pipe, up to 3 speed fan	1H/1C with pulsed reheat	-	VIC-VC3500E5000
	1H/1C with 4 inputs and pulsed reheat	-	VIC-VC3504E5000
Slave fan control only	3 fan outputs	-	VIC-VC3300E5000

### WIRING EXAMPLES



### DIMENSIONAL DRAWING



### SELECTABLE COLOR SCHEMES



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## VIC-VH7200 SERIES

BACnet, Echelon, and Wireless Models Available



VIC-VH7200A1000

The VIC-VH7200 humidity controller family features a complete embedded humidity control solution with an intuitive backlit LCD display that walks the installer through the configuration steps, making the process extremely simple. Accurate relative humidity control is achieved via the product's unique PI time proportional control algorithm, which virtually eliminates humidity offset associated with traditional, differential-based humidity controllers.

All models contain a user-controlled binary input, which monitors an electrode humidifier canister service status or may be used as a general purpose service indicator. Models are available with more advanced features such as discharge humidity, proportional high limit, and indoor humidity setpoint reset based upon outdoor air temperature.

### SPECIFICATIONS

Humidistat Power Requirements	19 to 30 Vac; 50 or 60 Hz; 2 VA (RC & C) Class 2
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Resolution: Temp Humidity	±0.1 °C (±0.2 °F) ±0.1%
Control Accuracy Humidity	±3% RH from 20 to 70% RH at 21 °C (70 °F)
Humidification Setpoint Range	10 to 90% RH
Dehumidification Setpoint Range	15 to 95% RH
Outdoor Air Temp Range	-40 to 50 °C (-40 to 122 °F)

### PI time proportioning

PI time proportioning algorithm for increased comfort, accuracy, and energy savings

### Binary input

Binary input for added functionality

### Local configuration

Unique local configuration utility...minimizes parameter tampering

### Lockable keypad

Tamper resistant, no need for thermostat guards

### EEPROM memory

No loss of program

### Optional remote humidity sensors

Increased flexibility and functionality

### APPLICATIONS

- Humidifier
- Dehumidifier/air exchanger
- Humidity high limit sensor
- Outdoor air temperature sensor
- Airflow switch

Binary Inputs	Relay dry contact only across Scom and DI1 terminals
Contact Output Rating	Each relay output: 30 Vac, 1A max.; 30 Vac, 3 A in-rush
Analog Output Rating	0 to 10 Vdc into 2k Ω resistance min.
Wire Gauge	18 gauge maximum, 22 gauge recommended
Dimensions	4.94" x 3.38" x 1.13" (12.5 x 86 x 30 mm)
Approximate Shipping Weight	0.75 lb (0.34 kg)

### WARRANTY

Limited Warranty	2 years
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### AGENCY APPROVALS



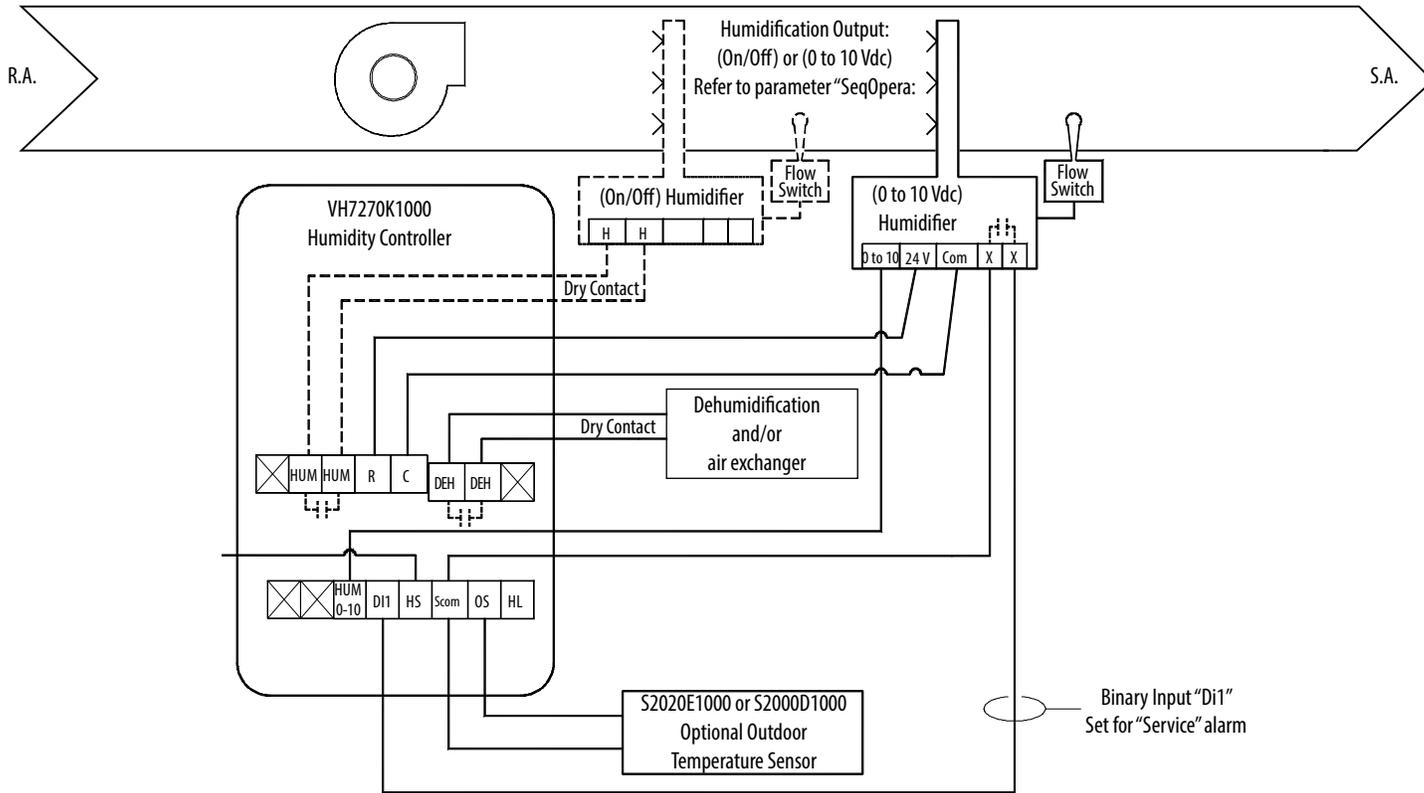
UL: 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN, XAPX (US) and XAPX7 (Canada)

FCC: Compliant to CFR 47, Part 15, Subpart B, Class A (US)

Industry Canada: ICES-003 (Canada)

CE: EMC Directive 2004/108/EC (European Union)

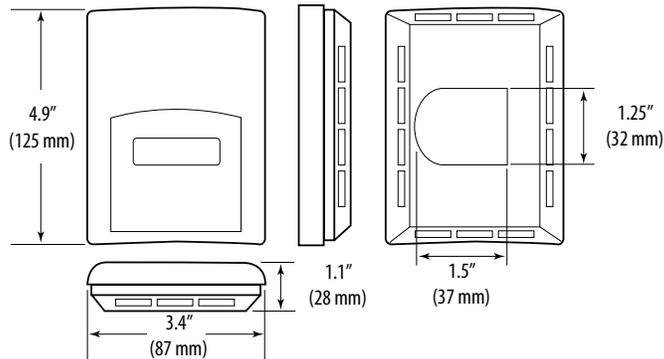
WIRING EXAMPLE



ORDERING INFORMATION

PART #	DESCRIPTION
VIC-VH7200A1000	Humidistat, ON/OFF
VIC-VH7270F1000	Humidistat, Analog Outputs
VIC-VH7270K1000	Humidistat, Analog Outputs, ON/OFF

DIMENSIONAL DRAWING



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## VZ7000 SERIES

BACnet MS/TP, LonWorks, Zigbee and Zigbee Pro Models Available



The VZ commercial zoning system has been specifically designed to bring a simple scalable solution to mid-market commercial applications without the cost associated with a typical DDC zoning system. Models include Rooftop and heat pump units controlling analog heat, CO<sub>2</sub> levels, and indoor air quality. Zoning controllers that provide floating and analog damper control are also available. A single central Controller unit can support up to 32 individual zone controllers.

All zoning system controllers can be fitted with an on-board PIR occupancy sensor cover that allows for advanced occupancy strategies, enabling greater energy savings to zones during scheduled events when no occupants are present.

### SPECIFICATIONS

Thermostat Power Requirements	19 to 30 Vac; 50 or 60 Hz; 2 VA Class 2
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC thermistor
Resolution	± 0.1 °C (± 0.2 °F)
Control Accuracy	Temp: ±0.5 °C (±0.9 °F) @ 21 °C (70 °F) typical calibrated
Occupied and Unoccupied Setpoint Range Cooling	12 to 37.5 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	4.5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)
Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Analog Input	AI4 0-10 Vdc into 10 kΩ resistance min.
Binary Inputs	Dry contact across BI1, BI2 and UI3 to common
Output Rating	30 Vac, 1 A max., 3 A in-rush

### PI time proportioning

PI time proportioning algorithm for increased comfort, accuracy, and energy savings

### Three digital inputs

Three digital inputs for added functionality

### Analog input

One 0-10V input for added functionality

### Local configuration

Unique local configuration utility minimizes parameter tampering

### Occupancy sensor

Models with occupancy sensor available

### Lockable keypad

Tamper resistant, no need for thermostat guards

### APPLICATIONS

- Rooftop zoning unit controller
- Heat pump zoning controller
- Rooftop zoning master controller

Economizer Analog Output Rating	0 to 10 Vdc into 2k Ω resistance min.
Economizer Analog Output Accuracy	±3% typical
Wire Gauge	18 gauge maximum, 22 gauge recommended
Dimensions	4.94" x 3.38" x 1.13" (12.5 x 86 x 30 mm)
Approximate Shipping Weight	0.75 lb (0.34 kg)

### WARRANTY

Limited Warranty	2 years
------------------	---------

### AGENCY APPROVALS



UL: 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN, XAPX (US) and XAPX7 (Canada)

FCC: Compliant to CFR 47, Part 15, Subpart B (US)

Industry Canada: ICES-003 (Canada)

CE: EMC Directive 89/336 EEC (European Union).

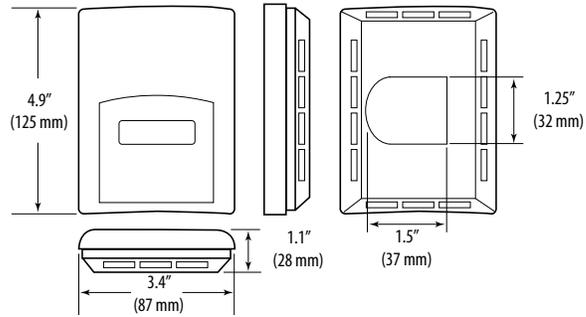
C-Tick: AS/NZS CISPR 22 Compliant (Australia / New Zealand); Supplier Code Number N10696

Wireless models:

FCC compliant to Part 15, Subpart C

CE: R and RTTE Directive 1995/5/EC (European Union)

## DIMENSIONAL DRAWING



## ORDERING INFORMATION

PART NUMBER	DESCRIPTION	OUTPUT	COMM.
<b>Rooftop Unit Controllers</b>			
VIC-VZ7260C5031B	Zone Control 2x Floating - Variable Volume Temp (VVT) Zone	Floating or On/Off	BACnet MS/TP
VIC-VZ7260C5031W	Zone Control 2x Floating - Variable Volume Temp (VVT) Zone	Floating or On/Off	Zigbee
VIC-VZ7260F5031B	Zone Control 2x Analog - Variable Volume Temp (VVT) Zone	0-10V	BACnet MS/TP
VIC-VZ7260F5031W	Zone Control 2x Analog - Variable Volume Temp (VVT) Zone	0-10V	Zigbee

PART NUMBER	HEAT/COOL	IAQ	ECONOMIZER	MOD. HEAT	COMM.
<b>Commercial Zoning System - Rooftop Master Controllers</b>					
VIC-VZ7656E1031B	2H/2C	X	X		BACnet MS/TP
VIC-VZ7656E1031W	2H/2C	X	X		Zigbee
VIC-VZ7656F1031B	1H/2C			X	BACnet MS/TP
VIC-VZ7656F1031W	1H/2C			X	Zigbee
VIC-VZ7656H1031B	2H/2C				BACnet MS/TP
VIC-VZ7656H1031W	2H/2C				Zigbee

PART NUMBER	DESCRIPTION	COMM.
<b>Commercial Zoning System - Heat Pump Controllers</b>		
VIC-VZ7656R1031B	Zone System Control Heat Pump - VariableVolume & Temperature (VVT) Master	BACnet MS/TP
VIC-VZ7656R1031W	Zone System Control Heat Pump - VariableVolume & Temperature (VVT) Master	Zigbee

## VZ8250 SERIES

BACnet MS/TP, and BACnet MS/TP with Zigbee Pro Models Available



VZ8250

Smart energy management has never been easier than with the VZ8250 Room Controllers for Variable Air Volume (VAV) applications. Designed for new construction and retrofit projects, the Room Controllers dramatically decrease project delivery costs by reducing installation, configuration and commissioning time. No complex software or tools are required to customize functionality to meet your applications requirements. The Room Controllers provide all the advanced features and monitoring functions required by modern building automation systems in a simple compact enclosure.

The VZ8250 Room Controllers, part of the VT8000 family, are both application-specific AND programmable. This enables the modification of pre-configured control sequences, or the creation of entirely new control sequences for VAV applications. Their configurable control sequences and scheduler functionalities deliver all the flexibility necessary for optimal indoor air quality applications.

### SPECIFICATIONS

Thermostat Power Requirements	24 Vac $\pm$ 15%, 50/60 Hz, 6 VA or 24 Vdc $\pm$ 15%
Operating Conditions	0 to 50 °C (32 to 122 °F); 0 to 95% RH non-condensing
Storage Conditions	-30 to 50 °C (-22 to 122 °F); 0 to 95% RH non-condensing
Temperature Sensor	Local 10k NTC type 2 thermistor
Temp. Sensor Resolution	$\pm$ 0.1 °C ( $\pm$ 0.2 °F)
Temp. Control Accuracy	$\pm$ 0.5 °C ( $\pm$ 0.9 °F) @ 21 °C (70 °F) typical calibrated
Humidity Sensor Precision	Reading range from 10 to 90% RH non-condensing 10 to 20% precision is 10%; 20 to 80% precision is 5%; 80 to 90% precision is 10%
Humidity Sensor Stability	<0.25% annual drift (typical)
Occupied and Unoccupied Setpoint Range Cooling	12 to 37.5 °C (54 to 100 °F)
Occupied and Unoccupied Setpoint Range Heating	4.5 to 32 °C (40 to 90 °F)
Room and Outdoor Air Temperature Display	-40 to 50 °C (-40 to 122 °F)

### Commercial and hospitality

Suitable for both commercial and hospitality markets and systems

### Digital touch screen

Customizable color digital touch screen interface with multi-language support

### Humidity sensor

Humidity sensor with onboard humidification strategy

### 7-day occupancy scheduling

2 to 4 events

### Universal inputs and outputs

Including CO<sub>2</sub> sensor and fresh air station input

### Optional cover

Optional occupancy sensor cover

### APPLICATIONS

- Single-speed fans
- Outdoor air temperature sensor
- Supply air temperature sensor
- Differential pressure switch sensor

Proportional Band for Room Temperature Range Control	Cooling & Heating: 1.8 °C (3.2 °F)
Analog Inputs	Modulating 0-10 Vdc across UI18, UI24 to common
Binary Inputs	Dry contact across terminal UI16, UI17 to common
Remote Temperature Sensor	10K T2 thermistor UI20, UI22, UI23
Wire Gauge	18 gauge maximum, 22 gauge recommended

### WARRANTY

Limited Warranty	18 months
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### AGENCY APPROVALS

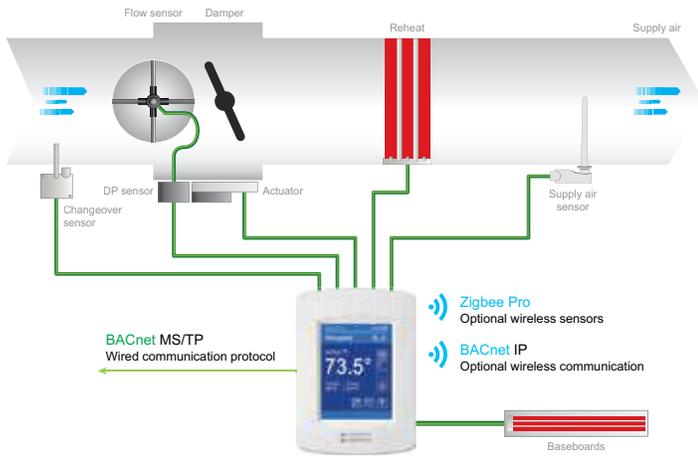


UL: UL 60730-1, UL 60730-2-9, UL 60730-2-13  
CAN/CSA: E60730-1, E60730-2-9  
CE: EN 60730-1, EN 60730-2-9, EN 60730-2-13

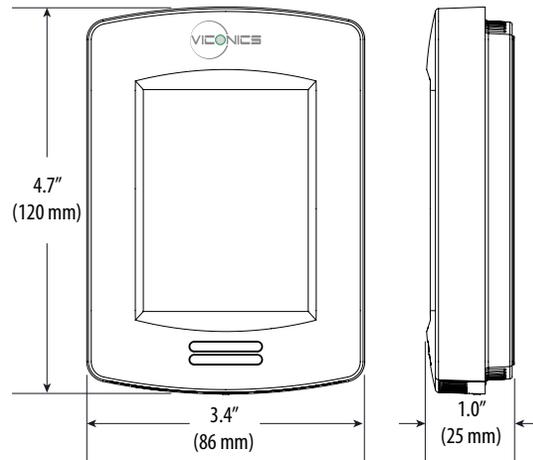
Models with Zigbee Radio  
RED 2014/53/EU  
ETSI: EN 300 328, EN 301 489-1, EN 301 489-17  
FCC Part 15C  
RSS-247

### TYPICAL PRESSURE INDEPENDENT APPLICATION (NO FAN)

Wiring Example

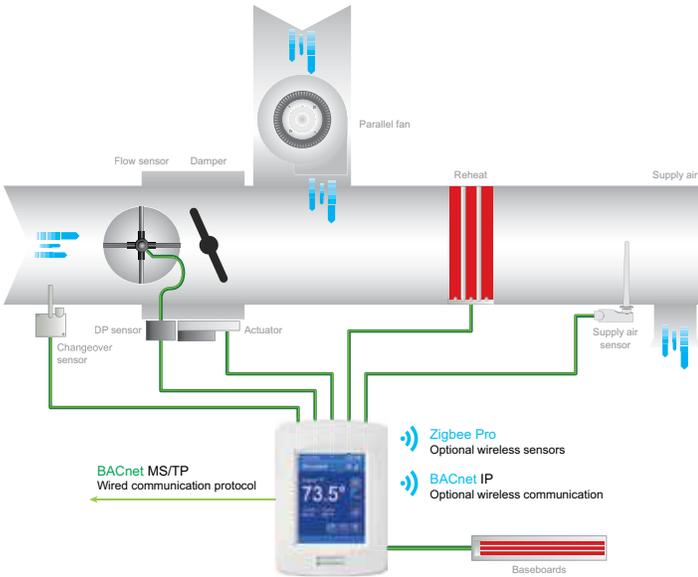


### DIMENSIONAL DRAWING



### TYPICAL PRESSURE INDEPENDENT APPLICATION (PARALLEL FAN)

Wiring Example



### SELECTABLE COLOR SCHEMES

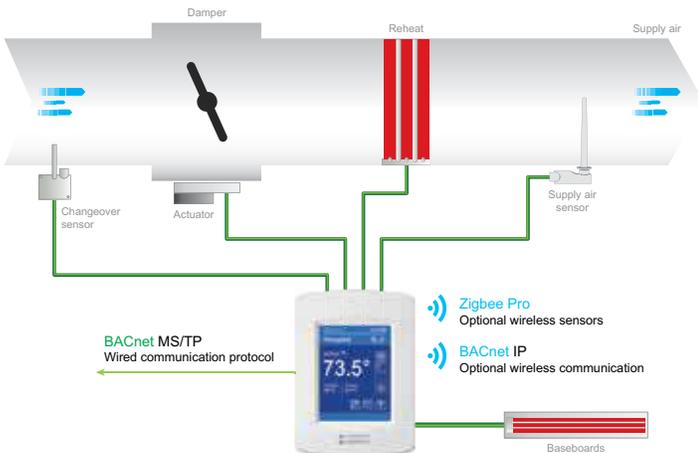


### ORDERING INFORMATION

PART NUMBER	DESCRIPTION	COMM.
VIC-VZ8250U5000B		BACnet MS/TP
VIC-VZ8250U5500B		BACnet MS/TP
VIC-VZ8250U5500BP		WRLS

### TYPICAL PRESSURE DEPENDENT APPLICATION (NO FAN)

Wiring Example



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## ACCESSORIES: SETPOINT DEVICES

### BMS WIRELESS INTEGRATION

The GW2 Wireless Gateway Manager and Zigbee Pro VT7000/VT8000 Room Controllers are targeted for either retrofit or new construction applications where the addition of communicating field bus wiring within the building space is prohibitive. The GW2 and Communicating Room Controllers with a wireless field bus encourages the use of existing wiring utilized by existing electronic controller type controls.

### WIRELESS GATEWAY

The GW2, when utilized in conjunction with the Room Controllers, will offer the integrator simple BACnet IP objects to integrate over standard building automation systems using familiar integration toolsets. A maximum of 30 Room Controllers can be wirelessly attached to a single GW2.

PART NUMBER	DESCRIPTION
VIC-GW2-010-00	Wireless gateway



VIC-GW2-010-00

### COMMUNICATION AND SENSORS

VT8000 Room Controllers can be adapted to communicate via one of three VCM modules: Wireless Zigbee Pro extended profile, CO<sub>2</sub> detection sensor, or Wi-Fi extended profile. This allows the VT8000 to pair with a variety of wireless sensors and switches for more precise control of HVAC systems in response to occupancy, as well as to communicate wirelessly for integration with BMS and networks.

PART NUMBER	DESCRIPTION	COMPATIBILITY
VIC-VCM8000V5045P	Wireless Zigbee Pro communication card	VT8000 Room Controllers
VIC-VCM8001V5045	CO <sub>2</sub> sensor module	VT8000 Room Controllers
VIC-VCM8002V5031	Wi-Fi module	VT8000 Room Controllers



VIC-VCM8000V5045P



VIC-VCM8001V5045



VIC-VCM8002V5031

## COMMUNICATION ADAPTERS

VT7000 Room Controllers are network ready, designed to accept the addition of communication. With a network card available for field upgrade, your system can be networked to an integrated building management system for the most advanced control and functionality.

In the part numbers, please note that:

- W: Legacy Zigbee for replacement
- P: Zigbee Pro, compatible with all room controllers



PART NUMBER	DESCRIPTION	COMPATIBILITY
VIC-VCM7000V5000W	Wireless Communication Card - 7000 - Zigbee Pro extended profile retrofit communication module	7000 Series Room Controllers (72, 73, R73, and 76)
VIC-VCM7000V5000P	Wireless Communication Card - 7000 - Zigbee proprietary wireless retrofit communication module	7000 Series Room Controllers (72, 73, R73, 76xx(B,H) and 76x7(B))
VIC-VCM7260Z5000B	BACnet replacement communication module	7260(C,F)
VIC-VCM7260Z5000W	Zigbee replacement communication module	7260(C,F)
VIC-VCM7300T5000B	Communication Module BACnet 73 with Relay Module - BACnet retrofit communication module	R73xx(A)
VIC-VCM7300T5000E	Communication Module LON 73 with Relay Module - Echelon retrofit communication module	R73xx(A)
VIC-VCM7300V5000B	BACnet Communication Card - 7200/7300 - BACnet retrofit communication module	7200(C,F) and 73xx(C,F)
VIC-VCM7300V5000E	LON Communication Card - 7200/7300 - Echelon retrofit communication module	7200(C,F) and 73xx(C,F)
VIC-VCM7600W5000B	BACnet retrofit communication module	76xx(W,E,F)
VIC-VCM7600W5000W	Zigbee proprietary wireless retrofit communication module	76xx(W,E,F)
VIC-VCM7600V5000B	BACnet Communication Card - BACnet retrofit communication module	76xx(B,H)
VIC-VCM7600V5000E	LON Communication Card - Echelon retrofit communication module	76xx(B,H)
VIC-VCM7607V5000B	BACnet Communication Card - 76X7 - BACnet retrofit communication module	76x7(B)
VIC-VCM7607V5000E	LON Communication Card - Echelon retrofit communication module	76x7(B)
VIC-VCM7656Z5000B	BACnet replacement communication module	Z7656(E,F,R,H)
VIC-VCM7656Z5000W	Zigbee replacement communication module	Z7656(E,F,R,H)

Note: The VCM7607V5000E (terminal equipment Controller Echelon LonTalk communication adapter) is not available for: VT7600W, VT7600F Room Controller models.





# CURRENT MONITORING

The Hawkeye line of current sensors is widely known as the industry standard for proof of flow. Unlike mechanical switches, Hawkeye current sensors are solid-state, minimizing failures caused by the wear and tear of moving parts. Veris offers a full range of analog and digital current sensing devices.

MODEL	DESCRIPTION	PAGE
H300/600/800/800NC/800HV/900	Current Switches: Fixed Trip Point (Status)	239
H308/608/701/708/808/908	Current Switches: Adjustable Trip Point, Standard Output	241
H609/709/709HV/809/909/909HV	Current Switches: Adjustable Trip Point, High Voltage Output	243
H606/706/806/906	Current Switches: Adjustable Trip Point, N.C. Output	245
H11D	Current Switches: Auto Calibration, Automation Systems, LCD Display	247
H614	VFD Current Switch: Auto Calibration	249
H720/904/934	VFD Switches and Current Sensors	251
H6ECM	ECM-Optimized Current Switch	253
H730/740/750/930/940/950	Current Switches with Relay: Fixed Trip Point (Status)	255
H735/738/748/758/938/948/958	Current Switches with Relay: Adjustable Trip Point, Standard Output	257
H739/749/939/949/959	Current Switches with Relay: Adjustable Trip Point, High Voltage Output	259
H721HC/721LC/921	Current Transducers: 4 to 20 mA Analog Output	261
H221/221SP/321/321SP/421/421SP	Current Transducers: 4 to 20 mA Analog Output, High Current Monitoring	263
H722LC/722HC/822/822-20/922	Current Transducers: 0 to 5 Vdc Analog Output	265
H723LC/723HC/923	Current Transducers: 0 to 10 Vdc Analog Output	267
H931	Current Transducers with Relay: 4 to 20 mA Analog Output	269
H932/952	Current Transducers with Relay: 0 to 5 Vdc Analog Output	271
H971/971SP/EA20 Series	Direct Current Transducers: 4 to 20 mA and 0 to 5 Vdc Analog Output	273
H5xx Series	Field Mount Motor Control Device	275
H120/120NC	Field Mount Status Relay	277

## CURRENT SENSOR SELECTION GUIDE

### CURRENT STATUS SWITCHES (DIGITAL OUTPUT)

	MICRO SPLIT-CORE (BEST ON RETROFITS)	MINI SOLID-CORE (COST EFFECTIVE FOR NEW INSTALLATIONS)	MINI SPLIT-CORE (BEST ON RETROFITS)	STANDARD SOLID CORE (COST EFFECTIVE FOR NEW INSTALLATIONS)	STANDARD SPLIT-CORE (BEST ON RETROFITS)
Detect Status (Digital On/Off)	H300 — 60A page 239	H800* — 200A page 239	H600 — 200A page 239		H900 — 200A page 239
Detect Belt Loss and Mechanical Failure (Adjustable Threshold)	H308 — 50A page 241	H808 — 50A page 241 H806 — 50A page 245 H809 — 50A page 243	H608 — 175A page 241 H606 — 50A page 245 H609 — 50A page 243	H708 — 135A page 241 H706 — 135A page 245 H709* — 135A page 243	H908 - 135A page 241 H906 - 135A page 245 H909* - 135A page 243
Self-Calibrating Switch					H11D — 200A page 247
VFD Model - Patented Technology			H614 — 150A page 249		H904 — 135A/20-75Hz page 251 H6ECM — 0.5 - 175A page 253
VFD Model - Patented Technology (Onboard Relay)					H934 — 135A/20-75Hz page 251
Veris Exclusive Patented Technology Status & Control (Onboard Pilot Duty Relay)				H730* — 200A page 255 H738* — 135A page 257 H739* — 135A page 259	H930* — 200A page 255 H938* — 135A page 257 H939* — 135A page 259

### FLYING LEADS AND JUNCTION BOX MOUNTING

High Voltage/Low Voltage Split		
Power Duty Status and Control	H120* — to 20A/2HP page 277	H5xx* — to 15A/1.5HP page 275

\* Indicates a series of products.

### CURRENT TRANSDUCERS (Analog Output)



Load Trending 4-20mA Output		H721LC: 10-40A page 261	H921: 30-120A page 261	H721HC: 50-200A page 261	H221/321/421: 300/800/2400A page 263
Load Trending 0-5V Output	H822*: 10/20A page 265	H722LC: 10-40A page 265	H922*: 30-120A page 265	H722HC: 50-200A page 265	
Load Trending 0-10V Output		H723LC: 10-40A page 267	H923: 20-150A page 267	H723HC: 50-200A page 267	
Load Trending with Relay 4-20mA Output			H931: 30-120A page 269		
Load Trending with Relay 0-5V Output			H932/H952: 30-120A page 271		
DC Current 4-20mA Output				H971/EA20: 10-200A page 273	
VFD 4-20mA Output				H720: 0-200A page 251	

\* Indicates a series of products.

# ADAPTABLE, VIEWABLE, AND COST COMPETITIVE

H11D Current Switch

## APPLICATIONS

- » HVAC fans, pumps, and blowers
- » Monitoring status of industrial process equipment



## FEATURES

### ELIMINATE GUESSWORK

View real-time amperage in the conductor, and know the exact trip current limits

### ADJUST TO AN APPLICATION ON THE FLY

Slide-switch selectable normal, wide range, and on/off trip points

### EXCEPTIONAL LABOR SAVINGS

Self-calibrating, self-learning:  
snap on and complete

# ULTIMATE VFD FAN AND PUMP STATUS

H614 VFD Current Switch

## APPLICATIONS

- » Monitoring fans, pumps, motors, and other electrical loads for proper operation
- » Detecting belt loss and motor failure ideal for fan and pump status
- » Verifying lighting circuit loads
- » Monitoring critical motors (compressor, fuel, etc.)
- » Monitoring industrial process equipment status (OEM)



## FEATURES

### GREATER INTELLIGENCE

Industry's most reliable self-learning, self-calibrating current switch

### INCREASED KNOWLEDGE

12-115 Hz, providing the industry's largest monitoring range

### SIMPLIFIED INSTALLATION

Auto configures up to 20 trip points for fault detection on VFD fan/pump motors

# HX00 SERIES

On/Off Status Current Switches



Hawkeye x00 on/off current switches provide a cost-effective solution for monitoring status on unit vents, exhaust fans, recirculation pumps, and other fixed loads where belt loss is not a concern.

Veris has applied new technology to the H300, H600, and H800 models to achieve impressive improvement in turn-on levels. The Hawkeye H300 and H600 have the lowest turn-on current in the industry at a mere 0.15 A!

## SPECIFICATIONS

Sensor Power	N.O models: Induced from monitored current; H800NC: 5 to 30 Vdc, permanently connected
Insulation Class	600 Vac RMS (UL), 300 Vac RMS (CE)
Frequency Range	50/60 Hz, On/Off status for Variable Frequency Drive (VFD) outputs at 12 to 115 Hz (a)
Temperature Range: H800NC, H300, H900	-15 to 60 °C (5 to 140 °F)
H600	-15 to 40 °C (5 to 104 °F) (to 200 A);
H800, H800HV	-15 to 60 °C (5 to 140 °F) (to 150 A) -40 to 50 °C (-40 to 122 °F) (to 200 A); -40 to 75 °C (-40 to 167 °F) (to 100 A, and 0.25 A status output)
Humidity Range	10 to 90% RH non-condensing
Off State Leakage (H800NC Only)	34 µA @ 5 Vdc, 200 µA @ 30 Vdc
On State Voltage Drop (H800NC Only)	1.9 Vdc (max.) @ 0.1 A

## Reliable

More reliable for status than relays across auxiliary contacts

## Installation flexibility

Removable mounting bracket provides installation flexibility

## Ideal for direct-drive units

Ideal for direct-drive units, unit vents, fan coil units, exhaust fans, and other fixed loads

## Flexibility

Bracket on H900 can be installed in three different configurations

## Low setpoint

Minimum trip point as low as 0.5 A (H608)...avoids the need for multiple wraps of the conductor through the sensor even on loads as small as 1/5 HP

## Quick installation

Split-core H300, H600 and H900 for fast retrofit installation

## APPLICATIONS

- Electrical load status
- Direct-drive units, exhaust fans, process motors, and other fixed loads
- Lighting run times and status
- VFD output On/Off status
- Direct-Drive units, unit vents, fan coil units, exhaust fans, and other fixed loads

Terminal Block Wire Size H600, H800, H900 H300	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> ); 22 to 16 AWG (0.3 to 1.3 mm <sup>2</sup> )
Terminal Block Torque H600, H800, H900 H300	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m); 7 in-lbs (0.8 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

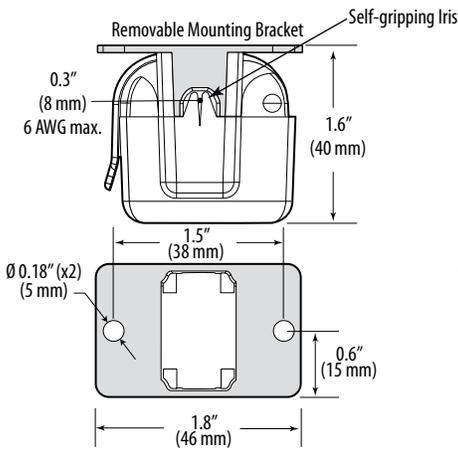
Agency approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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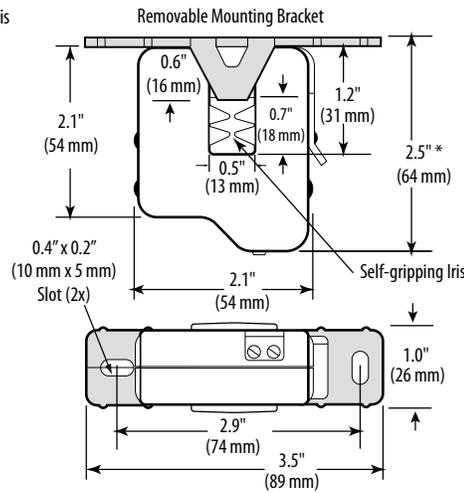
Note: Do not use the LED status indicators as evidence of applied voltage.

(a) VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.

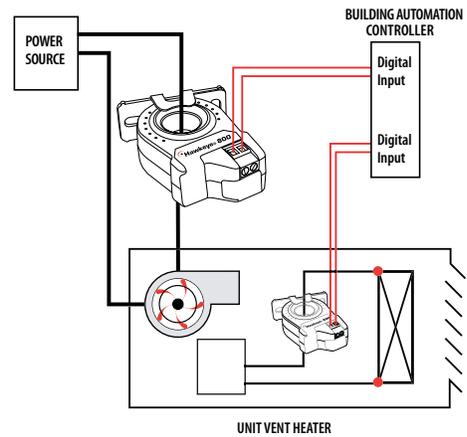
**H300**  
Dimensional Drawing



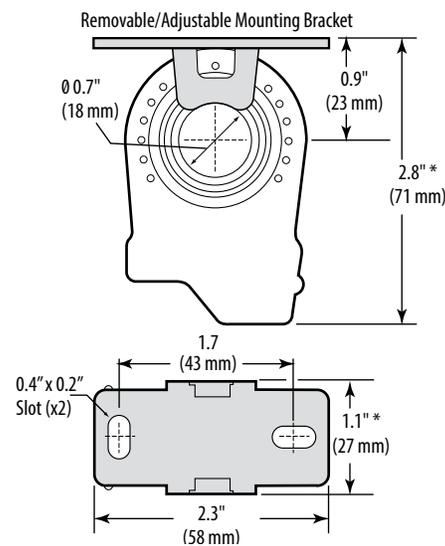
**H600**  
Dimensional Drawing



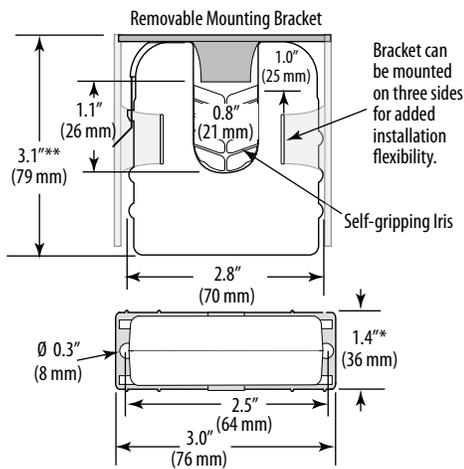
**UNIT VENT HEATER CONTROL**  
Wiring Diagram



**H800, H800HV, H800NC**  
Dimensional Drawing



**H900**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE @ 50/60 HZ ONLY	STATUS OUTPUT (MAX.)	TRIP POINT	HOUSING	UL	CE	LEAD FREE
H300	0.15 to 60 A	N.O. 1.0 A @ 30 Vac/dc	0.15 A or less	Split-core	• <sup>2</sup>	•	
H600	0.15 to 200 A	N.O. 1.0 A @ 30 Vac/dc	0.15 A or less	Split-core	• <sup>1</sup>	•	
H800	0.25 to 200 A	N.O. 1.0 A @ 30 Vac/dc	0.25 A or less	Solid-core	• <sup>1</sup>	•	
H800NC	0.5 to 200 A	N.C. 0.1 A @ 30 Vdc	0.5 A or less	Solid-core	• <sup>1</sup>		•
H800HV	0.75 to 200 A	N.O. 0.5 A @ 250 Vac/dc	0.75 A or less	Solid-core	• <sup>3</sup>		
H900	1.5 to 200 A	N.O. 1.0 A @ 30 Vac/dc	1.5 A or less	Split-core	•	•	

- Listed for use on 75°C insulated conductors.
- Product provides functional insulation only.
- Listed for use on 90°C insulated conductors.

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## HX08 SERIES & H701

Detect Belt Loss, Coupling Shear, and Mechanical Failure



Hx08 Series and H701 adjustable current switches offer high performance, with a wide array of amperage range options. These products can accurately detect belt loss, coupling shear, or other mechanical failure on unit vents, exhaust fans, recirculation pumps, and other fixed loads down to as little as 1/5 HP.

### SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS (UL), 300VAC RMS (CE)
Frequency Range <sup>2</sup>	50/60 Hz, On/Off status for Variable Frequency Drive (VFD) outputs at 12 to 115 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% (typical)
Terminal Block Wire Size	H308: 22-16 AWG (0.3 to 1.3 mm <sup>2</sup> ) Others: 24-14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	H308: 3.5 to 7 in-lbs (0.8 N-m) Others: 3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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### Retrofit or new construction

High performance devices in split- and solid-core housings

### Small size

Fits easily inside small enclosures

### Adjustable trip point

Precise current trip point setting

### Self-gripping iris

Self-gripping iris on split-core housings for easy installation

### Low setpoint

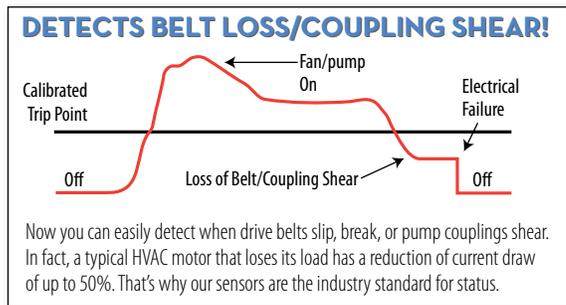
Minimum trip point as low as 0.5 A (H608)...no need for multiple wraps of the conductor through the sensor, even on loads as small as 1/5 HP

### Status LEDs

Status LEDs available for easy setup and local indication

### APPLICATIONS

- Detecting belt loss, coupling shear, and mechanical failure
- Monitoring status of industrial process equipment
- Verifying lighting circuit and other electrical service run times
- Monitoring status of critical motors (compressor, fuel, etc.)
- VFD output on/off status



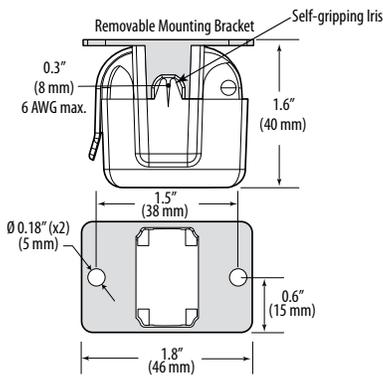
Notes: Do not use the LED status indicators as evidence of applied voltage.

If using this switch in an application that includes an electronically commutated motor (ECM), see Veris Application Note VN61, at [www.veris.com](http://www.veris.com).

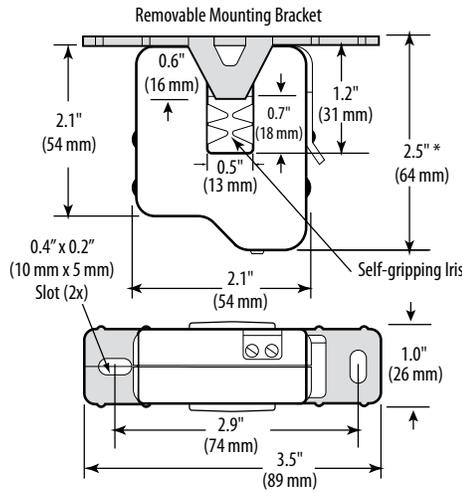
VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.



**H308**  
Dimensional Drawing

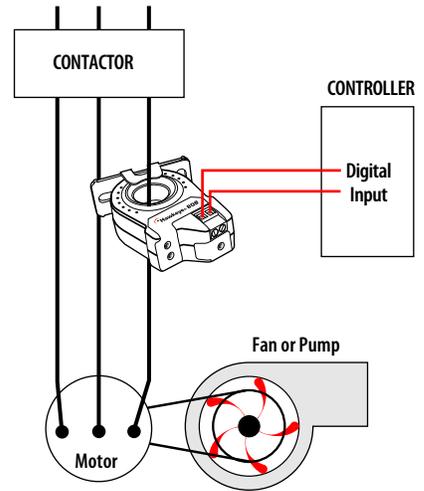


**H608**  
Dimensional Drawing

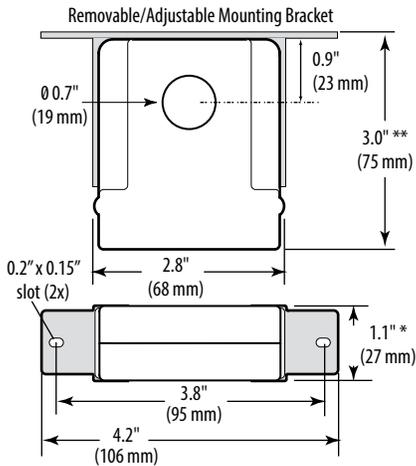


**MONITORING FAN /PUMP MOTORS FOR POSITIVE PROOF OF FLOW**

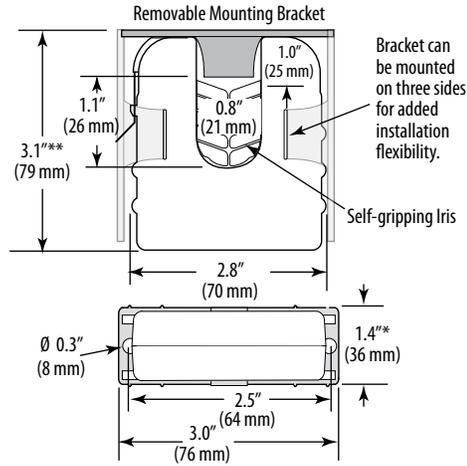
Wiring Diagram



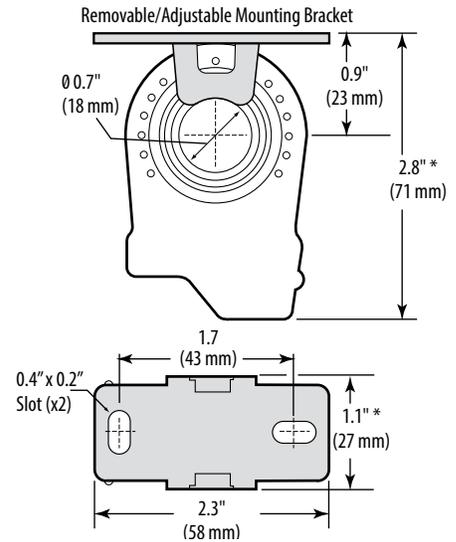
**H708/701**  
Dimensional Drawing



**H908**  
Dimensional Drawing



**H808**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE @ 50/60 HZ ONLY	STATUS OUTPUT (MAX.)	MIN. TRIP POINT	HOUSING	STATUS LED	UL	CE
H308	0.75 to 50 A	N.O. 1.0 A @ 30 Vac/dc	0.75 A or less	Split-Core	•	• <sup>2</sup>	•
H608	0.5 to 175 A		0.5 A or less	Split-Core	•	• <sup>1</sup>	•
H701	1 to 135 A		1.0 A or less	Solid-Core	•	•	
H708	1 to 135 A		1.0 A or less	Solid-Core	•	•	
H808	0.75 to 50 A		0.75 A or less	Solid-Core	•	•	•
H908	2.5 to 135 A		2.5 A or less	Split-Core	•	•	•

1. Listed for use on 75 °C insulated conductors.  
2. Product provides functional insulation only.



## HX09 SERIES

Detect Belt Loss, Coupling Shear, and Mechanical Failure



Hawkeye x09 Series are high performance current switches, ideal for line voltage loads. The devices are powered by the current being monitored. They are ideal for monitoring performance on unit vents, exhaust fans, recirculation pumps, and other fixed loads.

### SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS (UL), 300 Vac RMS (CE <sup>1</sup> )
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% (typical)
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use the LED status indicators as evidence of applied voltage.  
If using this switch in an application that includes an electronically commutated motor (ECM), see Veris Application Note VN61, at veris.com.

### Low setpoint

The H809 has a low (0.75 A) minimum setpoint...no need for multiple wraps of the conductor through the sensor, even on loads as small as 1/5 HP

### Small in size

H609 and H809 are small in size to fit easily inside small starter enclosures

### Versatility

Removable mounting bracket optimizes field versatility

### APPLICATIONS

- Detecting belt loss, coupling shear, mechanical failure, and interlocking loads
- Verifying lighting circuit and other electrical service run times
- Monitoring status of industrial process equipment
- Monitoring status of critical motors (compressor, fuel, etc.)
- VFD output On/Off status
- Fan/pump status monitoring

### Adjustable trip point

Precise current trip point setting

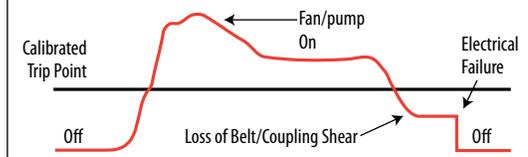
### Status LEDs

For easy setup and local indication

### Flexibility

Bracket on H909 can be installed in three different configurations

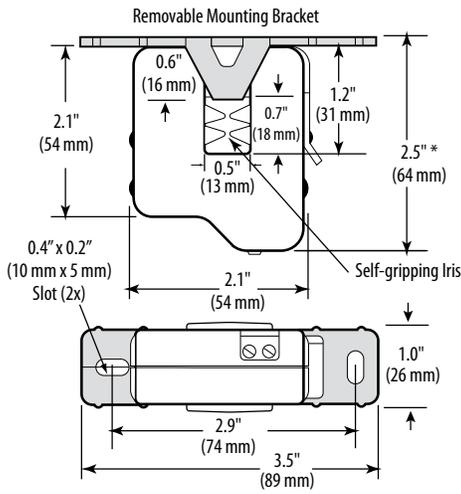
### DETECTS BELT LOSS/COUPLING SHEAR!



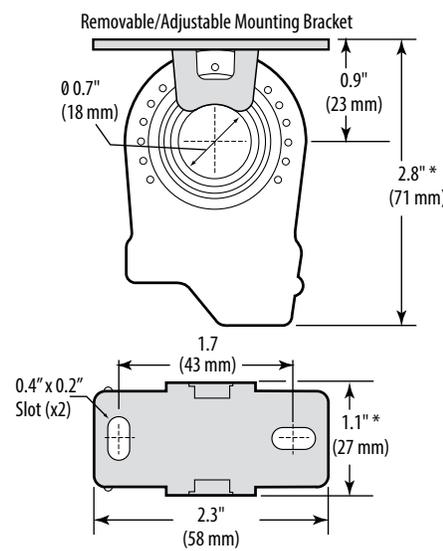
Now you can easily detect when drive belts slip, break, or pump couplings shear. In fact, a typical HVAC motor that loses its load has a reduction of current draw of up to 50%. That's why our sensors are the industry standard for status.



**H609**  
Dimensional Drawing

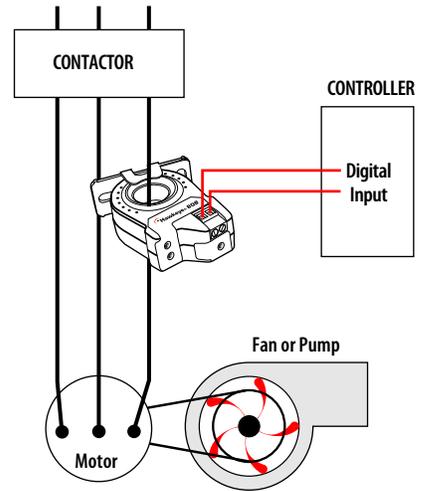


**H809**  
Dimensional Drawing

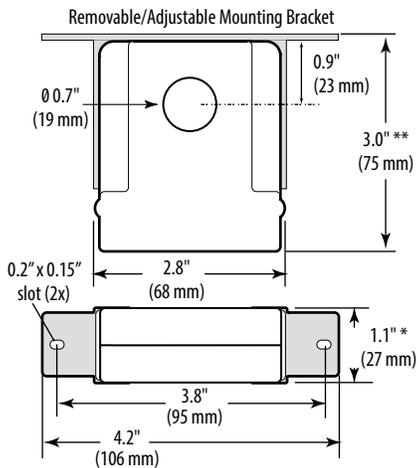


**MONITORING FAN /PUMP MOTORS FOR POSITIVE PROOF OF FLOW**

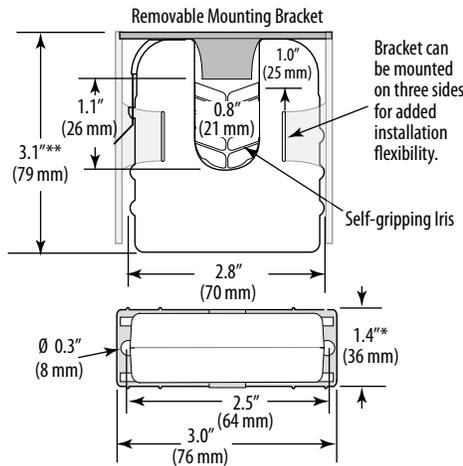
Wiring Diagram



**H709/H709HV**  
Dimensional Drawing



**H909/H909HV**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.

\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE @ 50/60 HZ ONLY	STATUS OUTPUT (MAX.)	MIN. TRIP POINT	STATUS LED	HOUSING	UL	CE	LEAD FREE
H609	1.25 to 50 A	N.O. 0.2 A @ 120 Vac/dc	1.25 A or less	•	Split-core	• <sup>1</sup>		•
H709	1 to 135 A	N.O. 0.2 A @ 120 Vac/dc	1.0 A or less	•	Solid-core	•		
H709HV	1 to 135 A	N.O. 1.0 A @ 250 Vac	1.0 A or less		Solid-core		•	
H809	0.75 to 50 A	N.O. 0.2A @ 120 Vac/dc	0.75 A or less	•	Solid-core	• <sup>1</sup>		•
H909	2.5 to 135 A	N.O. 0.2 A @ 120 Vac/dc	2.5 A or less	•	Split-core	•		
H909HV	2.5 to 135 A	N.O. 1.0A @ 250 Vac	2.5 A or less		Split-core		•	

1. Listed for use on 75°C insulated conductors.



# HX06 SERIES

Detect Belt Loss, Coupling Shear, and Mechanical Failure



Hawkeye x06 Series solid- and split-core current switches provide accurate, reliable, and maintenance-free fan and pump status indication where an NC output is needed.

## SPECIFICATIONS

Sensor Power	5 to 30 Vdc
Insulation Class	600 Vac RMS (UL), 300 Vac RMS (CE)
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% Typical
Off State Leakage	34 µA @ 5 Vdc, 200 µA @ 30 Vdc
On State Voltage Drop	1.9 Vdc max@ 0.1 A
Terminal Block Wire Size	H300: 22 to 16 AWG (0.3 to 1.3 mm <sup>2</sup> ) Others: 24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	H300: 7 in-lbs (0.8 N-m) Others: 3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use the LED status indicators as evidence of applied voltage. (a) VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.

## Adjustable trip point

Versatility with four available amperage ranges

## No tubing needed

Easier to install than differential pressure switches

## 100% solid-state

No moving parts to fail

## APPLICATIONS

- Monitoring fans, pumps, motors, and other electrical loads for proper operation
- Detecting belt loss and motor failure...ideal for fan and pump status
- Verifying lighting circuit loads
- Monitoring critical motors (compressor, fuel, etc.)
- Monitoring industrial process equipment status (OEM)

## Status LEDs

Output status LEDs for fast set up

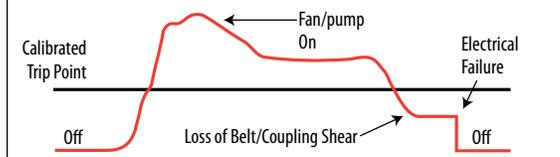
## Easy placement

Adjustable mounting bracket on the solid-core housing

## Self-gripping iris

Self-gripping iris on split-core housings for easy installation

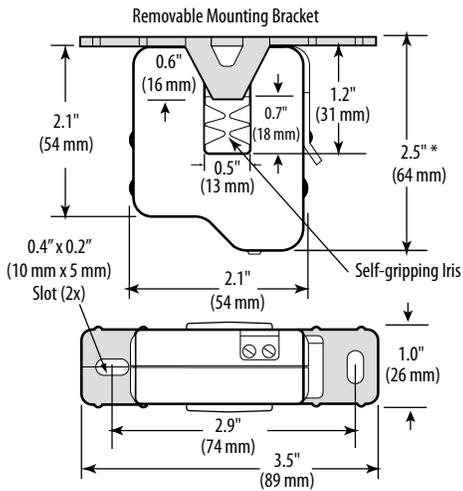
### DETECTS BELT LOSS/COUPLING SHEAR!



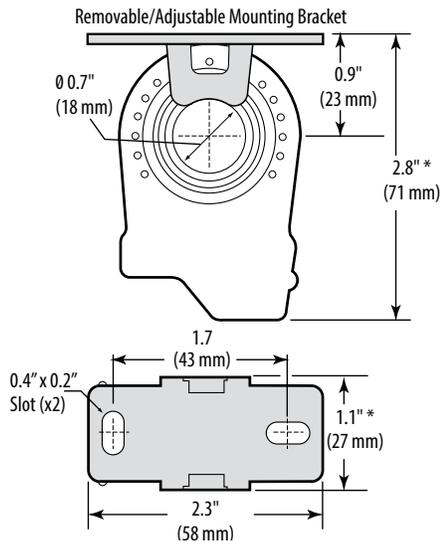
Now you can easily detect when drive belts slip, break, or pump couplings shear. In fact, a typical HVAC motor that loses its load has a reduction of current draw of up to 50%. That's why our sensors are the industry standard for status.



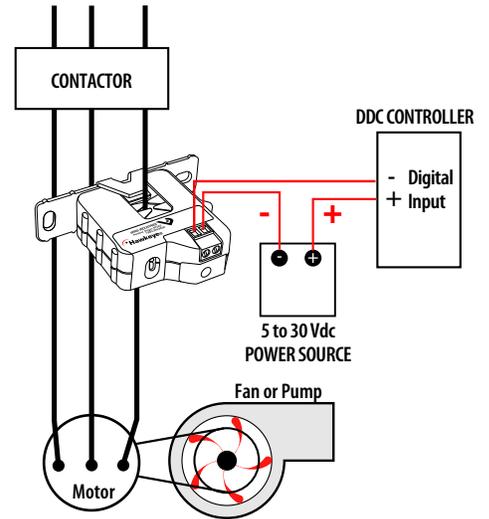
**H606**  
Dimensional Drawing



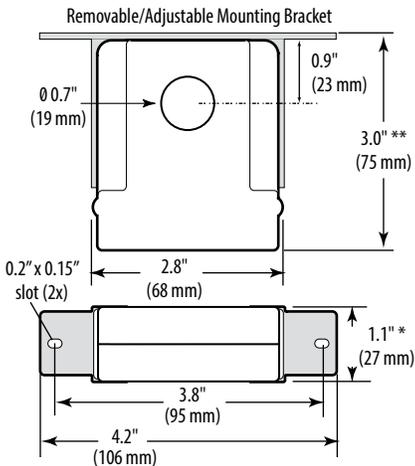
**H806**  
Dimensional Drawing



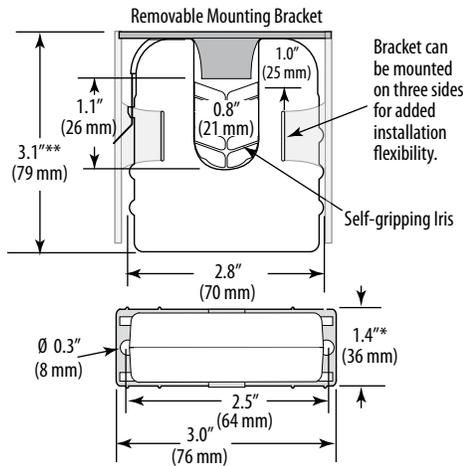
**MONITORING FAN/PUMP MOTORS FOR POSITIVE PROOF OF FLOW (H606 & H806)**  
Wiring Diagram



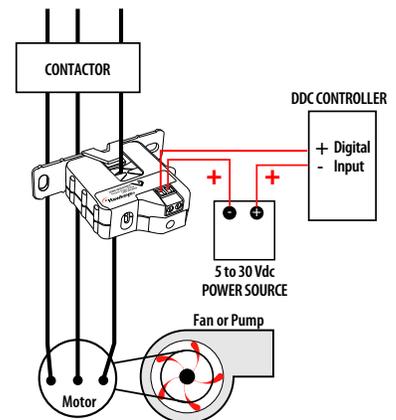
**H706**  
Dimensional Drawing



**H906**  
Dimensional Drawing



**MONITORING FAN/PUMP MOTORS FOR POSITIVE PROOF OF FLOW (H706 & H906)**  
Wiring Diagram



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT (MAX.)	MIN. TRIP POINT	HOUSING	STATUS LED	UL	CE
H606	1.25 to 50 A	N.C. 0.1 A @ 30 Vdc	1.25 A or less	Split-Core	•	• <sup>1</sup>	•
H706	1 to 135 A		1.0 A or less	Solid-Core	•	•	•
H806	0.75 to 50 A		0.75 A or less	Solid-Core	•	•	•
H906	2.5 to 135 A		2.5 A or less	Split-Core	•	•	•

1. Listed for use on 75°C insulated conductors.

# H11D

## LCD Display



H11D



The Hawkeye TruStat H11D is a microprocessor based, self-learning, self-calibrating current switch. It is designed for user ease, providing calibration-free status for both under and overcurrent, an LCD display, and slide-switch selectable trip point limits. At initial power-up, the H11D automatically learns the average current on the line with no action required by the installer. Once a current is learned, the switch monitors for changes in current greater than the selected range.

### SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Response Time	1 sec.
Accuracy	±2% of full scale
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
LCD Backlight	Off at low currents; illuminates when monitored current exceeds 4.5 A; flashes during an alarm state while current remains above 4.5 A
On-State Resistance	≤1.0 Ω
Off-State Resistance	≥1.0 MΩ
Setpoint Target Range, Switch Setting A <sup>1</sup>	±40% of learned nominal current; max. learned current of 142 A to enable an upper trip limit at or below 200 A
Setpoint Target Range, Switch Setting B <sup>1</sup>	±60% of learned nominal current; max. learned current of 125 A to enable an upper trip limit at or below 200 A
Switch Setting C <sup>1</sup>	On/Off Status; contacts are closed while amperage is above 2.5 A
Alarm Reset Range <sup>2</sup>	±5% of learned nominal current
Setpoint Calibration Learn Period	30 sec.; self-learning, pushbutton reset
Normal-to-Alarm Output Delay	1 sec. maximum
Alarm-to-Normal Output Delay	30 sec. nominal

### Backlit LCD

View the monitored current (up to 200 A)...no need for expensive handheld meters and offers easy visibility in dark enclosures

### Simplified troubleshooting

Records and displays the amperage level that trips the alarm

### Microcontroller-based learning technology

Automatically learns load upon initial power-up...minimizes calibration labor

### Versatility

Slide-switch selectable trip point limits

### Automatic calibration

Reduced errors and installation costs

### Reset function

Reset function can be used when unpowered...reduces the possibility of an arc flash incident

### APPLICATIONS

- HVAC fans, pumps, and blowers
- Monitoring status of industrial process equipment

Insulation Class	600 Vac RMS (UL); 300 Vac RMS (CE)
Hysteresis	10% (typical)
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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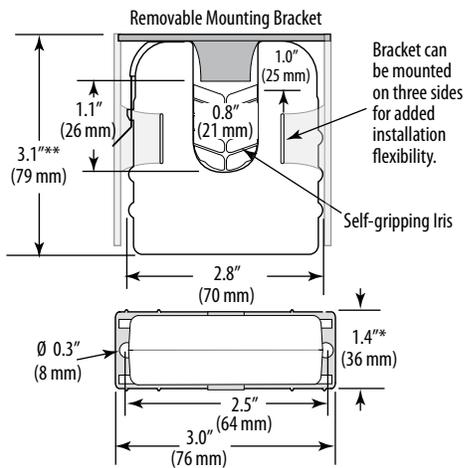
1. Trip point switch positions A and B are not for use in applications where the current will fluctuate by more than 40% (A) or 60% (B) of the nominal current. If the current will fluctuate by more than 60%, use the H11D for on/off status (position C) only.
2. The upper trip limit alarm resets when the current drops by 5% of the learned nominal current limit. The lower trip limit alarm resets when the current rises by 5% of learned nominal current limit.

Specification Note: For CE compliance, conductor shall be insulated according to IEC 61010-1

Do not use the LCD as evidence of applied voltage.

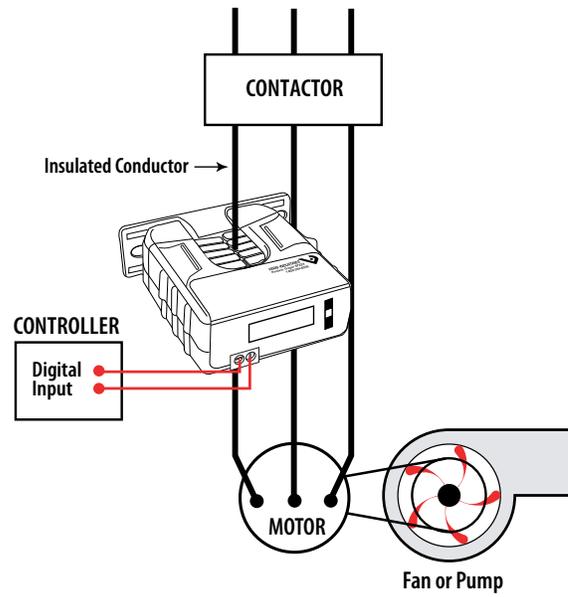


**DIMENSIONAL DRAWING**

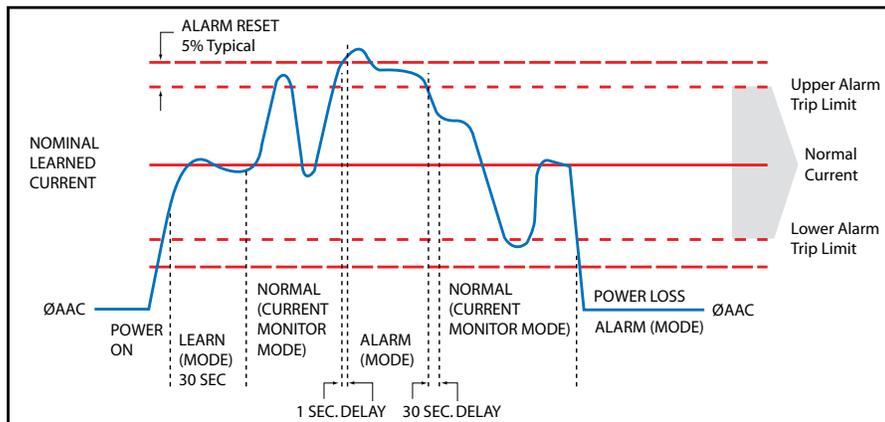


\* Terminal block may extend up to 1/8" over the height dimensions shown.

**WIRING DIAGRAM**



**FUNCTIONAL DRAWING**



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE <sup>1</sup>	STATUS OUTPUT	NOMINAL TRIP POINT TARGET RANGE	HOUSING	STATUS LED	UL	CE
H11D	2.5 to 200 A @ 60 Hz 3.0 to 200 A @ 50 Hz	N.O. 1.0 A @ 30 Vac/dc	±40%, ±60%, or on/off (user selectable)	Split-core	•	• <sup>2</sup>	•

1. To enable the upper trip limit alarm, the max. learned current for switch setting "A" is 142 A, and the max. learned current for switch setting "B" is 125 A. Switch setting "C" is for on/off status only, so the upper trip limit alarm does not apply.  
 2. Listed for use on 75 °C insulated conductors.



# H614

Automatically Learns At Initial Power-Up



H614



The Hawkeye H614 is a microprocessor based, self-learning, self-calibrating current-sensitive switching device designed for use with VFD systems. At initial power-up, the H614 automatically learns the average current on the line with no action required by the installer. Once a current is learned, the switch monitors for changes in current greater than  $\pm 20\%$  of the learned load. When calibrated for a given VFD system, the H614 is tolerant of gradual drifts in frequency due to expected conditions, such as an accumulation of debris in a filter, while still detecting a sudden drop due to a potential abnormal system condition (e.g., belt loss or other mechanical failure).

## SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Response Time	1 sec.
Learn Time	15 sec. learn period after frequency stabilizes
Frequency Range in Conductor	12 to 115 Hz <sup>1</sup>
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Alarm Limits	$\pm 20\%$ of learned current in every 5 Hz freq. band <sup>2</sup>
Normal-to-Alarm Status Output Delay	Approx. 7 sec.
Alarm-to-Normal Status Output Delay	1 sec. nominal <sup>3</sup>
Off Delay	<30 sec. nominal
Contact Ratings	30 Vac/dc, 1 A
Insulation Class	600 Vac (UL); 300 Vac RMS (CE)
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## Microcontroller based learning technology

Automatically learns load upon initial power-up...minimizes calibration labor

## Automatic trip point

Automatic trip point (1.5 to 150 Amps, 12 to 115 Hz)...detect abnormal events

## Under- and over-load

Microcontroller based learning technology...automatically learns load

## APPLICATIONS

- Monitoring fans, pumps, motors, and other electrical loads for proper operation
- Detecting belt loss and motor failure...ideal for fan and pump status
- Verifying lighting circuit loads
- Monitoring critical motors (compressor, fuel, etc.)
- Monitoring industrial process equipment status (OEM)

## Saves space

Small size fits easily inside small starter enclosures

## 100% solid state

100% solid state...no moving parts to fail

## Flexibility

Removable mounting bracket for installation flexibility

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL508 open device, CE: EN61010-1, CAT III, Pollution Degree 2
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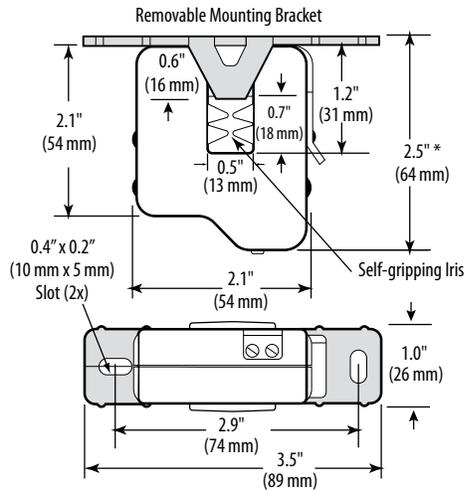
1. VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.
2. The H614 is not intended for use in applications where the current is expected to fluctuate by more than 20% due to acceptable causes other than VFD driven changes.
3. If the H614 experiences a momentary loss of power, the Alarm-to-Normal output delay may exceed 1 sec.

Specification Note: For CE compliance, conductor shall be insulated according to IEC 61010-1

The product design provides for basic insulation only. Use wire with minimum 75°C rated insulation. Do not use the LED status indicators as evidence of applied voltage. This sensor detects abnormal operation by looking for sudden changes in current across the entire frequency range. In Learn mode, the sensor calculates a margin 20% above and 20% below the learned frequency curve. An abnormal condition in the circuit is one that falls outside this margin.

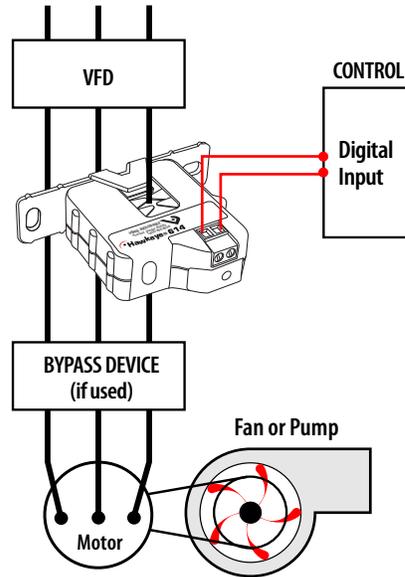


**DIMENSIONAL DRAWING**



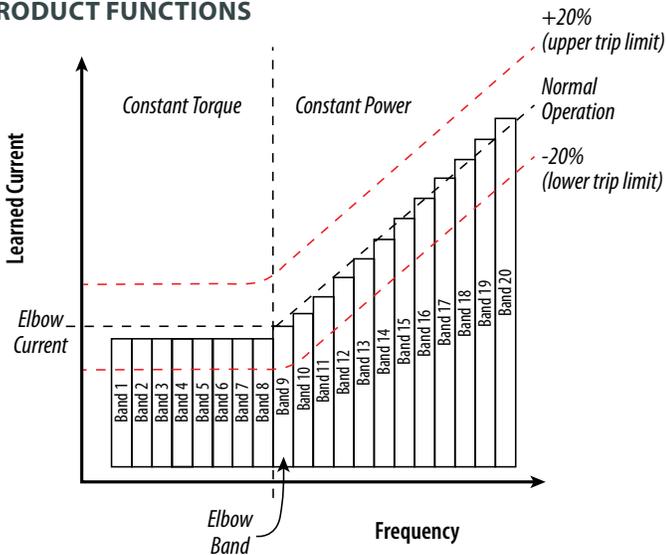
\* Terminal block may extend up to 1/8" over the height dimensions shown.

**WIRING DIAGRAM**



NOTE: The H614 is not intended for use in staged pump, variable inlet vane, and other applications in which the amperage changes under normal operation, independent of frequency. NOTE: (Optional) For added sensitivity in detecting amperage changes, use H614 devices on all three phases of the VFD

**PRODUCT FUNCTIONS**



**HOW IT WORKS**

During setup, the H614 automatically determines the normal amperage and frequency profile and stores it in memory. Then the microprocessor monitors for amperage changes greater than  $\pm 20\%$  of this learned curve, indicating a potential system failure.

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	FREQUENCY RANGE	STATUS OUTPUT	NOMINAL TRIP POINT TARGET RANGE	HOUSING	STATUS LED	UL	CE
H614	1.5 to 150 A <sup>1</sup>	12 to 115 Hz	N.O. 1.0 A @ 30 Vac/dc	$\pm 20\%$ in each of 20 bands	Split-core	•	• <sup>2</sup>	•

1. If the current is above 1.5 A, but neither LED is illuminated, the H614 is considered to be in on/off status mode.  
 2. Listed for use on 75°C insulated conductors.

**USAGE EXAMPLE**

The H614 is designed for HVAC fan and blower systems, as well as some single stage pumping systems involving consistent viscosity liquids. If an H614 is installed on one phase of the VFD, it detects changes in that phase that result from the VFD compensating for changes elsewhere in the system. Alternatively, for increased sensitivity, H614s can be used on all three phases for immediate detection of phase balance changes anywhere in the system.

SENSOR MODE		STATUS LED BLINK PATTERN	CONTACTS
Learning Mode (first 15 sec of operation after frequency stabilizes)		Alternating Red/Green (1 per sec.)	Closed
On/Off Status only	Learn mode incomplete. VFD system does not meet abnormal condition detection criteria	Green blink (5 times per sec. after 15 sec of stable frequency)	Closed
	Current is not adequate for the device to detect abnormal conditions	No LED	Closed
Status OK		Green blink (1 per sec.)	Closed
Alarm		Red blink (1 per sec.)	Open



# H720, H904 & H934

## Variable Frequency Drive Monitoring and Control

Also see H614.



U.S. Patent No. 5,705,989

Hawkeye 720, 904 and 934 current monitoring devices provide unique solutions for accurately monitoring status of motors controlled by variable frequency drives.

The microprocessor-based H904 and H934 store the sensed amperage values for normal operation at various frequency ranges in non-volatile memory. This information allows the device to distinguish between a reduced amp draw due to normal changes in the frequency and an abnormal amp drop due to belt loss or other mechanical failures. The relay on the H934 is isolated from the current switch, and all relay connections are externally accessible on the device.

The H720 analog output corresponds to current in the monitored conductor from 10 to 80 Hz.

### SPECIFICATIONS

Sensor Power	H904/H934: Induced from monitored conductor; H720: 12 to 30 Vdc
Insulation Class	600 Vac RMS
Frequency Range:	
H720	10 to 80 Hz;
H904/H934	20 to 34 Hz for on/off status, 34 to 75 Hz for belt loss indication On/Off status for Variable Frequency Drive (VFD) outputs <sup>1</sup>
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Off Delay (H904/H934)	0 sec to 2 min.
Accuracy (H720)	0.5% of 200 A (combined linearity, hysteresis, and repeatability)

### Load side monitoring

Suitable for load side monitoring of VFDs (H720)

### Precise scaling

Adjustable zero and span for precise scaling (H720)

### 0.5% accuracy

Accurate to 0.5% of full scale (H720)

### Automatically compensates

Automatically compensates for the effects of frequency and amperage changes in monitored conductor associated with VFDs (H901/934)

### Nuisance reduction

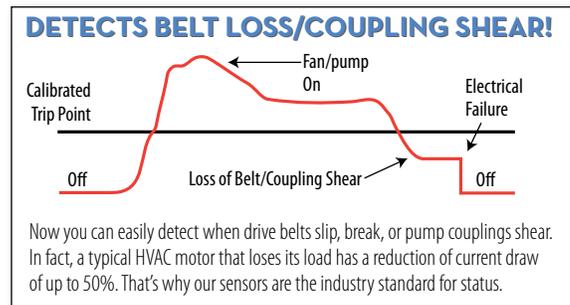
Provides a secondary setpoint option of 50% of the originally measured current (H901/934)

### Rapid troubleshooting

LED indicates normal and alarm conditions (H901/934)

### APPLICATIONS

- Monitoring positive status on motors controlled by variable frequency drives
- Replacing pressure switches
- Measuring current and load trending



Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing CAT III, Pollution Degree 2, basic insulation
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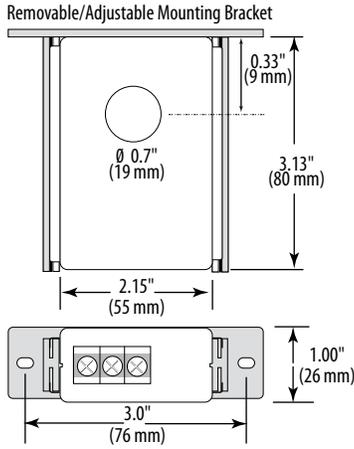


Note: Do not use the LED status indicators as evidence of applied voltage.

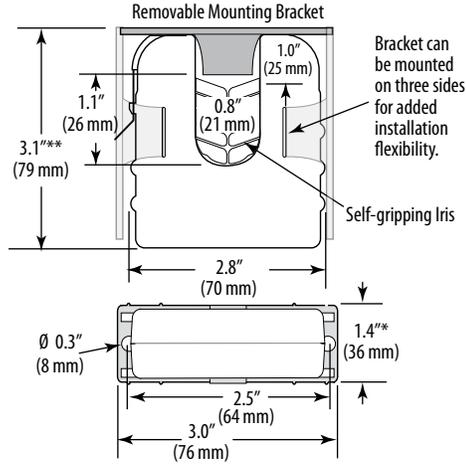
1. VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.



**H720**  
Dimensional Drawing



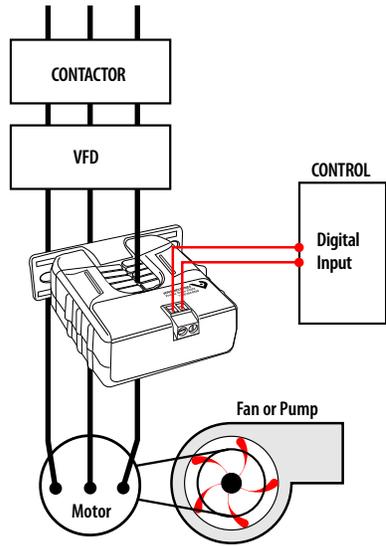
**H904/934**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.

**MONITORING FAN /PUMP MOTORS FOR POSITIVE PROOF OF FLOW**

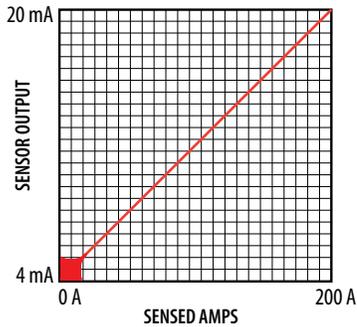
Wiring Diagram



Note: The H904 is not intended for use in staged pump or variable inlet vane applications.

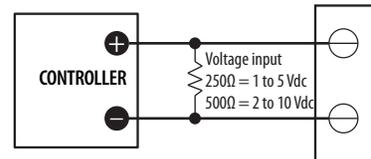
**EXAMPLE LINEAR OUTPUT (H720)**

Scale software as shown  
Requires 12 to 30 Vdc for sensor power



H934 Relay Contact Ratings		
Resistive - 5A @ 250 Vac, 30 Vdc		
Typical Coil Performance		
Voltage	AC	DC
24V	10 mA	10 mA

Voltage Output



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT	MIN. TRIP POINT	RELAY TYPE	HOUSING	STATUS LED	RELAY POWER LED	UL
H720	Lower limit: 0 A Upper limit: 20 to 200 A	4 to 20mA	n/a	none	Solid-core	•	•	•
H904	3.5 to 135 A, 20 to 75 Hz	Max. N.O. 0.1 A @ 30 Vac/dc	3.5 A or less	none	Split-core	•	•	•
H934				SPST, N.O.		•	•	•

Note: For auto-calibrating model see H614.



# H6ECM

Split-core Current Switch, Proof of Rotation (Flow) for ECM Systems



H6ECM05



The H6ECM is a current-sensitive switching device that monitors current (amperage) in the conductor passing through it. A change in amperage in the monitored conductor that crosses the switch (setpoint) causes the resistance of the FET status output to change state, similar to the action of a mechanical switch. The status output is suitable for connection to building controllers or other appropriate data acquisition equipment operating at up to 30 V. The product requires no external power supply to generate its output.

Electrically Commutated Motors (ECMs) are increasingly common as more energy conservation measures are implemented. The ECM is a brushless DC motor that is supplied AC power, converts that power to DC current and uses electronic switching to control the motor rotation. The ECM motor shaft speed can be reduced to save energy, resulting in lower cost and less component wear. The H6ECM is optimized to provide meaningful proof of rotation which verifies that the ECM motor is operating as expected.

## SPECIFICATIONS

Sensor Power	Induced from the monitored conductor
Insulation Class	600 Vac RMS
Frequency Range	60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% typical
Accuracy	±10%
Amperage Range	0.5 to 175 A continuous
Status Output Ratings	N.O. 1.0A @ 30 Vac/dc, not polarity sensitive
Setpoint	0.5 A (keep alive current < 0.5 A)
Off State Resistance	Open switch represents > 1 MΩ
On State Resistance	Closed switch represents < 200 mΩ

## High performance

High performance device, split-core housing

## Self-gripping iris

Self-gripping iris for easy installation

## Precise

Precise current trip point setting

## Status LEDs

Status LEDs for easy setup and local indication

## Small size

Fits easily inside small enclosures

## Up to 1 Amp status output

Increased application flexibility

## APPLICATIONS

- Systems with Electrically Commutated Motors such as cooling fans or compressor motors with off-state (keep alive) current less than 0.5 A

Terminal Block Max. Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL508 open device listing
Installation Category	CAT III, Pollution Degree 2



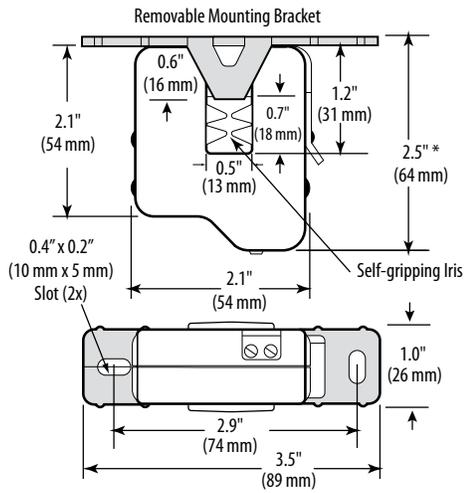
Notes: For applications requiring double or reinforced insulation, please contact the factory.

The product design provides basic insulation only.

Do not use the LED indicators as evidence of applied voltage.

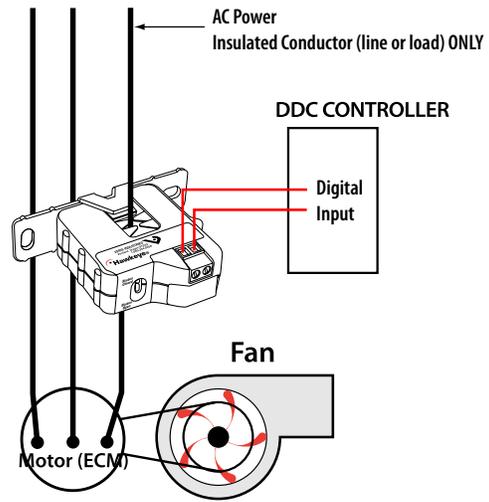


**DIMENSIONAL DRAWING**



\* Terminal block may extend up to 1/8" over the height dimensions shown.

**WIRING DIAGRAM**



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT	TRIP POINT	STATUS LED	UL
H6ECM05	0.5 to 175 A	N.O. 1.0 A @ 30 Vac/dc	0.5 A	•	•



# HX30/40/50 SERIES

On/Off Status and Control in One Package



The Hawkeye Relay Combination Series combines an on/off status sensor and command relay in one package, saving the labor, wire runs, and space required to mount a separate relay. The switch and relay (not electrically connected) are in the same housing, saving space and cost. It is ideal for monitoring and controlling motors where belt loss is not a concern.

## SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use the LED status indicators as evidence of applied voltage.

## On/off status

On/off status and command relay in a single labor and space saving device

## SPDT command relay

H740 and H940 feature a SPDT command relay

## Detect belt loss

Cost-effectively monitor start/stop, unit vents, fan coils, exhaust fans, and other loads where belt loss is not a concern

## No tubing necessary

Easier to install than differential pressure switches

## Easy setup

No calibration required...easy setup and operation

## APPLICATIONS

- Monitoring direct drive units, exhaust fans, and other fixed loads
- Monitoring on/off status of electrical loads
- Starting/stopping motors

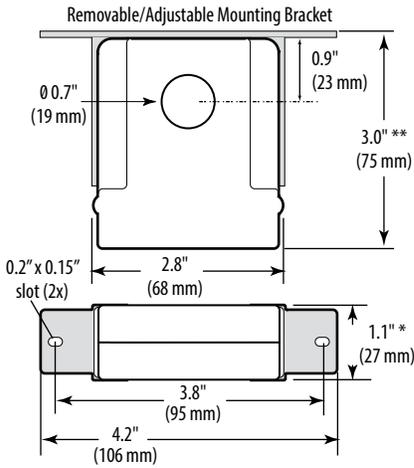
### RELAY CONTACT RATINGS

Hx30, Hx50 (SPST, N.O.)		
Resistive	10 A @ 250 Vac, 30 Vdc	
Inductive	5 A @ 250 Vac, 30 Vdc	
Hx40 (SPDT)		
Resistive	8 A @ 250 Vac, 30 Vdc	
Inductive	3.5 A @ 250 Vac, 30 Vdc	

### TYPICAL COIL PERFORMANCE

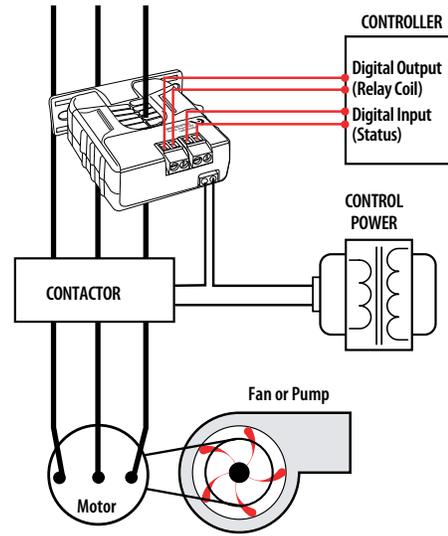
Voltage	TYPICAL COIL PERFORMANCE	
	AC	DC
24V	10 mA	10 mA
Pull In Voltage		
Hx30	20.1 Vdc	
Hx40	20.1 Vdc	
Hx50	8.4 Vdc	
Drop Out Voltage		
Hx30	5.2 Vdc	
Hx40	5.2 Vdc	
Hx50	3.0 Vdc	

**H730/740/750**  
Dimensional Drawing

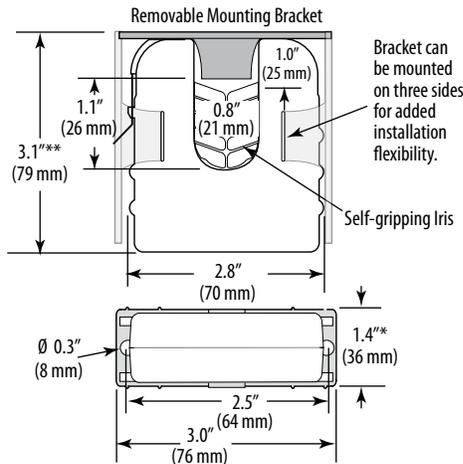


\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**START/STOP MONITORING OF FAN/PUMP MOTORS**  
Wiring Diagram

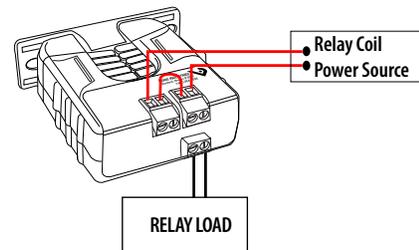


**H930/940/950**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.

**RELAY CONTROLLED DIRECTLY BY STATUS CONTACTS**  
Wiring Diagram



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT (MAX.)	TRIP POINT	RELAY	RELAY COIL	HOUSING	RELAY POWER LED	UL
H730	0.5 to 200 A	N.O. 1.0 A @ 30 Vac/dc	0.5 A or less	SPST, N.O.	24 Vac/dc	Solid-core	•	•
H740	0.5 to 200 A		0.5 A or less	SPDT	24 Vac/dc	Solid-core	•	•
H750	0.5 to 200 A		0.5 A or less	SPST, N.O.	12 Vdc nom.	Solid-core	•	•
H930	1.5 to 200 A		1.5 A or less	SPST, N.O.	24 Vac/dc	Split-core	•	•
H940	1.5 to 200 A		1.5 A or less	SPDT	24 Vac/dc	Split-core	•	•
H950	1.5 to 200 A		1.5 A or less	SPST, N.O.	12 Vdc nom.	Split-core	•	•

ACCESSORIES P. 279



# H735, HX38, HX48, HX58 SERIES

Status and Control in One Package



The Hawkeye Relay Combination Series is the ideal solution for the automation installer. These units combine a current switch and relay into a single package, reducing the space required for total control of fans and pumps. The current switch and relay operate independently of one another. These devices allow start/stop control and status monitoring with one device instead of two.

## SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% Typical
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use the LED status indicators as evidence of applied voltage.

## Combined relay & status

Combines command relay and fan/pump status sensor in a single, easy-to-install unit

## Fan & pump status

Detect belt loss and motor failure...ideal for fan and pump status

## Polarity insensitive

Polarity insensitive status outputs...fast and easy installation

## APPLICATIONS

- Starting/stopping and monitoring positive status of motors
- Detecting belt loss and coupling shear

## Two outputs

H748 and H948 feature a SPDT command relay...control two outputs with a single relay

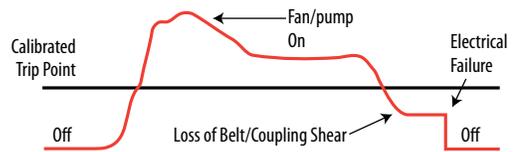
## Added flexibility

Bracket on H938, H948, and H958 can be installed in three different configurations

## Easy setup

Relay and status LEDs

### DETECTS BELT LOSS/COUPLING SHEAR!



Now you can easily detect when drive belts slip, break, or pump couplings shear. In fact, a typical HVAC motor that loses its load has a reduction of current draw of up to 50%. That's why our sensors are the industry standard for status.

### RELAY CONTACT RATINGS

H735 (SPST, N.O.)		
Resistive	5 A @ 250 Vac, 30 Vdc	
Inductive	3 A @ 250 Vac, 30 Vdc	
Hx38, Hx58 (SPDT N.O.)		
Resistive	10 A @ 250 Vac, 30 Vdc	
Inductive	5 A @ 250 Vac, 30 Vdc	
Hx48 (SPDT)		
Resistive	8 A @ 250 Vac, 30 Vdc	
Inductive	3.5 A @ 250 Vac, 30 Vdc	

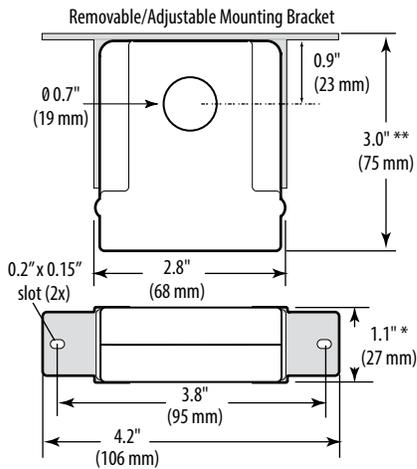
### TYPICAL COIL PERFORMANCE

Voltage	AC	DC
24V	10 mA	10 mA
12V (Hx58)		20 mA
Pull-in Voltage		
Hx3x	20.1 Vdc	
Hx48	20.1 Vdc	
Hx58	8.4 Vdc	
Drop-out Voltage		
Hx3x	5.2 Vdc	
Hx48	5.2 Vdc	
Hx58	3.0 Vdc	



**H735/738/748/758**

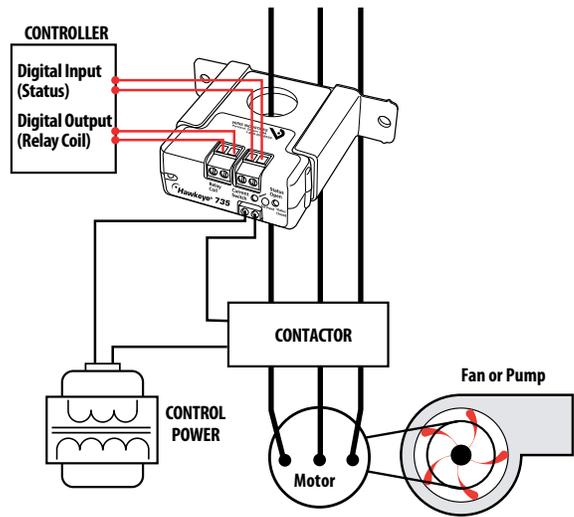
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

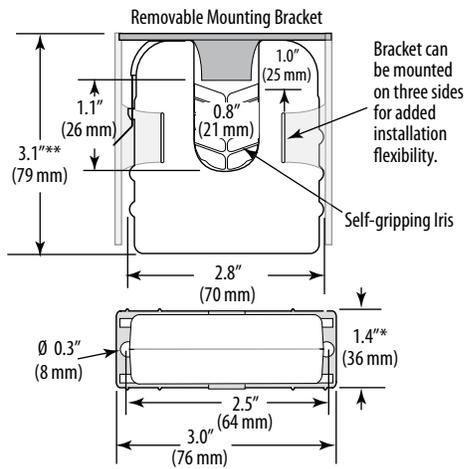
**START/STOP MONITORING OF FAN /PUMP MOTORS**

Wiring Diagram



**H938/948/958**

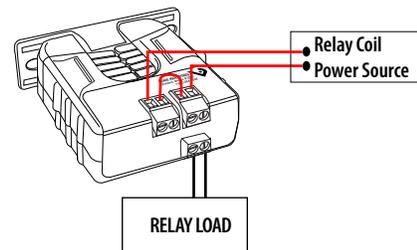
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**RELAY CONTROLLED DIRECTLY BY STATUS CONTACTS**

Wiring Diagram



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT (MAX.)	MIN. TRIP POINT	RELAY	COIL VOLTAGE	HOUSING	STATUS LED	RELAY POWER LED	UL	
H735	1 to 135 A	0.1 A @ 30 Vac/dc	1 A or less	SPST, N.O.	24 Vac/dc	Solid-core	•	•	•	
H738	1 to 135 A		1 A or less	SPST, N.O.	24 Vac/dc	Solid-core	•	•	•	
H748	1 to 135 A		1 A or less	SPDT	24 Vac/dc	Solid-core	•	•	•	
H758	1 to 135 A		1 A or less	SPST, N.O.	12 Vdc nom.	Solid-core	•	•	•	
H938	2.5 to 135 A		1.0 A @ 30 Vac/dc	2.5 A or less	SPST, N.O.	24 Vac/dc	Split-core	•	•	•
H948	2.5 to 135 A			2.5 A or less	SPDT	24 Vac/dc	Split-core	•	•	•
H958	2.5 to 135 A	2.5 A or less		SPST, N.O.	12 Vdc nom.	Split-core	•	•	•	

ACCESSORIES P. 279



# HX39, HX49 & HX59 SERIES

Status and Control in One Package



H939



H739



Hawkeye Relay Combination Series high voltage output current switches are the ideal solution for the automation installer. These units combine a current switch and relay into a single package, reducing the space required for total control of fans and pumps. The integrated current switch and relay operate independently of one another. All relay connections are externally available for maximum flexibility.

These products perform the functions of start/stop and status monitoring with one device instead of two.

## SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% Typical
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Agency Approvals	UL 508 open device listing, CAT III, Pollution Degree 2, basic insulation
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### AGENCY APPROVALS

Limited Warranty	5 years
------------------	---------



Do not use the LED status indicators as evidence of applied voltage.

## Combined relay & status

Combines command relay and fan/pump status sensor in a single, easy-to-install unit

## No tubing

Easier to install than differential pressure switches...no tubing needed

## Polarity insensitive

Polarity insensitive status outputs...fast and easy installation

## Detect belt loss

Detect belt loss & motor failure... ideal for fan and pump status

## Easy setup

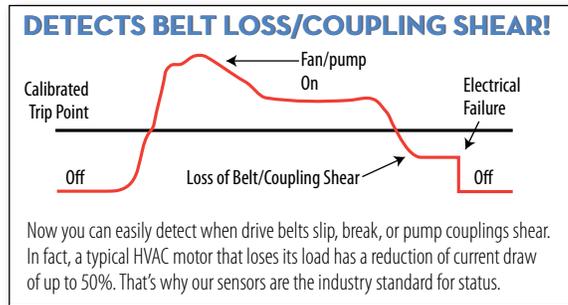
Relay and status LEDs

## Added flexibility

Bracket on H939, H949, and H959 can be installed in three different configurations

## APPLICATIONS

- Starting/stopping and monitoring positive status of motors
- Detecting belt loss and coupling shear



### Relay Contact Ratings

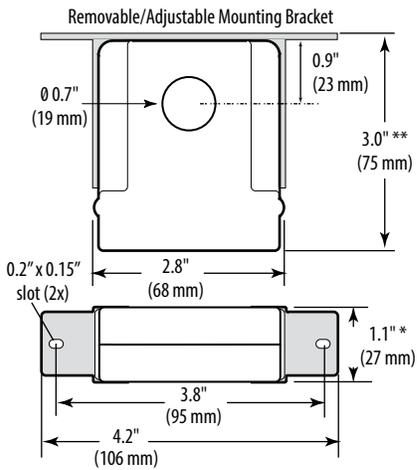
Hx39, Hx59 (SPST, N.O.)		
Resistive	10 A @ 250 Vac, 30 Vdc	
Inductive	5 A @ 250 Vac, 30 Vdc	
Hx38, Hx58 (SPDT)		
Resistive	8 A @ 250 Vac, 30 Vdc	
Inductive	3.5 A @ 250 Vac, 30 Vdc	

### Typical Coil Performance

Voltage	AC	DC
24V	10 mA	10 mA
12V (Hx58)		20 mA
Pull-in Voltage		
Hx39		20.1 Vdc
Hx49		20.1 Vdc
Hx59		8.4 Vdc
Drop-out Voltage		
Hx39		5.2 Vdc
Hx49		5.2 Vdc
Hx59		3.0 Vdc



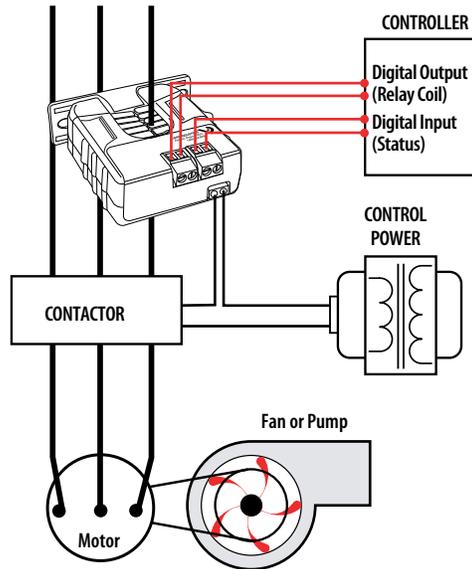
**H739/H749**  
Dimensional Drawing



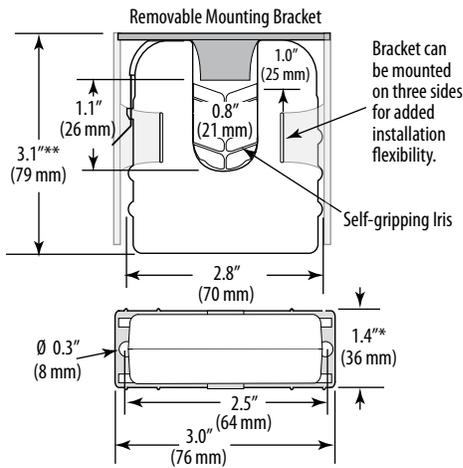
\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**START/STOP MONITORING OF FAN /PUMP MOTORS**

Wiring Diagram



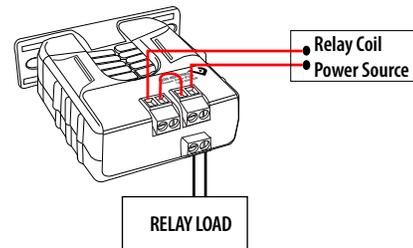
**H939/H949/H959**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**RELAY CONTROLLED DIRECTLY BY STATUS CONTACTS**

Wiring Diagram



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT (MAX.)	MIN. TRIP POINT	RELAY TYPE	RELAY COIL	HOUSING	STATUS LED	RELAY POWER LED	UL	
H739	1 to 135 A	N.O. 0.2 A @ 120 Vac/dc	1 A or less	SPST, N.O.	24 Vac/dc	Solid-core	•	•	•	
H749	1 to 135 A		1 A or less	SPDT	24 Vac/dc	Solid-core	•	•	•	
H939	2.5 to 135 A		2.5 A or less	SPST, N.O.	24 Vac/dc	Split-core	•	•	•	
H949	2.5 to 135 A		2.5 A or less	SPDT	24 Vac/dc	Split-core	•	•	•	
H959	2.5 to 135 A		2.5 A or less	2.5 A or less	SPST, N.O.	12 Vdc nom.	Split-core	•	•	•
				2.5 A or less	SPST, N.O.	12 Vdc nom.	Split-core	•	•	•

ACCESSORIES P. 279



# H721XC SERIES & H921

## Load Trending with 4 to 20 mA Output



Hawkeye Relay Combination Series high voltage output current switches are the ideal solution for the automation installer. These units combine a current switch and relay into a single package, reducing the space required for total control of fans and pumps. The integrated current switch and relay operate independently of one another. All relay connections are externally available for maximum flexibility.

These products perform the functions of start/stop and status monitoring with one device instead of two.

### SPECIFICATIONS

Sensor Power	30 mA (max) @ 12 to 30 Vdc
Insulation Class	600 Vac RMS (UL), 300 Vac RMS (CE)
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Accuracy	±2% F.S. from 10% to 100% of selected range, but not less than ±0.4 A
Response Time	2 sec.
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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## Lower costs

Power the sensor, and receive the signal with only two wires...lower cabling and commissioning costs than with traditional 3-wire sensors

## Retrofit

Self-gripping, split-core design for fast retrofit installation...no need to remove conductor (H921)

## New construction

Economical solid-core features adjustable bracket for easy alignment (H721 Series)

## Factory calibrated

Factory calibrated switch-selectable ranges for high resolution and installation ease

## 3 field-selectable

Three field-selectable ranges per unit...fewer versions to choose from, stock, and install

## Installation flexibility

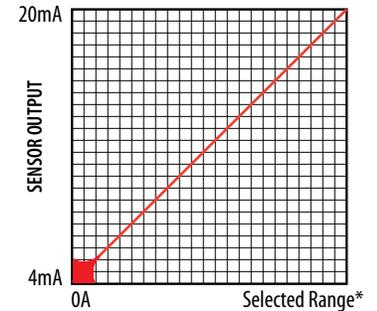
Removable mounting bracket for installation flexibility

### APPLICATIONS

- Load trending
- Motor control
- Fan/pump status

### EXAMPLE LINEAR OUTPUT

Scale software as shown

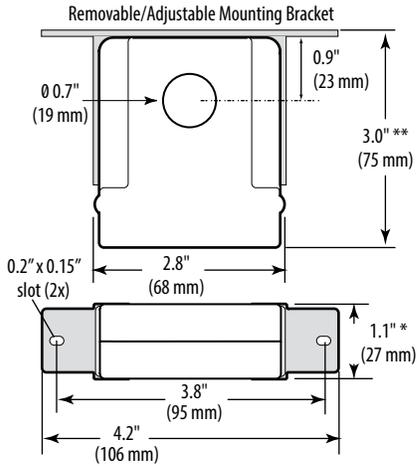


SENSED AMPS

\*Factory calibrated ranges selected with the amperage range switch

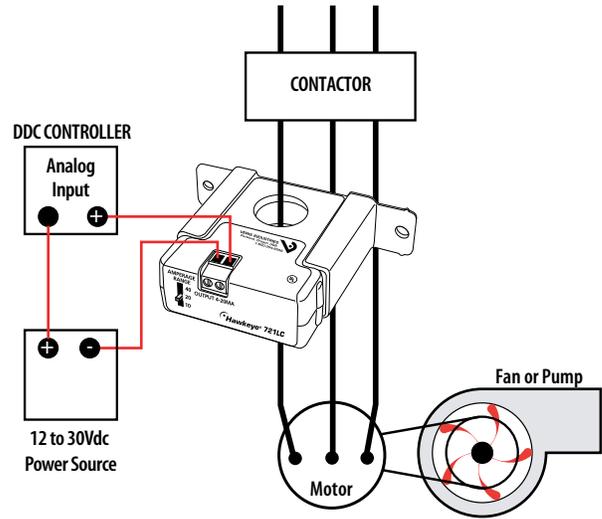


**H721LC/H721HC**  
Dimensional Drawing



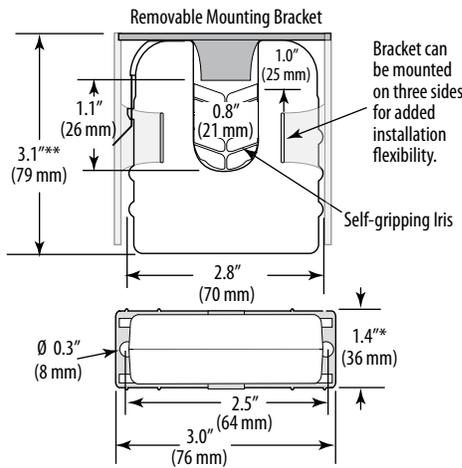
\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**MONITORING FAN /PUMP MOTORS FOR POSITIVE PROOF OF FLOW**  
Wiring Diagram

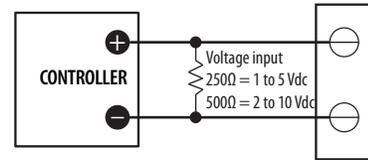


Voltage Output

**H921**  
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
\*\* Slide switch may extend up to 1/4" over the height dimensions shown.



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	SENSOR OUTPUT	HOUSING	UL	CE
H721LC	0 to 10/20/40 A	4 to 20 mA DC	Solid-Core	•	•
H721HC	0 to 50/100/200 A		Solid-Core	•	•
H921	0 to 30/60/120 A		Split-Core	• <sup>1</sup>	•

1. Listed for use on 75 °C insulated conductors.  
Note: For 10 to 80 Hz applications, see the H720 VFD sensor.



# HX21 & HX21SP SERIES

Large Load Trending with 4 to 20 mA Output



H321



Hawkeye x21/x21SP analog current transducers provide reliable load trending information for large motor loads (up to 2400 A), with a proportional 4 to 20 mA signal. Three devices are available, each with a different amperage range. The Hx21 versions include a span potentiometer that allows each sensor to be calibrated for maximum resolution. The Hx21SP versions are factory-calibrated at a range specified by the customer.

## SPECIFICATIONS

Sensor Power	30 mA (max) @ 12 to 30 Vdc
Insulation Class	600 Vac RMS (UL), 300 Vac RMS (CE)
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH, non-condensing
Accuracy	±2% from 10 to 100% of full scale
Response Time	2 sec.
Terminal Block Wire Size	12 AWG (3.3 mm <sup>2</sup> ) - 22 AWG (0.33 mm <sup>2</sup> )
Terminal Block Torque	7 to 8 in-lbs (0.8 to 0.9 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508 open device listing, CE: EN61010-1, (H221, H321 only)CAT III, Pollution Degree 2, basic insulation
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## Split-core design

Split-core design for easy installation and fast retrofits

## Loop powered

Loop powered 4 to 20 mA output

## No need for external CTs

No need for external CTs on large conductors

## Two-wire design

Two-wire design reduces wiring cost

## Large openings

Large openings for heavy conductors

## Field flexibility

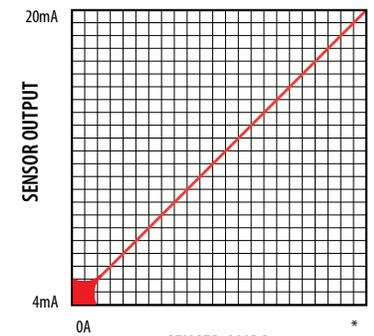
Hx21 models offer zero and span adjustments for field flexibility

## APPLICATIONS

- Load trending of large motors and other loads up to 2400 A
- Monitor critical motors (compressor, fuel, etc.)

## EXAMPLE LINEAR OUTPUT

Scale software as shown

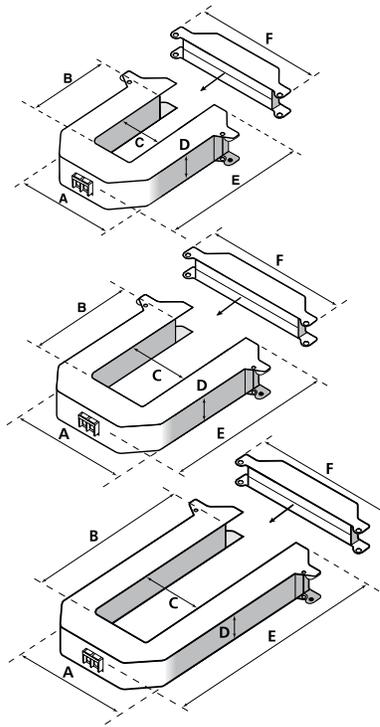


\*Adjusted with Span Potentiometer for Hx21 models; Factory-set per customer specification for Hx21SP models

- 100 to 300A (H221/H221SP)
- 300 to 800A (H321/H321SP)
- 1000 to 2400A (H421/H421SP)



**DIMENSIONAL DRAWING**



**H221**

- A = 3.7" (94 mm)
- B = 1.6" (40 mm)
- C = 1.4" (35 mm)
- D = 1.1" (29 mm)
- E = 4.2" (106 mm)
- F = 4.7" (120 mm)

**H321**

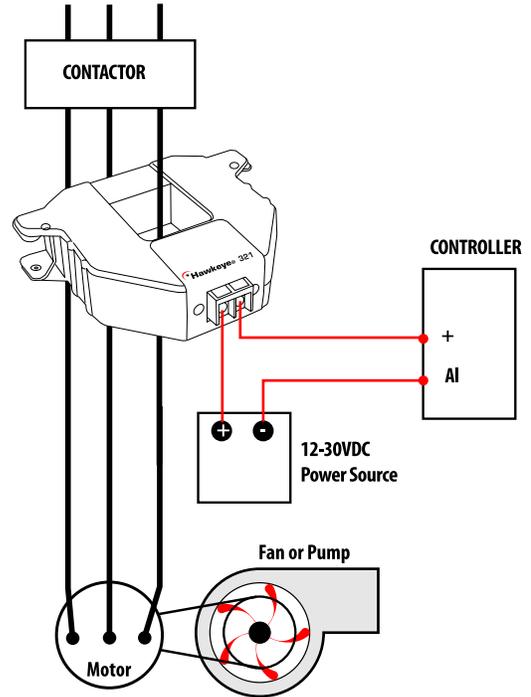
- A = 4.9" (124 mm)
- B = 2.9" (75 mm)
- C = 2.5" (63 mm)
- D = 1.2" (29 mm)
- E = 5.5" (140 mm)
- F = 6.0" (151 mm)

**H421**

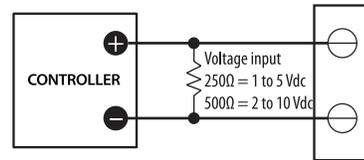
- A = 4.9" (124 mm)
- B = 5.5" (141 mm)
- C = 2.5" (63 mm)
- D = 1.1" (29 mm)
- E = 8.1" (206 mm)
- F = 6.0" (151 mm)

**MONITORING FAN /PUMP MOTORS LOADS**

Wiring Diagram



Voltage Output



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	SENSOR OUTPUT	HOUSING	UL	CE	LEAD FREE
	4 mA (Lower Limit) 20 mA (Upper Limit)					
H221	100 to 300 A	4 to 20 mA DC	Split-core	• <sup>1</sup>	•	
H221SP	100, 150, 200, 250, or 300 A <sup>2</sup>			• <sup>1</sup>	•	
H321	300 to 800 A			• <sup>1</sup>	•	
H321SP	300, 400, 500, 600, 700, or 800 A <sup>2</sup>			• <sup>1</sup>	•	
H421	1000 to 2400 A					•
H421SP	1000, 1200, 1400, 1600, 1800, 2000, 2200, or 2400 A <sup>2</sup>					•

1. Listed for use on 75 °C insulated conductors.

2. Factory calibrated - not field adjustable.

Note: When ordering HxxxSP versions, specify upper current limit for factory calibration (device is not field adjustable).

ACCESSORIES P. 279



# HX22 SERIES

Load Trending with 0 to 5 Vdc Output



## Self-powered analog

Self-powered analog current sensor simplifies installation

## New construction

Economical solid-core models feature adjustable bracket for easy alignment (H722xC)

## No external power required

No external power required for sensor

## Factory calibrated

Factory calibrated ranges for increased flexibility and resolution

## Retrofit

Self-gripping, split-core design for fast retrofit installation...no need to remove conductor (H622-xx, H922)

## No jumpers

No jumpers on unit...reduces installation error

The Hawkeye 622-xx, 722, 822, and 922 provide accurate load trending information with a proportional 0 to 5 Vdc output signal. Slide-switches provide easy field selection of monitored amperage range without jumpers (available on some models).

### SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS (UL), 300 Vac RMS (CE)
Frequency Range	50/60 Hz nominal
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Accuracy	±2% F.S. from 10% to 100% (range)
Response Time	2 sec.
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

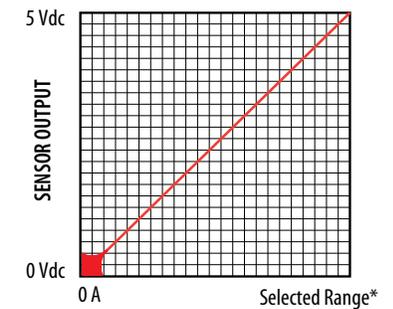
Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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### APPLICATIONS

- Load trending
- Motor control
- Positive proof of flow

### EXAMPLE LINEAR OUTPUT

Scale software as shown

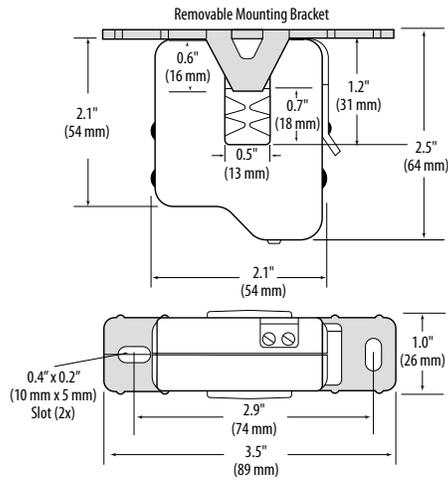


\*Factory calibrated ranges selected with the amperage range switch



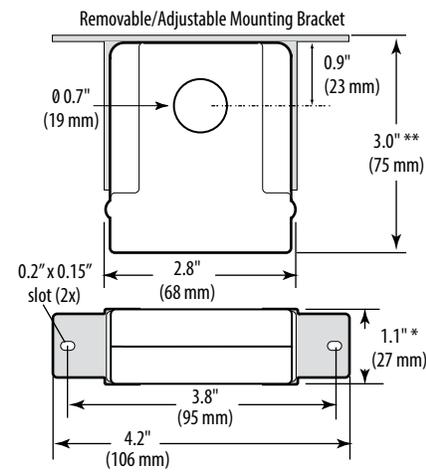
**H622-XX**

Dimensional Drawing



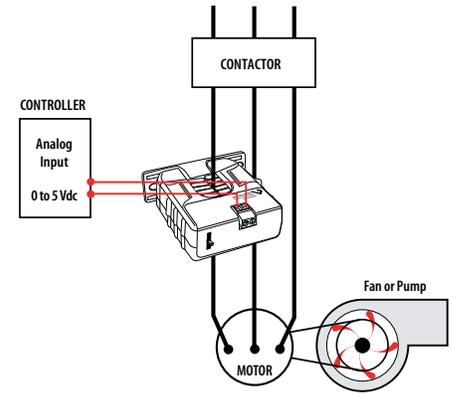
**H722LC/H722HC**

Dimensional Drawing



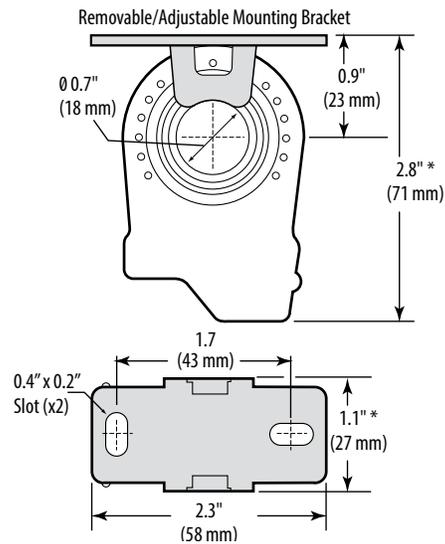
**MONITORING FAN /PUMP MOTORS FOR POSITIVE PROOF OF FLOW**

Wiring Diagram



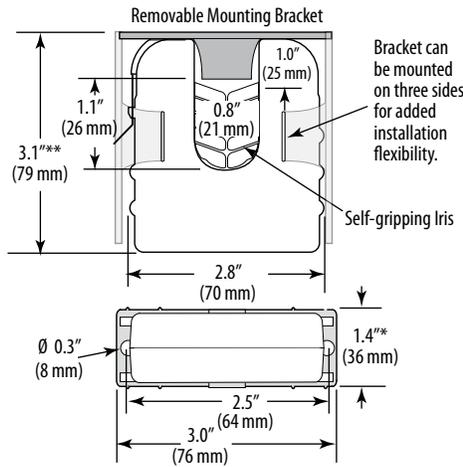
**H822/H822-20**

Dimensional Drawing



**H922**

Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	SENSOR OUTPUT	HOUSING	UL	CE	LEAD FREE
H622-10	0 to 10 A	0 to 5 Vdc	Split-core	•	•	
H622-20	0 to 20 A		Split-core	•	•	
H722LC	0 to 10/20/40 A		Solid-core	•	•	
H722HC	0 to 50/100/200 A		Solid-core	•	•	
H822	0 to 10 A		Solid-core	•		•
H822-20	0 to 20 A		Solid-core	•		•
H922	0 to 30/60/120 A		Split-core	• <sup>1</sup>	•	
H922030A	0 to 30 A		Split-core		•	
H922060A	0 to 60 A		Split-core		•	
H922120A	0 to 120 A		Split-core		•	

1. Listed for use on 75°C insulated conductors.

ACCESSORIES P. 279



# HX23 SERIES

Load Trending with 0 to 10 Vdc Output



The Hawkeye 623-xx, 723LC, 723HC, and 923 Series provide accurate load trending information with a proportional 0 to 10 Vdc output signal. Devices offer three amperage range options, with slide-switch selection for easy field adjustment – no need for jumpers.

## SPECIFICATIONS

Sensor Power	Induced from monitored current
Insulation Class	600 Vac RMS (UL) (H623-xx) 300 Vac RMS (CE) (H623-xx, H723, H923)
Frequency Range	50/60 Hz nominal
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH, non-condensing
Accuracy	±2% F.S. from 10% to 100% (range)
Response Time	2 sec.
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508 open device listing (H623-xx only); CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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## Self-powered analog

Self-powered analog current transducer 0 to 10 Vdc output

## No external power required

No external power required for sensor

## Retrofit

Self-gripping, split-core design for fast retrofit installation...no need to remove conductor (H623-xx and H923)

## Factory calibrated

Factory calibrated ranges for high resolution and installation ease

## No jumpers

No jumpers on unit...reduces installation error

## Field-selectable ranges

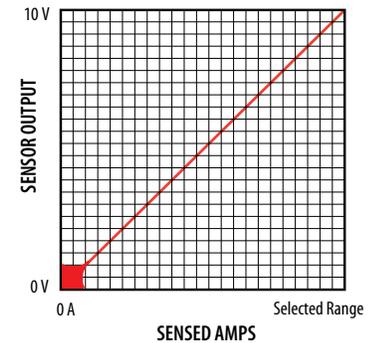
Some models available with field-selectable ranges

## APPLICATIONS

- Load trending
- Motor control
- Fan/pump status

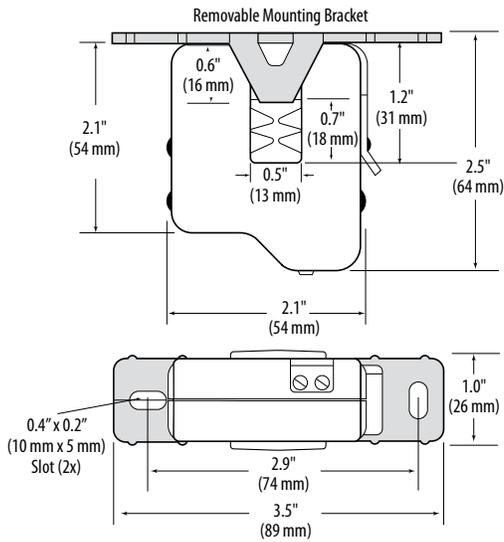
## EXAMPLE LINEAR OUTPUT

Scale software as shown



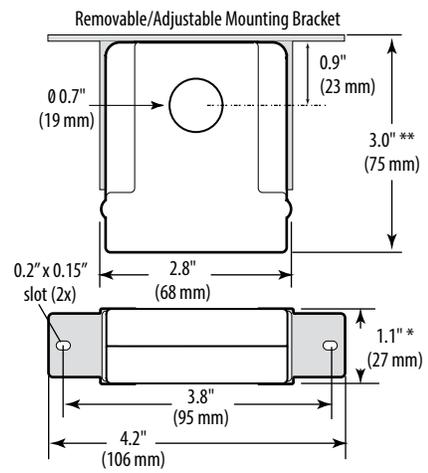
### H623-XX

Dimensional Drawing



### H723LC/H723HC

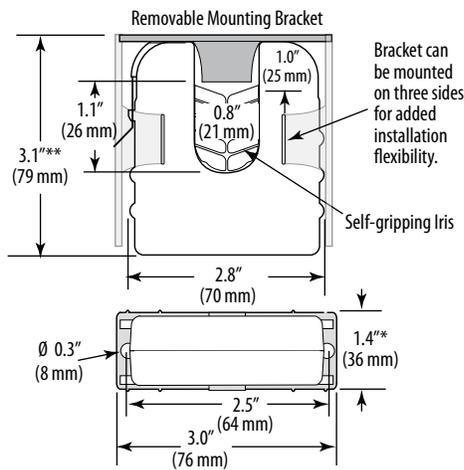
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

### H923

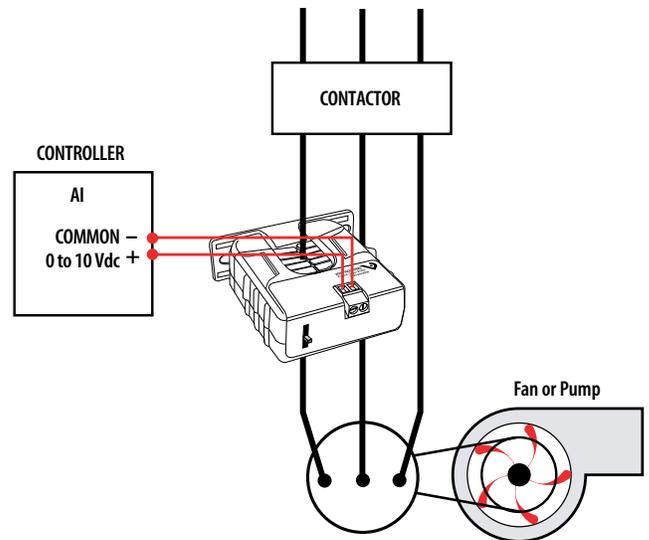
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

### MONITORING FAN/PUMP MOTORS FOR POSITIVE PROOF OF FLOW

Wiring Diagram



### ORDERING INFORMATION

MODEL	AMPERAGE RANGE	SENSOR OUTPUT	HOUSING	UL	CE
H623-10	0 to 10 A	0 to 10 Vdc	Split-core	•	•
H623-20	0 to 20 A		Split-core	•	•
H723LC	0 to 10/20/40 A		Solid-core		•
H723HC	0 to 50/100/200 A		Solid-core		•
H923	0 to 20/100/150 A		Split-core		•

ACCESSORIES P. 279



# H931

Load Trending and Control Relay  
in One Package



H931



The Hawkeye 931 provides accurate load trending information with a proportional 4 to 20 mA output signal. These devices offer three amperage ranges for versatility, with easy slide-switch selection. The command relay is fully integrated in the device, but it is isolated from the current transducer. This combination makes these products ideal for start/stop control and status monitoring of motors, using one device instead of two.

## SPECIFICATIONS

Sensor Power	30 mA (max.) @ 12 to 30 Vdc
Insulation Class	600 Vac RMS
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Accuracy	±2% F.S. from 10% to 100% (selected range)
Response Time	2 sec.
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508 open device listing, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use LED status indicators as evidence of applied voltage

## Loop-powered

Loop-powered analog current transducer with integral start/stop command relay

## Reduces installation charges

One device to install for start/stop and status

## Saves time

Reduces the number of installed components...saves time and space

## Fewer wires

Power the current sensor and receive the 4 to 20 mA signal with only two wires

## Retrofit

Self-gripping, split-core design for fast retrofit installation...no need to remove conductor

## Factory calibrated

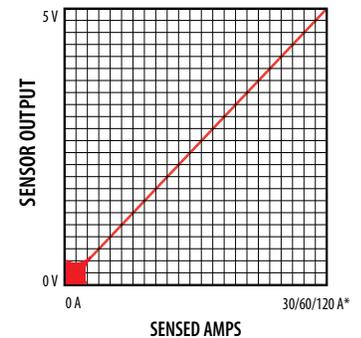
Selectable factory calibrated ranges up to 120 A for increased flexibility and resolution

## APPLICATIONS

- Load trending
- Motor control
- Positive proof of flow

## EXAMPLE LINEAR OUTPUT

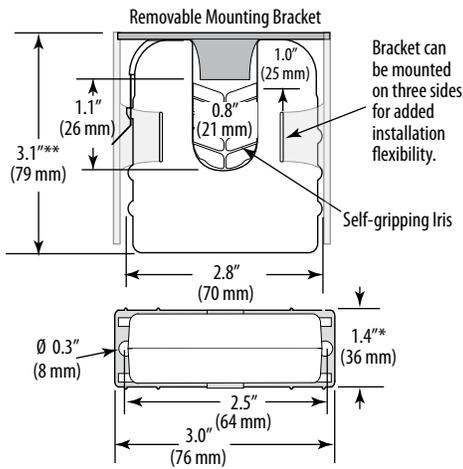
Scale software as shown



\*Factory calibrated ranges selected with the amperage range switch



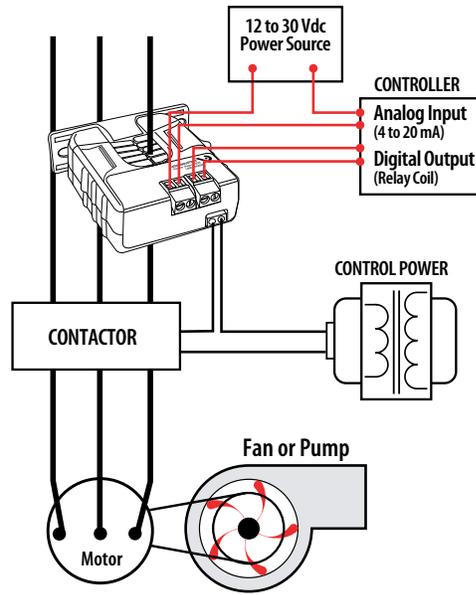
**DIMENSIONAL DRAWING**



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

**TRENDING & CONTROLLING MOTOR LOADS**

Wiring Diagram



**RELAY CONTACT RATINGS (N.O.)**

Resistive	5 A @ 250 Vac, 30 Vdc
	5 A @ 30 Vac, 30 Vdc
Inductive	2 A @ 250 Vac, 30 Vdc
	2 A @ 30 Vac, 30 Vdc

**TYPICAL COIL PERFORMANCE**

Voltage	AC	DC
24	15	15

**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	SENSOR OUTPUT	RELAY TYPE	RELAY COIL	RELAY	RELAY POWER LED	UL
H931	0 to 30/60/120 A	4 to 20 mA	SPST, N.O.	24 Vac/dc	•	•	•



# H932 & H952

Load Trending and Control Relay  
in One Package



H932



The Hawkeye 932 and 952 Series provide accurate load trending information with a proportional 0 to 5 Vdc output signal. This feature combined with an integrated command relay makes these products ideal for start/stop and status monitoring of motors.

The relay is fully isolated from the current sensor, and all relay connections are externally available for maximum flexibility.

## SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS
Frequency Range	50/60 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Accuracy	±2% F.S. from 10% to 100% (selected range)
Response Time	2 sec.
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508 open device listing, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use LED status indicators as evidence of applied voltage

## Self-powered

Self-powered analog current transducer with integral start/stop command relay

## Reduces installation

One device to install for start/stop and status

## Saves time

Reduces the number of installed components...saves time and space

## No external power

No external power required for current sensor

## Retrofit

Self-gripping, split-core design for fast retrofit installation...no need to remove conductor

## Increased flexibility

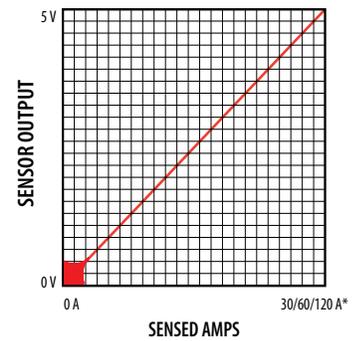
Selectable factory calibrated ranges up to 120 A for increased flexibility and resolution

## APPLICATIONS

- Load trending
- Motor control
- Fan/pump status

## EXAMPLE LINEAR OUTPUT

Scale software as shown

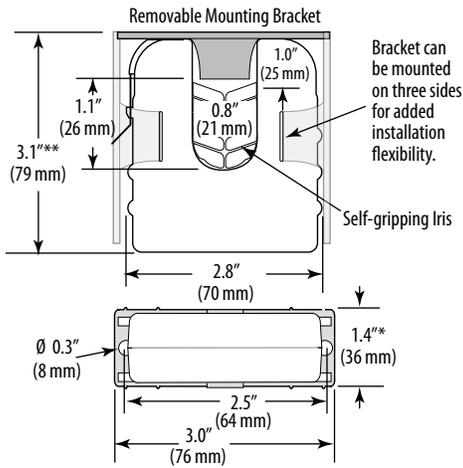


\*Factory calibrated ranges selected with the amperage range switch



### H932/H952

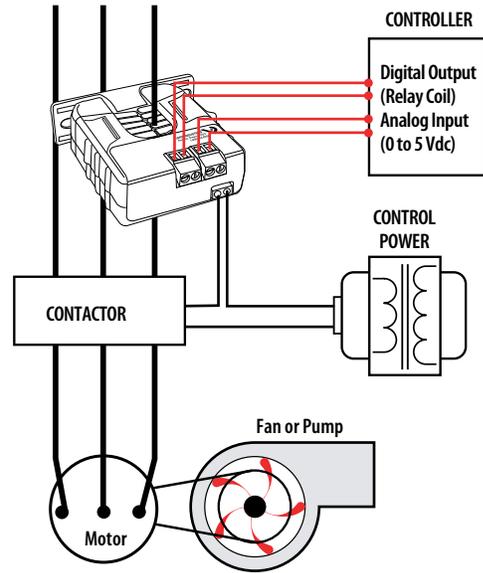
Dimensional Drawing



\* Terminal block may extend up to 1/8" over the height dimensions shown.  
 \*\* Slide switch may extend up to 1/4" over the height dimensions shown.

### TRENDING & CONTROLLING MOTOR LOADS WITH THE HAWKEYE 932

Wiring Diagram



#### RELAY CONTACT RATINGS (N.O.)

Resistive	5 A @ 250 Vac, 30 Vdc
	5 A @ 30 Vac, 30 Vdc
Inductive	2 A @ 250 Vac, 30 Vdc
	2 A @ 30 Vac, 30 Vdc

#### TYPICAL COIL PERFORMANCE

Voltage	AC	DC
24 (H932)	15	15
12 (H952)		20
Pull In Voltage (H952 only)		
12 Vdc		8.4 Vdc
Drop Out Voltage (H952 only)		
12 Vdc		3.0 Vdc

#### ORDERING INFORMATION

MODEL	AMPERAGE RANGE	SENSOR OUTPUT	RELAY TYPE	RELAY COIL	HOUSING	UL
H932	0 to 30/60/120 A	0 to 5 Vdc	SPST, N.O.	24 Vac/dc	Split-core	•
H952				12 Vdc		•

ACCESSORIES P. 279



# H971 & EA20 SERIES

DC Applications



Hawkeye DC Transducers provide accurate load level monitoring of DC loads. The H971 and EA20 use Pulse Reset Technology™ with field proven circuitry to provide a superior solution for DC applications with minimal risk of permanent magnetization, providing longer life and better accuracy.

The EA20 and the H971 have 4 to 20 mA output only. The H971 also offers bi-directional sensing capability and a user-adjustable span to allow greater application flexibility.

## SPECIFICATIONS

System Technology	Exclusive Pulse Reset Technology™
Amperage Range	H971: ±200 ADC; EA20: 0 to 100 ADC/0 to 150 ADC/0 to 200 ADC
Sensor Supply Voltage	12 to 24 Vdc <sup>1</sup>
Supply Current	35 mA <sup>2</sup>
Insulation Class	H971: 600 Vdc, EA20: 1000 Vdc
Temperature Range	-30 to 60 °C (-22 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Output	H971: Bidirectional 4 to 20mA (adjust. span) <sup>3</sup> ; EA20: Unidirectional 4 to 20 mA
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)
Response Time	Less than 150 msec

### ACCURACY

Accuracy at Ranges Below 100 A	±0.5 A (combined linearity, hysteresis, and repeatability) <sup>5</sup>
Accuracy at Ranges Above 100 A	±0.5% full scale (combined linearity, hysteresis, and repeatability) <sup>4</sup>
Withstand Current	25,000 ADC

### WARRANTY

Limited Warranty	5 years
------------------	---------

## Retrofit

Self-gripping iris for easy installation

## HOA

Bi-directional model...user-adjustable span from ±20 to ±200 A (H971)

## Flexibility

Bracket can be installed in three different configurations

## Status LED

Status LED ensures proper wiring

## Pulse Reset Technology™

Patented Pulse Reset Technology significantly increases accuracy... sensor is not affected by stray magnetic fields, minimize magnetization from over-current faults

## 100, 150 and 200 Amp span

100, 150, and 200 A versions available...application flexibility (EA20 uni-directional model)

## APPLICATIONS

- Battery chargers
- Motor armature current
- Motor field current
- Automotive loads
- Marine equipment
- Solar energy applications
- Telecom
- Electroplating

## AGENCY APPROVALS

Agency Approvals	CE 4: EN61010-1, CAT III, Pollution Degree 2, basic insulation
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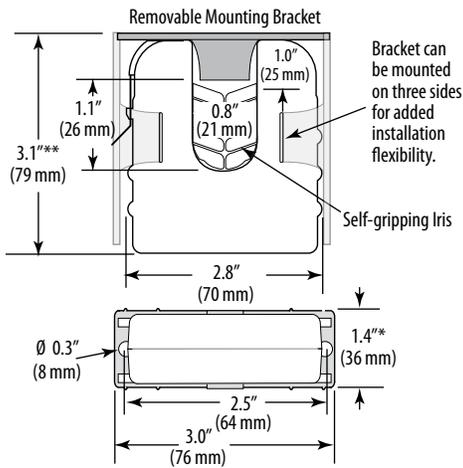
Note: Do not use the LED status indicators as evidence of applied voltage.

1. For currents over 120A, supply voltage must be at least 15V.
2. For H971, at zero monitored current: 35mA max.; at 200A monitored current: 55mA to 100mA depending on supply voltage and current polarity.
3. Unless factory set per customer specifications (H971SP only).
4. For single conductor through product (no wraps).



### H932/H952

Dimensional Drawing

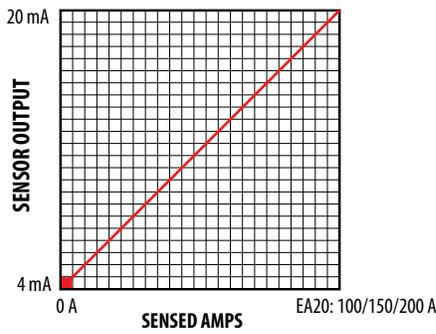


\* Terminal block may extend up to 1/8" over the height dimensions shown.

\*\* Slide switch may extend up to 1/4" over the height dimensions shown.

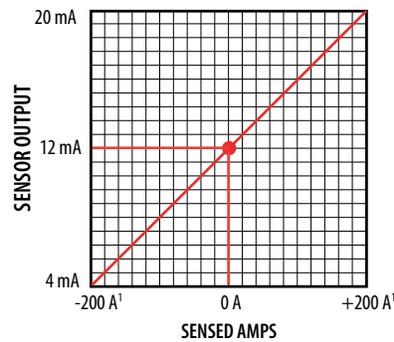
### EA20 LINEAR OUTPUT

Scale software as shown



### H971 BIDIRECTIONAL OUTPUT

Scale software as shown

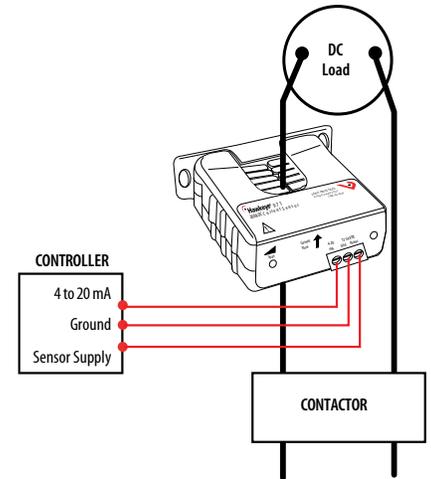


1. Field Adjustable from ±20 A to ±200 A

(not applicable to customer-specified factory scaled models)

### H971/EA20

Wiring Diagram



### ORDERING INFORMATION

MODEL	PULSE RESET TECHNOLOGY	AMPERAGE RANGE (DC)	SENSOR OUTPUT	HOUSING	STATUS LED	UL	CE	ROHS
Hawkeye Series								
H971	•	0 to 200 A	Bidirectional 4 to 20 mA	Split-core	•	•	•	•
H971SP	•	0 to 200 A <sup>1</sup>	Bidirectional 4 to 20 mA	Split-core	•	•	•	•
EA Series								
EA20BB010	•	0 to 100 A	Unidirectional 4 to 20 mA	Split-core	•	• <sup>2</sup>	•	•
EA20BB015	•	0 to 150A	Unidirectional 4 to 20 mA	Split-core	•	• <sup>2</sup>	•	•
EA20BB020	•	0 to 200A	Unidirectional 4 to 20 mA	Split-core	•	• <sup>2</sup>	•	•

1. Range set in factory per customer specified value from 0 to ±20 A through 0 to ±199 A.

2. UL Recognized.

# H5XX SERIES

Combination Switching Relay, Current Status Switch, and HOA Switch\*



The Hawkeye 5xx Series combines an industrial grade load-switching relay, current status switch\*, and Hand-Off-Auto (HOA) switch\* in an easy-to-install remote enclosure, making the series ideal for monitoring, directly controlling, and troubleshooting the control wiring of fractional horsepower motors.

In some models, the relay, current sensor, and HOA switch are combined in a series circuit. Once an H5xx is wired in series between the power source and motor, all three components are installed. The housing provides physical separation and multiple wiring exits to isolate control and high voltage wiring. An H5xx can be mounted directly on 2- or 4-gang junction boxes, nipped to a field enclosure, or stand alone.

## SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Frequency Range	50/60 Hz
Humidity Range	10 to 90% RH non-condensing
Temperature Range	-15 to 50 °C (5 to 122 °F)
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm <sup>2</sup> )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)
<b>WARRANTY</b>	
Limited Warranty	5 years
<b>AGENCY APPROVALS</b>	
Agency Approvals	UL 508 closed type device listing, CAT III, Pollution Degree 2, basic insulation

## Remote mounted HOA

Remote mounted current status sensor\* and command relay with or without HOA switch

HOA provides true relay control... ideal for troubleshooting control wiring

## Status sensor

Combines status sensor,\* command relay, and HOA switch in a single series circuit...one line connection for three devices

## SPST

SPST relay is field-selectable for N.O. or N.C. operation

## Gang box mounting

Mounts directly onto gang box, flush to existing enclosures and standalone

## Up to 1 HP

All models rated up to 1 HP @ 120 Vac, NS Versions 1 HP @ 120 Vac and 1.5 HP @ 277 Vac...one product for all fractional HP motor control and status applications

## APPLICATIONS

- Monitoring status and controlling small motor loads that are not driven by a motor starter or contactor
- Exhaust fans
- Unit ventilators
- Fan terminal units
- Fan coil units
- Recirculating pumps

### RELAY CONTACT RATINGS

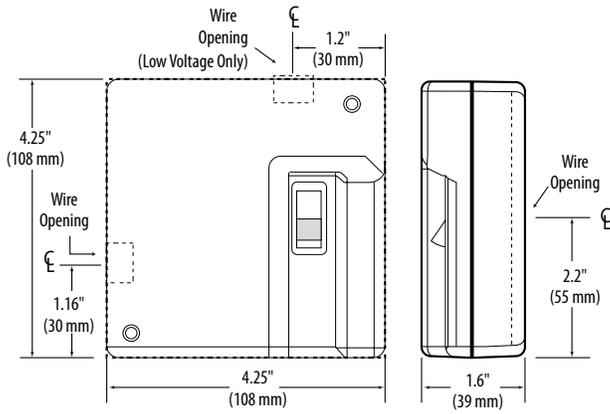
SPDT (NS) Models		
Resistive	15 A @ 277 Vac	
Motor	1 HP @ 120 Vac	
	1.5 HP @ 277 Vac	
SPST (HOA) Models		
Resistive	15 A @ 250 Vac	
Motor	1 HP @ 120 Vac	
<b>TYPICAL COIL PERFORMANCE</b>		
Voltage	AC	DC
24 V	36 mA	36 mA



\*Some models

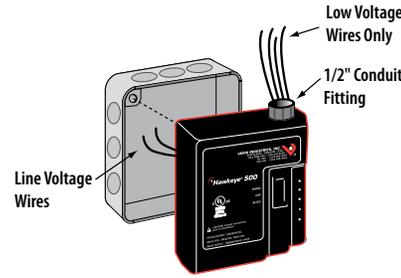


**DIMENSIONAL DRAWING**



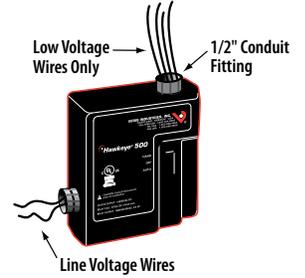
**MOUNTS DIRECTLY ON 4-GANG JUNCTION BOX**

Mounting Options

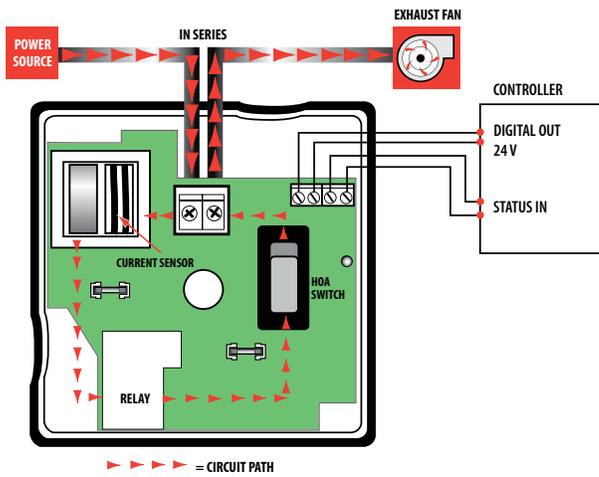


**MOUNTS DIRECTLY ON WALL OR PANEL**

Mounting Options



**WIRING DIAGRAM**

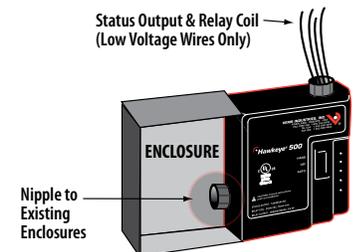


**MOUNTS DIRECTLY ON 2-GANG JUNCTION BOX**

Mounting Options



**ENCLOSURE MOUNT**



**ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	STATUS OUTPUT	TRIP POINT	RELAY	RELAY COIL	HOA SWITCH	STATUS LEDES	RELAY POWER LED	UL
H535	0.25 to 15A	Relay Only		SPST, Field-Selectable N.O./N.C.	24 Vac/dc	•		•	•
H535NS	0.25 to 15 A	Relay Only		SPDT				•	•
H540	0.25 to 15 A	N. O., 1.0 A @ 30 Vac/dc	0.25 A or Less, Fixed	SPST, Field-Selectable N.O./N.C		•		•	•
H540NS	0.25 to 15 A	N. O., 1.0A @ 30 Vac/dc	0.25 A or Less, Fixed	SPDT				•	•
H548	0.5 to 15 A	N. O., 1.0A @ 30 Vac/dc	0.5 A or Less, Adjustable	SPST, Field-Selectable N.O./N.C		•	•	•	•
H548NS	0.5 to 15 A	N. O., 1.0 A @ 30 Vac/dc	0.5 A or Less, Adjustable	SPDT				•	•

ACCESSORIES P. 279



# H120 SERIES

SPST Status Relay with Integral Current Switch



The H120 and H120NC offer a fixed current switch and SPST relay in a single externally mounted housing. Combining the current sensor and relay in one easy-to-install package eliminates the need to fit multiple devices into small electrical enclosures and simplifies the installation. Remove the labor associated with installing a separate current sensor.

## SPECIFICATIONS

Sensor Power	Induced from relay coil power
Operating Temperature	-15 to 60 °C (5 to 140 °F) (13.8 A max.), -15 to 50 °C (5 to 12 °F) (2 A max.)
Frequency Range	50/60 Hz
Operating Humidity	10 to 90% RH non-condensing
Expected Relay Life (mechanical)	10 million cycles
Relay Status	LED ON=energized

## LEAD WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Style and Gauge	UL1015; Coil: 18 AWG; Contacts: 12 AWG; Status: 16 AWG

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508 closed type device listing, CAT III, Pollution Degree 2, basic insulation
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Note: Do not use the LED status indicators as evidence of applied voltage.

## 2-in-1

Current switch and relay are in series...connect the contacts to the load and your current switch is automatically installed

## HP ratings

HP ratings make the H120 ideal for control and status of fractional HP motors

## Nipple mount

The nipple mount housing can be connected to any 1/2" conduit knockout for installation versatility

## 0.1A turn-on

Easily monitors the smallest loads

## Relay coil LED

Relay coil LED streamlines job commissioning and check out

## NEMA 1 rated

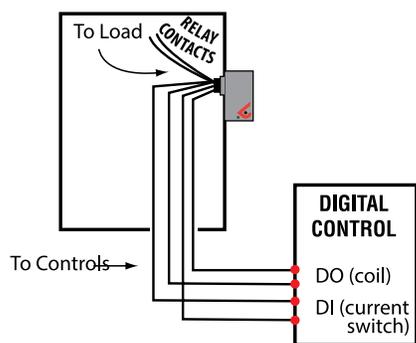
NEMA 1 rated housing may be used in plenum spaces

## APPLICATIONS

- Unit ventilators
- Fan coil units
- Exhaust fans
- Fan terminal units
- Fractional HP motors
- Light resistive loads

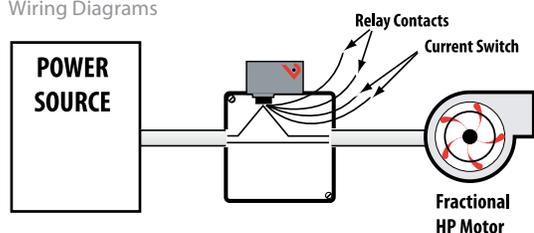
### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagrams

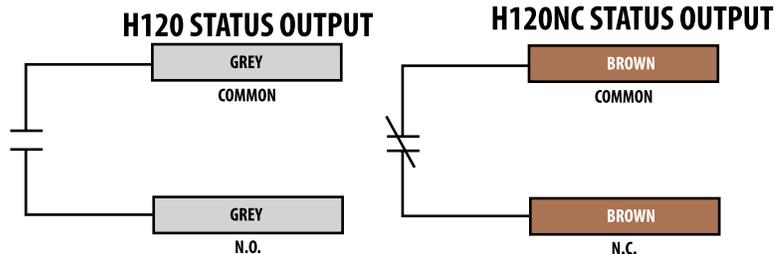
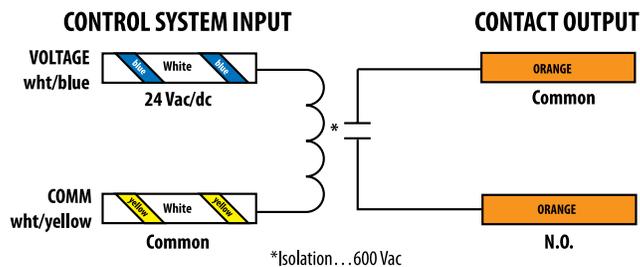


### NIPPLE MOUNT TO 4X ELECTRICAL BOX

Wiring Diagrams



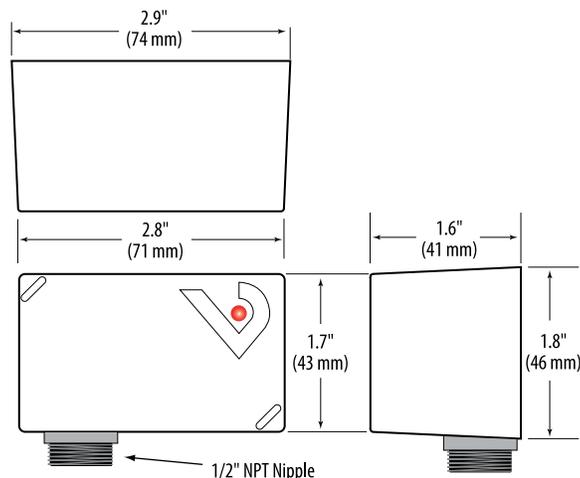
### WIRE COLOR CODES



### ORDERING INFORMATION

MODEL	AMPERAGE RANGE	COIL	RELAY	STATUS OUTPUT	TRIP POINT	HOUSING	RELAY POWER LED	UL
H120	0.1 to 20 A	24 Vac/dc	SPST, N.O.	N.O. 100 mA @ 30 Vac/dc	0.1 A or Less	Nipple Mount	•	•
H120NC				N.C. 100 mA @ 30 Vac/dc				•

### DIMENSIONAL DRAWING



#### RELAY CONTACT RATINGS

Resistive	20 A (r) @ 277 Vac/28Vdc
	(250,00 Cycles)
Motor	120 Vac, 1HP
	208 Vac, 1HP
	250 Vac, 2HP
	277 Vac, 2HP
Ballast	277 Vac, 20 A
Tungsten	120 Vac, 10 A

#### TYPICAL COIL PERFORMANCE

Voltage	Coil Current	
	AC	DC
24V	75 mA	32 mA

\*See operating temperature specifications

# ACCESSORIES SELECTION GUIDE: CURRENT MONITORING

Product	Description	Hx00	Hx08 & H701	Hx09	Hx06	H11D	H10F	H614	H904, H934, H720	H6ECM	Hx30/40/50	H735, Hx38, Hx48, Hx58	Hx39, Hx49, Hx59	H721xC & H921	Hx21 & Hx21SP	Hx22	H723xC & H923	H931 & H 951	H932 & H952	H971 & EA20
AH01	DIN Rail Clip Set	1	1	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
AH06	CT Mounting Brackets														•					
AH27	DIN Rail Clip Set	2	2																	
AV01	35 mm DIN Rail - 1 Meter Length	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
AV02	DIN Rail Stop Clip	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
PS	Universal Power Supply														•					

1. For H6xx, H8xx, H9xx.  
2. For H3xx.



**AH01**  
DIN Rail Clip Set



**AH06**  
CT Mounting Brackets



**AH27**  
DIN Rail Clip Set



**AV01**  
35 mm DIN Rail - 1 Meter Length



**AV02**  
DIN Rail Stop Clip



**PS**  
Universal Power Supply





# RELAYS

Veris offers a complete line of relays for motor control, relay logic, and other automation system applications. Nipple mount, DIN mount and other options are all available.

MODEL	DESCRIPTION	PAGE
V100/200	10 A SPDT Enclosed Relay 10 A@277 Vac, 28 Vdc	285
V101/102/103 and V201	10 A SPST Enclosed Relay with HOA Switch 10 A@250 Vac or 277 Vac	287
V300/400	10 A DPDT Enclosed Relay 10 A@277 Vac, 30 Vdc	289
V120/V220	20 A SPDT Enclosed Relay 20 A@277 Vac, 28 Vdc	291
V121/122/123 and V221/222/223	20 A SPST Enclosed Relay with HOA Switch 20 A@240 Vac, 8 A@28 Vdc	293
V320/V420	20 A DPDT Enclosed Relay 20 A@277 Vac, 28 Vdc	295
V321/V421	20 A DPST Enclosed Relay with HOA Switch 20 A@240 Vac or 8 A@240 Vdc	297
V645	10 A SPDT Enclosed Mini Command Relay 10 A@250 Vac N.O., 7 A@250 Vac N.C.	299
VMD1B	Socket SPDT Relays	301
VMD2B	Socket DPDT Relays	303
VMD3B	Socket 3PDT Relays	305
VMD4B	Socket 4PDT Relays	307
VS861	Solid State Relays	309
VTD	Time Delay Relays	311

# RELAY SELECTION GUIDE

## RELAYS AND SOCKETS

	NIPPLE MOUNT	SOCKET MOUNT	DIN MOUNT
SPDT 10A	V100*/V200* page 285	VMB1B-S* (3A) page 301	V645, VMB1B-S* (3A) pages page 299, page 301
SPDT 20A	V120/V220 page 291	VMD1B-C*/VMD1B-F* page 301	VMD1B-C*/VMD1B-F* page 301
DPDT 10A	V300/V400 page 289	VMD2B-S* page 303	VMD2B-S* page 303
DPDT 20A	V320/V420 page 295	VMD2B-C*/VMD2B-F* page 303	VMD2B-C*/VMD2B-F* page 303
3PDT 15A		VMD3B-C*/VMD3B-F* page 305	VMD3B-C*/VMD3B-F* page 305
4PDT 15A		VMD4B-C*/VMD4BF* page 307	VMD4B-C*/VMD4BF* page 307
Time Delay 12A		VTD2P-F50 page 311	VTD1P-UNI/VTD2P-UNI page 311
Solid State 8A			VS861* page 309

\* Indicates a series of products.

## RELAYS WITH HOA SWITCH

	NO HOA MONITORING	RESISTIVE HOA MONITORING	DIGITAL HOA MONITORING
SPST 10A	V101*/V201* page 287	V102 page 287	V103 page 287
SPST 20A	V121/V221 page 293	V122/V222 page 293	V123/V223 page 293
DPST 20A	V321/V421 page 295		

\* Indicates a series of products.



# REDUCE COSTS WITH QUICK AND EASY MOUNTING

Victory Enclosed Relays

## APPLICATIONS

- » Command contactors
- » Control motors
- » Isolation
- » Device interlocking
- » Relay logic
- » Sense voltages for alarm conditions



## FEATURES

### SAVES DEBUG TIME

Local control and troubleshooting with HOA switch available

### SAVES LABOR

Flying leads for exceptional time and labor savings

### QUICK MOUNTING

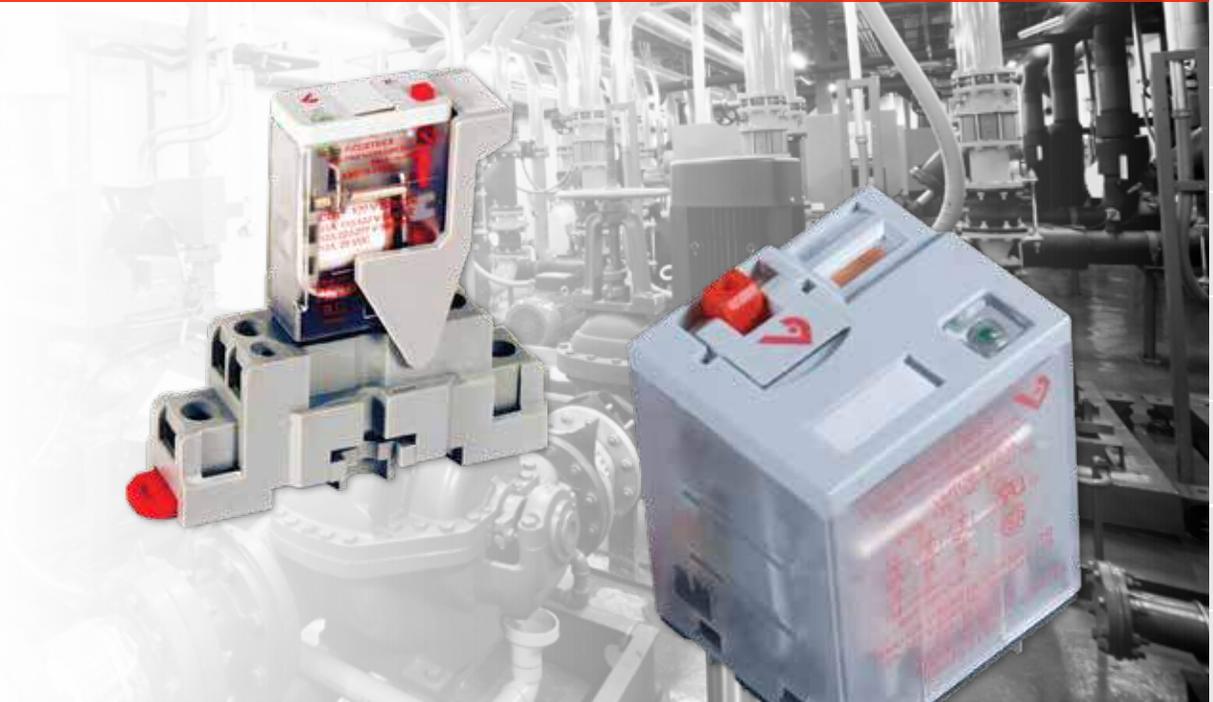
With nipple mount feature for common electrical box enclosures

# SAVE TIME, COSTS WITH SIMPLIFIED INSTALLATION, MAINTENANCE

DIN Mount Socket Relays

## APPLICATIONS

- » In panel
- » Panel or DIN rail mount
- » Command contactors
- » Control motors
- » Device interlocking
- » Relay logic



## FEATURES

### MANUALLY OVERRIDE

Relay with override lever, providing control at the relay

### CONTACT FLAG

For easy troubleshooting with visual confirmation, eliminates guesswork and saves time

### HOLD-DOWN CLIP

Available with marking surface for tidy installation

### TEST BUTTON

Push to test button, activate relay to commission job



# VICTORY 100 & 200 SERIES

Great for External Mount Applications



Victory 100 and 200 Series 10 A enclosed relays are pilot-duty relays in an easy-to-use nipple mount enclosure. The V100/V200 Series provide quick relay mounting without a dedicated field enclosure, making them ideal for retrofit projects. Field-selectable high and low voltage coil inputs provide on-site versatility.

## SPECIFICATIONS

Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	600 Vac RMS

### OPERATING TEMPERATURE RANGE

V100, V100DC, V200	-34 to 60 °C (-29 to 140 °F)
V100D, V200D	-40 to 55 °C (-40 to 131 °F)

### Wire Specifications

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 16 AWG

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508
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## Sleek enclosure

Reduces the need for panel space

## UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

## Nipple mount

Victory Series products can be mounted to any electrical enclosure, easing installation

## Eliminate conduit

Run low voltage instead of line voltage...eliminates conduit in some applications

## Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces, provides secure connections to wire nuts

## APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

### TYPICAL COIL PERFORMANCE

Pull in Voltage	AC	DC
10 to 30 V	8	9
120 V	78	
208 to 277 V	154	
Drop Out Voltage		
10 to 30 V	2	3
120 V	18	
208 to 277 V	36	
Voltage	Coil Current	
	AC	DC
10 V	25 mA	14 mA
12 V	25 mA	14 mA
24 V	31 mA	16 mA
30 V	39 mA	18 mA
120 V	22 mA	
208 V	19 mA	
277 V	25A	

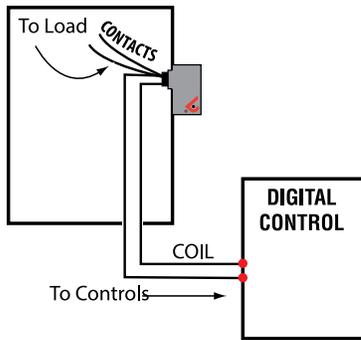
### CONTACT RATINGS

Resistive	10 A @ 277 Vac, 28 Vdc
Motor	120 Vac, 1/3 HP N.O. & 1/6 HP N.C. 240 Vac, 1/3 HP N.O. & 1/6 HP N.C. 277 Vac, 1/4 HP N.O. * 1/8 HP N.C.
Pilot Duty	277 Vac (1.7 A), 480 VA N.O.
Ballast	277 Vac, 1.7 A
Tugsten	120 Vac, TV3 N.O. TV2 N.C.
Gold Flash	yes



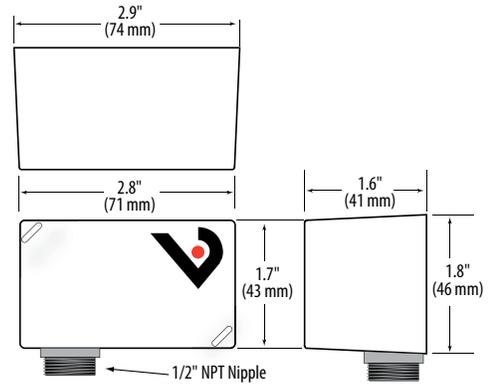
### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram



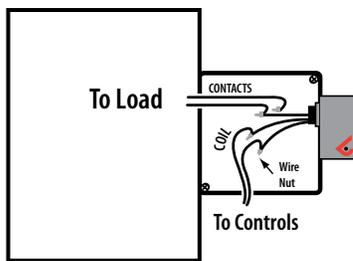
### V100/V100DC/V200

Dimensional Drawing



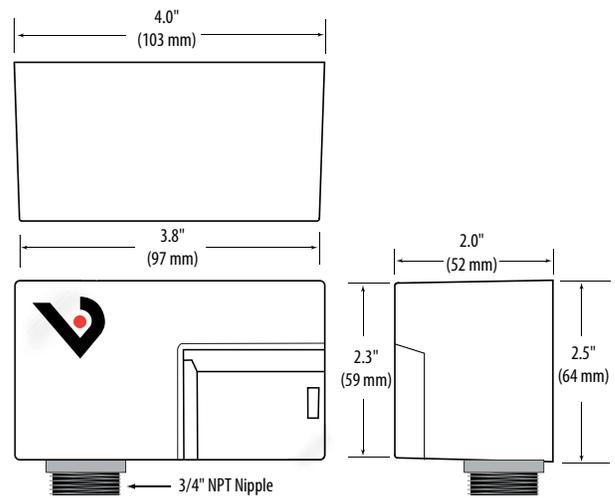
### NIPPLE MOUNT TO ANY 2X OR 4X ELECTRICAL BOX

Wiring Diagram



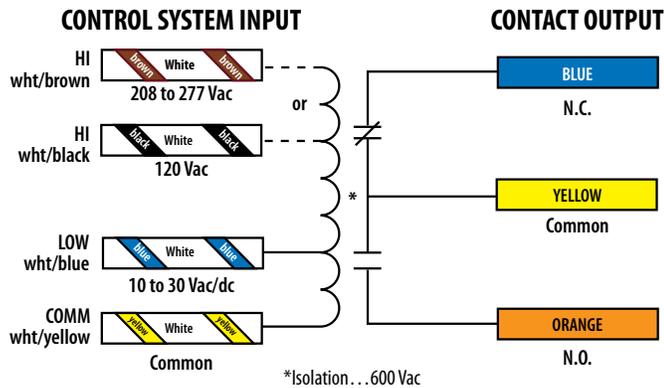
### V100D/V200D

Dimensional Drawing



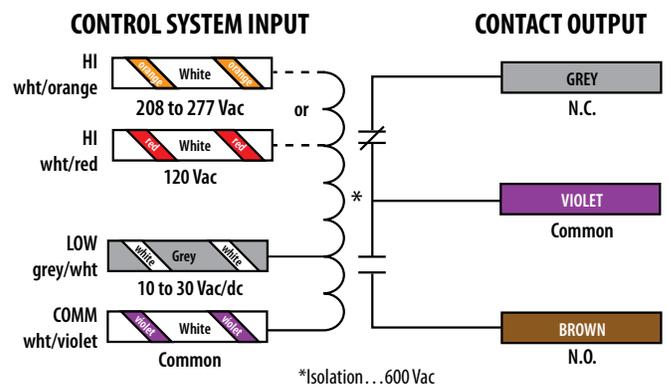
### PRIMARY

Wire Color Codes



### RELAY 2 ON V100D AND V200D ONLY

Wire Color Codes



### ORDERING INFORMATION

MODEL	RELAY	COIL	AMPERAGE RATING	RELAY POWER LED	UL
V100*	SPDT	10 to 30 Vac/dc, 120 Vac	10 A	•	•
V100D	2x SPDT	10 to 30 Vac/dc, 120 Vac		•	•
V100DC	SPDT	10 to 30 Vdc		•	•
V200	SPDT	10 to 30 Vac/dc, 208 to 277 Vac		•	•
V200D	2x SPDT	10 to 30 Vac/dc, 208 to 277 Vac		•	•

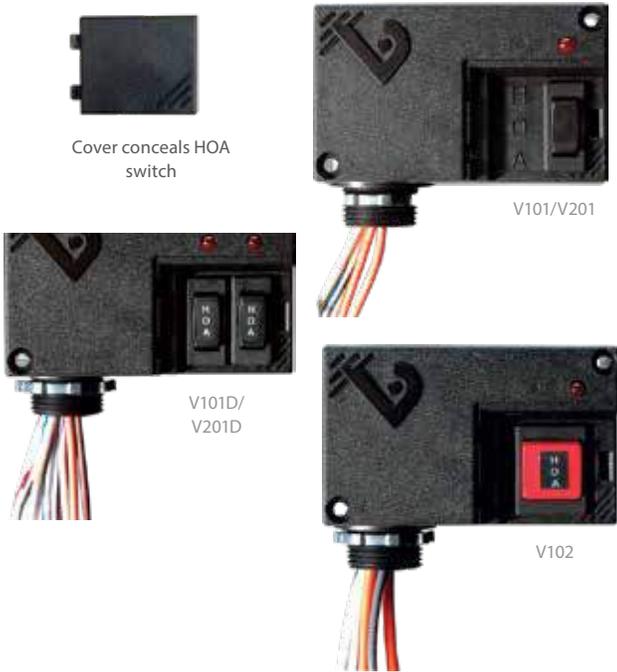
Note: Some units are Plenum rated per UL 1995. For details, see White Paper VWP01, *UL 1995 and Plenum Ratings*, at [www.veris.com](http://www.veris.com).

\*U.S. origin version available.



# VICTORY 101, 102 & 103 SERIES

Relays with HOA Switches for Local Control



With a concealed HOA switch for local control and troubleshooting, the Victory 101, 102, and 103 Series relays provide HOA flexibility while limiting unauthorized switch manipulation. To further guard against control system override, some relays are equipped with a monitored HOA.

The V102 provides a two-wire resistive output and the V103 offers a three-wire digital monitor. Now your customers and technicians can enjoy the benefit of local control without the problems often caused by override.

## SPECIFICATIONS

Operating Temp Range	-40 to 55 °C (-40 to 131 °F)
Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	600 Vac RMS

## WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 16 AWG; HOA monitor wires: 16 AWG

## V102 RESISTIVE MONITOR MAXIMUMS

Voltage Max.	13.4 Vac/dc
Current Max.	4mA AC/DC

## V103 Digital Monitor Maximums

Dry Circuit Contact Rating (Max.)	24 Vac/dc@100 mA
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## WARRANTY

Limited Warranty	5 years
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## Nipple mount

Can be mounted to any electrical enclosure, easing installation

## Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces, provides secure connections to wire nuts

## Protective cover

Conceals and protects the HOA switch, reducing the likelihood of tampering

## UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

## Sleek enclosure

Reduces the need for panel space

## Switch position monitors

Allows the control system to notify personnel when a load is inadvertently left ON or OFF (V102 and V103 models)

## APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

TYPICAL COIL PERFORMANCE		
Pull in Voltage	AC	DC
10 to 30 V	8	9
120 V	78	
208 to 277 V	154	
Drop Out Voltage		
10 to 30 V	2	3
120 V	18	
208 to 277 V	36	
Voltage	Coil Current	
	AC	DC
10 V	25 mA	14 mA
24 V	31 mA	16 mA
30 V	39 mA	18 mA
120 V	22 mA	
208 V	19 mA	
277 V	25A	

CONTACT RATINGS	
V101, V201, V101D*, V201D*	
Resistive	10 A @ 250 Vac
Motor	1/3 HP @ 120Vac
Gold Flash	Yes
V101, V201, V101D*, V201D*	
Resistive	10 A @ 277 Vac
Motor	1/3 HP @ 240 Vac
Gold Flash	Yes

\*each relay

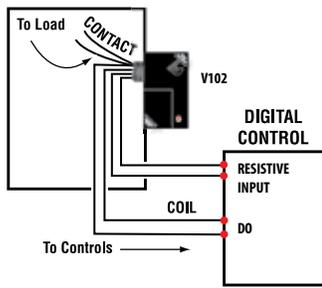
## AGENCY APPROVALS

Agency Approvals	UL 508
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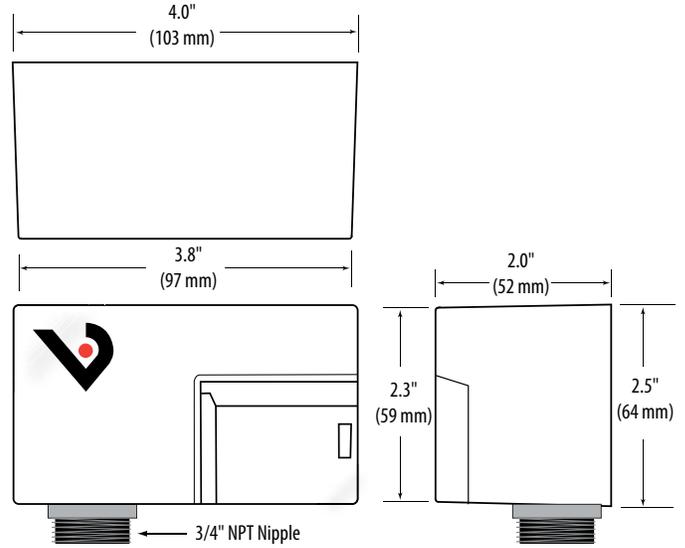


### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram

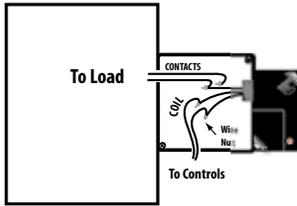


### DIMENSIONAL DRAWING



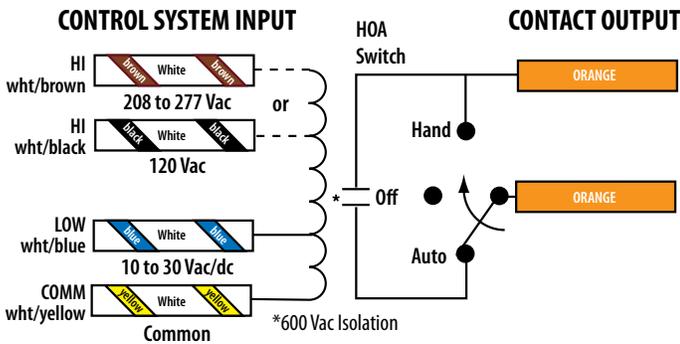
### NIPPLE MOUNT TO ANY 2X OR 4X ELECTRICAL BOX

Wiring Diagram



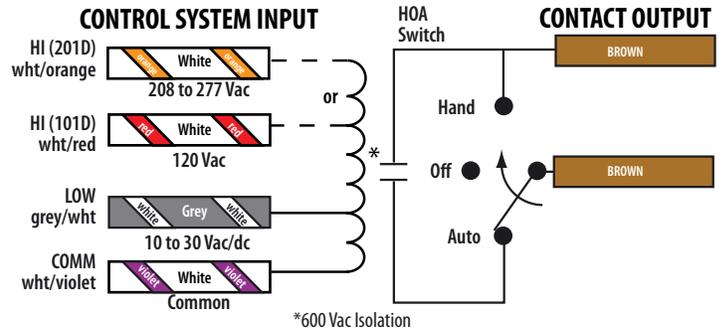
### PRIMARY

Wire Color Codes



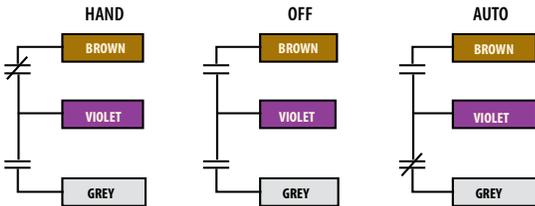
### RELAY #2 FOR V101D/V201D ONLY

Wire Color Codes



### V103 DIGITAL HOA POSITION MONITOR

Wire Color Codes

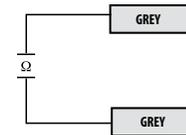


Switch Positions:  
 HAND = Brown wire closed to Common  
 OFF = Both wires open to Common  
 AUTO = Grey wire closed to Common  
 VIOLET = Common

### V102 RESISTIVE HOA POSITION MONITOR

Switch Positions:  
 HAND ~ 1.4 kΩ  
 OFF ~ 6.2 kΩ  
 AUTO ~ 3.4 kΩ

Cable Faults:  
 OPEN = Infinite Ω  
 SHORT ~ 0 Ω



### ORDERING INFORMATION

MODEL	RELAY	COIL	AMPERAGE RATING	HOA	HOA MONITOR	RELAY POWER LED	UL
V101	SPST, N.O.	10 to 30 Vac/dc, 120 Vac	10 A	•	None	•	•
V101D	2x SPST, N.O.	10 to 30 Vac/dc, 120 Vac		•	None	•	•
V102	SPST, N.O.	10 to 30 Vac/dc, 120 Vac		•	Resistive	•	•
V103	SPST, N.O.	10 to 30 Vac/dc, 120 Vac		•	Digital	•	•
V201	SPST, N.O.	10 to 30 Vac/dc, 208 to 277 Vac		•	None	•	•
V201D	2x SPST, N.O.	10 to 30 Vac/dc, 208 to 277 Vac		•	None	•	•



# VICTORY 300 & 400

DPDT Relays Provide Versatility



The Victory 300 and 400 Series 10A DPDT pilot duty enclosed relays combine industrial strength and ease of use. The nipple mount enclosure makes installation easy. With no need for a dedicated field enclosure, they are the ideal retrofit devices. One coil input controls the state of two pilot rated contacts for the simultaneous control of two devices or both poles of a single-phase circuit, e.g. motor loads. Field-selectable high and low voltage coil inputs provide on-site versatility.

## SPECIFICATIONS

Operating Temp Range	-34 to 60 °C (-29 to 140 °F)
Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	600 Vac RMS

## WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 16 AWG

## WARRANTY

Limited Warranty	5 years
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## AGENCY APPROVALS

Agency Approvals	UL 508
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## Nipple mount

Can be mounted to any electrical enclosure, easing installation

## Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces and provides secure connections to wire nuts

## Sleek enclosure

Reduces the need for panel space

## UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

## APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

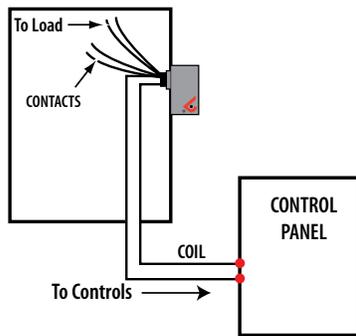
### CONTACT RATINGS

Resistive	10 A total of both poles, 250 Vac & 28 Vdc
Motor	1/8 HP @ 120 Vac

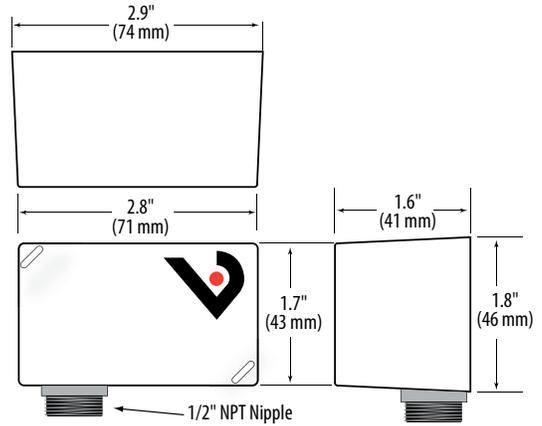


### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram

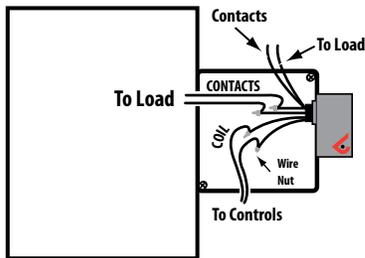


### DIMENSIONAL DRAWING

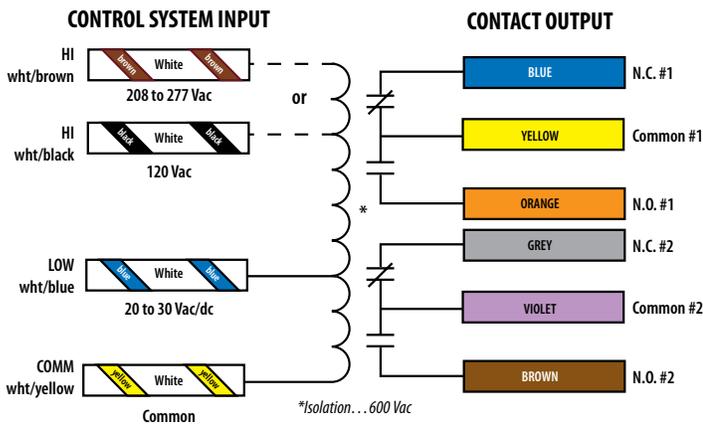


### NIPPLE MOUNT TO ANY 2X OR 4X ELECTRICAL BOX

Wiring Diagram



### WIRE COLOR CODES



### ORDERING INFORMATION

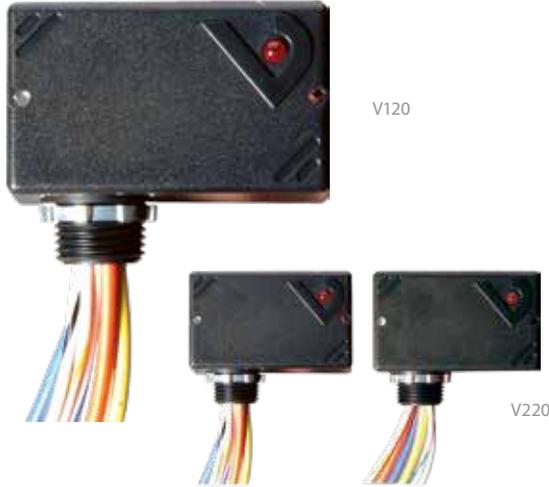
MODEL	RELAY	COIL	AMPERAGE RATING	RELAY POWER LED	UL
V300	DPDT	20 to 30 Vac/dc, 120 Vac	10 A	•	•
V400		20 to 30 Vac/dc, 208 to 277 Vac		•	•

Note: Some units are Plenum rated per UL 1995. For details, see White Paper VWP01, UL 1995 and Plenum Ratings, at [www.veris.com](http://www.veris.com).



# VICTORY 120 & 220

Great for External Mount Applications



## Nipple mount

Can be mounted to any electrical enclosure, easing installation

## Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces and provides secure connections to wire nuts

## HP ratings

Ideal for control of fractional HP motors

## UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

## Sleek enclosure

Reduces the need for panel space

The Victory 120 and 220 20 A SPDT enclosed relays combine a power duty relay with a high level of field-selectability and versatility. The devices are quick and easy to install using the threaded nipple mount. With no need for a dedicated field enclosure, this series is ideal for retrofit projects.

### APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

### SPECIFICATIONS

Operating Temp. Range	-34 to 55 °C (-29 to 131 °F)
Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	600 Vac RMS

### WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 12 AWG

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508
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### TYPICAL COIL PERFORMANCE

Voltage	Coil Current	
	AC	DC
24 V	75 mA	32 mA
120 V	42 mA	
208 V	36 mA	
277 V	49 mA	

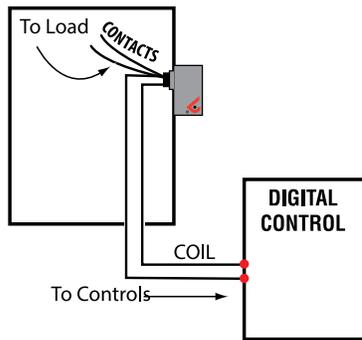
### CONTACT RATINGS

Resistive	20 A @ 277 Vac, 28 Vdc
Motor	120 Vac, 1 HP 277, 2 HP
Pilot Duty	A300
Ballast	277 Vac, 20 A N.O. 277 Vac, 10 A N.O.
Tungsten	120 Vac, 10 A N.O. 120 Vac, 2 A N.O.

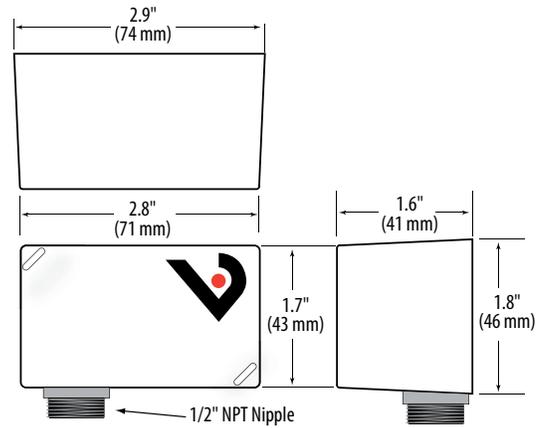


### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram

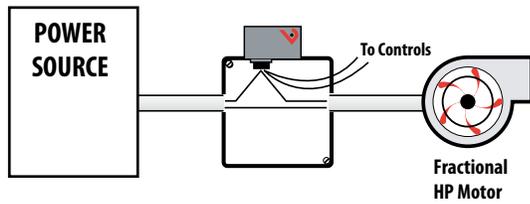


### DIMENSIONAL DRAWING

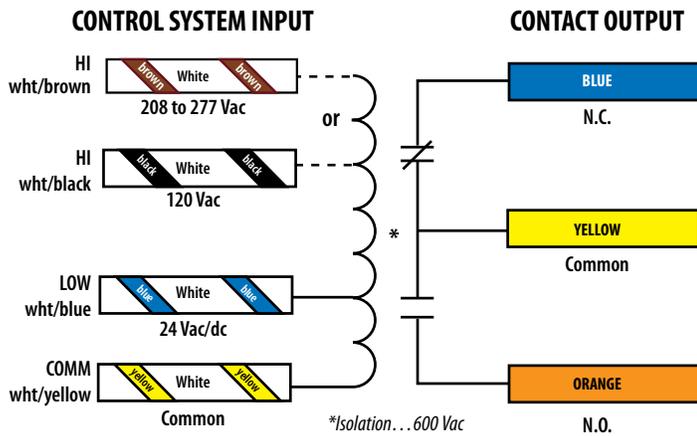


### NIPPLE MOUNT TO A 4X ELECTRICAL BOX

Wiring Diagram



### WIRE COLOR CODES



### ORDERING INFORMATION

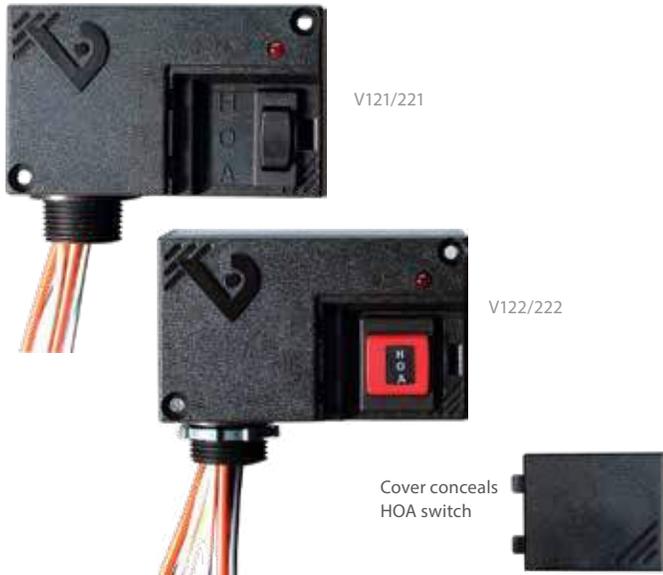
MODEL	RELAY	COIL	AMPERAGE RATING	RELAY POWER LED	UL
V120	SPDT	24 Vac/dc, 120 Vac	20 A	•	•
V220		24 Vac/dc, 208 to 277 Vac		•	•

Note: Some units are Plenum rated per UL 1995. For details, see White Paper VWP01, UL 1995 and Plenum Ratings, at [www.veris.com](http://www.veris.com).



# VICTORY 121, 122, & 123 SERIES

HOA Switch Provides Local Control



The Victory 121, 122, and 123 Series HOA relays have a concealed HOA switch for local control and troubleshooting with limited unauthorized switch manipulation. To further guard against control system override, the V122/V222 and V123/V223 are equipped with a monitored HOA. The V122/V222 provides a two-wire resistive output and the V123/V223 offers a three-wire digital monitor. Now you can enjoy the convenience of local control with none of the drawbacks.

## SPECIFICATIONS

Operating Temp. Range	-40 to 60 °C (-40 to 131 °F)
Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	277 Vac RMS

## WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 12 AWG; HOA monitor wires: 16 AWG

## V122/V222 RESISTIVE MONITOR MAXIMUMS

Voltage Max.	13.4 Vac/dc
Current Max.	4 mA AC/DC

## V123/V223 DIGITAL MONITOR MAXIMUMS

Dry Circuit Contact Rating (Max.)	24 Vac/dc@100 mA
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## WARRANTY

Limited Warranty	5 years
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## Protective cover

Conceals and protects the HOA switch, reducing the likelihood of tampering

## Nipple mount

Allows the V121 Series to be mounted to any electrical enclosure easing installation

## Switch position monitors

Allows the control system to notify personnel when a load is inadvertently left ON or OFF (V122/V222 & V123/V223 models)

## Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces and provides secure connections to wire nuts

## UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

## Sleek enclosure

Reduces the need for panel space

## APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

### TYPICAL COIL PERFORMANCE

Voltage	Coil Current	
	AC	DC
24 V	75 mA	32 mA
120 V	42 mA	
208 V	36 mA	
277 V	39 mA	

### CONTACT RATINGS

V121, V221	
Resistive	20 A @ 240 Vac
	8 A @ 28 Vdc
	12 A @ 14 Vdc
Motor	1 HP ! 120 Vac
V122, V123, V222, V223	
Resistive	20 A @ 240 Vac
	8 a @ 28 Vdc
	14 A @ 14 Vdc
Motor	1 HP @ 250 Vac

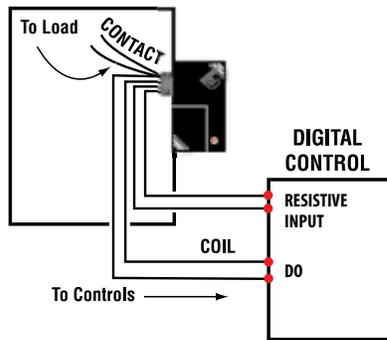
## AGENCY APPROVALS

Agency Approvals	UL 508
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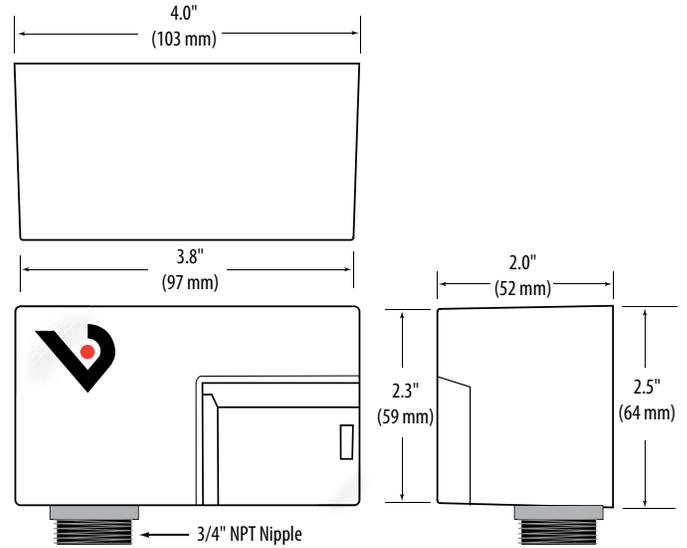


### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram

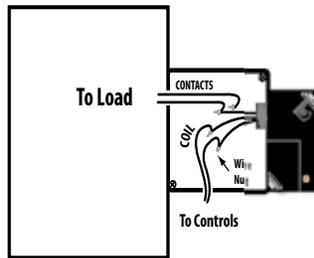


### DIMENSIONAL DRAWING

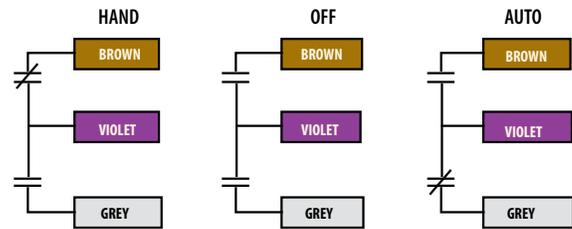


### NIPPLE MOUNT TO ANY 2X OR 4X ELECTRICAL BOX

Wiring Diagram



### V123/V223 DIGITAL HOA POSITION MONITOR

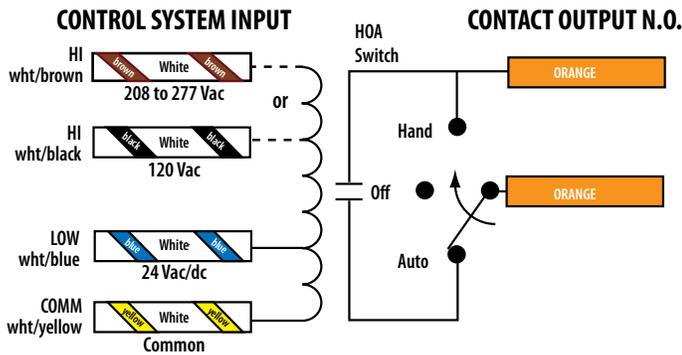


Switch Positions:

HAND = Brown wire closed to Common  
OFF = Both wires open to Common

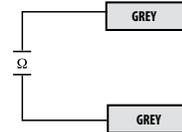
AUTO = Grey wire closed to Common  
VIOLET = Common

### WIRE COLOR CODES



### V122/V222 RESISTIVE HOA POSITION MONITOR

Switch Positions: Cable Faults:  
HAND ~ 1.4 kΩ OPEN = Infinite Ω  
OFF ~ 6.2 kΩ SHORT ~ 0 Ω  
AUTO ~ 3.4 kΩ



### ORDERING INFORMATION

MODEL	RELAY	COIL	AMPERAGE RATING	HOA	HOA MONITOR	RELAY POWER LED	UL
V121	SPST, N.O.	24 Vac/dc, 120 Vac	20 A	•	None	•	•
V122		24 Vac/dc, 120 Vac		•	Resistive	•	•
V123		24 Vac/dc, 120 Vac		•	Digital	•	•
V221		24 Vac/dc, 208 to 277 Vac		•	None	•	•
V222		24 Vac/dc, 208 to 277 Vac		•	Resistive	•	•
V223		24 Vac/dc, 208 to 277 Vac		•	Digital	•	•

Note: Some units are Plenum rated per UL 1995. For details, see White Paper VWP01, *UL 1995 and Plenum Ratings*, at [www.veris.com](http://www.veris.com).



# VICTORY 320 & 420

## DPDT Relays Provide Versatility



The Victory 320 and 420 DPDT power duty enclosed relays combine industrial strength and ease of use. With the nipple mount enclosure, installation could not be easier. The V320/V420 need no dedicated field enclosure, so they are the ideal retrofit devices. One coil input controls the state of two power rated contacts for the simultaneous control of two devices or both poles of a single-phase circuit, e.g. motor loads. Field-selectable high and low voltage coil inputs provide on-site versatility.

### SPECIFICATIONS

Operating Temp Range	-40° to 40°C (-40° to 104°F)
Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	277 Vac RMS

### WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 12 AWG; HOA monitor wires: 16 AWG

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508
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### Sleek enclosure

Reduces the need for panel space

### Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces and provides secure connections to wire nuts

### Nipple mount

Can be mounted to any electrical enclosure, easing installation

### UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

### APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

TYPICAL COIL PERFORMANCE		
Voltage	Coil Current	
	AC	DC
24 V	150 mA	64 mA
120 V	84 mA	
277 V	102 mA	

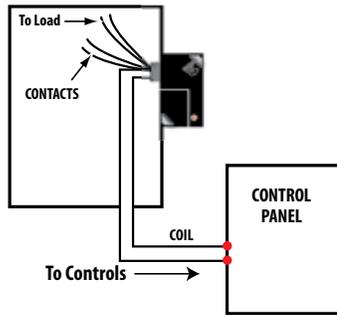
  

CONTACT RATINGS	
Resistive	20 A @ 277 Vac, 28 Vdc
Motor	120 Vac, 1 HP 277 Vac, 2 HP
Pilot Duty	A300
Ballast	20 A @ 277 Vac N.O. 10 A @ 277 Vac N.C.
Tungsten	10 A @ 120 Vac N.O. 2 A @ 120 Vac N.C.

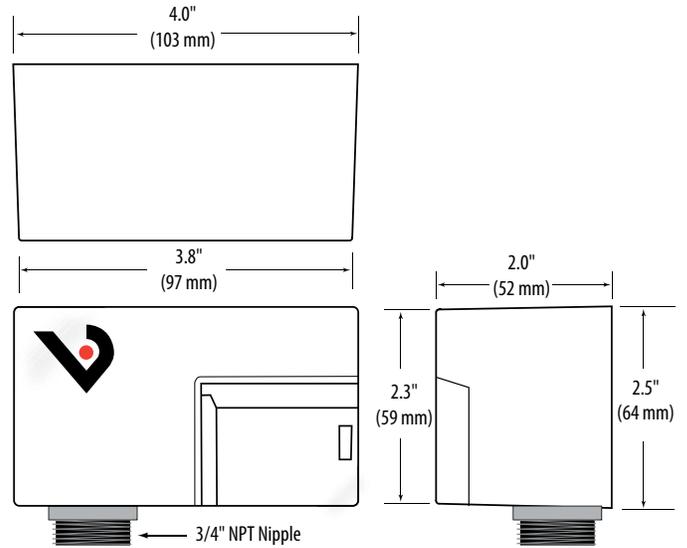


### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram

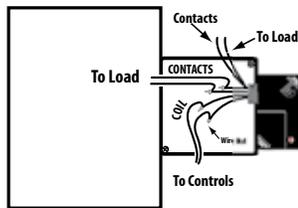


### DIMENSIONAL DRAWING

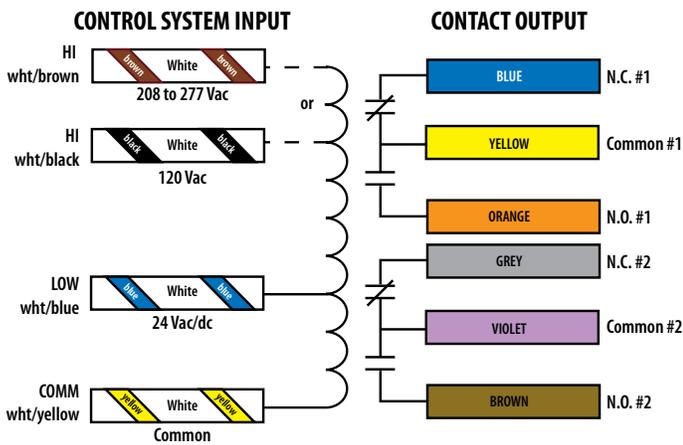


### NIPPLE MOUNT TO ANY 2X OR 4X ELECTRICAL BOX

Wiring Diagram



### WIRE COLOR CODES



### ORDERING INFORMATION

MODEL	RELAY	COIL	AMPERAGE RATING	RELAY POWER LED	UL
V320	DPDT	24 Vac/dc, 120 Vac	20 A	•	•
V420		24 Vac/dc, 208 to 277 Vac		•	•

Note: Some units are Plenum rated per UL 1995. For details, see White Paper VWP01, UL 1995 and Plenum Ratings, at [www.veris.com](http://www.veris.com).



# VICTORY 321 & 421

## HOA Switch Provides Local Control



The Victory 321 and 421 DPST power duty enclosed relays combine an industrial strength relay with installation flexibility. Use the nipple mount to attach to any enclosure. One coil input controls the state of two power rated contacts for simultaneous control of two devices or both poles of a single phase load. Each output is enabled with a Hand-Off-Auto switch for local control. The Victory series does not require a dedicated field enclosure, so it is ideal for retrofit projects. Field-selectable high and low voltage coil inputs provide on-site versatility.

### SPECIFICATIONS

Operating Temp. Range	-40 to 40 °C (-40 to 104 °F)
Operating Humidity Range	10 to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON=energized
Insulation Class	277 Vac RMS

### WIRE SPECIFICATIONS

Lead Length	14" (356 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 12 AWG; HOA monitor wires: 16 AWG

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508
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### Nipple mount

Can be mounted to any electrical enclosure, easing installation

### Flexible wire

Flexible tinned stranded wire... fits easily in tight spaces and provides secure connections to wire nuts

### Versatile ratings

Versatile coil and contact ratings minimize the number of models to choose

### UL508 Listed

Designed and listed for field installation...makes electrical inspection a snap

### Protective cover

Conceals and protects the HOA switch, reducing the likelihood of tampering

### Sleek enclosure

Reduces the need for panel space

### APPLICATIONS

- Command contactors
- Control motors
- Isolation
- Device interlocking
- Relay logic
- Sense voltages for alarm conditions

### TYPICAL COIL PERFORMANCE

Voltage	Coil Current	
	AC	DC
24 V	120 mA	64 mA
120 V	84 mA	
277 V	102 mA	

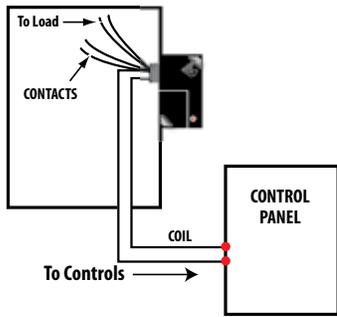
### CONTACT RATINGS

Resistive	20 A @ 240 Vac
	8 A @ 28 Vac
	14 A @ 14 Vac
Motor	120 Vac, 1 HP

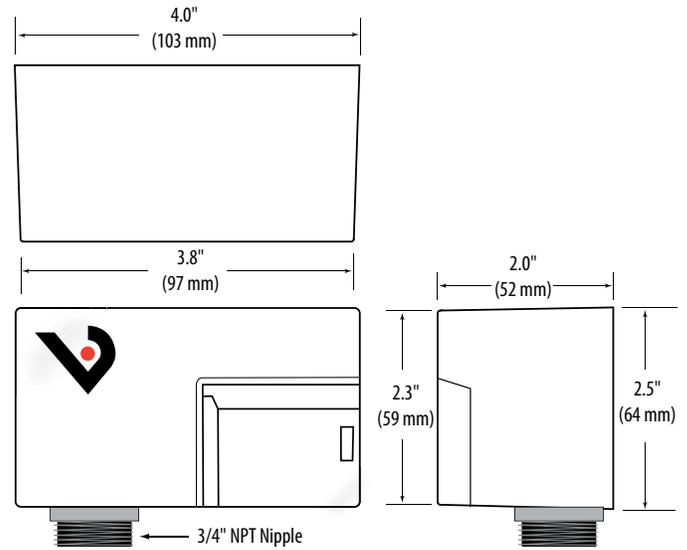


### NIPPLE MOUNT DIRECTLY TO A PANEL

Wiring Diagram

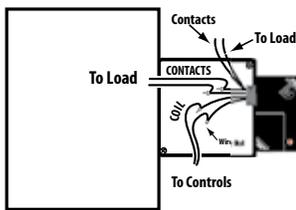


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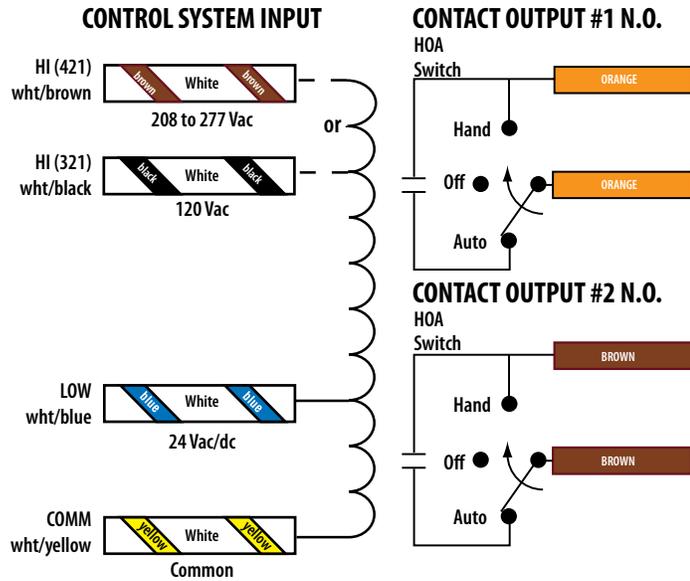


### NIPPLE MOUNT TO ANY 2X OR 4X ELECTRICAL BOX

Wiring Diagram



### WIRE COLOR CODES



### ORDERING INFORMATION

MODEL	RELAY	COIL	AMPERAGE RATING	HOA	RELAY POWER LED	UL
V321	DPST	24 Vac/dc, 120 Vac	20 A	•	•	•
V421		24 Vac/dc, 208 to 277 Vac		•	•	•

Note: Some units are Plenum rated per UL 1995. For details, see White Paper VWP01, *UL 1995 and Plenum Ratings*, at [www.veris.com](http://www.veris.com).



# VICTORY 645

10 A Relay in a Small Package for Tight Spaces



The Victory 645 is an economical, multi-purpose relay designed for control of loads up to 10 A. Its small size allows for space saving utility in panels and field enclosures.

## SPECIFICATIONS

Operating Temp. Range	0 to 60 °C (32 to 140 °F)
Operating Humidity Range	10% to 90% RH non-condensing
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Relay Status	LED ON = Energized
Dielectric Strength	1500 Vac RMS

### WIRE SPECIFICATIONS

Lead Length	10" (254 mm) min.
Gauge	UL1015; Coil: 18 AWG; Contacts: 16 AWG

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

Agency Approvals	UL 508
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## Economical

Economical multi-voltage relay

## Flexible

24 to 30 Vac/dc or 120 Vac coil input provides application flexibility

## Easy diagnostics

Status LED for visual indication

## Switching

Switch up to 10 A@250 Vac

## Mounting options

Ships with foam tape, mounting screw, and DIN rail clip

## APPLICATIONS

- Sense voltages for alarm conditions
- Relay logic
- Isolation
- For start/stop of small motors & contactors
- Device interlocking

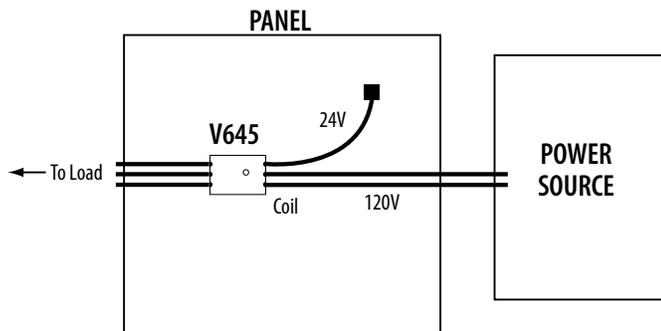
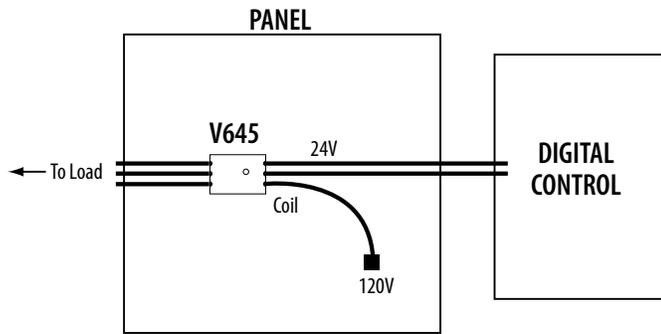
### TYPICAL COIL PERFORMANCE

Voltage	Coil Current	
	AC	DC
24 to 30 V	32 mA	13 mA
120 V	17 mA	

### CONTACT RATINGS

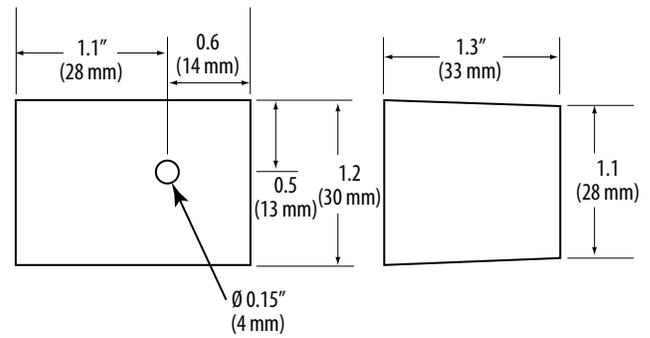
Resistive	10 A @ 250 Vac, N.O.
	7 A @ 250 Vac, N.C.
	6 A @ 277 Vac
	7 A @ 30 Vdc
Motor	125 Vac, 1/4 HP, H.P.

### WIRING DIAGRAMS

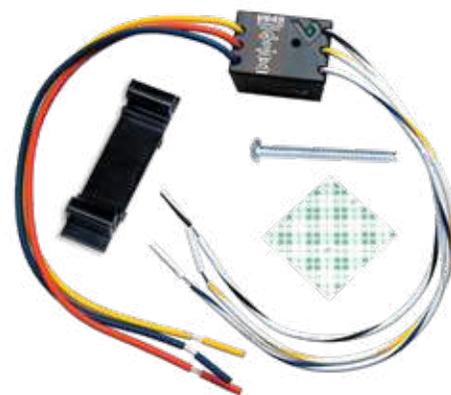


\* Wire is capped on unused option.

### DIMENSIONAL DRAWING

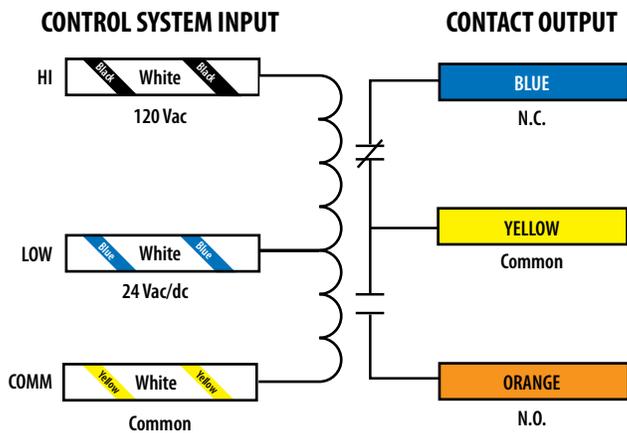


### MOUNTING METHOD



The V645 comes with a DIN rail clip, screw, and foam tape for a variety of mounting methods.

### WIRE COLOR CODES



### ORDERING INFORMATION

MODEL	RELAY	COIL	AMPERAGE RATING	RELAY POWER LED	UL
V645	SPDT	24 to 30 Vac/dc, 120 Vac	10 A	•	•



# VMD1B-C & VMD1B-F SERIES

Socket Relays in a Wide Range of Coil Voltages



## Color-coded pushbutton

Allows manual operation of relay, AC coils red or DC coils blue (-F Series only)

## Override lever

When activated, locks push-button and contacts in the powered position (-F Series only)

## LED status lamp

Shows coil "ON" or "OFF" status (-F Series only)

## Flag indicator

Shows relay status in manual or powered condition (-F Series only)

## 2-way mounting

Side or DIN rail mounting system...retrofits existing panel mounting and 35 mm DIN rail

The Veris VMD1B-C Series are SPDT blade-style relays for socket/DIN mounting. The DIN-rail compatible VBD1B-C sockets feature finger-safe terminals in a slim, attractive design.

The Veris VMD1B-F Series are full-featured SPDT blade style relays for socket/DIN mounting. The VMD1B-F Series are equipped with an LED for coil proof, a flag for contact proof, an override lever, and a push-to-test button for momentary contact control. The VMD1B-F allows for instant and conclusive troubleshooting. Never wonder if the relay, control system, or wiring is the cause of a problem. The DIN-rail-compatible VBD1B-F sockets feature a slim design with finger-safe terminals and a removable hold-down clip. Never struggle with wire clips again.

### TYPICAL COIL PERFORMANCE

Power Consumption	
AC Coils	0.9 VA
DC Coils	0.7 VA

### CONTACT RATINGS

Standard (F & C Series)	
Resistive	15 A @ 120 Vac
	15 A @ 277 Vac
	15 A @ 28 Vdc
Motor	1/3 @ 120 Vac
	3/4 @ 277 Vac
Pilot Duty	B300

## SPECIFICATIONS

Operating Temp. Range	-40 to 55 °C (-40 to 131 °F)
Coil Operating Range	85% to 110% of rated voltage
Coil Drop-out Voltage Threshold	15% of rated voltage
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Operating Time	20 msec typical
Dielectric Strength	1500 Vac RMS

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS

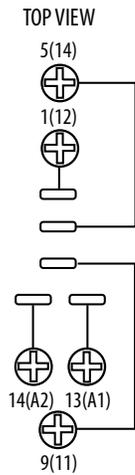


**VBD1B SOCKET**

Wiring Diagram

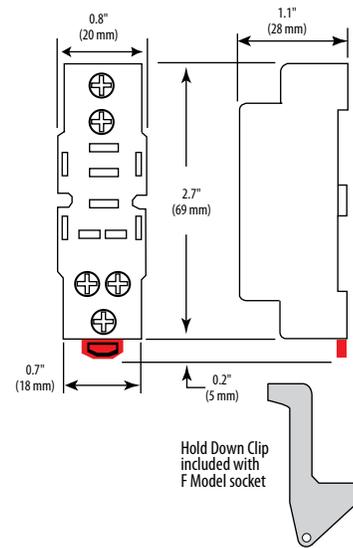
Function	NEMA (IEC) Terminal
Coil (+)*	14 (A2)
Coil (-)*	13 (A1)
COMM	9 (11)
N.O.	5 (14)
N.C.	1 (12)

\* NOTE: Observe polarity for relays with DC coil voltages only.



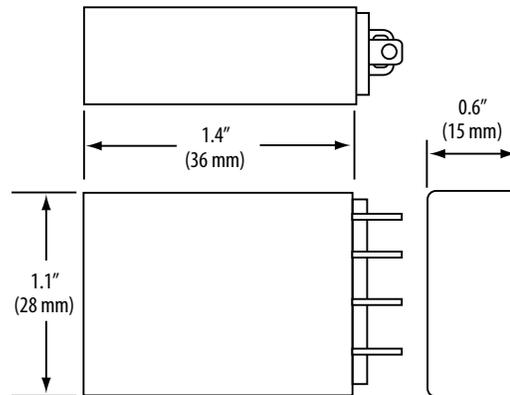
**VMD1B SOCKET**

Dimensional Drawing



**VMD1B RELAYS**

Dimensional Drawing



**ORDERING INFORMATION**

MODEL	RELAY TYPE	AMPERAGE RATING	COIL VOLTAGE	MIN. SWITCHING CURRENT	FULL FEATURED	UL	CE
VMD1B-C12D	SPDT	15 A	12 Vdc	100 mA@5 Vdc		•	•
VMD1B-C24D		15 A	24 Vdc	100 mA@5 Vdc		•	•
VMD1B-C24A		15 A	24 Vac	100 mA@5 Vdc		•	•
VMD1B-C120A		15 A	120 Vac	100 mA@5 Vdc		•	•
VMD1B-F12D		15 A	12 Vdc	100 mA@5 Vdc	•	•	•
VMD1B-F24D		15 A	24 Vdc	100 mA@5 Vdc	•	•	•
VMD1B-F24A		15 A	24 Vac	100 mA@5 Vdc	•	•	•
VMD1B-F120A		15 A	120 Vac	100 mA@5 Vdc	•	•	•

**SOCKET ORDERING INFORMATION**

MODEL	AMPERAGE RATING	VOLTAGE RATING	FINGER SAFE	HOLD DOWN CLIP	UL	CE
VBD1B-C	15 A	300 V	•		•	•
VBD1B-F			•	•	•	•

When relays and sockets are used together, amperage rating is the lesser of the two ratings.



# VMD2B-C & VMD2B-F SERIES

Socket Relays in a Wide Range of Coil Voltages



Veris VMD2B Series are DPDT blade-style relays for socket/DIN mounting.

The VMD2B-F is the full-featured model in a slim housing. The LED, the flag indicator, and the test button allow for worry-free operation and easy troubleshooting with minimal downtime. Never wonder where the problem is!

## SPECIFICATIONS

Operating Temp. Range	-40 to 55 °C (-40 to 131 °F)
Coil Operating Range	85% to 110% of rated voltage
Coil Drop-out Voltage Threshold	15% of rated voltage
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Operating Time	20 msec typical
Dielectric Strength	1500 Vac (RMS)

### WARRANTY

Limited Warranty	5 years
------------------	---------

### AGENCY APPROVALS



## Color-coded push button

Allows manual operation of relay, AC coils red or DC coils blue (-F Series only)

## Override lever

When activated, locks push-button and contacts in the powered position (-F Series only)

## LED status lamp

Shows coil "ON" or "OFF" status (-F Series only)

## Flag indicator

Shows relay status in manual or powered condition (F Series only)

## 2-way mounting

Side or DIN rail mounting system...retrofits existing panel mounting and 35 mm DIN rail

### TYPICAL COIL PERFORMANCE

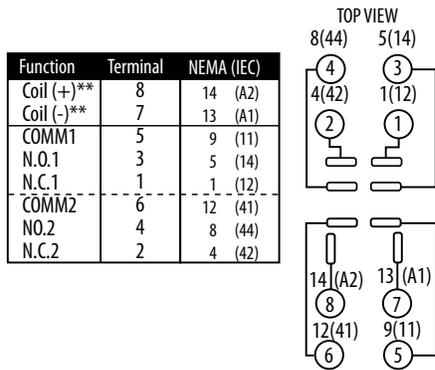
	Power Consumption
AC Coils	1.2 VA
DC Coils	0.9 W

### CONTACT RATINGS

Standard (F & C Series)	
Resistive	15 A @ 120 Vac
	12 A @ 277 Vac
	12 A @ 28 Vdc
Motor	1/2 HP @ 120 Vac
	1 HP @ 250 Vac
Pilot Duty	B300

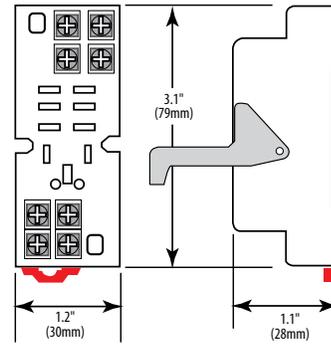
**VBD2B SOCKET**

Wiring Diagram



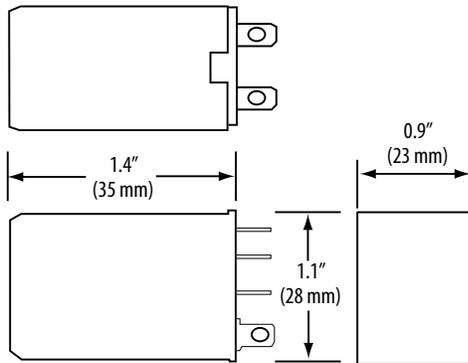
**VBD2B-F SOCKET**

Dimensional Drawing



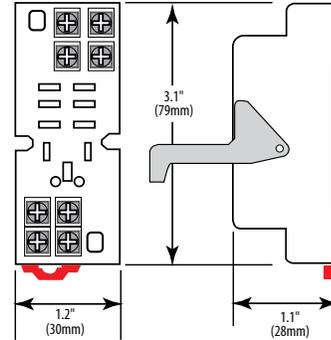
**VMD2B RELAY**

Wiring Diagram



**VBD2B-F SOCKET**

Dimensional Drawing



**ORDERING INFORMATION**

MODEL	RELAY TYPE	AMPERAGE RANGE	COIL VOLTAGE	MIN. SWITCHING CURRENT	FULL FEATURED	UL	CE
VMD2B-C12D	DPDT	15 A	12 Vdc	100 mA@5 Vdc		•	•
VMD2B-C24D		15 A	24 Vdc	100 mA@5 Vdc		•	•
VMD2B-C24A		15 A	24 Vac	100 mA@5 Vdc		•	•
VMD2B-C120A		15 A	120 Vac	100 mA@5 Vdc		•	•
VMD2B-F12D		15 A	12 Vdc	100 mA@5 Vdc		•	•
VMD2B-F24D		15 A	24 Vdc	100 mA@5 Vdc		•	•
VMD2B-F24A		15 A	24 Vac	100 mA@5 Vdc		•	•
VMD2B-F120A		15 A	120 Vac	100 mA@5 Vdc		•	•
VMD2B-F240A		15 A	240 Vac	100 mA@5 Vdc		•	•

**SOCKET ORDERING INFORMATION**

MODEL	AMPERAGE RATING	VOLTAGE RATING	FINGER SAFE	HOLD DOWN CLIP	UL	CE
VBD2B-F	20 A	300 V	•	•	•	•

When relays and sockets are used together, amperage rating is the lesser of the two ratings.



# VMD3B & VMD3B-C SERIES

Socket Relays with a Wide Range of Features and Coil Voltages



The VMD3B Series are 3PDT blade-style relays for socket/DIN mounting.

The standard VMD3B-C model is economical and reliable. The full-featured VMD3B-F includes an LED and a flag indicator for convenient status viewing and a push-button test feature for easy troubleshooting. The finger-safe sockets reduce risk, and the hold-down clip keeps the device secure. Enhanced safety and dependability.

## SPECIFICATIONS

Operating Temp. Range	-40 to 55 °C (-40 to 131 °F)
Coil Operating Range	85% to 110% of rated voltage
Coil Drop-out Voltage Threshold	15% of rated voltage
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Operating Time	20 msec typical
Dielectric Strength	1500 Vac RMS

## WARRANTY

Limited Warranty	5 years
------------------	---------

## AGENCY APPROVALS



## Color-coded push buttons

Allows manual operation of relay. AC coils red, DC coils blue. (-F Series only)

## 2-way mounting

Side or DIN rail mounting system...retrofits existing panel mounting and 35 mm DIN rail

## Override lever

When activated, locks push button and contacts in the powered position (-F Series only)

## I.D. tag

I.D. tag/write-on plastic label... used for identification of relays in multi-relay circuits (-F Series only)

## Flag indicator

Shows relay status in manual or powered condition (-F Series only)

## LED status lamp

Shows coil "ON" or "OFF" status (-F Series only)

## TYPICAL COIL PERFORMANCE

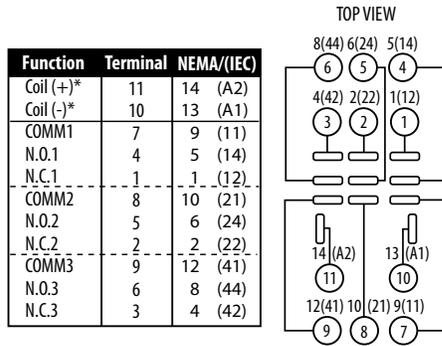
Power Consumption	
AC Coils	1.2 VA
DC Coils	1.4 W

## CONTACT RATINGS

Resistive	15 A @ 120 Vac
	12 A @ 277 Vac
	12 A @ 28 Vdc
Motor	1/2 HP @ 120 Vac
	3/4 HP @ 250 Vac
Pilot Duty	B300

### VBD3B SOCKET

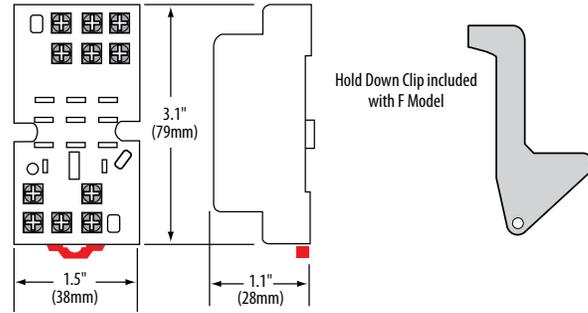
Wiring Diagram



\*Observe polarity for relays with DC coil voltages only

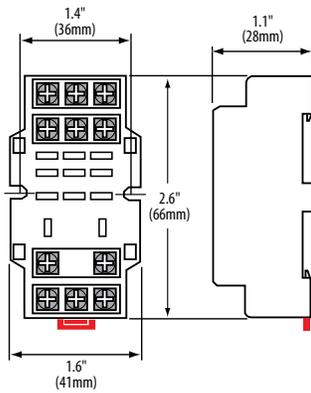
### VBD3B-F SOCKET

Wiring Diagram



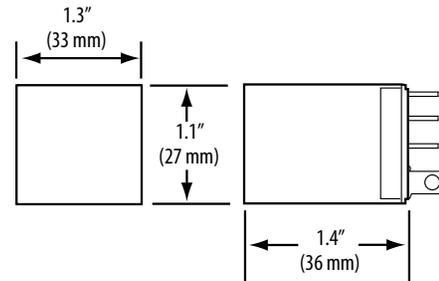
### VBD3B-C SOCKET

Wiring Diagram



### VMD3B RELAY

Wiring Diagram



### ORDERING INFORMATION

MODEL	RELAY TYPE	AMPERAGE RANGE	COIL VOLTAGE	MIN. SWITCHING CURRENT	FULL FEATURED	UL	CE	
VMD3B-C24D	3PDT	10 A	24 Vdc	100 mA@5 Vdc		•	•	
VMD3B-C24A			24 Vac			•	•	
VMD3B-C120A			120 Vdc			•	•	
VMD3B-F24D		15 A	24 Vdc			•	•	•
VMD3B-F24A			24 Vac			•	•	•
VMD3B-F120A			120 Vac			•	•	•

### SOCKET ORDERING INFORMATION

MODEL	AMPERAGE RATING	VOLTAGE RATING	FINGER SAFE	HOLD DOWN CLIP	UL	CE
VBD3B-F	16 A	300 V	•	•	•	•

When relays and sockets are used together, amperage rating is the lesser of the two ratings.

# VMD4B & VMD4B-C SERIES

Socket Relays with a Wide Range of Features and Coil Voltages



The Veris VMD4B Series are 4PDT blade-style relays for socket/DIN mounting. Both the full-featured and standard DIN rail sockets are compatible with both the VMD4B-C and VMD4B-F relays and feature a slim, attractive design.

The standard VMD4B-C model is economical and reliable. The full-featured VMD4B-F includes an LED and a flag indicator for convenient status viewing and a push-button test feature for easy troubleshooting. The finger-safe sockets reduce risk, and the hold-down clip keeps the device secure. Enhanced safety and dependability.

## SPECIFICATIONS

Operating Temp. Range	-40 to 55 °C (-40 to 131 °F)
Coil Operating Range	85% to 110% of rated voltage
Coil Drop-out Voltage Threshold	15% of rated voltage
Expected Relay Life	Electrical (@ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Operating Time	20 msec typical
Dielectric Strength	1500 Vac RMS

### WARRANTY

Limited Warranty	5 years
------------------	---------

### AGENCY APPROVALS



## Color-coded pushbuttons

Allows manual operation of relay. AC coils red, DC coils blue. (-F Series only)

## 2-way mounting

Side or DIN rail mounting system...retrofits existing panel mounting and 35 mm DIN rail

## Override lever

When activated, locks pushbutton and contacts in the powered position (-F Series only)

## ID tag

ID tag/write-on plastic label... used for identification of relays in multi-relay circuits (-F Series only)

## Flag indicator

Shows relay status in manual or powered condition (-F Series only)

## LED status lamp

Shows coil "ON" or "OFF" status (-F Series only)

### TYPICAL COIL PERFORMANCE

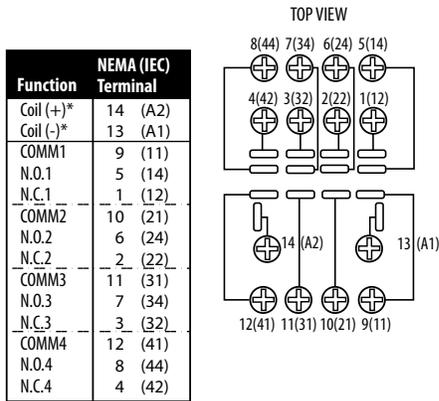
Power Consumption	
AC Coils	1.5 VA
DC Coils	1.5 W

### CONTACT RATINGS

Resistive	10 A @ 120 Vac
	10 A @ 277 Vac
	10 A @ 28 Vdc
Motor	1/3 HP @ 120 Vac
	1/2 HP @ 250 Vac
Pilot Duty	B300

**VBD4B SOCKET**

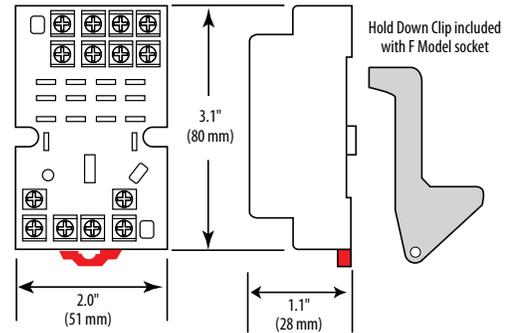
Wiring Diagram



\*Observe polarity for relays with DC coil voltages only

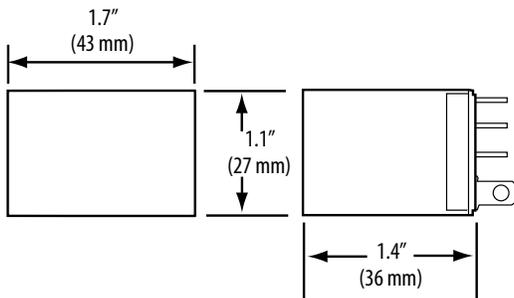
**VBD4B-F SOCKET**

Dimensional Drawing



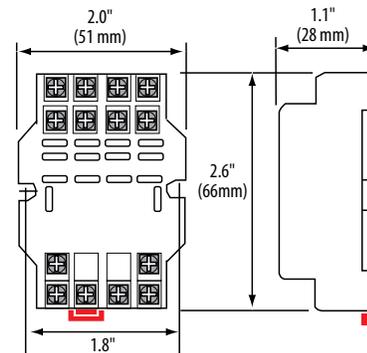
**VMD4B RELAY**

Dimensional Drawing



**VBD4B-F SOCKET**

Dimensional Drawing



**ORDERING INFORMATION**

MODEL	RELAY TYPE	AMPERAGE RANGE	COIL VOLTAGE	MIN. SWITCHING CURRENT	FULL FEATURED	UL	CE
VMD4B-C24D	4PDT	10 A	24 Vac	100 mA@5 Vdc		•	•
VMD4B-C24A			24 Vac			•	•
VMD4B-C120A			120 Vac			•	•
VMD4B-F24D			24 Vdc		•	•	•
VMD4B-F24A			24 Vac		•	•	•
VMD4B-F120A			120 Vac		•	•	•

**SOCKET ORDERING INFORMATION**

MODEL	AMPERAGE RATING	VOLTAGE RATING	FINGER SAFE	HOLD DOWN CLIP	UL	CE
VBD4B-C	10 A	300 V			•	•
VBD4B-F	10 A		•	•	•	•

When relays and sockets are used together, amperage rating is the lesser of the two ratings.

ACCESSORIES P. 324



# VS861 SERIES

Higher Reliability than Electromagnetic Relays



VS861210DC

The DIN-mountable VS861 Series Solid State Relay with an internal heat sink is the first complete solid state relay available in a modular package.

A SSR (solid state relay) can perform many of the same tasks as an electromechanical relay. The SSR differs in that it contains no moving mechanical parts. It is essentially an electronic device that relies on the electrical, magnetic, and optical properties of semiconductors and electrical components to achieve its isolation and relay switching function.

## SPECIFICATIONS

### OUTPUT CHARACTERISTICS

Switching Voltage	VS861210DC(AC) & VS861208DC(AC): 24 to 280 Vac, VS861208DD: 3 to 150 Vdc
Maximum Zero Turn-on Voltage (Vpk)	VS861210DC(AC) & VS861208DC(AC): 35 V
Maximum Rate of Rise Off State Voltage (dv/dt)	VS861210DC(AC): 500 V/μS, VS861208DC: 475 V/μS, VS861208AC: 350 V/μS
Incandescent Lamp Ampere Rating (RMS)	VS861210DC(AC): 8 A, VS861208DC(AC): 5 A
Motor Load Rating (RMS)	VS861210DC(AC): 4.5 A, VS861208DC(AC): 3 A
Min. Load Current to Maintain On	VS861210DC(AC): 50 mA, VS861208DC(AC): 150 mA, VS861208DD: 20 mA
Non-Repetitive Surge Current (1 cycle)	VS861210DC(AC): 500 A, VS861208DC(AC): 200 A, VS861208DD: 35 A
Max. RMS Overload Current (1 sec.)	VS861210DC(AC) & VS861208DC: 24 A, VS861208(DD): 17 A
Max. Off State Leakage Current (RMS)	10 mA
Typical On State Voltage Drop (RMS)	1.25 Vac
Max. On State Voltage Drop (RMS)	VS861210DC(AC) & VS861208DC(AC): 1.6 Vac, VS861208DD: 1.6 Vdc

### INPUT CHARACTERISTICS

Must Release Voltage	VS861210DC, VS861208DC, & VS861208DD: 1 Vdc, VS861210AC & VS861208AC: 10 Vac
----------------------	--

## No moving parts

No moving parts to wear or fail

## EMI

Reduced EMI

## Contacts

No contact bounce or arcing contacts

## Long life

Longer life than electromechanical relays

## Superior performance

Fast response time and high frequency of on/off cycling

## APPLICATIONS

- Lighting
- Instrumentation systems and alarm systems
- Traffic control
- Industrial automation

SP (Nominal) Input Impedance	VS861210DC, VS861208DC, & VS861208DD: Current Regulator; VS861210AC & VS861208AC: 16 to 25 kΩ
Typical Input Current @ 5 Vdc or 240 Vac	VS861210DC: 16 mA, VS861210AC, VS861208DC(AC), & VS861208DD: 12 mA
Reverse Polarity Protection	VS861210DC, VS861208DC, & VS861208DD: Yes

### OTHER CHARACTERISTICS

Operating Time (Response Time)	VS861210DC & VS861208DC: 8.3 msec; VS861210AC & VS861208AC: 40 msec; VS861208DD: 5 msec
Release Time	VS861210DC & VS861208DC: 8.3 msec; VS861210AC & VS861208AC: 80 msec; VS861208DD: 5msec
Rated Insulation Voltage/ Dielectric Strength	2500 Vac
Operating Temp Range	-30 to 80 °C (-22° to 176 °F)
Thermal Resistance (Junction to Case)	VS861210DC(AC): 0.66 °C/W, VS861208DC(AC): 2.0 °C/W, VS861208DD: 0.5 °C/W
Integral Heat Sink	4.0 °C/W

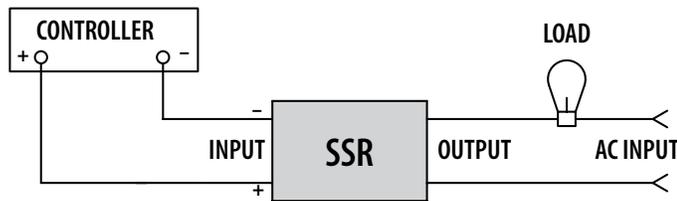
### WARRANTY

Limited Warranty	5 years
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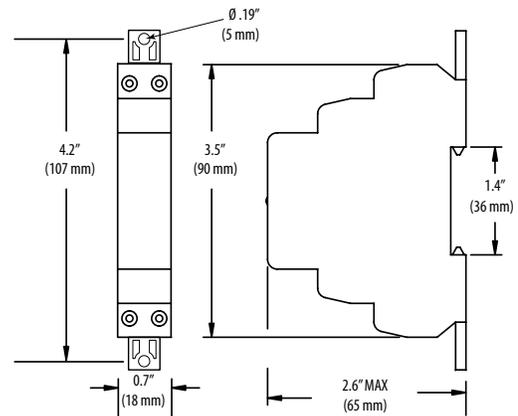
### AGENCY APPROVALS



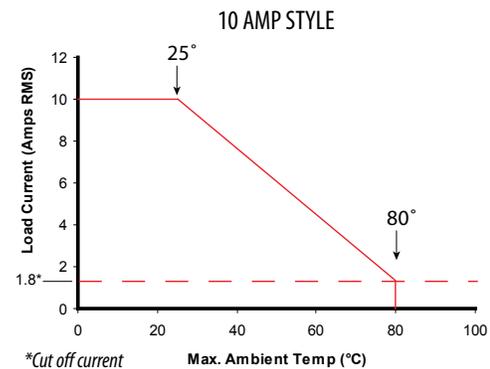
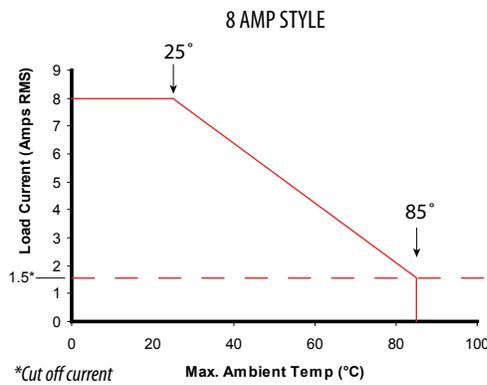
**WIRING DIAGRAM**



**DIMENSIONAL DRAWINGS**



**AMPERAGE DERATING FOR TEMPERATURE**



**LOAD CONSIDERATIONS**

The primary concern when using SSRs is improper heat sinking. The type of load current should be evaluated when considering an SSR as a switching option. SSRs alone are not compatible with high inrush currents, but cautionary measures can be taken in high inrush applications to increase the SSR's versatility, see table at right.

LOAD TYPE	CAUTIONARY ACTION
All Load Types	Verify that the inrush current does not exceed the surge specifications of the SSR.
Steady-state Resistance	Consider thermal management. Assure device temperature will remain in safe operating area.
DC (Inductive)	Place a diode across the load to absorb surges during turnoff.
Incandescent Lamp	Use a zero voltage turn-on type.
Capacitive	Verify that the rate of current rise capabilities are not exceeded. Zero voltage turn-on is an effective method for limiting this rate.
Motors and Solenoids	Use a current shunt and oscilloscope to examine the duration of the inrush current. Verify that back EMF does not create an overvoltage situation during turn-off.
Transformers	Use a zero cross turn-on device; verify that the half cycle surge capability is not exceeded. Rule of thumb: select an SSR with a half cycle current surge rating greater than the maximum applied line voltage divided by the transformer primary resistance.

**ORDERING INFORMATION**

MODEL	RELAY	AMPERAGE RATING	INPUT VOLTAGE	SWITCHING DEVICE	SWITCHING VOLTAGE	SWITCHING TYPE	UL	CE
VS861210DC	SPST, N.O.	10 A	3 to 32 Vdc	SCR	24 to 280 Vac	Zero Cross	•	•
VS861210AC		10 A	90 to 280 Vac, 80 to 140 Vdc	SCR	24 to 280 Vac	Zero Cross	•	•
VS861208DC		8 A	3 to 32 Vdc	Triac	24 to 280 Vac	Zero Cross	•	•
VS861208AC		8 A	90 to 280 Vac, 80 to 140 Vdc	Triac	24 to 280 Vac	Zero Cross	•	•
VS861208DD		8 A	3.5 to 32 Vdc	MOSFET	3 to 150 Vdc	DC Switching	•	•



# VTD SERIES



## Thumb wheel adjustment

VTD2P-F50 has thumb wheel adjustment for function and timing accuracy

## Solid state relays

VTD1P/2P-UNI models are made with solid state relays for greater reliability

## Housing options

Two different housings provide multiple mounting options

The Veris VTD Series are multi-function time delay relays equipped with an external control switch input and designed for easy socket/DIN mounting. The VTD2P-F50 includes five functions shown at left, while the VTD1P-UNI and VTD2P-UNI include the same five as the VTD2P-F50 plus five more, for the most versatile relay available. Save inventory costs by purchasing one relay for all the functions you need.

### SPECIFICATIONS

Operating Range	85% to 110% of nominal voltage
Drop-Out Voltage Threshold	15% of nominal voltage
Expected Relay Life	Electrical (resistive @ rated current) 100,000 cycles; Mechanical (unpowered) 10,000,000 cycles
Dielectric Strength	1000 Vac RMS
Operating Temp Range	-20 to 55 °C (-4 to 131 °F)

### WARRANTY

Limited Warranty	5 years
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### AGENCY APPROVALS



\*The CE mark indicates RoHS2 compliance.

### TYPICAL COIL PERFORMANCE

	Power Consumption
AC Coils	1.5 VA
DC Coils	2 w

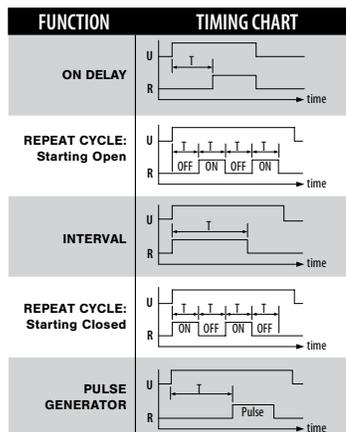
### CONTACT RATINGS

(VTD2P-F50)	
Resistive	12 A @ 240 Vac, 30 Vdc
Pilot Duty	B300
(VTD1p-UNI, VTD2P-UNI)	
Resistive	15A @ 240 Vac, 24 Vdc
Motor	1/2 HP @ 120 Vac; 1 HP @ 240 Vac

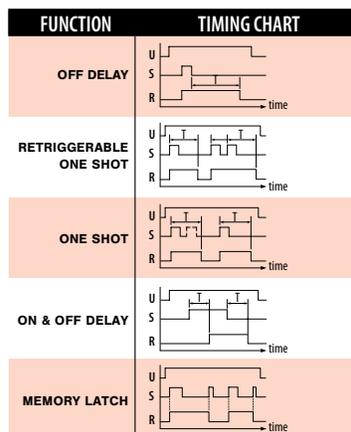
### TIMING CHARACTERISTICS

	VTD2P-F50	VTD1P-UNI, VTD2P-UNI
Function Available	5	10
Time Ranges		
0.1 sec	0 to 999	1 to 10
sec	0 to 999	1 to 10
0.1 min	0 to 999	1 to 10
min	0 to 999	1 to 10
0.1 hr	0 to 999	1 to 10
hr	0 to 999	1 to 10
10 hr	0 to 999	---
0.1 day	---	1 to 10
day	---	1 to 10
Tolerance (mechanical setting)	0%	5%
Repeatability	0.1%	0.2%
Operate Time (max)	25ms	no spec
Rest Time (max)	150 ms	150 ms
Trigger Pulse Length (min)	---	50 ms

### POWER TRIGGER



### SWITCH TRIGGER

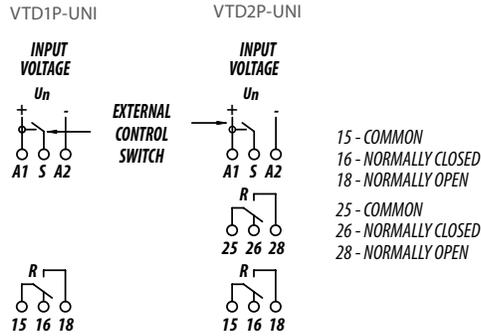


U: Input voltage (power supply) S: Control switch (open or closed)  
R: Relay contacts (on or off) T: Setting time



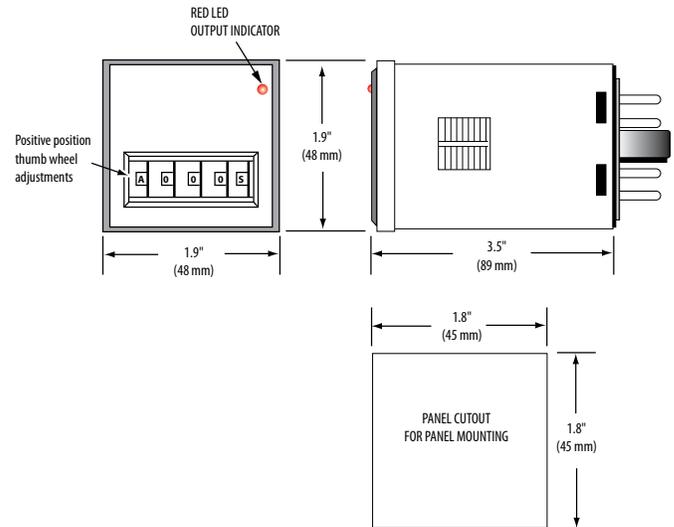
### VTD1P-UNI/VTD2P-UNI

Dimensional Drawing



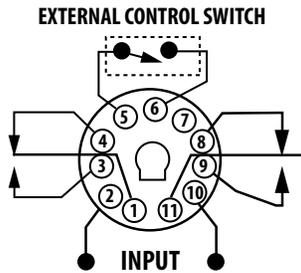
### VTD2P-F50

Dimensional Drawing



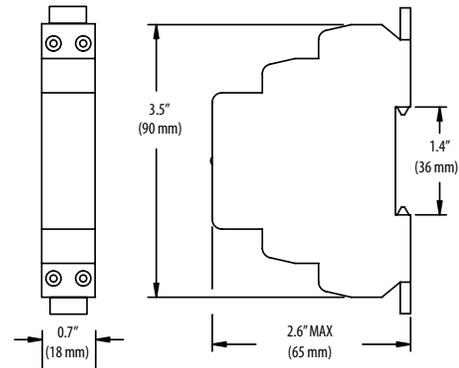
### VTD2P-F50

Wiring Diagram



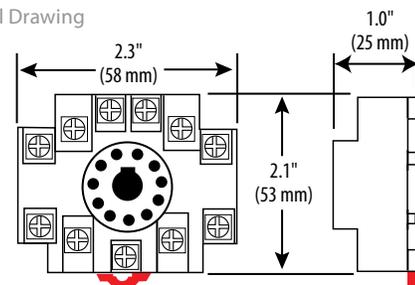
### VTD1P-UNI/VTD2P-UNI

Dimensional Drawing



### VBD3P-C

Dimensional Drawing



### RELAY ORDERING INFORMATION

MODEL	RELAY STYLE	NO. OF FUNCTIONS	AMPERAGE RANGE	COIL VOLTAGE	MIN. SWITCHING CURRENT	UL	CE
VTD2P-F50	DPDT	5	12	24 to 240 Vac/dc	100 mA@5 Vdc	Recognized*	•
VTD1P-UNI	SPDT	10	15	24 to 240 Vac/dc		Listed	•
VTD2P-UNI	DPDT	10	15	24 to 240 Vac/dc		Listed	•

\*UL Listed when used with Veris sockets.

### SOCKET ORDERING INFORMATION

MODEL	AMPERAGE RATING	VOLTAGE RATING	UL	CE
VBD3P-C	15 A	300	•	•

When relays and sockets are used together, the overall amperage rating is the lesser of the two ratings.



## ACCESSORIES SELECTION GUIDE: RELAYS

Product	Description	VST10 & 100	VST120	VMD1B-C & VMD1B-F	VMD2B-C & VMD2B-F	VMD3B-C & VMD3B-F	VMD4B-C & VMD4B-F
AV01	35 mm DIN Rail - 1 Meter Length			•	•	•	•
AV02	DIN Rail Stop Clip			•	•	•	•
AV05	2.75" SNAPTRACK, 2" Length	•	•				



**AV01**  
35 mm DIN Rail - 1 Meter Length



**AV02**  
DIN Rail Stop Clip



**AV05 (2.75")**  
2.75" SNAPTRACK, 2" Length





# POWER SOURCES

Veris provides a wide range of AC or DC output power supplies. Veris AC transformers are available with or without a circuit breaker and with single or dual threaded hubs. All come standard with foot mounting flanges and flying lead terminations. Capacities range from 20 to 375 VA. Veris offers a line of low heat generating, fully enclosed DC power supplies as well. These sleek DIN mount units are available in 12 or 24 Vdc outputs from 7.5 to 90 Watts in capacity.

MODEL	DESCRIPTION	PAGE
PS	Power Supplies	317
X	Control Transformers	319

## POWER SOURCES SELECTION GUIDE

DC Power Supply	PS* page 317
Control Transformers	X* page 319

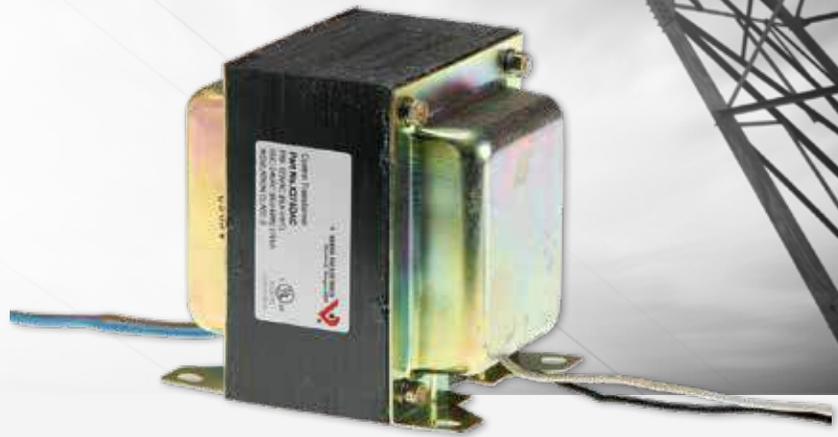
\* Indicates a series of products

# A CONVENIENT SOURCE OF AC CONTROL POWER FOR HVAC CONTROL AND BUILDING AUTOMATION APPLICATIONS

X Series Control Transformers

## APPLICATIONS

- » Controller power
- » Driving relays and other digital I/O circuits
- » Powering sensors



## FEATURES

### FLEXIBILITY YOU WANT

Multiple hub/foot mounting and voltage options available

### CERTIFICATION YOU NEED

UL Listings for all models

### RIGHT PRODUCT FOR THE JOB

Current limiting options available



# PS SERIES

## PS Series Switching Power Supplies



PS Series  
Capable of supplying up to 90 Watts  
(AV01 DIN rail not included)

### Up to 90 W

High efficiency switching power supply capable of supplying up to 90 W

### DIN rail mounting

Easy installation

### Loop power

Ideal for supplying loop power to Veris power transducers and current sensors

### Small size

Saves panel space

### Universal voltage input

Universal voltage input from 100 to 240 Vac/110 to 340 Vdc

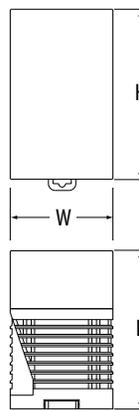
### High efficiency

Won't generate excessive heat in control panel

### SPECIFICATIONS

Input Voltage (except PSxx-100W)	100 to 240 Vac (85 to 264 Vac), 50/60Hz (47 to 63 Hz); 110 to 340 Vdc (105 to 370 Vdc)
Input Voltage (PSxx-100W)	100 to 120/200 to 240 Vac, Jumper Selectable 50/60 Hz (47 to 63 Hz); 240 to 370 Vdc
Input Current (Typical @100 Vac)	
7.5 W (12 and 24 Vdc)	0.18 A
15 W (12 and 24 Vdc)	0.35 A
30 W (12 and 24 Vdc)	0.7 A
60 W	1.3 A
90 W	1.1 A
Inrush Current (100 Vac)	15 A (7.5 W) 18 A (15 W and up)
Overcurrent Protection	105% min. auto-reset
Ripple	24 V, 4% P-P 12 V, 6% P-P
Leakage Current	120 Vac, 0.5 mA max. 230 Vac, 1.0 mA max.
Output Current (12 V Models)	
7.5 W	0.6 A
15 W	1.3 A
30 W	2.5 A
Output Current (24 V Models)	
7.5 W	0.3 A
15 W	0.65 A
30 W	1.3 A
60 W	2.5 A
90 W	3.75 A
Operating Temperature	-25 to 75 °C (-13 to 167 °F)
Operating Humidity	20 to 90% RH non-condensing
Storage Temperature	-25 to 75 °C (-13 to 167 °F)

### DIMENSIONAL DRAWING



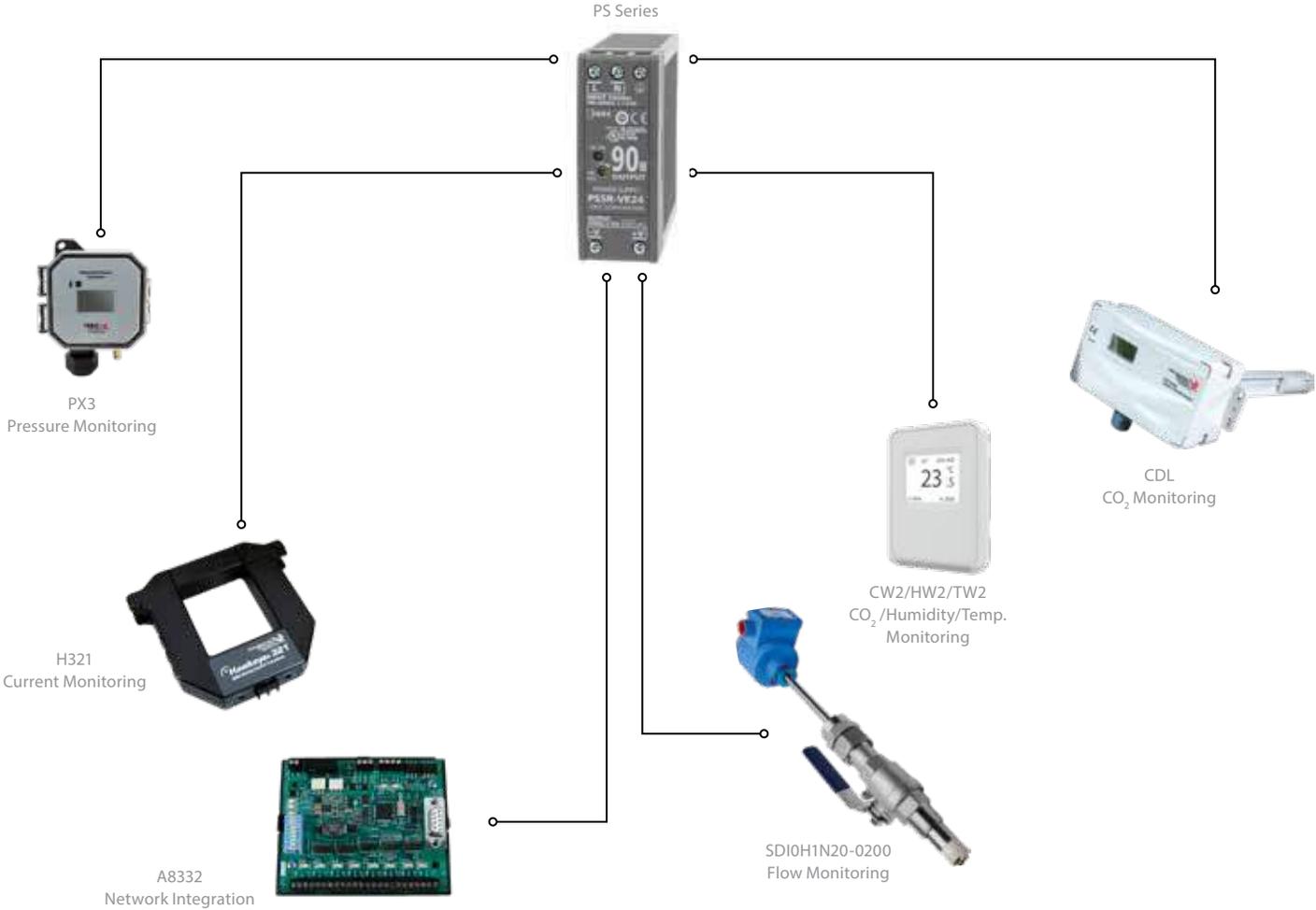
	H	W	D	WEIGHT (APPROX.)
7.5 W	3.0" (75 mm)	1.9" (45 mm)	2.8" (70 mm)	130 g
15 W	3.6" (90 mm)	0.9" (22.5 mm)	3.8" (95 mm)	140 g
30 W	3.6" (90 mm)	0.9" (22.5 mm)	3.8" (97 mm)	150 g
60 W	3.8" (95 mm)	1.5" (36 mm)	4.3" (108 mm)	260 g
90 W	3.8" (95 mm)	1.5" (36 mm)	4.3" (108 mm)	310 g

Terminals	Spring-up, finger-safe (when tightened); captive M3.5 screws Phillips/flat heads
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### AGENCY APPROVALS



SUPPLYING POWER FOR ALL YOUR DC NEEDS



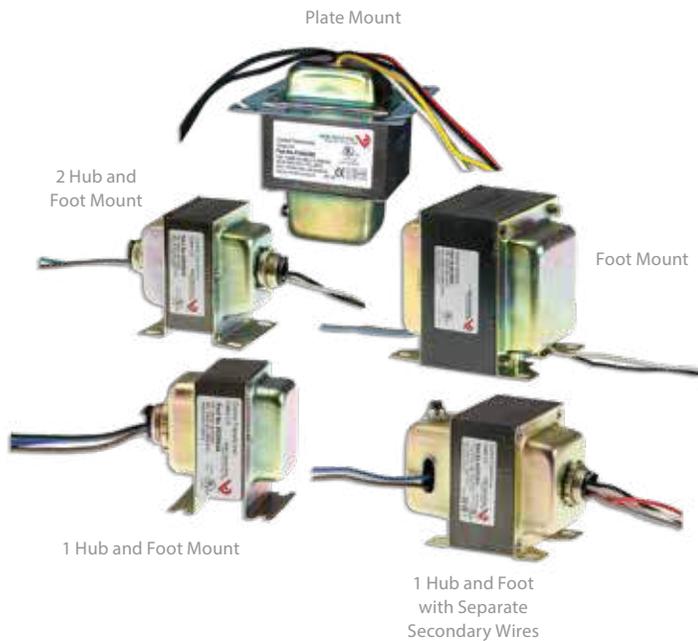
ORDERING INFORMATION

Output	Watts	Example:
PS <input type="text"/>	- S <input type="text"/> W	PS <input type="text"/> - S <input type="text"/> W
12 = 12 Vdc	7.5 = 7.5 Watts	
24 = 24 Vdc	15 = 15 Watts	
	30 = 30 Watts	
	60* = 60 Watts	
	90* = 90 Watts	

\*Available in 24 V only.



# X SERIES



Veris X Series Control Transformers are a convenient source of control power for HVAC control and building automation applications. A wide variety of UL-listed transformers are available with single and dual threaded hub mounting options. Multiple current limiting options are available, including a circuit breaker in some models. Save ordering time and purchase order costs when buying other Veris sensors by including transformers in your order.

## SPECIFICATIONS

Frequency	50/60 Hz
Operating Temperature	-40 to 65 °C (-40 to 149 °F)
No Load Voltage	27 to 28 Vac
Hub Style	Fits 1/2" electrical k.o.
Wire	UL 1015, 18 AWG*
Wire Length	8 inches
<b>WARRANTY</b>	
Limited Warranty	5 years
<b>AGENCY APPROVALS</b>	



\*X085AAA, X375DAC have 14 AWG secondary wires.

## UL Listings

UL Listings for all models simplify panel building requirements

## One-stop shopping

Save time by ordering along with other Veris products

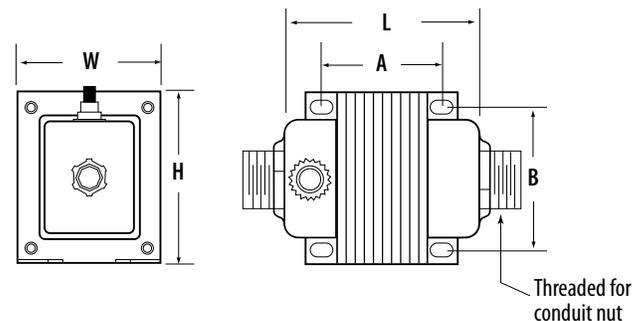
## Threaded hub options

Threaded hub options maximize installation flexibility

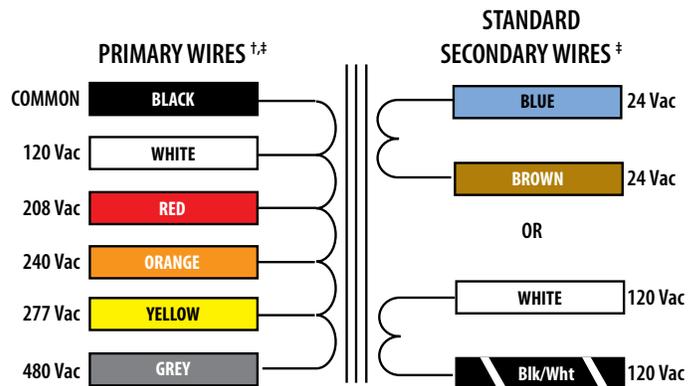
## APPLICATIONS

- Controller power
- Powering sensors
- Driving relays and other digital I/O circuits

## DIMENSIONAL DRAWING

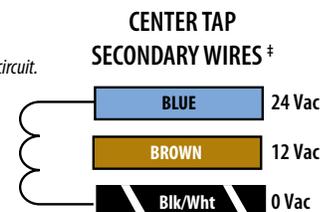


## WIRE COLORS



† Primary of 24 V isolation transformers = Red/Red

‡ Colors refer to the transformer wiring, not the external circuit.



## ORDERING INFORMATION

MODEL	VA	PRIMARY VOLTAGE (VAC)	SECONDARY VOLTAGE (VAC)	CURRENT LIMITING METHOD	CLASS	MOUNTING	SEPARATED PRIMARY & SECONDARY WIRES	UL	CE	L	W	H	A	B
<b>STANDARD</b>														
X020AAA	20	120	24	Inherent	2	1HUB+FT		•	•	2.3	1.9	2.6	1.59	1.69
X020ACA		277		Inherent	2	1HUB+FT		•	•	2.3	1.9	2.6	1.59	1.69
X020ADA		24		Inherent	General	1HUB+FT		•	•	2.3	1.9	2.6	1.59	1.69
X040AAA	40	120		Inherent	2	1HUB+FT		•	•	2.7	2.2	2.9	1.98	1.81
X040AAB		120		Inherent	2	2HUB+FT	•	•	•	2.7	2.2	2.9	1.98	1.81
X040ACA		277		Inherent	2	1HUB+FT		•	•	2.7	2.2	2.9	1.98	1.81
X040ADA		24		Inherent	2	1HUB+FT		•	•	2.7	2.2	2.9	1.98	1.81
X040AMB		120/208/240/277		Fuse	2	2HUB+FT	•	•	•	2.7	2.2	2.9	1.98	1.81
X040BNA		120/208/240		Fuse	2	1HUB+FT		•	•	2.7	2.2	2.9	1.98	1.81
X040BPC	24	12/24		Fuse	2	Foot	•	•	•	2.7	2.2	2.9	1.98	1.81
X050BAA	50	120	24	Fuse	2	1HUB+FT		•	•	2.8	2.2	2.9	2.06	1.81
X050BAB		120		Fuse	2	2HUB+FT	•	•	•	2.8	2.2	2.9	2.06	1.81
X050BCA		277		Fuse	2	1HUB+FT		•	•	2.8	2.2	2.9	2.06	1.81
X050BGB		208/240		Fuse	2	2HUB+FT	•	•	•	2.8	2.2	2.9	2.06	1.81
X050CAA		120		Circuit Breaker	2	1HUB+FT		•	•	3.5	2.5	3.1	1.91	2.03
X050CBA		120/240/277/480		Circuit Breaker	2	1HUB+FT		•	•	3.5	2.5	3.1	1.91	2.03
X050CBB		120/240/277/480		Circuit Breaker	2	2HUB+FT	•	•	•	3.5	2.5	3.1	1.91	2.03
X050CCA		277		Circuit Breaker	2	1HUB+FT		•	•	3.5	2.5	3.1	1.91	2.03
X050CEB		208/240/277/480		Circuit Breaker	General	2HUB+FT	•	•	•	3.5	2.5	3.1	1.91	2.03
X050CEG		208/240/277/480		120	Circuit Breaker	General	Plate, 90° Sec Elbow	•	•	•	3.5	4.0	4.0	3.38
X050CHA	120/208/240/480	24	Circuit Breaker	2	1HUB+FT		•	•	3.5	2.5	3.1	1.91	2.03	
X050CHB	120/208/240/480		Circuit Breaker	2	2HUB+FT	•	•	•	3.5	2.5	3.1	1.91	2.03	
X050CNA	120/208/240		Circuit Breaker	2	1HUB+FT		•	•	3.5	2.5	3.1	1.91	2.03	
X050CNB	120/208/240		Circuit Breaker	2	2HUB+FT	•	•	•	3.5	2.5	3.1	1.91	2.03	
X050COA	120/208/240/277/480		Circuit Breaker	2	1HUB+FT		•	•	3.5	2.5	3.1	1.91	2.03	
X050COB	120/208/240/277/480		Circuit Breaker	2	2HUB+FT	•	•	•	4.3	2.5	3.1	2.70	2.00	
X050DLB	220		None	2	2HUB+FT	•	•	•	2.8	2.2	2.9	2.06	1.81	
X075CAA	120		24	Circuit Breaker	2	1HUB+FT		•	•	3.9	2.5	3.1	2.31	2.03
X075CAB	120			Circuit Breaker	2	2HUB+FT	•	•	•	3.9	2.5	3.1	2.31	2.03
X075CBA	120/240/277/480			Circuit Breaker	2	1HUB+FT		•	•	3.9	2.5	3.1	2.31	2.03
X075CHA	120/208/240/480	Circuit Breaker		2	1HUB+FT		•	•	3.9	2.5	3.1	2.31	2.03	
X085AAA	120	Inherent		General	1HUB+FT		•	•	3.2	3.8	3.2	2.2	3.14	
X100CAA	120	99	Circuit Breaker	2	1HUB+FT		•	•	4.1	2.5	3.1	2.51	2.03	
X100CAB	120		Circuit Breaker	2	2HUB+FT	•	•	•	4.1	2.5	3.1	2.51	2.03	
X100CBA	120/240/277/480		Circuit Breaker	2	1HUB+FT		•	•	4.3	2.5	3.1	2.70	2.03	
X100CBB	120/240/277/480		Circuit Breaker	2	2HUB+FT	•	•	•	4.3	2.5	3.1	2.70	2.03	
X100CBE	120/208/277/480		Circuit Breaker	2	Plate		•	•	4.3	4.0	4.0	3.38	3.38	
X100CHB	120/208/240/480		Circuit Breaker	2	2HUB+FT	•	•	•	4.3	2.5	3.1	2.70	2.03	
X100CKB	480		120	Circuit Breaker	General	2HUB+FT	•	•	•	4.1	2.5	3.1	2.51	2.03
X100CLB	220	Circuit Breaker	2	2HUB+FT	•	•	•	4.1	2.5	3.1	2.51	2.03		
X150CAA	150	120	Circuit Breaker	General	1HUB+FT	•	•	•	3.5	3.8	3.2	2.08	3.26	
X175BAB	175	120	24	Fuse	General	2HUB+FT	•	•	•	4.1	3.8	3.2	3.19	3.14
X175CAB		120		Circuit Breaker	General	2HUB+FT	•	•	•	4.1	3.8	3.2	3.19	3.14
X240DAA	240	120	None	General	1HUB+FT	•	•	•	3.7	3.8	4.5	3.24	3.18	
X375DAC	375	120	None	General	Foot	•	•	•	4.3	3.8	4.5	3.83	3.18	
<b>CENTER TAP</b>														
X020APC	20	24	12/24	Inherent	2	Foot	•	•	•	2.3	1.9	2.6	1.59	1.69
X040BQC	40	120/208/240		Fuse	2	Foot	•	•	•	2.7	2.2	2.9	1.98	1.81
X100CRC	100	120/240		Circuit Breaker	2	1HUB+FT	•	•	•	4.3	2.5	3.1	2.70	2.03



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# VALUES



**WE BELIEVE IN OUR PRODUCTS AND WE VALUE OUR RELATIONSHIPS.**



Veris understands that consistency and reliability are important to our customers. That's why we strive to deliver excellent products and friendly expertise to help our customers get the job done right the first time.



# TEAM

**NEED A FRIEND IN THE ENERGY AND ENVIRONMENTAL SENSORS BUSINESS?**

**WE'VE GOT YOUR BACK.**

Our customer service and sales teams are passionate about building long-lasting relationships and providing a great experience. Our friendly and dedicated customer service and sales team is just a phone call or email away.

**USA & CANADA SALES**

Phone: 800-354-8556  
Email: [sales@veris.com](mailto:sales@veris.com)

**INTERNATIONAL SALES**

Phone: +1 (503) 598-4564  
Email: [intl@veris.com](mailto:intl@veris.com)

**GENERAL CONTACT**

Phone: 800-354-8556  
U.S. & Canada Fax: 503-598-4664

By purchasing products from Veris Industries, LLC. (referred to as, "Veris," "us," "we," and "our"), whether through our website [www.veris.com](http://www.veris.com) (the "Website") or otherwise (e.g., placing an order via telephone, facsimile, mail, or electronic transmission), you, on behalf of yourself and any entity you represent, if applicable (referred to as "you" or "Purchaser"), acknowledge that (1) all of the following terms and conditions ("Sales Terms") apply to every purchase; (2) these Sales Terms supersede any conflicting terms in any other purchase order, acknowledgement, agreement, or document, unless you and Veris have negotiated a separate master sales agreement that has been signed by both Veris and Purchaser; (3) these Sales Terms form a legally-binding agreement between you and Veris; and (4) if acting on behalf of an entity, you must have, and you represent and warrant that you have, full authority to bind your entity to these Sales Terms.

Please read these Sales Terms carefully.

## EFFECTIVENESS OF SALE & DELIVERY

Title transfers to Purchaser upon delivery to carrier. Purchaser bears all risk and transportation costs in accordance with INCOTERMS 2010, EXW. Packaging will be designed by Veris with the intent of protecting the product during shipment. Delivery dates are estimated only. In no event will Veris be liable for any damages of any kind, direct or indirect, in the event of delay of delivery.

## CANCELLATION POLICY

If your order is for standard products shipped from stock at quantities less than LOQ (Large Order Quantity), you can cancel your order at any time prior to shipment without charge. Upon receipt of a purchase order, Veris will proceed to facilitate the manufacture and shipment of that order. In doing so, investment of materials and labor is made in the order. Therefore, if you cancel an order that exceeds the LOQ or is customized to your specifications, cancellation of that order can result in a loss to Veris. Therefore, by placing an order for quantities in excess of LOQ or for custom-made products, you are making a commitment to pay Veris for any investments of labor and materials that are made to fulfill that order (LOQ's available upon request). If you cancel such an order prior to shipment, with respect to any unfinished goods, Veris will bill for labor and material costs already incurred; with respect to finished goods, we will ship those products and bill for the originally agreed upon purchase price plus shipping.

After shipment, cancellation is no longer available; instead, please refer to the returns policy listed below in the Returns section of these Sales Terms.

## LIMITED WARRANTY FOR MOST PRODUCTS

Subject to the conditions and restrictions described below, Veris warrants to Purchaser that any product sold by Veris, except for products described in "Products Sold Without Warranty" below, shall be free from material defects in design, materials, or manufacturing for the period shown on the current datasheet for that product or, if the current datasheet does not specify a warranty period, for a warranty period of 5 years, in each case beginning from the delivery date; provided, however, that the warranty shall not extend to ordinary wear and tear, or to normally replaceable components (e.g., batteries and humidity sensor elements).

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