**2017-2018
ENGINEERING
CATALOG**

# SENVA®
## SENSORS

**SUPERIOR BUILDING AUTOMATION SENSORS**

## Higher Reliability
## Faster Installation
## Superior Accuracy

**Current**

**Pressure**

**Humidity**

**Temperature**

**Carbon Dioxide**
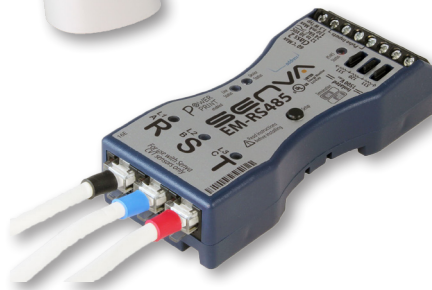
**Nitrogen Dioxide**

**Carbon Monoxide**

**Energy Monitoring**

**Water Detection**

**Transformers**

## *Sense the Difference*®

# Higher Reliability, Faster Installation, Superior Accuracy
## Sense the Difference

## We Promise

**SAME DAY SHIPPING**

Place your order prior to 3 pm PST, and it's on the way

**EASY TO ORDER   866-660-8864**

5 am to 5 pm PST (8AM-8PM EST) or online 24/7!

**7 YEAR LIMITED WARRANTY**

We stand behind our quality. See terms and conditions. Warranty varies for certain items.

**FAST ACCOUNT APPROVAL**

Instant $1000 credit limit.

**LIVE TECHNICAL SUPPORT**

The industry's best!

**CUSTOM ORDERS**

We go the extra mile—Have a special requirement? Just ask!

**ONLINE ORDERING**

Our online web store lets you manage all your Senva business.

## Our Purpose

Build a great company in which our competitive spirit thrives.  Our growth will provide personal, professional, and financial opportunity for our team.  We will innovate automation systems, conserving energy, increasing efficiency, and enhancing the quality of life.

## SENVA Core Values

**PROVIDE SUPERIOR CUSTOMER SERVICE**

- Be easy to do business with and impress the customer

**RAPID INNOVATION**

- Get customer inspired solutions to market quickly

**ACT WITH INTEGRITY**

- Our actions are guided by honesty, consistency of character, and good faith

**EXPECT EXCELLENCE**

- Recognize and reward performance; never tolerate mediocrity
- Invest in people
- Compete to win

**MAINTAIN A HIGH SENSE OF URGENCY**

- The market belongs to the aggressive and the swift
- Be lean and results oriented
- Encourage risk taking

**STAND FOR QUALITY**

- Quality is each employees job
- Be consistent in our communications and environment
- Establish clear standards and methods for quality

**HAVE FUN**

- Celebrate victory, learn from defeat
- Be positive and enthusiastic

# What We Do

Senva provides superior sensors that make even the most challenging installation operate more reliably, accurately, and profitably.

We do this from deep customer involvement that begins by listening to application problems, possessing the insight to understand them, and then to effectively create relevant and technically superior products.

We are empathetic to both our customers' project needs and committed to their personal success. We are passionate about excellent service, high integrity and character.

# ISO Certification

As part of enhancing our management systems with the collaboration of our entire staff and Orion Registrar, Inc., we are pleased to announce our ISO 9001:2008 registration.

To view our certificate, please visit our website www.senvainc.com under the documents section or email our team at sales@senvainc.com

**ISO 9001:2008**
**CERTIFIED**

**Designed and Assembled**
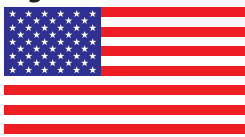
**In the U.S.A**

This classification of manufacturing is our promise that this product was designed and assembled from top to bottom in our Beaverton, OR facility. Senva sensors are built with a commitment to superior quality that Senva has been known for since 2008.
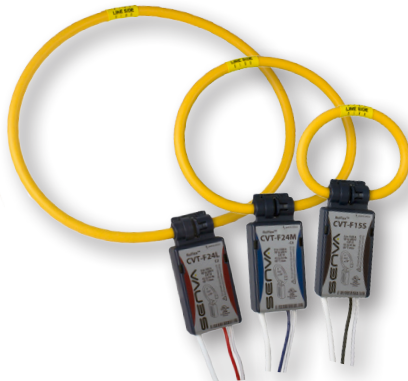
**Senva Production Facility - Beaverton, OR**

**Senva current sensor assembly and testing line**

SENVA

# Featured Product Highlights



**Current/Voltage Transducer™ (CVT™)**



**EM-PULSE Energy Meter**



**EM-RS485 Energy Meter**

## EM Series Energy Meters

We set out to make the easiest to install, most accurate meter. We started with flexible Rogowski CTs because they're compact, lightweight, and split-core for easy installation. But we didn't like their accuracy. So we gave them a brain so they can digitally communicate with our meter. And then it dawned on us you'd appreciate not having high voltage at the meter where you make your digital connections. So we made the voltage connection at the CT itself. Suddenly, we were measuring current and voltage in a current transducer. We named it the Current/Voltage Transducer™ (CVT™) and called the patent attorney. To complement the CVT™, our metering platform offers two meter options (EM-PULSE & EM-RS485) which are small enough to fit in the palm of your hand, yet powerful enough to self-configure during install removing all manual configuration! ***Get in. Get out. Get data.***

*(EM Series - Page 24)*

Available with

ASHRAE **BACnet**® **Modbus**

## TG (Toxic Gas) Series

To continually meet the demands and requirements of monitoring parking structures and loading bays, we've expanded our gas monitoring line to include both carbon monoxide and nitrogen dioxide options. The TG Series sensors can be ordered as individual CO or NO2 sensors or as a combination CO/NO2 sensor in a shared enclosure. Available with an analog output that supports daisy chain wiring or a protocol version that supports both BACnet MS/TP and Modbus network communications for cost effective coverage of large areas. Standard features include field replaceable elements, element lifetime clock, programmable fan relay, LED indicators, integrated display and audible alarm.

*(TG Series - Page 74)*

Available with

ASHRAE **BACnet**® **Modbus**



**TG Analog Series**



**TG Protocol Series**

*BACnet® is a registered trademark of ASHRAE.*

# CONTENTS

> *Senva sensors are engineered to reduce installation time and be trouble-free*

**TO ORDER**
Ph: 866-660-8864
Fax: 503-296-2529
sales@senvainc.com

**FREE SHIPPING**
via UPS Ground on your first order OR any qualifying* order placed online at senvainc.com

*Online orders of $300 or more ship free in the contiguous 48 states. Online orders of $500 or more ship free to Alaska, Hawaii and Canada. Online orders including 3 or more transformers do not qualify for free shipping.

⚠ **Warning:** This catalog is designed for reference only. Refer to installation instructions that accompany product and heed all safety instructions. Never rely on current status LED to indicate presence of power. Product improvement is a continuing process at Senva. Changes may occur to products without prior notice.

> ## *The safest, most cost-effective proof of flow for fans and pumps is with Senva Sensors.*



*Reduce the risk of arc flash with Senva.*



*No guesswork. Multi-turn adjustments are a thing of the past.*



*Save over 1/2 hour per sensor install.*

**Next time, I'm using Senva.**



*OSHA requires protection when working in energized enclosures; just use Senva never calibrate live again!*

## If you're calibrating current sensors in energized enclosures, you're wasting time and money.

Worse, you should be suiting up for arc flash protection (yes, it's OSHA code). If you're not, you're exposed to injury and liability. Senva makes it safe, simple, and profitable.

# Thanks to PRESET™ you'll never calibrate in live enclosures again!
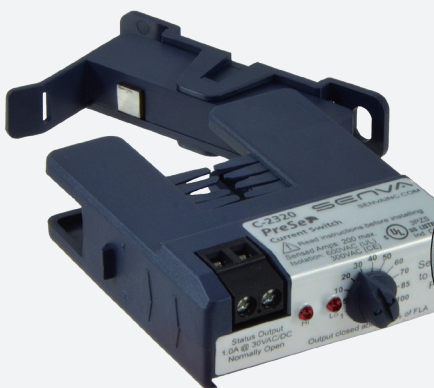


*Patent Pending*
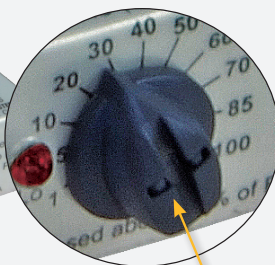
**PreSet™ sensors let you set the dial to the motor amperage. You can install the sensor and never return back to calibrate.** Installers tell us they save over ½ hour per sensor. Plus, they're safe. You do the math.

Never calibrate live again!



*Set the sensor to motor full load amps—never return to calibrate!*

**Split Core Mini now available!**



**PreSet™**

SENVA

## CURRENT

PreSet™ Series 8
AutoSet™ VFD Series 10
AutoSet™ Series 12
Fixed Go/No Series 14
Analog Series 16
Go/No Multipoint 18
Fan Wall Multi-motor 20
ECM Certification 22

## ECM Certified fixed current sensors

**Electronically commutated motors (ECMs) can be a challenge to monitor with fixed current sensors. That is until Senva created the industry's first ECM Certified fixed current sensor line.** See page 22 **for insight on the challenges with monitoring ECMs and how Senva can help prevent false trips in the field.**

## Let AUTOSET™ do the calibrating for you!
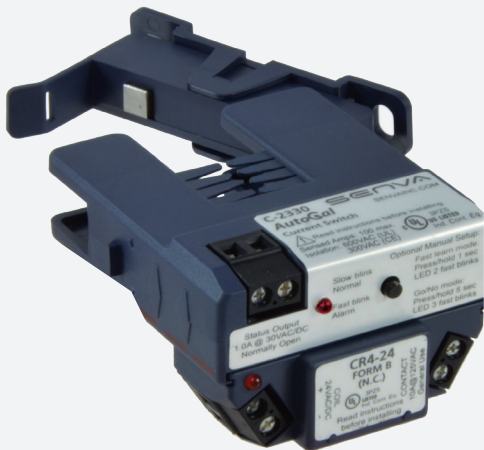
**AutoSet™ sensors take it a step further, by automatically adjusting to the motor load.** So smart, they even take into account effects of air balancing without false trips. We also have models for variable frequency drives—and they require no trained "learning".

Our standard split core lets you snap on a control relay to get start/stop/status in a single labor and space saving device.

**AutoSet™**

*Automatically adjusts without training and even takes into account air balancing.*

SENVA

# PreSet™
# Adjustable Current Switch

Scaled calibration for proof of flow set-point
Split and solid core models to 150A
N.O. 30VAC/DC or 120VAC output
Optional command relay

*Patent Pending*

PreSe7™

c (UL) us

## DESCRIPTION

PreSet™ allows for matching sensor set-point to the motor nameplate, eliminating the need to calibrate in energized enclosures and reducing installation time. Sensor will detect motor undercurrent conditions such as belt loss, coupling shear, and mechanical failure on fans and pumps.

## APPLICATIONS

- Detecting belt loss, coupling shear, and mechanical failure on fans and pumps
- Monitoring status of industrial processes
- Monitoring status of critical motors

## FEATURES

### Save time and money while eliminating calibration inside energized enclosures

- Preset™ scaled calibration enables set-point adjustment for proof of flow by simply matching dial to motor full load amps (FLA) nameplate
- Safer: Eliminates calibration in energized enclosures, reduces arc flash hazard
- No need to return to calibrate—saves time and money
- Super low turn-on

### Maintenance-free—no call backs

- Superior to traditional adjustable CTs and pressure switches
- Industry leading 7 year warranty
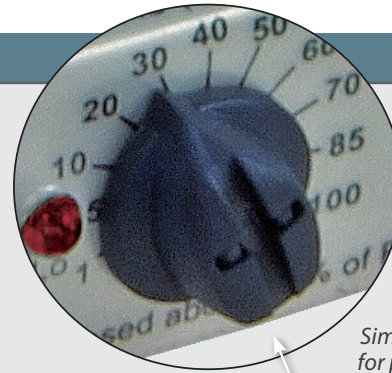
*Simply set to motor FLA for proof of flow set-point*

*Patent Pending*

## SET-POINT OPERATION

### Detects Belt Loss/Coupling Shear!

*Fan/pump On*

*Electrical Failure*

Calibrated Trip Point

*Off*

*Loss of Belt/Coupling Shear*

*Off*
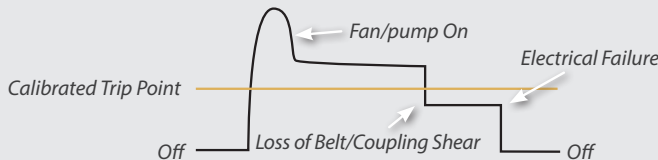
*Now you can easily detect when drive belts slip, break, or pump coupling shear. In fact, a typical HVAC motor that loses its load has a reduction of current draw of up to 50%. That's why our sensors are the industry standard for status.*

*No hazardous guesswork. Multi-turn adjustments are a thing of the past.*
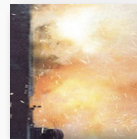
*Reduce the risk of arc flash because sensor is calibrated to motor FLA nameplate*
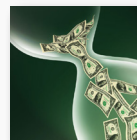
*Save over 1/2 hour per sensor install—based on field productivity tests.*

## SPLIT CORE
### C-2320
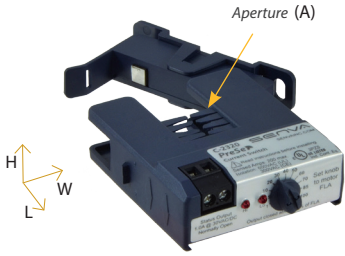
*Aperture* (A)

H ↑ W L

L: 2.5" H: 0.57" W: 2.23"
A: 0.75"x 0.75"

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris, or use detachable base to screw or DIN mount
- Larger 0.75" aperture accomodates oversize conductors

## OPTIONAL RELAY
### for additional labor savings

L: .84" H: .72" W: 2.06"

- Add to 2320 series to get start/stop/status in a single device
- Reduces the number of installed components... saves time and space
- Removable relay facilitates service

## SPLIT CORE - MINI
### C-2220

L: 2.00" H: .75" W: 1.75"
A: .0.40"x 0.32"

- Mount sensor without removing conductor for installation savings
- Fits in small enclosures
- Clamp on conductor with iris, or screw mount detachable base

## SOLID CORE
### C-1320

*Aperture* (A)

L: 2.40" H: 1.04" W: 1.6"
A: 0.52" diameter

- Compact design
- Aperture accomodates spade terminals

## SOLID CORE - MINI
### C-1220

L: 1.91" H: .88" W: 1.31"
A: 0.30" diameter

- Super small—fits anywhere
- Low cost

## ORDERING INFORMATION

| SPLIT CORE | Min (on) | Max A | N.O. Output* | Trip LED | Power LED |
|---|---|---|---|---|---|
| C-2320-L | 0.45A | 50A | 1.0A@30VAC/DC | • | • |
| C-2320 | 0.50A | 100A | 1.0A@30VAC/DC | • | • |
| C-2320-H  *NEW LOWER TURN-ON!* | 0.50A | 150A | 1.0A@30VAC/DC | • | • |
| C-2320HV | 0.50A | 100A | 0.2A@120VAC | • | • |
| C-2320HV-L | 0.45A | 50A | 0.2A@120VAC | • | • |

| SPLIT CORE - MINI | | | | | |
|---|---|---|---|---|---|
| C-2220 | 1.00A | 50A | 1.0A@30VAC/DC | | • |

| SOLID CORE | | | | | |
|---|---|---|---|---|---|
| C-1320 | 0.75A | 50A | 1.0A@30VAC/DC | | • |

| SOLID CORE - MINI | | | | | |
|---|---|---|---|---|---|
| C-1220-L | 0.75A | 5A | 1.0A@30VAC/DC | | • |
| C-1220 | 0.75A | 50A | 1.0A@30VAC/DC | | • |
| C-1220HV-L | 0.75A | 5A | 0.2A@120VAC | | • |
| C-1220HV | 0.75A | 50A | 0.2A@120VAC | | • |

| COMMAND RELAY | Contact rating | Coil |
|---|---|---|
| CR3-24 | N.O. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR4-24 | N.C. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR3-12 | N.O. 10A @ 125VAC | 9-12VDC 30mA nom. |
| CR4-12 | N.C. 10A @ 125VAC | 9-12VDC 30mA nom. |

*Other coil voltages available—consult factory*

**Ordering tip:** *For best resolution, choose the sensor lowest maximum amperage which accomodates your motor (e.g. 0-50A us -L, 50-100A use standard, 100 to 150A use -H*

## SPECIFICATIONS

| | |
|---|---|
| Standard Output Rating | 1.0A@30VAC/DC |
| Line Voltage Output Rating | 0.2A@120VAC (-HV ONLY) |
| Output Type | NO, solid-state FET |
| Temperature Rating | -15-60 ° C |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Sensor Power | Induced |
| Frequency Range | 50/60Hz |

## TYPICAL WIRING

CONTROLLER
NOTE: Device is NOT polarity sensitive.

INSULATED PRIMARY AC CONDUCTOR 600VAC MAX

V+
DI
(SINKING)

Status Output 1.0A @ 30VAC/DC Normally Open
HI LO
Set knob to motor FLA
Output closed above 70% of FLA

ALTERNATE CONTROLLER ARRANGEMENTS

V+
DI
GND
(SOURCING)

DI
DI
VAC
(AC)

**Warning:** *Refer to installation instructions that accompany product and heed all safety instructions. Do not rely on current status LED to indicate presence of power.*

Designed and Assembled
In the U.S.A
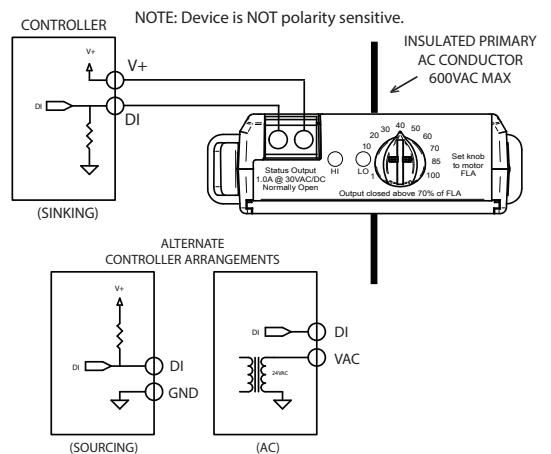
7 year limited warranty

# AutoSet™ VFD
# Split Core Current Switch

Self-calibrating for proof of flow
0.5-135A range
N.O. 30VAC/DC or 120VAC output
Optional command relay

*Patent Pending*

## DESCRIPTION

The AutoSet™ VFD line self-calibrates to detect belt loss on motors operated by a variable frequency drive.  The C-2350VFD line's microprocessors automatically set the proper threshold - no false alarms with varying frequencies.  Sensor will detect motor undercurrent conditions such as belt loss, coupling shear, and mechanical failure on fans and pumps while reducing installation time.

## APPLICATIONS

- Detecting belt loss, coupling shear, and mechanical failure on variable frequency drives

## FEATURES AND BENEFITS

### Self calibration for proof of flow on fans and pumps

- Works without costly 'training' of sensor—our sensors are just plain smarter!
- No need to open hot starter enclosures—save on labor as well as improve safety
- Only VFD sensor line capable of functioning on VFDs to 0.5A
- Sensor is always properly adjusted—no call backs
- Push-button and LED interface:
  - Slow blink = normal operation
  - Fast blink = alarm
  - Fast learn mode (optional): Press/hold button 1 second, LED makes 2 fast blinks.
  - Go/No mode (optional) : Press/hold button 5 seconds, LED makes 3 fast blinks.

### Split-core with optional command relay

- Easy installation and provides stop/start/status in a unitary device—saves component and installation space/cost

### Maintenance-free—no call backs

### Save time and money
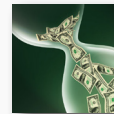
*Save up to 15 minutes per sensor install (based on field productivity tests.)*

### SET POINT OPERATION

**Positive proof of flow for VFD driven fans and pumps**
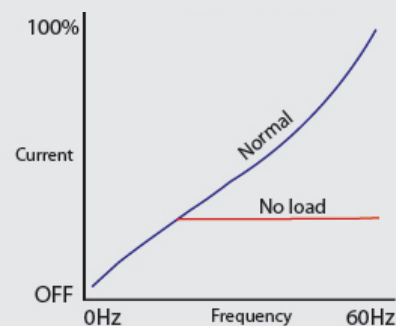
*7 year limited warranty*
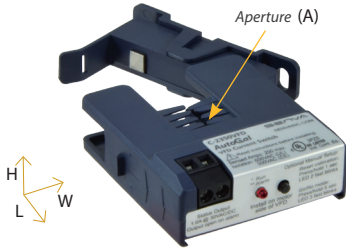
# SENVA

## SPLIT CORE
## C-2350VFD

Aperture (A)

H
L
W

L: 2.5" H: 0.57" W: 2.23"
A: 0.75" x 0.75"

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris, or use detachable base to screw or DIN mount
- Larger 0.75" aperture accomodates oversize conductors

## SPLIT CORE
## C-2350VFD-L
## for fractional and small HP VFDs

*Note: 3-wire device*

## OPTIONAL RELAY

L: 0.84" H: 0.72" W: 2.06"

- Add to 2350 series to get start/stop/status in a single device
- Reduces the number of installed components… saves time and space
- Removable relay facilitates service

## ORDERING INFORMATION

| SPLIT CORE | Min (on) | Max A | Output* | Sensor Power |
|---|---|---|---|---|
| C-2350VFD-L | 0.5A | 15 A | 1.0A@30VAC/DC | 12 to 30VDC/ 24VAC |
| C-2350VFD | 3.5A | 135A | 1.0A@30VAC/DC | Induced |
| C-2350VFD-HV | 3.5A | 135A | 0.2A@120VAC | Induced |

| COMMAND RELAY | Contact rating | Coil |
|---|---|---|
| CR3-24 | N.O. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR4-24 | N.C. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR3-12 | N.O. 10A @ 125VAC | 9-12VDC 30mA nom. |
| CR4-12 | N.C. 10A @ 125VAC | 9-12VDC 30mA nom. |

## SPECIFICATIONS

| | |
|---|---|
| Standard Output Rating | 1.0A@30VAC/DC |
| Line Voltage Output Rating | 0.2A@120VAC (-HV MODEL ONLY) |
| Output Type | NO, solid-state FET |
| Temperature Rating | -15-60 ° C |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Frequency Range (C-2350VFD) | 20-60Hz; proof of flow loss alarm at 50Hz+ |
| Frequency Range (C-2350VFDHV) | 20-60Hz; proof of flow loss alarm at 50Hz+ |
| Frequency Range (C-2350VFD-L) | 5-60Hz; proof of flow loss alarm at 50Hz+ |

## 2350VFD-L 3-WIRE FOR MICRO VFD APPLICATIONS
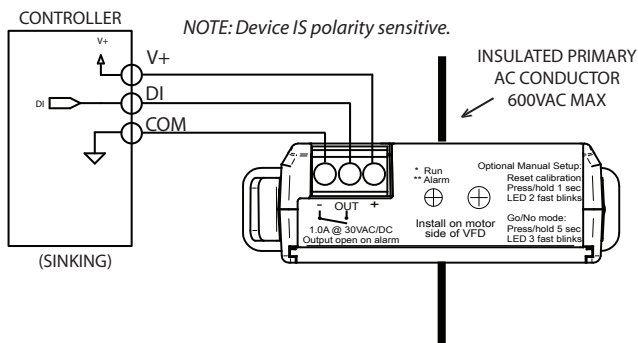
CONTROLLER

*NOTE: Device IS polarity sensitive.*

V+
DI
COM

INSULATED PRIMARY
AC CONDUCTOR
600VAC MAX

(SINKING)

* Run
** Alarm

OUT

1.0A @ 30VAC/DC
Output open on alarm

Install on motor side of VFD

Optional Manual Setup:
Reset calibration
Press/hold 1 sec
LED 2 fast blinks

Go/No mode:
Press/hold 5 sec
LED 3 fast blinks

⚠ **Warning:** *Refer to installation instructions that accompany product and heed all safety instructions. Do not rely on current status LED to indicate presence of power.*

## WIRING FOR C-2350VFD

CONTROLLER

*NOTE: Device is NOT polarity sensitive.*

V+
DI

INSULATED PRIMARY
AC CONDUCTOR
600VAC MAX

(SINKING)

Status Output
0.5A @ 30VAC/DC
Normally Open

Slow blink
Normal

Fast blink
Alarm

Optional Manual Setup:
Fast learn mode:
Press/hold 1 sec
LED 2 fast blinks

Go/No mode:
Press/hold 5 sec
LED 3 fast blinks

ALTERNATE
CONTROLLER ARRANGEMENTS

V+
DI
DI
GND

(SOURCING)

DI
DI
VAC
24VAC

(AC)

*AutoSet*™

# AutoSet™
# Split Core Current Switch

Self-calibrating for proof of flow
2.5-135A range
N.O. 30VAC/DC or 120VAC output
Optional command relay

*AutoSet*™

c UL us

## DESCRIPTION

The AutoSet™ line offers unparalleled installation ease for proof of flow status applications for constant volume motors and pumps. Sensor automatically adjusts to detect motor undercurrent conditions such as belt loss, coupling shear, and mechanical failure on fans and pumps. Eliminates the need to calibrate in energized enclosures while reducing installation time.

## APPLICATIONS

- Detecting belt loss, coupling shear, and mechanical failure on fans and pumps
- Monitoring status of industrial processes
- Monitoring status of critical motors

## FEATURES AND BENEFITS

### Self calibration for proof of floor on fans and pumps

- Safer: Eliminates calibration in energized enclosures, reduces arc flash hazard
- No need to return to calibrate—saves time and money
- Sensor is always properly adjusted—no call backs
- Proprietary design dynamically adjusts, eliminating call backs due to air balancing
- Self learning--no time consuming training required
- Push-button and LED interface:
  - Slow blink = normal operation
  - Fast blink = alarm
  - Fast learn mode (optional): Press/hold button 1 second, LED makes 2 fast blinks.
  - Go/No mode (optional) : Press/hold button 5 seconds, LED makes 3 fast blinks.

### Split-core with optional command relay

- Easy installation and provides stop/start/status in unitary device—saves component and installation space/cost

### Maintenance-free—no call backs

**Designed and Assembled**

In the U.S.A

*7 year limited warranty*

### Save time and money by eliminating hazardous calibration energized enclosures

*No hazardous guesswork. Multi-turn adjustments are a thing of the past; no time consuming "training!"*
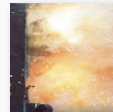
*Reduce the risk of arc flash as sensor adjusts set-point automatically*
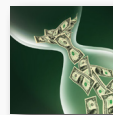
*Save up to 1/2 hour per sensor install (based on field productivity tests.)*

### SET-POINT OPERATION

"Run"

Air Balancing

Belt Loss

Auto-calibration

Electrical Failure

Fan Load "OFF"

Output Energized

OFF

Sensor Output

**Positive proof of flow for constant volume fans and pumps**

# SENVA

**SPLIT CORE C-2330**

Aperture (A)

H
W
L
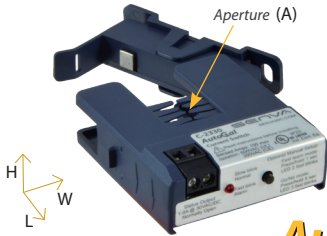
L: 2.5" H: .57" W: 2.23"
A: 0.75" x 0.75"

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris, or use detach-able base to screw or DIN mount
- Larger 0.75" aperture accomodates oversize conductors

**OPTIONAL RELAY**

*AutoSet™*

L: 0.84" H: .72" W: 2.06"

- Add to 2330 series to get start/stop/status in a single device
- Reduces the number of installed components; saves time and space
- Removable relay facilitates service

**Next time, I'm using Senva.**

*OSHA requires protection when working in energized enclosures; just use Senva never calibrate live again!*

## ORDERING INFORMATION

| SPLIT CORE | Min (on) | Max A | N.O. Output* | Sensor Power |
|---|---|---|---|---|
| C-2330 | 2.5A | 135A | 1.0A@30VAC/DC | Induced |
| C-2330HV | 2.5A | 135A | 0.2A@120VAC | Induced |

| COMMAND RELAY | Contact rating | Coil |
|---|---|---|
| CR3-24 | N.O. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR4-24 | N.C. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR3-12 | N.O. 10A @ 125VAC | 9-12VDC 30mA nom. |
| CR4-12 | N.C. 10A @ 125VAC | 9-12VDC 30mA nom. |

## SPECIFICATIONS

| | |
|---|---|
| Standard Output Rating | 1.0A@30VAC/DC |
| Line Voltage Output Rating | 0.2A@120VAC (-HV MODEL ONLY) |
| Output Type | NO, solid-state FET |
| Temperature Rating | -15-60 ° C |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Frequency Range | 50/60Hz |

## TYPICAL WIRING

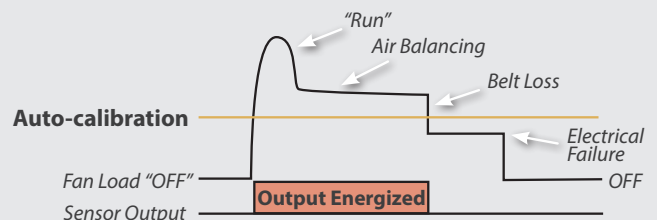*NOTE: Device is NOT polarity sensitive.*

CONTROLLER

V+
DI

V+

(SINKING)

INSULATED PRIMARY
AC CONDUCTOR
600VAC MAX

Slow blink Normal

Fast blink Alarm

Optional Manual Setup:
Fast learn mode:
Press/hold 1 sec
LED 2 fast blinks

Go/No mode:
Press/hold 5 sec
LED 3 fast blinks

Status Output
0.5A @ 30VAC/DC
Normally Open

ALTERNATE CONTROLLER ARRANGEMENTS

V+
DI
GND

(SOURCING)

DI
VAC
24VAC

(AC)

**Warning:** *Refer to installation instructions that accompany product and heed all safety instructions. Do not rely on current status LED to indicate presence of power.*

# Fixed Setpoint
# Current Switches

Go/No status
0.25-200A range
Split and solid core models
N.O. 30VAC/DC or 120VAC output
Optional command relay

## DESCRIPTION

Fixed threshold trip point detects the presence of current above low trip point to provide cost-effective status monitoring unit vents, exhaust fans, recirculation pumps, and other fixed loads where belt loss is not a concern.

## APPLICATIONS

- Monitoring on/off status of electrical loads
- Monitoring direct-drive units, exhaust fans, and other fixed loads
- Verifying lighting run times

## FEATURES

### Run status based on current

**Ideal for ECM motors**

- Trip point operation is tuned to prevent false trips when used with electronically commutated motors

**Reliable and cost-effective**

- Solid-state—no moving parts to fail
- Less expensive than 277V relays for lighting status
- More reliable for status than relays across auxiliary contacts
- Industry leading 7 year limited warranty
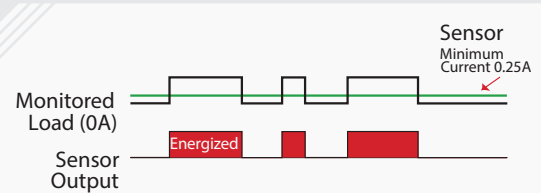
*The go/no series output changes state whenever current above the minimum turn-on is present. This provides "go/no" status on loads that are not subject to mechanical failures.*

**Designed and Assembled**
**In the U.S.A**

*7 year limited warranty*

## TYPICAL WIRING
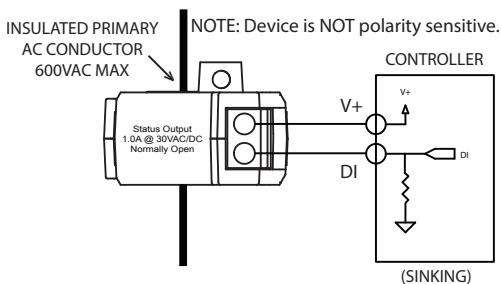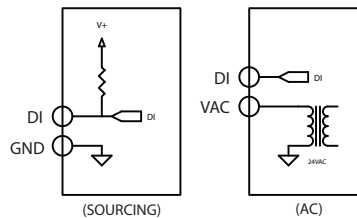
INSULATED PRIMARY AC CONDUCTOR 600VAC MAX

NOTE: Device is NOT polarity sensitive.

CONTROLLER

Status Output 1.0A @ 30VAC/DC Normally Open

V+
DI
(SINKING)

ALTERNATE CONTROLLER ARRANGEMENTS

DI
GND
(SOURCING)

DI
VAC
(AC)

⚠️ **Warning:** *Refer to installation instructions that accompany product and heed all safety instructions.*

### SPLIT CORE
### C-2300
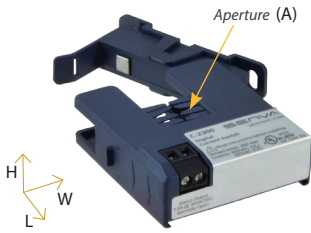
Aperture (A)



L: 2.5"H: 0.57"W: 2.23"
A: 0.75"x. 0.75"

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris, or use detach-able base to screw or DIN mount
- Larger 0.75" aperture accomodates oversize conductors

### OPTIONAL RELAY



L: 0.84"H: .72"W: 2.06"

- Add to 2300 series to get start/stop/status in a single device
- Reduces the number of installed components... saves time and space
- Removable relay facili-tates service

### SPLIT CORE - MINI
### C-2200

Aperture (A)
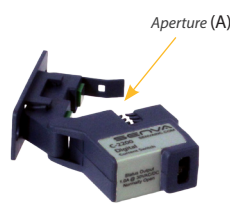


L: 2.00"H: .75"W: 1.75"
A: .0.40"x 0.32"

- Mount sensor without removing conductor for installation savings
- Fits in small enclosures
- Clamp on conductor with iris, or screw mount detachable base

### SOLID CORE
### C-1300

Aperture (A)



L: 2.27"H: 1.04"W: 1.6"
A: 0.52" diameter

- Compact design
- Aperture accomodates spade terminals

### SOLID CORE - MINI
### C-1200

Aperture (A)



L: 1.78"H: .88"W: 1.31"
A: 0.30" diameter

- Super small—fits anywhere
- Low cost

## ORDERING INFORMATION

| SPLIT CORE | Min (on) | Max A | N.O. Output |
|---|---|---|---|
| C-2300 | 0.35A | 200A | 1.0A@30VAC/DC |
| C-2300HV | 0.35A | 100A | 0.2A@120VAC |

| SPLIT CORE - MINI | | | |
|---|---|---|---|
| C-2200 | 0.5A | 50A | 1.0A@30VAC/DC |

| SOLID CORE | | | |
|---|---|---|---|
| C-1300 | 0.25A | 50A | 1.0A@30VAC/DC |

| SOLID CORE - MINI | | | |
|---|---|---|---|
| C-1200 | 0.25A | 50A | 1.0A@30VAC/DC |
| C-1200HV | 0.25A | 50A | 0.2A@120VAC |

| COMMAND RELAY | Contact rating | Coil |
|---|---|---|
| CR3-24 | N.O. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR4-24 | N.C. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR3-12 | N.O. 10A @ 125VAC | 9-12VDC 30mA nom. |
| CR4-12 | N.C. 10A @ 125VAC | 9-12VDC 30mA nom. |

## SPECIFICATIONS

| | |
|---|---|
| Standard Output Rating | 1.0A@30VAC/DC |
| Line Voltage Output Rating | 0.2A@120VAC (-HV MODELS ONLY) |
| Output Type | NO, solid-state FET |
| Temperature Rating | -15-60 ° C |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Sensor Power | Induced |
| Frequency Range | 50/60Hz |

SENVA

## Analog
# Current Sensors

0-5VDC, 0-10VDC, 4-20mA outputs
Multiple selectable range split-cores
Optional command relay
Fixed ranges on solid-cores
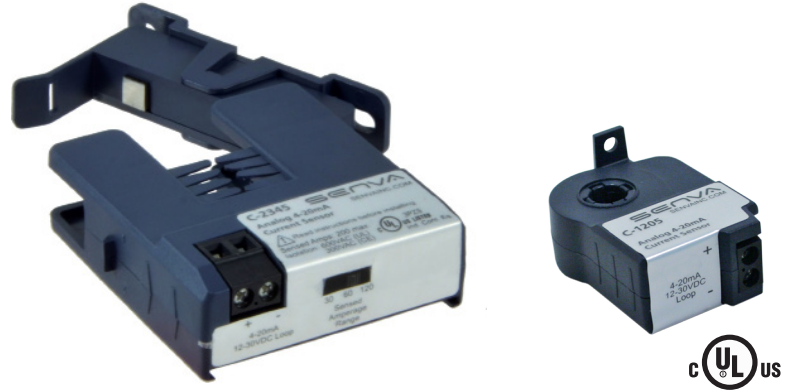
## DESCRIPTION

Senva analog transducers measure AC current and provide a proportional output for load trending and control. Choose from easy to install split-core or compact solid core. Selectable ranges and optional command relay make for a versatile transducer.

## APPLICATIONS

- Load trending
- Motor control
- Process control
- Fan/Pump status
- Motor load jamming
- Lighting load levels

## FEATURES

**Split-core switch selectable ranges (30, 60, 120A or 5, 10, 20A full scale ranges)**

- Makes scaling easy
- Reduces inventory
- No call backs due to mis-sizing

**0-5VDC, 0-10VDC, 4-20mA loop powered versions**

- Versions compatible with any system

**Superior split core design for easy installation**

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris or use detachable base to screw or DIN mount
- Larger 0.75" aperture accomodates oversize conductors

**Snap-on command relay for unitary start/stop/status**

- Reduces the number of installed components… saves time and space
- Removable relay facilitates service

**Reliable and cost-effective**

- Industry leading 7 year limited warranty

Designed and Assembled
In the U.S.A

7 year limited warranty

## SET-POINT OPERATION- MODELS C-2343, C-2344, C-2345

Factory calibrated

30/60/120A

Load
Amps

0A

4mA
0 VDC

Sensor
Output

20mA
5/10 VDC

## SPECIFICATIONS

| | |
|---|---|
| Temperature Rating | -15-60 ° C |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Frequency Range | 50/60Hz |

## SPLIT CORE C-234X
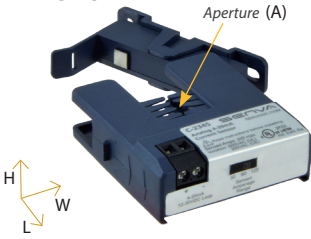
*Aperture* (A)

L: 2.5" H: 0.57" W: 2.23"
A: 0.75"x. 0.75"

- Mount sensor without removing conductor for installation savings
- Clamp on conductor with iris, or use detachable base toscrew or DIN mount
- Larger 0.75" apeture accomodates oversize conductors

## OPTIONAL RELAY

- Add to 234X series to get start/stop/status in a single device
- Reduces the number of installed components... saves time and space
- Removable relay facilitates service

## SOLID CORE C-120X

*Aperture* (A)

L: 1.78" H: .88" W: 1.31"
A: 0.30" diameter

- Compact design
- Apeture accomodates spade terminals

## ORDERING INFORMATION

| SPLIT CORE | Range A | Output | Sensor Power |
|---|---|---|---|
| C-2343 | 30A, 60A, 120A Selectable | 0 - 5 VDC | Induced |
| C-2344 | 30A, 60A, 120A Selectable | 0 - 10 VDC | Induced |
| C-2345 | 30A, 60A, 120A Selectable | 4 - 20mA | Loop- powered, 30 VDC |
| C-2343-L | 5A, 10A, 20A Selectable | 0 - 5 VDC | Induced |
| C-2345-L | 5A, 10A, 20A Selectable | 4 - 20mA | Loop- powered, 30 VDC |
| C-2343-200 | 200A | 0 - 5 VDC | Induced |
| C-2344-200 | 200A | 0-10 VDC | Induced |

| SOLID CORE - MINI | | | |
|---|---|---|---|
| C-1203 | 15 A | 0 - 5 VDC | Induced |
| C-1205 | 15 A | 4 - 20mA | Loop- powered, 30 VDC |
| C-1203-L | 5 A | 0 - 5 VDC | Induced |

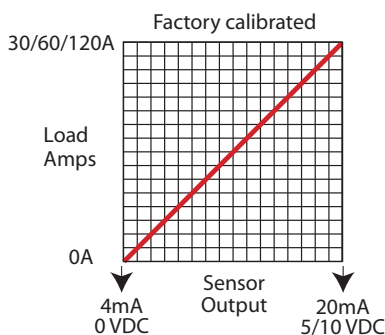| COMMAND RELAY | Contact rating | Coil |
|---|---|---|
| CR3-24 | N.O. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR4-24 | N.C. 10A @ 125VAC | 24VAC/DC 15mA nom. |
| CR3-12 | N.O. 10A @ 125VAC | 9-12VDC 30mA nom. |
| CR4-12 | N.C. 10A @ 125VAC | 9-12VDC 30mA nom. |

## TYPICAL WIRING 0-5/10VDC OUTPUT

INSULATED PRIMARY AC CONDUCTOR 600VAC MAX

*NOTE: Device IS polarity sensitive.*

CONTROLLER

Scaling: 0-15A 0-5VDC Output

AI

GND
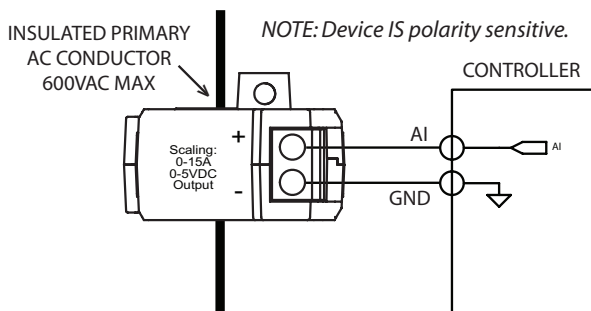
## TYPICAL WIRING LOOP 4-20 MA
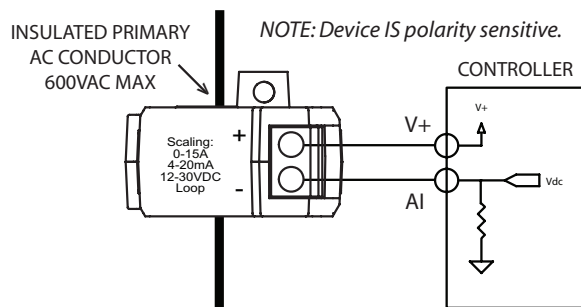
INSULATED PRIMARY AC CONDUCTOR 600VAC MAX

*NOTE: Device IS polarity sensitive.*

CONTROLLER

Scaling: 0-15A 4-20mA 12-30VDC Loop

V+

AI

V+

Vdc

⚠ **Warning:** *Refer to installation instructions that accompany product and heed all safety instructions.*

SENVA

## Fixed Setpoint
# Multipoint Current Switch
Go/no status for six points
0.3-50A range per point

EC MOTOR CERTIFIED

c **UL** us
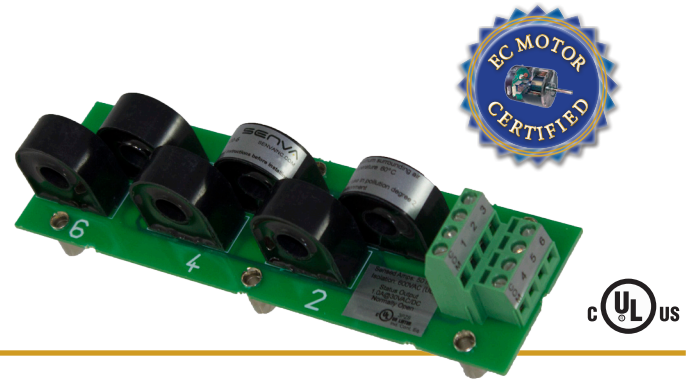
## DESCRIPTION

This multipoint sensor provides cost-effective control panel mount monitoring for 6 loads. Fixed threshold trip point detects the presence of current above low trip point to provide cost-effective status monitoring unit vents, exhaust fans, recirculation pumps, and other fixed loads where belt loss is not a concern.

## APPLICATIONS

- Fan wall and other multi-motor installations
- Monitoring on/off status of electrical loads
- Monitoring direct-drive units, exhaust fans, and other fixed loads
- Verifying lighting run times

## FEATURES

### Reliable and cost-effective

- Compact design conserves panel space
- Great for fan wall applications
- Solid-state—no moving parts to fail
- Less expensive than 277V relays for lighting status
- More reliable for status than relays across auxiliary contacts
- Industry leading 7 year limited warranty

### Ideal for ECM motors

- Trip point operation is tuned to prevent false trips when used with electronically commutated motors

### Run status based on current for six points
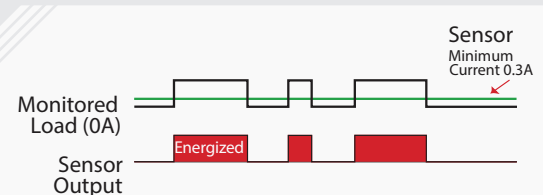


Sensor Minimum Current 0.3A

Monitored Load (0A)

Energized

Sensor Output

*The go/no series output changes state whenever current above the minimum turn-on is present. This provides "go/no" status on loads that are not subject to mechanical failures.*

Designed and Assembled

In the U.S.A

7 year limited warranty

## ORDERING INFORMATION

| 6 POINT SENSOR | Min (on) | Max A | Output* |
|---|---|---|---|
| C-1500-6 | 0.3 A | 50A | 1.0A@30VAC/DC |

## SPECIFICATIONS

| | |
|---|---|
| Amperage Range | .3A (on)-50A  (50A max per sensor) |
| Output Type | NO, solid-state FET |
| Standard Output Rating | 1.0A@30VAC/DC |
| Temperature Rating | -15-60 ° C, Maximum surrounding air ambient, 60 ° C. For use in Pollution Degree 2 Environment. |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Sensor Power | Induced |
| Dimensions (L-W-H) | 5.8"l x 1.7" w x 1.45" h |
| Sensor Aperture | 0.38" |
| Frequency Range | 50/60Hz |
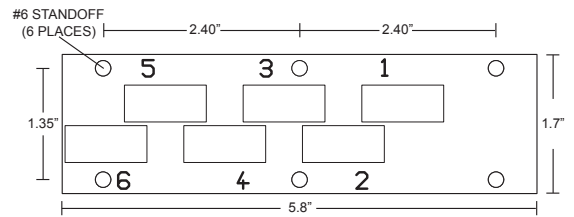
## TYPICAL WIRING



**2nd COM TERMINAL PROVIDED FOR WIRING CONVENIENCE**

## DIMENSIONS



⚠ **Warning:** *Refer to installation instructions that accompany product and heed all safety instructions. Do not rely on current status LED to indicate presence of power.*

SENVA

*Ratio Monitoring*
# Fanwall Current Switch

Go/no status for fan walls up to 18 motors
0.1-50A per current transformer
Operates on VFD driven fan walls

*Patent Pending*

c(UL)us

## DESCRIPTION

The C-1550 provides load-side "go/no" status for fan walls up to 18 equally sized  motors.  Using just two CTs, this microprocessor based sensor is able to detect the loss of any one or more motors from the fan array.  The unit learns ratio of current A to current B. Ratio is continuously monitored. Output alarms (opens) when measured current ratio is 10% or more different than learned ratio or current is not present. Operation is based on a ratio of load--therefore this sensor is intended for a fanwall installation or section thereof in which a single variable speed drive is utilized.  The sensor will also work with non-VFD motor loads.

## APPLICATIONS

- Fan wall and other multi-motor installations

## FEATURES

### Simple and effective fan wall status

- Designed for direct coupled fans
- Works on load side of VFDs
- Solid-state—no moving parts to fail
- Industry leading 7 year limited warranty

### Easy installation

- One device takes the place of up to 18 individual CTs
- Saves  panel space and installation time
- Microprocessor monitors motor currents regardless of operating frequency

### LED for operational feedback

- Green solid = ready
- Green slow blink = current present and monitoring
- Green fast blink = learning in process
- Red solid = alarm, output open, motor failure detected

### Run status based on current for up to 18 motors with a single unit



*Fan/pump On*

*Loss of a motor = alarm*

*Off*

*Off*

*Two CTs measure the load differential between two groups of motors loads;  when a motor is lost,  the differential increases and the sensor alarms.*

**Designed and Assembled**

**In the U.S.A**
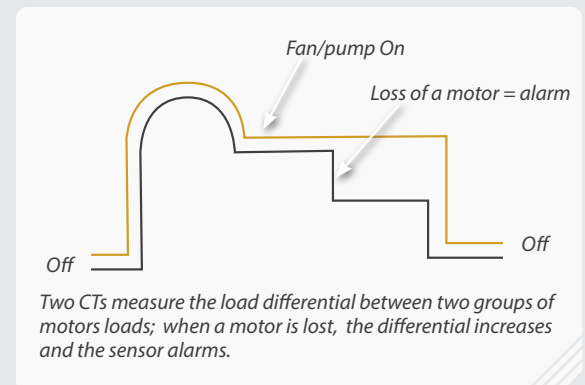
*7 year limited warranty*

## ORDERING INFORMATION

| FANWALL SENSOR | Min (on) | Max A | Output* |
|---|---|---|---|
| C-1550 | 0.1 A | 50A | 0.1A@30VAC/DC |

## SPECIFICATIONS

| | |
|---|---|
| Amperage Range | 0.1A (on)-50A  (50A max per sensor) |
| Output Type | NO, solid-state FET |
| Standard Output Rating | 0.1A@30VAC/DC |
| Temperature Rating | -15-60 ° C, Maximum surrounding air ambient, 60 ° C. For use in Pollution Degree 2 Environment. |
| Insulation Class | 600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor |
| Sensor Power | 12-24VDC/24VAC, 50mA max |
| Dimensions (L-W-H) | 3.86"l x 1.31" w x 1.85"h |
| Sensor Aperture | 0.58" |
| Frequency Range | 15-60Hz |

## TYPICAL WIRING
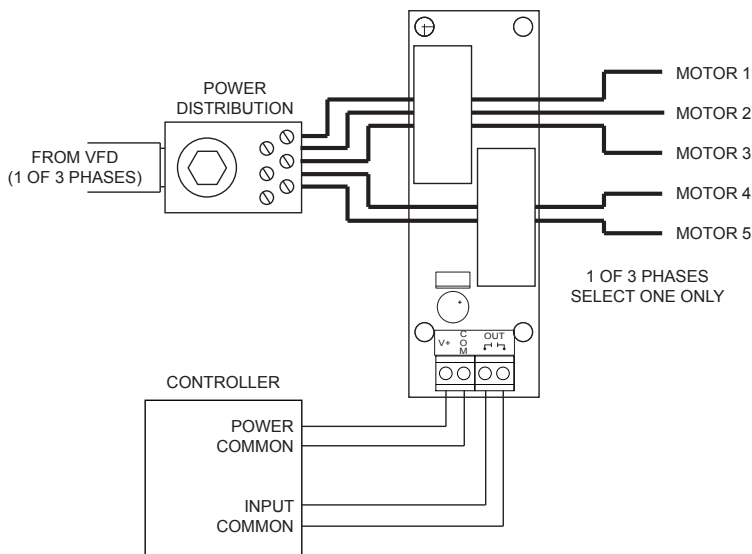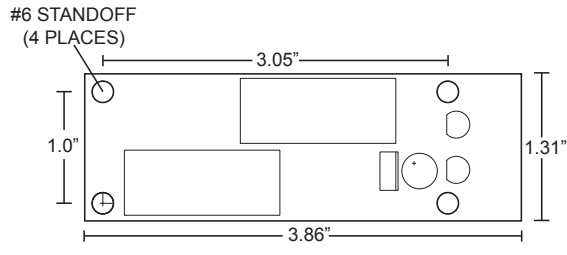


POWER DISTRIBUTION

FROM VFD
(1 OF 3 PHASES)

MOTOR 1
MOTOR 2
MOTOR 3
MOTOR 4
MOTOR 5

1 OF 3 PHASES
SELECT ONE ONLY

V+  COM  OUT

CONTROLLER

POWER COMMON

INPUT COMMON

⚠ **Warning:** *Refer to installation instructions that accompany product and heed all safety instructions. Do not rely on current status LED to indicate presence of power.*

## DIMENSIONS



#6 STANDOFF
(4 PLACES)

3.05"

1.0"

1.31"

3.86"

# What are ECMs?

Electronically Commutated Motors (ECMs) are brushless DC motors that function using a built-in inverter and a magnet rotor, and as a result are able to achieve greater efficiency in air-flow systems than some kinds of AC motors.  ECMs are also relatively low-maintenance; the use of true ball bearings reduces the need for oiling and varied start-up speeds reduce
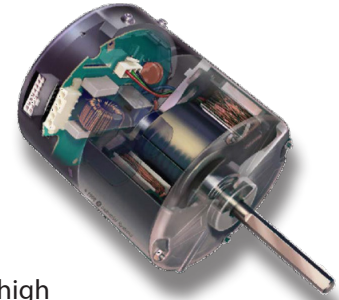
# Why are ECMs gaining momentum?

ECMs are cost and energy efficient and can reduce operating costs.  They maintain a high level (65 to 75 percent) of efficiency at a variety of speeds.  In comparison, AC motors can be inefficient when used in air control systems because the fan motor noise can require the motor to run at less than a full load.  When turned down, AC motor efficiency suffers in comparison to ECMs.

# What are the challenges with monitoring an ECM with digital current sensors?

ECMs draw a small amount of AC current to the inverter, up to 120mA, when the motor isn't running.  If you're using a fixed current sensor with a extremely low trip-point, it may falsely indicate the motor is running when in fact it is only passive current draw from the inverter.

# How can Senva current sensors prevent false trips on ECMs.

Choosing a current sensor with a fixed setpoint above the 120mA threshold will help avoid false trips.  Senva has adjusted the setpoint across the fixed current sensor line above the ECM threshold.  This includes options in our solid-core and split-core lines.
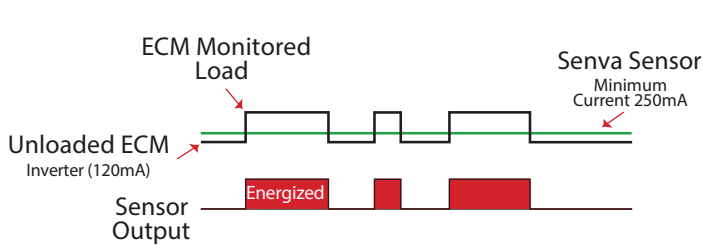


The Senva go/no series output changes state whenever current above the minimum turn-on is present. This provides "go/no" status on ECMs without false trips due to the inverter current.
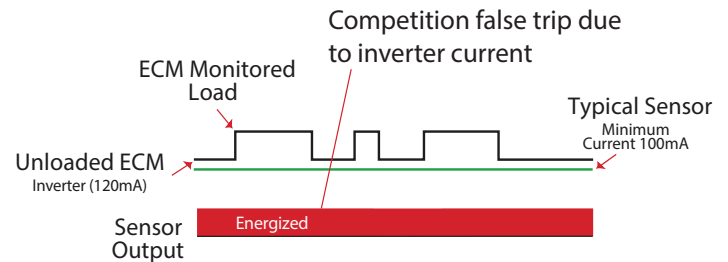


Typical go/no sensors with lower trip points may not change output as they are prone to false trips from the inverter current. The end result is a sensor that cannot distinguish when the ECM is loaded or unloaded.

## ORDERING INFORMATION

| SPLIT CORE | Min (on) | Max A | N.O. Output* |
|---|---|---|---|
| C-2300 | 0.35A | 200A | 1.0A@30VAC/DC |
| SPLIT CORE - MINI | | | |
| C-2200 | 0.5A | 50A | 1.0A@30VAC/DC |
| SOLID CORE | | | |
| C-1300 | 0.25A | 50A | 1.0A@30VAC/DC |
| SOLID CORE - MINI | | | |
| C-1200 | 0.25A | 50A | 1.0A@30VAC/DC |
| 6 POINT SENSOR | | | |
| C-1500-6 | 0.3A | 50A | 1.0A@30VAC/DC |

C-1200

C-1500-6

C-1300

C-2300

C-2200

Designed and Assembled

In the U.S.A

7 year limited warranty

## IEC-Style Contactors and Starters Selection Guide
## Average Amperages for Given Horsepower Motor Ratings

The table below provides the average full-load currents of squirrel cage motors based on NEC (National Electrical Code) Tables 430-148, 149, and 150. These values are given only as a guide - they may vary depending on the type of motor and manufacturer. Refer to the actual motor nameplate for full-load current values.

| HP | 110 to 120 VAC | | | 220 to 240 VAC | | | 440 to 480 VAC | | |
|---|---|---|---|---|---|---|---|---|---|
| | Single Phase | Two Phase | Three Phase | Single Phase | Two Phase | Three Phase | Single Phase | Two Phase | Three Phase |
| 1/10 | 3.0 | - | - | 1.5 | - | - | - | - | - |
| 1/8 | 3.8 | - | - | 1.9 | - | - | - | - | - |
| 1/6 | 4.4 | - | - | 2.2 | - | - | - | - | - |
| 1/4 | 5.8 | - | - | 2.9 | - | - | - | - | - |
| 1/3 | 7.2 | - | - | 3.6 | - | - | - | - | - |
| 1/2 | 9.8 | 4.0 | 4.4 | 4.9 | 2.0 | 2.2 | 2.5 | 1.0 | 1.1 |
| 3/4 | 13.8 | 4.8 | 6.4 | 6.9 | 2.4 | 3.2 | 3.5 | 1.2 | 1.6 |
| 1 | 16.0 | 6.4 | 8.4 | 8.0 | 3.2 | 4.2 | 4.0 | 1.6 | 2.1 |
| 1 1/2 | 20.0 | 9.0 | 12.0 | 10.0 | 4.5 | 6.0 | 5.0 | 2.3 | 3.0 |
| 2 | 24.0 | 11.8 | 13.6 | 12.0 | 5.9 | 6.8 | 6.0 | 3.0 | 3.4 |
| 3 | 34.0 | 16.6 | 19.2 | 17.0 | 8.3 | 9.6 | 8.5 | 4.2 | 4.8 |
| 5 | 56.0 | 26.4 | 30.4 | 28.0 | 13.2 | 15.2 | 14.0 | 6.6 | 7.6 |
| 7 1/2 | 80.0 | 38.0 | 44.0 | 40.0 | 19.0 | 22.0 | 21.0 | 9.0 | 11.0 |
| 10 | 100.0 | 48.0 | 56.0 | 50.0 | 24.0 | 28.0 | 26.0 | 12.0 | 14.0 |
| 15 | 135.0 | 72.0 | 84.0 | 68.0 | 36.0 | 42.0 | 34.0 | 18.0 | 21.0 |
| 20 | - | 94.0 | 108.0 | 88.0 | 47.0 | 54.0 | 44.0 | 23.0 | 27.0 |
| 25 | - | 118.0 | 136.0 | 110.0 | 59.0 | 68.0 | 55.0 | 29.0 | 34.0 |
| 30 | - | 138.0 | 160.0 | 136.0 | 69.0 | 80.0 | 68.0 | 35.0 | 40.0 |
| 40 | - | 180.0 | 208.0 | 176.0 | 90.0 | 104.0 | 88.0 | 45.0 | 52.0 |
| 50 | - | 226.0 | 260.0 | 216.0 | 113.0 | 130.0 | 108.0 | 56.0 | 65.0 |
| 60 | - | - | - | - | 133.0 | 154.0 | - | 67.0 | 77.0 |
| 75 | - | - | - | - | 166.0 | 192.0 | - | 83.0 | 96.0 |
| 100 | - | - | - | - | 218.0 | 248.0 | - | 109.0 | 124.0 |
| 125 | - | - | - | - | - | 312.0 | - | 135.0 | 156.0 |
| 150 | - | - | - | - | - | 360.0 | - | 156.0 | 180.0 |
| 200 | - | - | - | - | - | 480.0 | - | 208.0 | 240.0 |
| 250 | - | - | - | - | - | 602.0 | - | - | 302.0 |
| 300 | - | - | - | - | - | - | - | - | 361.0 |
| 350 | - | - | - | - | - | - | - | - | 414.0 |
| 400 | - | - | - | - | - | - | - | - | 477.0 |
| 500 | - | - | - | - | - | - | - | - | 590.0 |
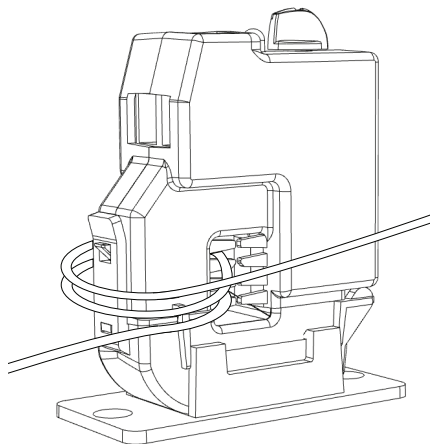


### Tech tip for smaller motors and loads
*For small motors: If the sensor you have will not turn on due to low amperage, wrap the conductor through the aperture. Each wrap will increase the amperage by 1x. For best resolution, choose the currents sensor that most closely matches your maximum motor or load full load amps (FLA)*

# The ultimate energy meter from Senva

## Get in. Get out. Get data.

We set out to make the easiest to install, most accurate meter. We started with flexible Rogowski CTs because they're compact, lightweight, and split-core for easy installation. But we didn't like their accuracy. So we gave them a brain so they can digitally communicate with our meter. And then it dawned on us you'd appreciate not having high voltage at the meter where you make your digital connections. So we made the voltage connection at the CT itself. Suddenly, we were measuring current and voltage in a current transducer.

Available with

ASHRAE **BACnet**®

**Modbus**
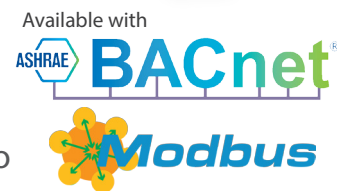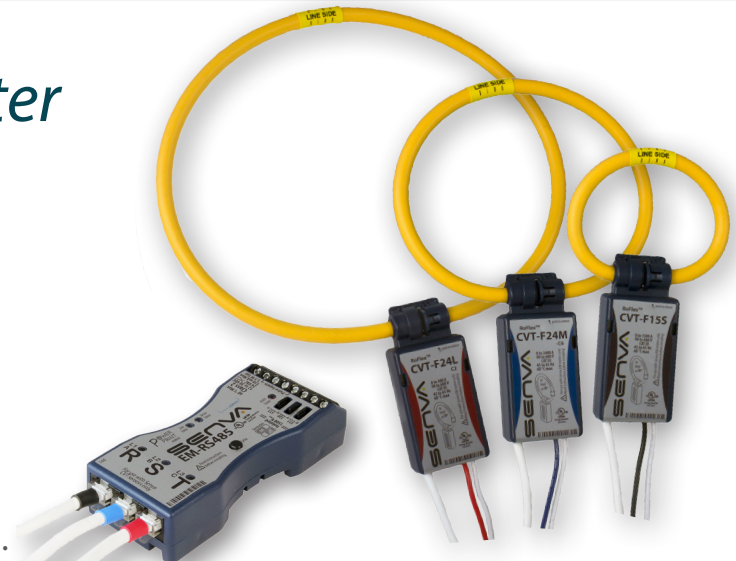
## We christened it the "CVT" and called the patent attorney...

The Current/Voltage Transducer™ (CVT™) measures both voltage and current, communicating the data digitally to the meter via plug-in low voltage connections.

N        L1

**Data to meter**
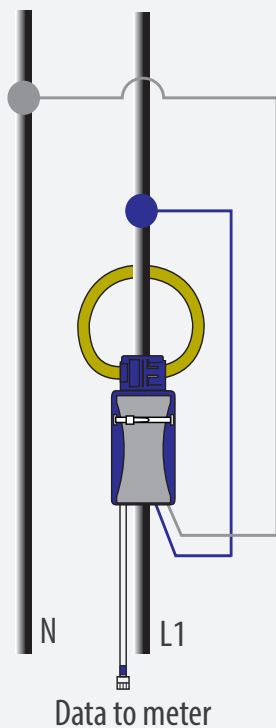
**Smart microprocessor enabled CVTs™ boast numerous benefits:**

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

## ENERGY METERS

EM Series                                          26

## Intelligent Meter Technology auto-detects and self configures on each installation!

The meter recognizes the CVT™ sensors and then scales itself accordingly.  If you're using BACnet or Modbus versions (EM-RS485), it even self-configures its baud rate, eliminating additional configuration steps to provide a full data stream of power variables.   Two pulse inputs allows aggregation of additional EM-PULSE meters. With the EM-RS485, the on-board inputs can connect to a variety of pulse output meters (water, gas, steam, etc.) for increased flexibility.

The entire assembly is easily mounted inside the electrical panel. Multiple mounting options including DIN rail adapter, snap-in mounting ears and integrated rare earth magnets to instantly secure on any ferrous enclosure or surface.

*The most compact meter ever! Simply plug in CVT™ connections for easy installation*

Additional features include diagnostics for assistance during installation. User programmable pulse scales, pulse width/alarm options, energy type, balanced load multipliers and PowerPrint power quality alarm.

It all adds up to ease of installation and higher accuracy.  Just what you'd expect from Senva.
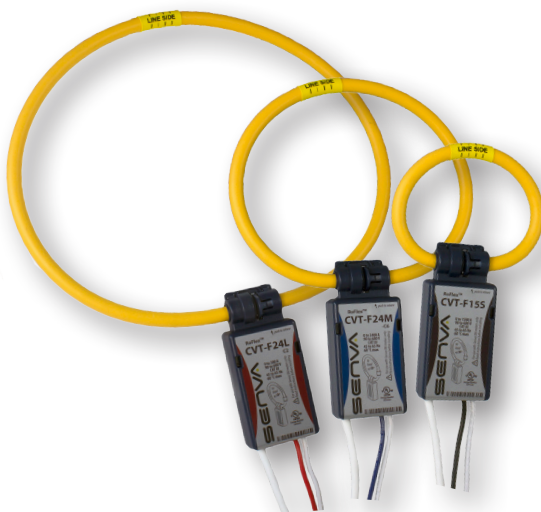
*Flexible Rogowski CVT™ sensors are available in four sizes from 9" to 36" in circumference (approximately 2.8" to 11.4" in diameter) and include rating options from 300A to 6000A*

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

*BACnet® is a registered trademark of ASHRAE.*

## EM Series
# Energy Meters

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

ASHRAE **BACnet**®

**Modbus**

c ⓤL us

## DESCRIPTION

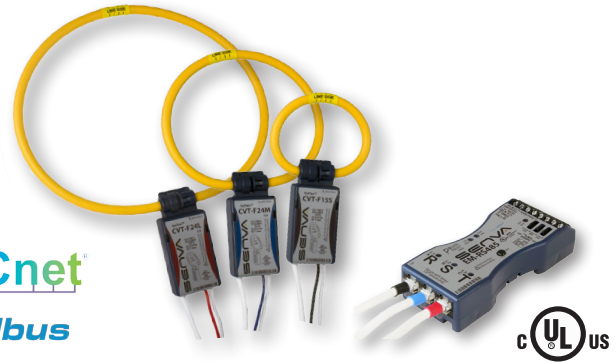The EM Series is the safest and fastest meter to install on the market. The perfect product for retrofits as the high voltage components are embedded in the Current/Voltage Transducer™ (CVT™).  The entire assembly is easily mounted inside the electrical panel eliminating labor and space required to install a separate transducer box.  Each CVT™ uses digital communication with the meter for superior noise immunity--ideal for applications where accuracy matters!  The CVTs™ are individually calibrated and measurement accuracy is independent of the transducer. To complement the CVT™, our metering platform offers two meter options (EM-PULSE & EM-RS485) which are small enough to fit in the palm of your hand, yet powerful enough to self-configure during install, removing all manual configuration!

## APPLICATIONS

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

**Designed and Assembled**

**In the U.S.A**

*7 year limited warranty*

## FEATURES

### Intelligent Meter Technology

- EM Series meters auto-detect and self configure for electrical service, CVT™ size, communication protocol (BACnet/Modbus), baud rate and more for simple and efficient installation
- Calibration is at the CVT™ level so any CVT™ from the product family will maintain its accuracy with any EM Series meter

### Ultimate Flexibility

- One universal meter supports all CVT™ options in the product family
- 2 pulse inputs for summing multiple meters on the EM-PULSE or for general (configurable) pulse counting on the EM-RS485 (from any pulse meter - water, gas, steam, etc.)
- 2 pulse outputs on the EM-PULSE for separately tracking positive and negative energy usage, additional power metrics or power quality alarms
- Flexible Mounting Options
  - Supports mounting on either horizontal or vertical PR30 (TS 35/F6) DIN rail
  - Snap-in mounting ears allow screwing to any suitable surface
  - Integrated rare earth magnets secure the EM meter to any ferrous enclosure or surface-- Get In. Get Out. Get Data.
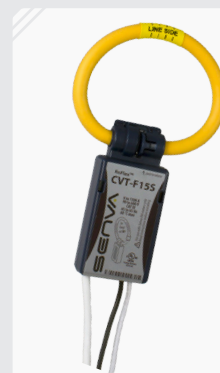
### Split-core Rogowski CVT™

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

### Quick Start Auto-detection

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

### Compact Size

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

## METER ORDERING

*version*

**EM-** [ ]
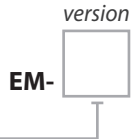
**Version**
PULSE = Pulse
RS485 = Modbus & BACnet

## CVT ORDERING

*coil*  *len*  *clr*

**CVT- F** [ ] **-** [ ] **-** [ ]

**Type**
F = Flex Rogowski

**Coil (Amps/Size)**
03S = 300A/Small
08S = 800A/Small
08M = 800A/Medium
15S = 1500A/Small
15M = 1500A/Medium
24M = 2400A/Medium
24L = 2400A/Large
60G = 6000A/Grande

**Lead Length**
Blank = 3' (default)
L06 = 6'
L10 = 10'

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

## SPECIFICATIONS (METER AND CVT™)

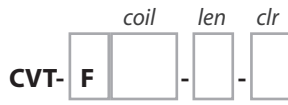| | | |
|---|---|---|
| Power Supply Input | | 12-30VDC/24VAC[1], 100mA max. |
| Pulse Outputs | Dual Outputs | Import and Export Energy Outputs |
| | Type | Solid state dry contact |
| | Specifications | N.O., 300mA max, 40V max |
| | Pulse scaling | 0.01, 0.1, 1, 10, 100, 1k Wh/Pulse |
| RS-485 Output | RS-485 | 2-wire, BACnet MS/TP, Modbus RTU |
| | Baud Rates | 9600, 19200, 38400, 57600, 76800, 115200 |
| | RS-485 Loading | 1/4 unit |
| Pulse Inputs[2] | Dual Inputs | 3.5 +/- 0.5 VDC, short circuit current is 10mA max |
| | Pulse Rate | 50 Hz (default), configurable up to 500 Hz |
| | Pulse active | <100 ohms |
| | Pulse Undefined | 100-1000 ohms |
| | Pulse Idle | >1000 ohms |
| Service Types | Configurations | 1Ph, 2Ph, 3Ph Wye (4-Wire), 3Ph Delta (3-Wire) |
| | Voltages | 90V$_{L-N}$ through 600V$_{L-L}$ |
| | Frequency | 45-65 Hz |
| Performance | Accuracy | 1% for V, A, kW, kVAR, kVA |
| Current/Voltage Transducer™ | Small Rope Circumference | 9" |
| | Medium Rope Circumference | 15" |
| | Large Rope Circumference | 24" |
| | Grande Rope Circumference | 36" |
| | 300A Operating Range[3] | +/-1% 30-300A (+/-3% >10A) |
| | 800A Operating Range[3] | +/-1% 30-800A (+/-3% >10A) |
| | 1500A Operating Range[3] | +/-1% 30-1500A (+/-3% >10A) |
| | 2400A Operating Range[3] | +/-1% 50-2400A (+/-3% >15A) |
| | 6000A Operating Range[3] | +/-1% 120-6000A (+/-3% >40A) |
| Operating Environment | Temperature | -4 to 140°F (-20 to 60°C) |
| | Humidity | 0-95% non-condensing |
| Meter Enclosure | Material | Polycarbonate/ABS |
| | Dimensions | 4.1"h x 1.8"w x 0.9"d |
| CVT™ Enclosure | Material | Polycarbonate/ABS |
| | Enclosure Dimensions | 3.5"h x 1.6"w x 0.8"d |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) PULSE Meter: Pulse Inputs must have same scale as the Pulse Outputs for accurate accumulation.*
*    RS485 Meter: Pulse Inputs are configurable to users needs.*
*(3) CVT™ Accuracy based on reading, not full scale.*

## FUSE ORDERING

*Color*

**CVT-FUSE-** [ ]

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

## SPECIFICATIONS (FUSES)

| | |
|---|---|
| Fuse | 1/2 Amp, 600VAC slow blow, 200kA AC Interrupting rating |
| Wire | 18AWG, 18" lead on each end of fuse pack, 600VAC rating |
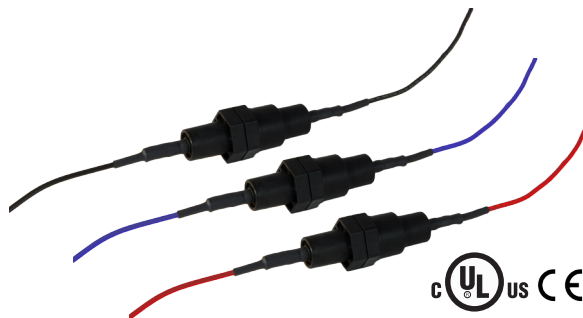
*CVT-FUSE-3PH pictured*

*BACnet® is a registered trademark of ASHRAE.*

> **The install was great, no need for copper and a pipe fitter to finish it; plus it's the best instrument I have used in the last 20 years.**



*Built-in snubbers are standard in every PWS and PWC element to protect them from permanent damage due to water hammer (high pressure spikes)*

*Standard LCD on every PW transmitter simplfies installation and toggles between PSID, supply and return pressures!*

## Save time and money by eliminating costly plumbing with our new wet-wet pressure transducer!

Our PW Wet-Wet Series revolutionary design eliminates costly field plumbing. Simply run wires to sensors instead of costly plumbing!  Also eliminates the need for costly bypass assemblies.

Each PW transmitter features a standard LCD for ease of installation and remote sensing elements that tap directly into the supply and return lines. Startup time is also reduced since purging air out of the lines is not necessary. Project call for conduit? Order the PW Series with armored cable to save even more time or specify our conduit mounted sensors to run your own wire on site. The PW Wet-Wet Series is a game changer, so what are you waiting for?

*Eliminates costly plumbing and bypass assemblies*
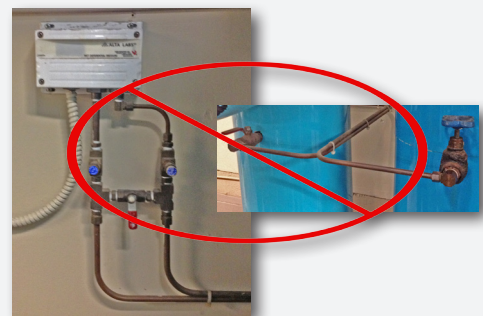


*Wire leads--not pipe!*
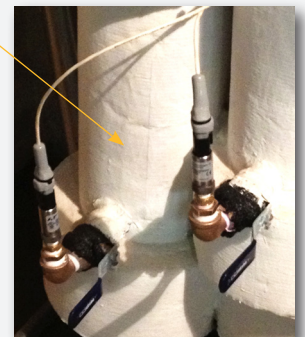
# PRESSURE SENSORS

## PRESSURE

*Selectable ranges and an LCD are a technician's best friend, that's why we make them standard on every dry media differential pressure sensor!*
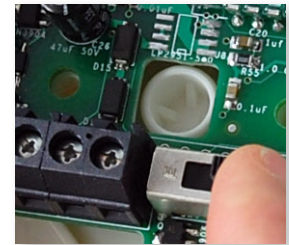
*Selectable pressure ranges, output type and uni/bi-directional settings (on 002-A models) for easy installation*

## Three installation friendly packages

Choose from our open frame panel mount, NEMA4 with integral duct probe, or NEMA4 with brass hose barb fittings. Each model offers the standard LCD and selectable range selector for ease of installation.

Dual outputs on every device save time when ordering and all low pressure models offer uni/bi-directional modes. Available in inches of water column or pascals models.

SENVA

# Probe, duct, panel
# Low Differential Pressure

0-2" W.C., 0-500Pa version All-in-one
Zero-drift sensing technology
Standard LCD display
Dual 0-5/10VDC and 4-20mA outputs

*NEMA 4 Duct Probe PDP32*

*NEMA 4 PDP31*

*Panel Mount PDP30*
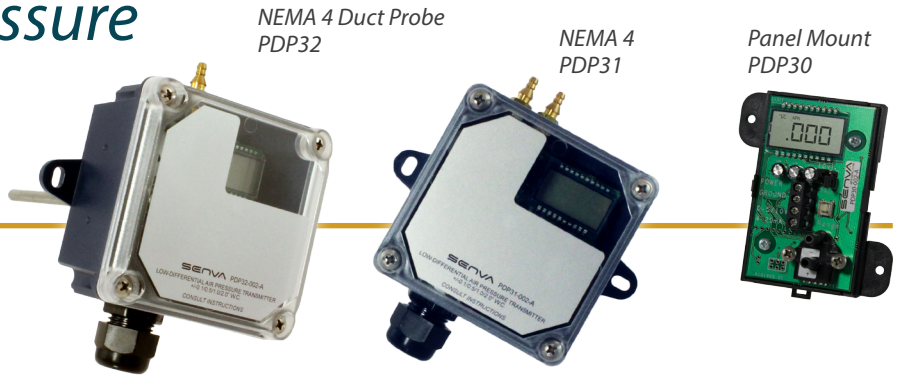
## DESCRIPTION

This PDP series dry media pressure sensors cover up to 0-2" (0-500Pa) and offers industry-leading long-term stability thanks to a fully calibrated and temperature compensated application specific integrated circuit (ASIC) in the piezoresistive silicon pressure sensor. The sensor features five field selectable ranges in both inches of WC and pascals, dual 0-5/0-10VDC and 4-20mA outputs, uni/bi-directional modes, and LCD readout for ease of installation.

## APPLICATIONS

- Ideal for clean rooms, hospitals, fume hoods, computer rooms, and other very low differential pressure applications
- Static pressure in duct or room, variable air volume system control, and filter status monitoring

## FEATURES

### Industry-leading long-term stability

- On-board application specific integrated circuit (ASIC)
- Fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects, and non-linearity

### Easy to install and maintain

- Mount in any position. No gravity effect
- LCD display for easy setup and commissioning

### Push button selectable ranges, outputs, and modes

- One model with five ranges: 0-2" (0.1, 0.25, 0.5, 1.0, 2.0) and 0-500Pa (.025, .062, .125, .250, .500kPa)
- Jumper selectable uni- or bi-directional
- Dual outputs 4-20mA and jumper selectable 0-5V or 0-10V

### Three Versatile package styles:

- Open Frame: Panel mount DIN or screw-mount model
- Probe: NEMA 4 with integral duct probe
- Duct: NEMA 4 with brass hose barb fittings
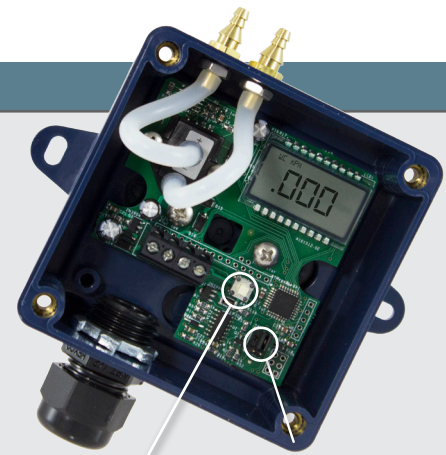
*Push button Selectable ranges for high resolution*

*Select output type and uni/bi-directional modes*

*Push button Selectable ranges for high resolution*

*Select output type and uni/bi-directional modes*

Designed and Assembled
In the U.S.A

*7 year limited warranty*

# SENVA

## ORDERING

*pkg*

**PDP3** ☐ **-002-A**

**Package**

0 = Open Frame
1 = NEMA 4
2 = NEMA 4 / duct probe
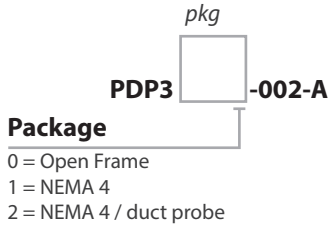
*(Write your selected Package number in the box above)*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 30mA max. 15-30VDC/24VAC Required for 10V F.S. Output |
| Output Type | Dual | 3-wire 0-5/10VDC and 3-wire 4-20mA |
| Output scaling | Model PDP3X-002-A, selectable ranges | 0-2" (0.1/0.25/0.5/1.0/2.0"W.C.) |
| | | 0-500Pa (.025/.062/.125/.250/.500kPa) |
| | | uni or bi-directional (jumper selectable) |
| Operating Environment | Temperature range | 32 to 122 F (0-50C) |
| | Humidity range | 0-95% RH |
| Media compatibility | | Dry, oil-free air. Nitrogen |
| Sensor Type | | Silicon Ceramic Diaphragm |
| Sensor Performance | Position effects | None - position insensitive |
| | Zero Drift | None |
| | Accuracy | +/-0.25% of full scale BFSL |
| | Total Band Error | +/-2.5% of full scale |
| | Maximum Working Pressure | 135" W.C. |
| | Maximum Over Pressure | 270" W.C. |
| | Burst Pressure | 415" W.C. |
| | Maximum Common Mode Pressure | 1400" W.C. |
| Enclosure | PDP30-002-A (Panel Mount) | Open frame, 35mm DIN rail or screw mount |
| | PDP31-002-A (Duct or Panel Mount) | IP65, screw mount, brass hose barb fittings |
| | PDP32-002-A (Duct Mount w/pickup tube) | IP65, screw mount, brass hose barb fitting and static pickup tube |

(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.

## TYPICAL WIRING



WIRING:

PWR = Power Supply +
GND = Common (power & signal)
0-10V = Voltage output 5v/10vdc
4-20mA = Current output 4-20mA

(PWR and GND required for both Voltage and Current output operation)

WIRING:
POWER = Power Supply +
GND/COM = Common (power & signal)
0-10V OUT = Voltage output 5v/10vdc
4-20mA OUT = Current output 4-20mA

(PWR and GND required for both Vdc and mA operation)

# SENVA
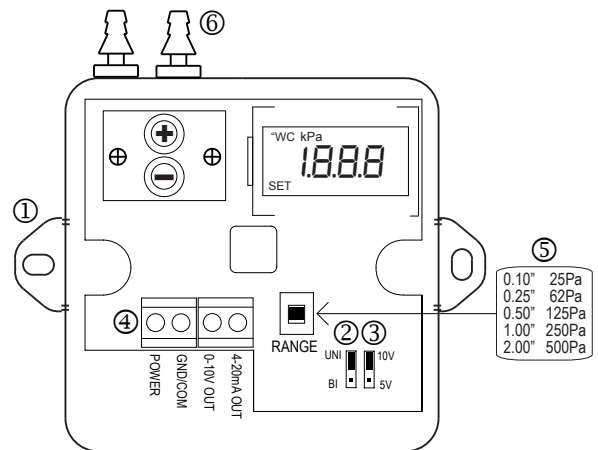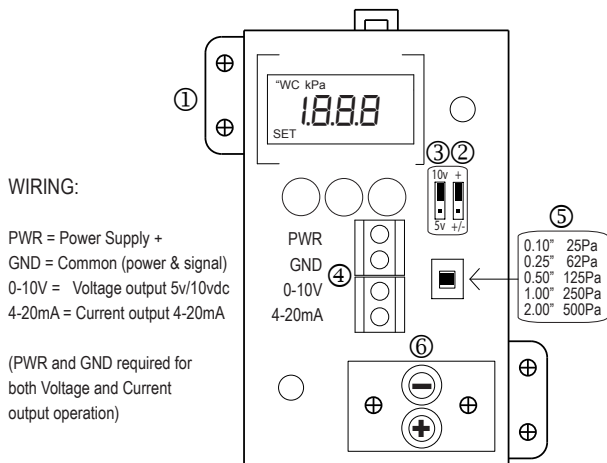
## Probe, duct, panel
# Static - Differential Pressure

0-25", 0-7000 Pa versions
Accurate silicon piezoresistive sensor
LCD display (WC or pascal models)
Dual 0-5/10VDC and 4-20mA outputs
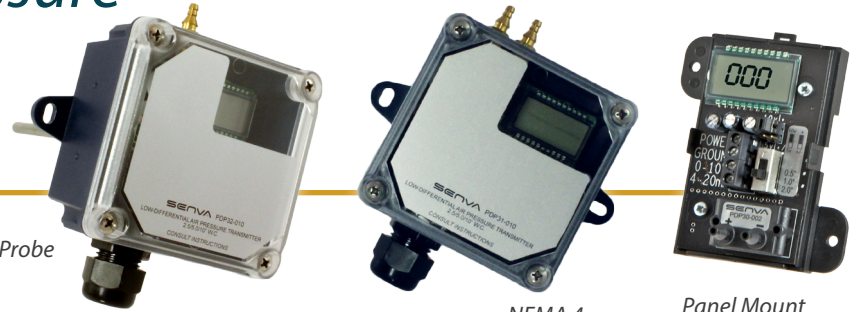
*NEMA 4 Duct Probe*
*PDP32*

*NEMA 4*
*PDP31*

*Panel Mount*
*PDP 30*

### DESCRIPTION

This PDP series dry media pressure sensors cover up to 0-25" (0-7000pA). The transmitter features field selectable pressure ranges LCD readout for ease of installation. Piezoresistive sensor chip provides accurate and reliable sensing.

### APPLICATIONS

▪ Static pressure in duct or room, variable air volume system control, and filter status monitoring

## FEATURES

*Push button and remote zero*

*Selectable ranges for high resolution*

**Integrated, micromachined silicon piezoresistive sensor**

▪ Outstanding sensitivity, linearity, and hysteresis

**Switch-selectable ranges**

▪ Three WC models with three ranges each: 0-10" (Selectable 2.5, 5.0, 10.0"WC) or 0-25" (Selectable 10, 15, 25"WC)
▪ Three Pa modelswith three ranges each: 0-2500Pa (0-2500/1250/250"Pa uni-directional only) or 0-7000Pa (Selectable 0-7000 (7000/5000/2500 Pa uni-directional)
▪ Dual outputs 4-20mA and jumper selectable 0-5V or 0-10V

**Easy to install and maintain**

▪ LCD display for easy setup and commissioning
▪ Auto zero push button input and auto zero control contact for system accuracy
▪ Dual outputs: 4-20mA and jumper selectable 0-5V or 0-10V

**Three Versatile package styles:**

▪ Open Frame: Panel mount DIN or screw-mount model
▪ Probe: NEMA 4 with integral duct probe
▪ Duct: NEMA 4 with brass hose barb fittings

**Designed and Assembled**
**In the U.S.A**

*warranty*
*7 year limited warranty*

## ORDERING

pkg    p range

**PDP3**

### Package

0 = Panel Mount
1 = NEMA 4
2 = NEMA 4 with duct probe

### Pressure Range

-010 = 0-10" (Selectable 2.5,5,10"WC)
-025 = 0-25" (Selectable 10,15,25"WC)
-2500Pa (Selectable 2500, 1250, 250 Pa)
-7000Pa (Selectable 7000, 5000, 2500 Pa)

*(Write your selected Package and Pressure Range numbers in the boxes above)*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 30mA max. (13VDC min for 10V f.s. output) |
| Output type | Dual outputs | 3-wire 0-5/10VDC and 3-wire 4-20mA |
| Output scaling | Model PDP[XX]-010 | 0-10" (Selectable 2.5, 5, 10"WC) |
| | Model PDP[XX]-025 | 0-25" (Selectable 10, 15, 25"WC) |
| | PDP[XX]-2500Pa | 0-2500Pa (Selectable 2500, 1250, 250 Pa) |
| | PDP[XX]-7000Pa | 0-7000Pa (Selectable 7000, 5000, 2500 Pa) |
| Operating Environment | Calibrated temperature range | 50 to 140 F (10-60C) |
| | Humidity range | 0-90% RH |
| Media compatibility | | Dry, oil-free air, N2 |
| Sensor Type | | Integrated, micromachined silicon piezoresistive |
| Sensor Performance | Accuracy (Linearity, hysteresis, temperature) | 2.5% f.s. |
| | Auto-zero input | Push-button and contact closure input provided |
| Enclosure | PDP30-XXX (Duct or Panel Mount) | IP65, screw mount, brass hose barb fittings |
| | PDP31-XXX (Duct or Panel Mount) | IP65, screw mount, brass hose barb fittings |
| | PDP32-XXX (Duct Mount w/pickup tube) | IP65, screw mount, brass hose barb fitting and static pickup tube |

(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.

## TYPICAL WIRING
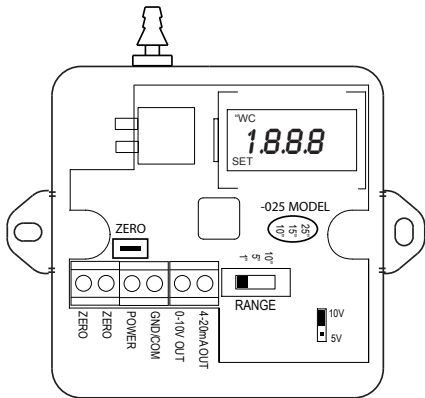


WIRING:
POWER = Power Supply +
GND/COM = Common (power & signal)
0-10V OUT = Voltage output 5v/10vdc
4-20mA OUT = Current output 4-20mA
ZERO = Contact closure input

(PWR and GND required for both Vdc and mA operation)

## Stainless thread mount
# Gauge Pressure Transducer

Stainless Steel Wet Media
1/4" MNPT
0-5VDC or 4-20mA outputs
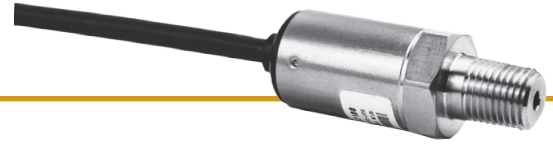
### DESCRIPTION

This PG Series is a rugged and accurate gauge pressure sensor. It is compatible with a wide variety of liquids and gases. The MEMS technology gives the PG series flexibility to be used in virtually any OEM application. Whether measuring hydraulic pressure in a manifold or corrosive liquids and gases such as sea water or hydrogen, the PG series industrial pressure sensor provides a thick diaphragm to maintain long-term stability.

### APPLICATIONS

- Refrigeration Pump Controls
- Chillers
- Freon and Ammonia Cooling Systems
- CO2 Systems
- Building Controls
- Water Pressure Systems
- Boiler Controls
- Environmental Test Chambers

## FEATURES

**Versatile**

- Compact, Robust Package
- 48" wire leads; 1/4" MNPT
- Chemical Compatibilities: Any gas or liquid compatible with 17-4 stainless steel.

**High Reliability...fewer call backs**

- Burst pressure 5X full scale
- Reverse voltage protected
- Rugged stainless steel construction
- UL508 Certified
- No oil, welds or internal o-rings

**Superb Accuracy**

- < ±0.5% BFSL @ room temperature (Accuracy includes non-linearity, hysteresis & non-repeatability)

## ORDERING

PG- ☐ ☐ -S- ☐

**Pressure Range**

15 = 15 PSI
50 = 50 PSI
75 = 75 PSI
100 = 100 PSI
200 = 200PSI
300 = 300 PSI
500 = 500 PSI

**Output Type**

B = 0-5 VDC
C = 4-20 mA

## ELECTRICAL DATA

| Output | 4-20mA | 0-5VDC |
|---|---|---|
| Power Supply | 10-28VDC | 10-28VDC |
| Output Impedance | >10k Ohms | <100 Ohms, Nominal |
| Current Consumption | 20mA, typical | <10mA |
| Bandwidth | (-3dB): DC to 250 Hz | (-3dB): DC to 1kHz |
| Output Noise | - | <2mV RMS |
| Zero Offset | <±1% of FS | <±1% of FS |
| Span Tolerance | <±1.5% of FS | <±1.5% of FS |
| Output Load | 0-800 Ohms @ 10-28VDC | 10k Ohms, min |
| Reverse Polarity Protection | Yes | Yes |

## ENVIRONMENTAL DATA

| **Temperature** | |
|---|---|
| Operating | -40 to 85°C (-40 to 185°F) |
| Storage | -40 to 100°C (-40 to 212°F) |
| **Thermal Limits** | |
| Compensated Range | 0 to 55°C (32 to 132°F) |
| TC Zero | <±1.5% of FS |
| TC Span | <±1.5% of FS |
| **Other** | |
| Shock | EN 60068-2-27 |
| Vibration | EN 60068-2-6, 60068-2-64, and IEC 68-2-32 |
| EMI/RFI Protection | Yes |
| Rating | IP-66 (housing only) |

## PERFORMANCE @ 25°C (77°F)

| Accuracy [1] | <±0.5% BFSL |
|---|---|
| Stability (1 year) | ±0.25% FS, typical |
| Over Range Protection | 2X Rated Pressure |
| Burst Pressure | 5X or 20,000 PSI (whichever is less) |
| Pressure Cycles | > 100 Million |

*(1) Accuracy includes non-linearity, hysteresis & non-repeatability*

## WIRING CONNECTIONS

| 0-5 VDC Models | 3-wire voltage |
|---|---|
| 4-20mA Models | 2-wire loop powered |

## Remote cable mounted sensors
# Wet-wet Differential Pressure

Prefabricated cables design
0 to 5~500 PSID (0 to 273~3447 kPa)
Revolutionary design eliminates plumbing
LCD display (PSID or kPa jumper selectable)
Dual 0-5/10VDC and 4-20mA outputs

Designed and Assembled

In the U.S.A

### DESCRIPTION

The PW Cable Wet-Wet series remote sensors are installed directly into the pipe and electrical connection is made between the PWS remote sensors and the PW transmitter via cables. This dramatically reduces labor cost by eliminating plumbing/piping to a traditional transducer. Startup time is reduced since purging air out of the lines is not necessary. Traditional plumbed bypass assemblies are no longer required. Choose between the PW10 and PW20 model based on your anticipated PSID range.

### APPLICATIONS

- Ideal for monitoring pumps and load differential pressures in HVAC systems and processes where local indication is needed.
- Process control systems
- Flow measurement of various gases or liquids
- Liquid level measurement of pressurized vessels

### FEATURES

#### Versatile Universal Transmitter

- Three selectable PSID ranges per sensing element
- Low and standard PSID range transmitter models
- 500 PSIG is ideal for high rise applications
- User friendly LCD displays in PSID or kPa

#### Jumper selectable features for easy installation

- Absolute mode outputs absolute value of difference
- Port swap corrects plumbing errors
- Fast/slow to select desired response time
- Uni/bi directional
- Display units in PSI/kPa
- Test mode—forces full-scale output
- Over range icon flashes if differential pressure is over-range, alerting technician to move range switch to next higher dp setting and rescale panel
- Switch selectable outputs: 2-wire 4-20mA, 3-wire 0-5V or 0-10V

#### High Reliability

- Standard built-in snubbers protect sensing elements from water hammer damage
- MEMS sensor technology

#### Snap on deutsch sensor connection

- Allows for mounting sensor and quick connection of wire later
- Eliminates wire twisting when tightening sensors in pipe fitting

**Save time and money--pull wires, not pipe!**

*Pre-wired leads for fast snap connection to sensors*

*Revolutionary design eliminates costly field plumbing. Simply run wires to sensors instead of costly plumbing! Also eliminates the need for costly bypass assemblies.*

**Don't waste time and money on plumbing like this ever again!**
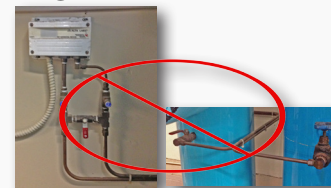
*Cables are prefabricated and snap onto sensors with industrial deutsch connectors. This eliminates wire twisting when tightening sensors. IP65 rated for outdoor use when armored.*

# ORDERING

**Ordering sensors:** *Order elements based on expected maximum PSIG.  Order quantity of (2) PWSxxx sensors of same pressure range per (1) PW transmitter. The PW cables are prefabricated and cut to custom lengths at the factory.*
**Need further explanation:** *Turn to page 42*

range  length  type

## UNIVERSAL TRANSMITTER: PW

**Transmitter Ranges**

10 = Low PSID selectable ranges
20 = Standard PSID selectable ranges

**Sensor Cable Length (feet)**

| | | | |
|---|---|---|---|
| A = 3' | E = 20' | I = 40' | M = 100' |
| B = 6' | F = 25' | J = 45" | |
| C = 9' | G = 30' | K = 50' | |
| D = 15' | H = 35' | L = 75' | |

**Sensor Cable Type**

A = Armored plenum cable    Blank = Standard plenum cable

element number

## REMOTE SENSORS: PWS

### Element Number

| Element Number | Element Range | PW10 Selectable Ranges | PW20 Selectable Ranges |
|---|---|---|---|
| **025** | 25 PSIG | 5/10/25 PSID | 5/10/25 PSID |
| **050** | 50 PSIG | 5/10/25 PSID | 10/25/50 PSID |
| **100** | 100 PSIG | 10/20/40 PSID | 50/75/100 PSID |
| **250** | 250 PSIG | 25/50/100 PSID | 75/150/250 PSID |
| **500** | 500 PSIG | 50/100/150 PSID | 100/250/500 PSID |

### PRESSURE SENSOR SERVICE VALVE: PWBV

Optional service valve PWBV for live sensor swap

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | Voltage output mode 0-5V | 12-30VDC/24VAC[1], 20mA max. |
| | Voltage output mode 0-10V | 15-30VDC/24VAC required for 10V full scale output |
| | Current (4-20 mA) output mode | 12-30VDC, 20mA max. |
| Output type | Switch selectable | 3-wire 0-5/10VDC and 2-wire 4-20mA |
| Pressure Ranges | Model PWS025 | 25 PSIG (Select 5/10/25 PSID) |
| | Model PWS050 | 50 PSIG (Select 5/10/25 or 10/25/50 PSID based on PW Model) |
| | Model PWS100 | 100 PSIG (Select 10/20/40 or 50/75/100 PSID based on PW Model) |
| | Model PWS250 | 250 PSIG (Select 25/50/100 or 75/150/250 PSID based on PW Model) |
| | Model PWS500 | 500 PSIG (Select 50/100/150 or 100/250/500 PSID based on PW Model) |
| Operating Temperature | Transmitter | 32 to 140F (0-60°C) |
| Media compatibility | Type | Water; other 17-4 SS compatible media |
| | Temperature | 32 to 250°F (0-125°C) |
| Zero Adjustment | Automatic | Push-button, terminal block switch input, Push button for 5-seconds to re-zero. Hold for 10-seconds to restore factory settings |

**Transmitter Performance [2]**

PW10 Accuracy

| Range | A | B/C |
|---|---|---|
| 25 PSI Element | ±2% FS | ±1% FS |
| 50-500 PSI Element | ±4% FS | ±2% FS |

PW20 Accuracy

| Range | A | B/C |
|---|---|---|
| All PSIG Elements | ±2% FS | ±1% FS |

| | | |
|---|---|---|
| Sensor Type | | Micro-machined silicon strain gauge |
| Sensor Performance | Accuracy | < ±0.5% BFSL |
| | Zero Offset | < ±2% |
| | Span Tolerance | < ±2% |
| | Stability (1 Year) | ±0.25%FS, typ |
| | Overange Protection | 2X Rated Pressure |
| | Burst Pressure | 5X or 20,000 psi (whichever is less) |
| | Pressure Cycles | > 100 Million |
| | Compensated Range | 0 to 55°C (30 to 130°F) |
| | Temperature Compensation | Zero, <±1.5% of FS  Span, <±1.5% of FS |
| | Shock | 100G, 11 msec, 1/2 sine |
| | Vibration | 10G peak, 20 to 2000 Hz. |
| | EMI/RFI Protection | Yes |
| Enclosure, PW20 Transmitter | Construction | Powdered coated steel |
| | Sealing | IP65 (when installed with water-tight fittings) |
| Enclosure, PWS (xxx) Sensor | Construction | Stainless Steel 17-4, 1/4" MNPT, Deutsch DT series connector |
| | Sealing | IP65 (when installed with armored cable option) |
| Enclosure, PWBV Service Valve | Construction | Chrome-plated brass, 1/4" NPT Female x Male |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) FS is defined as the full scale of the selected range in bi-directional mode.*

# SENVA

## Remote conduit mounted sensors
# Wet-wet Differential Pressure

Conduit adapter design
0 to 5~500 PSID (0 to 273~3447 kPa)
Revolutionary design eliminates plumbing
LCD display (PSID or kPa jumper selectable)
Dual 0-5/10VDC and 4-20mA outputs

**Designed and Assembled**

**In the U.S.A**

## DESCRIPTION

The PW Conduit Wet-Wet series remote sensors are installed directly into the pipe and electrical connection is made between the PWC remote sensors and PW transmitter via 4-conductor shielded cable run through conduit. This dramatically reduces labor cost by eliminating plumbing/piping to a traditional transducer. Startup time is reduced since purging air out of the lines is not necessary. Traditional plumbed bypass assemblies are no longer required. Choose between the PW10 and PW20 model based on your anticipated PSID range.

## APPLICATIONS

- Ideal for monitoring pumps and load differential pressures in HVAC systems and processes where local indication is needed.
- Process control systems
- Flow measurement of various gases or liquids

## FEATURES

**Conduit ports on transmitter and elements**

- Run conduit and 4-conductor shielded cable from transmitter to elements to wire in the field
- Eliminates costly plumbing and by-pass manifolds

**Versatile Universal Transmitter**

- Three selectable PSID ranges per sensing element
- Low and standard PSID range transmitter models
- 500 PSIG is ideal for high rise applications
- User friendly LCD displays in PSID or kPa

**Jumper selectable features for easy installation**

- Absolute mode outputs absolute value of difference
- Port swap corrects plumbing errors
- Fast/slow to select desired response time
- Uni/bi directional
- Test mode—forces full-scale output
- Over range icon flashes if differential pressure is over-range, alerting technician to move range switch to next higher dp setting and rescale panel
- Switch selectable outputs: 2-wire 4-20mA, 3-wire 0-5V or 0-10V

**High Reliability**

- Standard built-in snubbers protect sensing elements from water hammer damage
- MEMS sensor technology

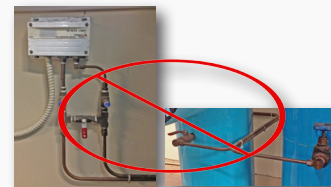**Save time and money - pull wires, not pipe!**

- Run 4-conductor shielded cable in conduit from PW transmitter to PWC elements

**Don't waste time and money on plumbing like this ever again!**

- Revolutionary design eliminates costly field plumbing. Simply run wires to sensors instead of costly copper tubing! Also eliminates the need for expensive bypass assemblies.

## ORDERING

> **Ordering sensors:** *Order elements based on expected maximum PSIG. Order quantity of (2) PWCxxx sensors of same pressure range per (1) PW transmitter. Conduit, conduit connectors and 4-conductor shielded cable not provided.*
> **Need further explanation:** *Turn to page 43*

*range*

### UNIVERSAL TRANSMITTER: PW

**Transmitter Ranges**

10 = Low PSID selectable ranges
20 = Standard PSID selectable ranges

### PRESSURE SENSOR SERVICE VALVE: PWBV

Optional service valve PWBV for live sensor swap. Order 1 PWBV service valve for each PWCxxx element.

*element number*

### REMOTE SENSORS: PWC

**Element Number**

| Element Number | Element Range | PW10 Selectable Ranges | PW20 Selectable Ranges |
|---|---|---|---|
| **025** | 25 PSIG | 5/10/25 PSID | 5/10/25 PSID |
| **050** | 50 PSIG | 5/10/25 PSID | 10/25/50 PSID |
| **100** | 100 PSIG | 10/20/40 PSID | 50/75/100 PSID |
| **250** | 250 PSIG | 25/50/100 PSID | 75/150/250 PSID |
| **500** | 500 PSIG | 50/100/150 PSID | 100/250/500 PSID |

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | Voltage output mode 0-5V | 12-30VDC/24VAC[1], 20mA max. |
| | Voltage output mode 0-10V | 15-30VDC/24VAC required for 10V full scale output |
| | Current (4-20 mA) output mode | 12-30VDC, 20mA max. |
| Output type | Switch selectable | 3-wire 0-5/10VDC and 2-wire 4-20mA |
| Pressure Ranges | Model PWC025 | 25 PSIG (Select 5/10/25 PSID) |
| | Model PWC050 | 50 PSIG (Select 5/10/25 or 10/25/50 PSID based on PW Model) |
| | Model PWC100 | 100 PSIG (Select 10/20/40 or 50/75/100 PSID based on PW Model) |
| | Model PWC250 | 250 PSIG (Select 25/50/100 or 75/150/250 PSID based on PW Model) |
| | Model PWC500 | 500 PSIG (Select 50/100/150 or 100/250/500 PSID based on PW Model) |
| Operating Temperature | Transmitter | 32 to 140F (0-60°C) |
| Media compatibility | Type | Water; other 17-4 SS compatible media |
| | Temperature | 32 to 250°F (0-125°C) |
| Zero Adjustment | Automatic | Push-button, terminal block switch input, Push button for 5-seconds to re-zero. Hold for 10-seconds to restore factory settings |

**Transmitter Performance [2]**

| PW10 Accuracy | Range | A | B/C |
|---|---|---|---|
| | 25 PSI Element | ±2% FS | ±1% FS |
| | 50-500 PSI Element | ±4% FS | ±2% FS |

| PW20 Accuracy | Range | A | B/C |
|---|---|---|---|
| | All PSIG Elements | ±2% FS | ±1% FS |

| | | |
|---|---|---|
| Sensor Type | | Micro-machined silicon strain gauge |
| Sensor Performance | Accuracy | < ±0.5% BFSL |
| | Zero Offset | < ±2% |
| | Span Tolerance | < ±2% |
| | Stability (1 Year) | ±0.25%FS, typ |
| | Overange Protection | 2X Rated Pressure |
| | Burst Pressure | 5X or 20,000 psi (whichever is less) |
| | Pressure Cycles | > 100 Million |
| | Compensated Range | 0 to 55°C (30 to 130°F) |
| | Temperature Compensation | Zero, <±1.5% of FS  Span, <±1.5% of FS |
| | Shock | 100G, 11 msec, 1/2 sine |
| | Vibration | 10G peak, 20 to 2000 Hz. |
| | EMI/RFI Protection | Yes |
| Enclosure, PW20 Transmitter | Construction | Powdered coated steel |
| | Sealing | IP65 (when installed with water-tight fittings) |
| Enclosure, PWC (xxx) Sensor | Construction | Stainless Steel 17-4, 1/4" MNPT, 1/2" Conduit Fitting |
| | Sealing | IP65 (when installed with water tight fittings) |
| Enclosure, PWBV Service Valve | Construction | Chrome-plated brass, 1/4" NPT Female x Male |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) FS is defined as the full scale of the selected range in bi-directional mode.*

# First time ordering our PW cable series? Let us help step by step!

## What do I need?

### PW Cable Wet-Wet Series

**PWS Sensing Elements**
Order (2) PWS sensing elements for every (1) PW transmitter. Each PWS element connects to the PW transmitter cables via snap-on deutsch connectors.

**PW Transmitter**
The configuration of the unit including powering the device, output, jumpers and PSID range selection is done inside of the PW transmitter. Cable length and type must be specified upon ordering.

**On/Off Service Valve**
Optional service valve (PWBV) for live sensor swap. Order 1 PWBV service valve for each PWS element.

## ORDERING SENSING ELEMENTS

### Step 1

**Element connection type**
This guide is for units that include prefabricated cables with deutsch connectors cut to a custom length at the factory. (If running your own 4-conductor shielded cable through conduit is desired, see page 37 of the catalog)

### Step 2

**Element pressure (PSIG) range**
Each sensing element has a maximum PSIG rating. Ensure that your system will not exceed this rating to avoid clipping any readings before the device calculates the differential pressure.

element number

**REMOTE SENSORS: PWS**

**Element Number**

**025** = 25 PSIG
**050** = 50 PSIG
**100** = 100 PSIG
**250** = 250 PSIG
**500** = 500 PSIG

### Step 3

**How many PWS sensing elements do I need?**
It takes a pair (2) of PWS elements with the same PSIG rating per (1) PW transmitter.

## OPTIONAL SERVICE VALVES

### Step 4

**Do you need optional on/off service valves?**
Optional service valves (PWBV) are recommended for live sensor swap and also protecting the sensing elements from debris if the system needs to be flushed.

Order (2) PWBV service valves for each (1) PW transmitter.

## ORDERING TRANSMITTER

### Step 5

**Transmitter range**
After selecting the proper pair of PWS elements, select the PW10 or PW20 transmitter based on the PSID selectable range scale that best fits your application. (Use the cross reference table below)

| Element Number | Element Range | PW10 Selectable Ranges | PW20 Selectable Ranges |
|---|---|---|---|
| **025** | 25 PSIG | 5/10/25 PSID | 5/10/25 PSID |
| **050** | 50 PSIG | 5/10/25 PSID | 10/25/50 PSID |
| **100** | 100 PSIG | 10/20/40 PSID | 50/75/100 PSID |
| **250** | 250 PSIG | 25/50/100 PSID | 75/150/250 PSID |
| **500** | 500 PSIG | 50/100/150 PSID | 100/250/500 PSID |

### Step 6

**Cable length and type**
The PW cables are prefabricated and cut to custom lengths at the factory. (Tip: For outdoor installations order the armored plenum cable)

range  length  type

**UNIVERSAL TRANSMITTER: PW**

**Transmitter Ranges**

10 = Low PSID selectable ranges
20 = Standard PSID selectable ranges

**Sensor Cable Length (feet)**

| | | | |
|---|---|---|---|
| A = 3' | E = 20' | I = 40' | M = 100' |
| B = 6' | F = 25' | J = 45" | |
| C = 9' | G = 30' | K = 50' | |
| D = 15' | H = 35' | L = 75' | |

**Cable Type**

A = Armored plenum cable      Blank = Standard plenum cable

## FURTHER ASSISTANCE

Call us at **(866) 660-8864**
or email **sales@senvainc.com**

# First time ordering our PW conduit series? Let us help step by step!

## What do I need?

### PW Conduit Wet-Wet Series

**PWC Sensing Elements**
Order (2) PWC sensing elements for every (1) PW transmitter. Each PWC element has a 1/2" conduit adapter on top.

**PW Transmitter**
The configuration of the unit including powering the device, output, jumpers and PSID range selection is done inside of the PW transmitter.

**On/Off Service Valve**
Optional service valve (PWBV) for live sensor swap. Order 1 PWBV service valve for each PWC element.

---

## ORDERING SENSING ELEMENTS

### Step 1

**Element connection type**
This guide is for units that will require the installer to provide conduit and 4-conductor shielded cable. (If prefabricated cables are desired, please see page 36 of the catalog)

### Step 2

**Element pressure (PSIG) range**
Each sensing element has a maximum PSIG rating. Ensure that your system will not exceed this rating to avoid clipping any readings before the device calculates the differential pressure.

element number

**REMOTE SENSORS: PWC**

**Element Number**

**025** = 25 PSIG
**050** = 50 PSIG
**100** = 100 PSIG
**250** = 250 PSIG
**500** = 500 PSIG

### Step 3

**How many PWC sensing elements do I need?**
It takes a pair (2) of PWC elements with the same PSIG rating per (1) PW transmitter.

## ORDERING TRANSMITTER

### Step 5

**Transmitter range**
After selecting the proper pair of PWC elements, select the PW10 or PW20 transmitter based on the PSID selectable range scale that best fits your application. (Use the table below to cross reference the PSID ranges associated with each PWC element)

range

**UNIVERSAL TRANSMITTER: PW**

**Transmitter Ranges**

10 = Low PSID selectable ranges
20 = Standard PSID selectable ranges

### Transmitter PSID selectable ranges

| Element Number | Element Range | PW10 Selectable Ranges | PW20 Selectable Ranges |
|---|---|---|---|
| **025** | 25 PSIG | 5/10/25 PSID | 5/10/25 PSID |
| **050** | 50 PSIG | 5/10/25 PSID | 10/25/50 PSID |
| **100** | 100 PSIG | 10/20/40 PSID | 50/75/100 PSID |
| **250** | 250 PSIG | 25/50/100 PSID | 75/150/250 PSID |
| **500** | 500 PSIG | 50/100/150 PSID | 100/250/500 PSID |

---

## OPTIONAL SERVICE VALVES

### Step 4

**Do you need optional on/off service valves?**
Optional service valves (PWBV) are recommended for live sensor swap and also protecting the sensing elements from debris if the system needs to be flushed.

Order (2) PWBV service valves for each (1) PW transmitter.

## FURTHER ASSISTANCE

### Still have questions?

Don't hesitate to call us at
**(866) 660-8864**
or email
**sales@senvainc.com**

# "Field adjustability simplifies commissioning. Institutional customers have their own metrics and they want them matched."

## It's only perfect if the customer says so.

We're familiar with that facilities manager whose antiquated humidity instrument "may" or may not be as accurate as our NIST traceable chamber. So we added provisions for you to quickly rescale our sensor to match their reference points. It doesn't make us wrong; the customer is always right.
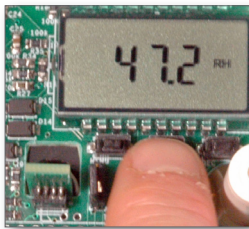


*Rescale our transducers in seconds to meet customer requirements*



*State of the art Testing Facilities. 8-point NIST Certification Options, consult factory*

## Changing the game with microsensing
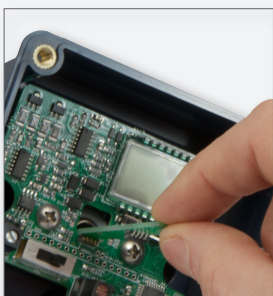


*Field replaceable RH element on the HD Series*

Senva's element features two calibrated micro-sensors for relative humidity and temperature coupled on the same integrated circuit. As such, they're optimized, not for signal strengths, but long-term stability.

Forming a single unit, they enable precise determination of dew point. Condensation or even immersions present no problems whatsoever. But, let's be honest. It doesn't mean you'll never ever have a problem. We all know swimming pools and nitrogen rich agriculture applications can oxidize anything—our sensors included. That's why our sensor element is conveniently replaced without disturbing the installation. No field calibration is required.

# HUMIDITY/TEMPERATURE

## HUMIDITY/TEMP

*The "Triple Threat Combo": CO2, RH, and temp in a compact unit with optional BACnet in the* **AQW Series.** *This customizable sensor allows you to specify RH, CO2 or both to meet project requirements!*
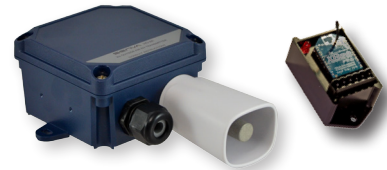
*Wireless units for rooftop applications reduces installation time and permits proper location. Solar Powered—save hundreds on your install.*
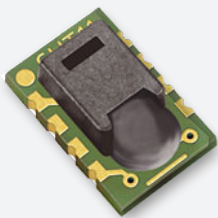
*Our microsensors are optimized for precision relative humidity and temperature measurement*

## When it comes to humidity, we're not perfect. Just better.

Conventional capacitive sensors have large elements that absorb or release water proportional to the relative environmental humidity. But they also absorb contaminants. And their bulky materials age haphazardly. Long term stability is the casualty. We set out to change that paradigm—and did.

## How about the world's first solar power wireless outside air station?

Outside air is one of the most challenging installations going. First, you have to get to the roof top. Then you have conduit. Then someone figures out it's not really in the shade. Like moving that conduit again? We just had a notion that a solar-powered wireless humidity temp transmitter would be a better idea.

*BACnet® is a registered trademark of ASHRAE.*

# SENVA

# Wall Humidity Sensors
# CO2/Humidity/Temp

ASHRAE **BACnet**®

Available with analog outputs or protocol for BACnet RS-485
Integrated set-point relay
Optional field replaceable NDIR CO2 and RH elements

**Designed and Assembled**
**In the U.S.A**

## DESCRIPTION

The AQW series design allows customization for a sensor that meets project requirements for monitoring temperature, CO2 and relative humidity. The sensor can be ordered as stand alone temperature, CO2/Temp, RH/Temp or all-in-one CO2/RH/Temp with a 0-5/10V analog or BACnet RS485 output.  Lower material costs and installation time by combining multiple sensors into a single sensor housing with standard LCD and optional add-on features.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

**Customize to meet project requirements**

- Standard LCD and temperature on each device
- Options to add CO2 and/or RH sensing elements
- Field replaceable elements for CO2 and RH
- Available with 0-5/10V Analog or BACnet protocol communication

**Protocol Version**

- BACnet RS-485 ready
- Auto-configuration wizard detects baud rate and MAC address
- Adjustable set-point using button menu or optional 10k slider

**Analog Version**

- LCD for easy setup of all parameters (concealment cover included)
- Programmable set-points for complete control
- Provision to offset CO2 reading
- Optional thermistors, sliders and override button

**High performance field replaceable NDIR CO2 element**

- Selectable auto-calibration mode returns sensor to baseline values

**2% RH field replaceable sensor**

- On-board temperature compensation for RH eliminates temp coefficient errors achieving excellent measurement accuracy, high repeatability and offset stability.
- State of the art testing facilities. 8-point NIST traceable certification available—consult factory

**Quality**

- Industry leading 7-year limited warranty/ 2-year RH element, 3-year CO2 element limited warranties

## ORDERING INFORMATION

| | Output | CO2 | RH | SLD | BTN | RTD/TH | Color |
|---|---|---|---|---|---|---|---|
| **AQW -** | | | B | | | | |

**Output Type**
A = Analog (0-5/10V)
B = BACnet RS-485

**CO2 Sensor**
A = None
B = CO2 Sensor

**RH Sensor**
A = None
**B = 2% RH Sensor**

**Set-Point Slider**
A = None
B = 1k (Not valid w/ BACnet)
C = 10k

**Push Button**
A = None
B = Override Button (Requires thermistor)
C = User Push Button

**RTD/Thermistor***
A = None
C = 100Pt (385) RTD
D = 1000Pt (385) RTD
E = 10k type 2
F = 10k type 3
G = 10k w/11k
H = 3k
I = 2k2
J = 1k8
K = 20k

**Color**
1 = White
2 = Ivory
4 = Light Almond

*Add-on RTD/Thermistor not readable via BACnet; Temperature output is standard on AQW devices, Add-on RTD/Thermistor is option for Analog.

| **Example** | Output | CO2 | RH | SLD | BTN | RTD/TH | Color |
|---|---|---|---|---|---|---|---|
| **AQW -** | B | B | B | A | A | A | 1 |

(AQW sensor with BACnet RS-485, Temp, CO2, 2% RH, no set-point slide, no user push button, no RTD/thermistor, white color)

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| **Analog Outputs** | Temperature | 0--5/10V standard, Scaling 50°F to 95°F (10°C to 35°C); thermistor/RTD values optional |
| | CO2 and RH | 0-5/10V |
| | Update Rate | Continuous |
| | Programmable Relay | Solid-state output, 1A @ 30VAC/DC, N.O. |
| **Analog LCD Menu Parameters** [2] | 5Pt, Set point, Hi (On) | Sets relay turn-on threshold (800ppm default) |
| | 5Ph, Set point, hysteresis (Off) | Sets the relay turn-off hysteresis (100ppm default) |
| | 5CL, Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | AdJ, Adjustment | CO2 Offset adjustment +/-250ppm (0 default) |
| | CAL, Auto Calibration Period | Off, 7 days, 14 days, 30 days, 60 days (14 days default) |
| | °FC, Displayed Temp Unit | °F degrees fahrenheit (default), °C degrees celsius |
| | LuL Analog Output Scale | 5u 5.0V full scale, I0u 10.0V full scale (default) |
| | run, Run Mode | Displays temp and optional CO2 and RH |
| **Protocol Output** | Protocol | BACnet (Isoloated) |
| | Connection | 3-wire RS-485, with isolated ground |
| | Data Rate | Locally set baud rate up to 115200 (9600, 19200, 28800, 38400, 57600, 76800, 115200) |
| | Address Range | 0-127 |
| **Protocol Relay Set-point** | Programmable | Solid-state output, 1A @ 30VAC/DC, N.O. |
| | | Source selectable: CO2, RH, Temperature |
| **CO2** | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading (400-2000ppm) |
| | Range | 0-2000/5000ppm; Programmable up to 10,000ppm |
| | Response time | 60 seconds to 90% reading |
| | Sample rate | 3 seconds |
| **Relative Humidity** | Type | Digital CMOS |
| | Accuracy | 2% models, +/-2% over 10 to 90%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Temperature coefficient | Compensated on-board |
| | Response time [3] | 30s |
| | Sample rate | 3s |
| | Operating range/Output Scale | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [4] | -20° C to 60° C @ RH>90%; -20° C to 80° C @ RH=50% |
| **Temperature (with RH option)** | Type | Silicon Bandgap |
| | Nominal Accuracy | +/-0.3° C (operating range) |
| | Maximal Accuracy | +/-0.5° C (at 25° C), +/-1.0° C (operating range) |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time (3) | 30s |
| | Sample rate | 3s |
| **Temperature (without RH option)** | Type | NTC Thermistor |
| | Nominal Accuracy | +/-0.5° C (operating range) |
| | Maximal Accuracy | +/-1.0° C (at 25° C), +/-2.0° C (operating range) |
| | Resolution | 0.05° C |
| | Repeatability | +/-0.2° C |
| | Sample Rate | 100 milliseconds |
| **Operating Environment** | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| **Enclosure** | Material | ABS Plastic |
| | Dimensions | 4.85"h x 3.25"w x 1.19"d |

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Quick Start Menu parameters shown, for additional capabilities see installation manual.
(3) Time for reaching 63% of reading at 25° C and 1 m/s airflow
(4) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)

**BACnet® is a registered trademark of ASHRAE.**

# Recessed Wall
# Humidity/Temperature

2% or 3% accuracy
0-5/10V RH/Temp (thermistors optional)
Field-calibration potentiometer
Durable and attractive low-profile design

| Ivory | White | Light Almond | Almond | Black | Brown | Gray |
|---|---|---|---|---|---|---|
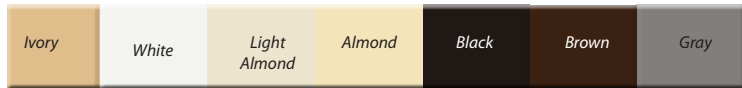
## DESCRIPTION

The HR series is designed for use in energy management systems in buildings. They combine excellent stability with reliable operation and the provision to offset the RH reading +/-5% for in-field calibration. Thermistor options accommodate any installation. Housing is offered in multiple color choices to match any decor.

## APPLICATIONS

- HVAC room humidity and temperature measurement and control
- Energy management/building control

## FEATURES

**Attractive recessed design is attractive and durable**

- Match colors and existing interior decor
- Fits in most standard wall plates
- No exposed screws; unobtrusive tamper resistant design
- Ideal for schools

**Field calibration poteniometer**

- Field calibration scaled adjustment allows easy adjustment of calibrated RH value as needed to maintain certification.
- 0-5V/0-10V output—jumper selectable

**Choose from a range of accuracy and options**

- 2% and 3% RH accuracy options
- Thermistor outputs for temperature optional

**Superior RH sensing**

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability.

**Slimline enclosure**

- Tamper resistant design allows the sensor to mount flush with the wall for a clean, low-profile appearance

*Optional Trim Ring for surface mount applications or mis-sized j-boxes*

**Designed and Assembled**

In the U.S.A

*7 year limited warranty*

## ORDERING

|  | accy | temp | color |
|---|---|---|---|
| **HR** | ☐ | ☐ | ☐ |

**Accuracy**

2 = 2%
3 = 3%

**Temperature**

A = None
B = Transmitter
C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F= 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

**Color**

Blank = White
2 = Ivory
3 = Brown
4 = Light Almond
5 = Almond
6 = Black
7 = Gray

## SPECIFICATIONS

| Power Supply | | 12-30VDC/24VAC [1], 15mA max. |
|---|---|---|
| Outputs | RH% and Temperature | 3-wire 0-5/10V [4] (jumper selectable) |
| Output scaling | RH% | 0-100% RH |
| | Temperature | 50-95° F (10-35° C) |
| Thermistor Options | | Yes, see ordering table below |
| Media filter | | PTFE membrane, IP54 protection |
| Relative Humidity | Accuracy | 2% models, +/-2% over 10 to 90%RH range |
| | | 3% models, +/-3% over 20 to 80%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Non-Linearity | factory linearized <1%RH |
| | Temperature coefficient | fully compensated by on-board temp sensor |
| | Response time [2] | 30s |
| | Output update rate | 2s |
| | Operating range | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [3] | -20° C to 60° C @ RH>90% |
| | | -20° C to 80° C @ RH=50% |
| Temperature | Accuracy (-20° C to 70° C range) | 2% models, <+/-1° C; 0.5° C typ @ 25° C |
| | | 3% models, <+/-2° C; 0.5° C typ @ 25° C |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time [2] | 30s |
| | Temperature Scaling | 50-95° F (10-35° C) |
| | Output update rate | 2s |
| | Operating range | -40° C to 120° C |

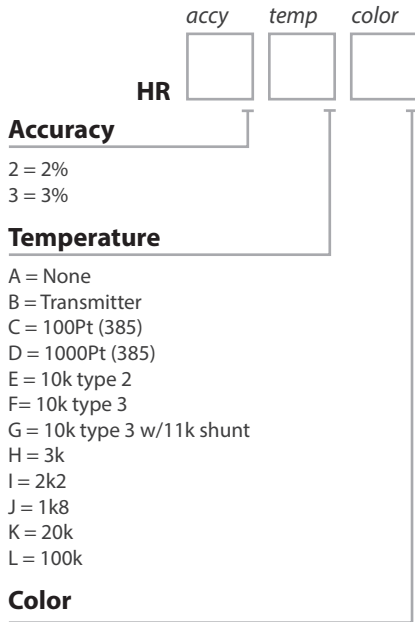(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow.
(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours).
(4) 15-30VDC/24VAC power supply voltage required for 10 volt output.

## DIMENSIONS



2.944
3.310
4.690
1.239
1.980
2.892
4.641
1.761

*Optional #Trim Ring for surface mount applications or mis-sized j-boxes*

## TYPICAL WIRING



COMMON
RH OUT
T OUT
POWER SUPPLY
THERMISTOR
THERMISTOR

T RH — +
OUT PWR 12-30VDC (24VAC)
SENVA HR-____
ROOM RH/T SENSOR
☐ 2% ☐ RH ☐ RTD
☐ 3% ☐ T ____
CONSULT INSTRUCTIONS PRIOR TO INSTALLATION OR SERVICE
THERMISTOR (OPTIONAL)

## *Duct*
# Humidity/Temperature

2% or 3% accuracy (NIST certification options)
0-5V/10V and 4-20mA RH/Temp (thermistors optional)
LCD display with field calibration menu
Field replaceable element

## DESCRIPTION

The HD Series is designed with both the engineer and field technician in mind. The HD Series combines excellent stability with reliable operation in 2% or 3% RH accuracy options. Optional temperature transmitters, RTDs and thermistors add further flexibilty when ordering. The standard LCD and field replaceable elements make the intitial installation and future service a breeze.

## APPLICATIONS

- HVAC room humidity and temperature measurement and control
- Replaceable element is ideal for difficult environments such as swimming pools

## FEATURES

### Versatile

- 2% or 3% RH versions with field replaceable sensor
- Switch selectable 5V/10V and 4-20mA RH/T transmitter outputs
- Thermistor outputs for temperature optional

### Easy to maintain

- Field calibration. LCD and push-button menu allows easy adjustment of calibrated RH value as needed to maintain certification.
- Field replaceable sensor—without disturbing conduit

### Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability.
- State of the art testing facilities. 8-point calibration certificate available (NIST traceability—consult factory)

### Quality

- Industry leading 7-year warranty/ 2-year replaceable element warranty

### Field replaceable element

- Ideal for harsh environments
- Accurate dual RH/Temp IC sensing
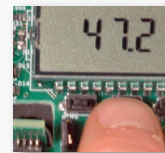
### LCD with menu

- Easier commissioning
- Re-scale to field metrics if required
- LCD cover provided

### NIST traceable

- 8-point calibration certification options. Consult factory.

**Designed and Assembled**
In the U.S.A

*7 year limited warranty*

## ORDERING

accy    temp

HD -

**Accuracy**

2 = 2%
3 = 3%

**Temperature**

A = None
B = Transmitter
C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F= 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

### Replacement Sensor Elements

HSD-2 = 2% accuracy
HSD-3 = 3% accuracy

*Consult factory for certification and point calibration options*

*(Write your selected Accuracy, Temperature, and Replacement Sensor Elements numbers/letters in the boxes above)*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | 3-wire voltage mode (0-5/10V) | 12-30VDC/24VAC [1], 15mA max. |
| | 2-wire current mode (4-20mA) | 12-30VDC, 30mA max. |
| Outputs | RH and Temperature (option) | 3-wire 0-5/10V [4] or 2-wire 4-20mA |
| Output scaling | RH | 0-100% RH |
| | Temperature (jumper) | 32-122° F (0-50°C) or -40-140° F (-40-60°C) |
| Thermistor/RTD | Optional | See ordering table |
| Media filter | | PBT with water-vapor permeable membrane |
| Relative Humidity | Accuracy | 2% models, +/-2% over 10 to 90%RH range<br>3% models, +/-3% over 20 to 80%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Non-Linearity | factory linearized <1%RH |
| | Temperature coefficient | fully compensated by on-board sensor |
| | Response time [2] | 30s |
| | Output update rate | 2s |
| | Operating range | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [3] | -20° C to 60° C @ RH>90%<br>-20° C to 80° C @ RH=50% |
| Temperature | Accuracy (-20° C to 70° C range) | 2% models, <+/-1° C; 0.5° C typ @ 25° C<br>3% models, <+/-2° C; 0.5° C typ @ 25° C |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time (2) | 30s |
| | Output update rate | 2s |
| | Operating range | -40° C to 120° C |
| Enclosure | Materials | ABS/Polycarbonate |
| | Dimensions | 4.0"h x 4.4"w x 2.1"d (+6.8" probe) |

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow.
(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)
(4) 15-30VDC/24VAC power supply voltage required for 10 volt output.

## DIMENSIONS



## TYPICAL WIRING



4-20mA wiring:
mA OUT = 4-20mA output return
V+ PWR = Loop supply voltage

0-5V/0-10V wiring:
V OUT = Voltage output, 0-5 or 10VDC
V- COM = Ground/Common
V+ PWR = Power supply voltage

SENVA

## Outside Air
# Humidity/Temperature

2% or 3% accuracy (NIST certification options)
0-5V/10V and 4-20mA RH/Temp (thermistors optional)
LCD display with field calibration menu
Field replaceable element

### DESCRIPTION

The HO Series is designed to be mounted on the building exterior to provide outside air RH measurement. The HO Series combines excellent stability with reliable operation in 2% or 3% RH accuracy options. Optional temperature transmitters, RTDs and thermistors add further flexibilty when ordering. The standard LCD, gasketed lid and field replaceable elements make the intitial installation and future service a breeze.

### APPLICATIONS

- Outdoor humidity and temperature measurement for building control

## FEATURES

### Versatile

- 2% or 3% Rh versions with field replaceable sensor
- Switch selectable 5V/10V and 4-20mA RH/T transmitter outputs
- Thermistor/RTD output for temperature optional

### Easy to maintain

- Field calibration. LCD and push-button menu allows easy adjustment of calibrated RH value as needed to maintain certification
- Replace a sensor without disturbing conduit

### Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability
- State of the art testing facilities. 8-point calibration certificate available (NIST traceability—consult factory)

### Quality

- Industry leading 7-year warranty/ 2-year replaceable element warranty

**Field replaceable element**

- Ideal for harsh environments
- Accurate dual RH/Temp IC sensing
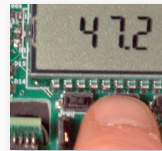
**LCD with menu**

- Easier commissioning
- Re-scale to field metrics if required

**NIST traceable**

- 8-point calibration certification options. Consult factory.

Designed and Assembled
In the U.S.A

warranty 7

*7 year limited warranty*

# SENVA

## ORDERING

*accy*    *temp*

**HO -**

**Accuracy**

2 = 2%
3 = 3%

**Temperature**

A = None
B = Transmitter
C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F= 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

**Replacement Sensor Elements**
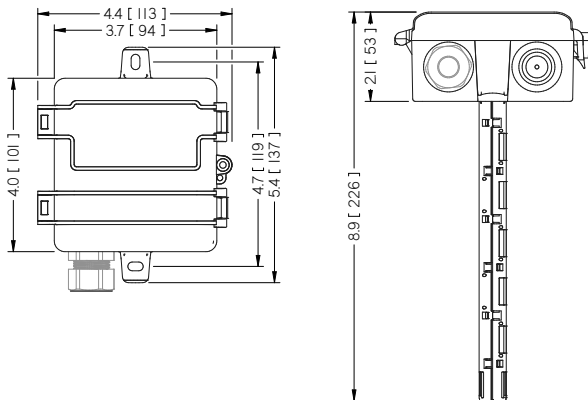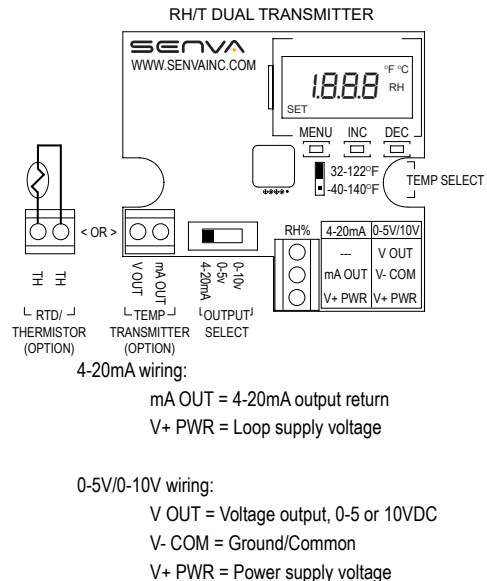
HSO-2 = 2% accuracy
HSO-3 = 3% accuracy

*warranty*

## SPECIFICATIONS

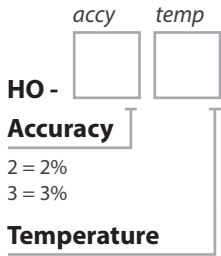| | | |
|---|---|---|
| Power Supply | 3-wire voltage mode (0-5/10V) | 12-30VDC/24VAC[1], 15mA max |
| | 2-wire current mode (4-20mA) | 12-30VDC, 30mA max. |
| Outputs | RH and Temperature (option) | 3-wire 0-5/10V[4] or 2-wire 4-20mA |
| Output scaling | RH | 0-100% RH |
| | Temperature (jumper) | 32-122°F (0-50°C) or -40-140°F (-50-60°C) |
| Thermistor/RTD | Optional | See ordering table |
| Media filter | | Sintered stainless steel |
| Relative Humidity | Accuracy | 2% models, +/-2% over 10 to 90%RH range  3% models, +/-3% over 20 to 80%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Non-Linearity | Factory linearized <1%RH |
| | Temperature coefficient | Fully compensated by on-board sensor |
| | Response time[2] | 30s |
| | Output update rate | 2s |
| | Operating range | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions[3] | -20° C to 60° C @ RH>90%  -20° C to 80° C @ RH=50% |
| Temperature | Accuracy (-20° to 70°C range) | 2% models, <+/-1° C; 0.5° C typ @ 25° C  3% models, <+/-2° C; 0.5° C typ @ 25° C |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time[2] | 30s |
| | Output update rate | 2s |
| | Operating range | -40°  to 70° C |
| Enclosure | Materials | ABS/Polycarbonate |
| | Dimensions | 4.0"h x 4.4"w x 2.1"d (+2.8" solar shield) |

*(1) One side of transformer,, secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow.*
*(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)*
*(4) 15-30VDC/24VAC power supply voltage required for 10 volt ouput.*

## TYPICAL WIRING

RH/T DUAL TRANSMITTER



SENVA
WWW.SENVAINC.COM

MENU   INC   DEC

32-122°F
-40-140°F

TEMP SELECT

| RH% | 4-20mA | 0-5V/10V |
|---|---|---|
| | --- | V OUT |
| | mA OUT | V- COM |
| | V+ PWR | V+ PWR |

RTD/
THERMISTOR
(OPTION)

TEMP
TRANSMITTER
(OPTION)

OUTPUT
SELECT

4-20mA wiring:

mA OUT = 4-20mA output return

V+ PWR = Loop supply voltage

0-5V/0-10V wiring:

V OUT = Voltage output, 0-5 or 10VDC

V- COM = Ground/Common

V+ PWR = Power supply voltage

## DIMENSIONS



4.4 [ 113 ]
3.7 [ 94 ]
4.0 [ 101 ]
4.7 [ 119 ]
3.7 [ 37 ]
5.4 [ 190 ]
7.5 [ 190 ]
1.9 [ 48 ]
2.1 [ 53 ]

# Wireless Outside Air
# Humidity/Temperature

2.4 GHz ZigBee™ wireless for easy installation
2% or 3% accuracy
LCD display with field calibration
Field replaceable element

## DESCRIPTION

The WO outside air series consists of a labor saving solar powered wireless temp/humidity transmitter with a remote receiver. This eliminates costly conduit, roof penetrations, and allows for easy repositioning should conditions warrant. Excellent stability with reliable operation.

## APPLICATIONS

- Outdoor humidity and temperature measurement for building control
- Eliminate costly conduit runs and relocation

## FEATURES

### Breakthrough wireless labor savings

- 2.4 GHz ZigBee™ wireless for super fast installation—save hours on conduit and allows for flexible repositioning.
- Solar-powered for long, reliable transmission; works even in cloudy areas

### Versatile

- 2% or 3% RH versions with field replaceable sensor
- 3-wire 0-10V output

### Easy to maintain

- Field replaceable sensor—without disturbing installation

### Superior RH sensing

- On-board temperature compensation for RH. Eliminates temperature coefficient errors and achieves an excellent measurement accuracy as well as high repeatability and offset stability.

### Quality

- Industry leading 7-year warranty/ 2-year replaceable element warranty

### Solar powered with integral battery

- Trouble-free operation without changing batteries or pulling conduit

### Field replaceable element

- Ideal for harsh environments
- Accurate dual RH/Temp IC sensing

**Designed and Assembled**

**In the U.S.A**

warranty

*7 year limited warranty*

## ORDERING

*accy*

**WO -**

**Accuracy**

2 = 2%
3 = 3%

**Replacement Sensor Elements**

HSO-2 = 2% accuracy
HSO-3 = 3% accuracy

*(Write your selected Accuracy and Replacement Sensor Element numbers/ letters in the boxes above)*
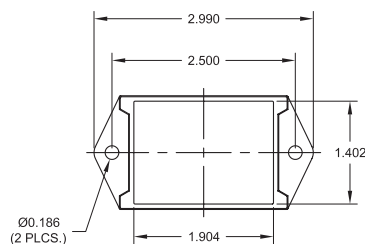
## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | Transmitter | Long life battery with integral solar charger |
| | Receiver | 12-30VDC/12VAC[1], 45mA max |
| Radio | Frequency/Power | 2.4GHz unlicensed ISM band, ZigBee™, 60mW |
| | Range | 300' line-of-sight |
| | FCC id | OUR24XBEE |
| | Broadcast interval | Daylight, 5-min; Dark, 30-min |
| Outputs | RH% and Temperature | 3-wire 0-10VDC |
| Output scaling | RH% | 0-100% RH |
| | Temperature | -40 to 140° F |
| Media filter | | Sintered Stainless Steel |
| Relative Humidity | Accuracy | 2% models, +/-2% over 10 to 90%RH range |
| | | 3% models, +/-3% over 20 to 80%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Non-Linearity | factory linearized <1%RH |
| | Temperature coefficient | fully compensated by on-board temp sensor |
| | Response time [2] | 30s |
| | Output update rate | 2s |
| | Operating range | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [3] | -20° C to 60° C @ RH>90% |
| | | -20° C to 80° C @ RH=50% |
| Temperature | Accuracy (-20° C to 70° C range) | 2% models, <+/-1° C; 0.5° C typ @ 25° C |
| | | 3% models, <+/-2° C; 0.5° C typ @ 25° C |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time (2) | 30s |
| | Output update rate | 2s |
| | Operating range | -40° C to 120° C |

*(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.*

*(2) Time for reaching 63% of reading at 25° C and 1 m/s airflow*

*(3) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)*

## DIMENSIONS



70 mm (2.75 in)
94 mm (3.7 in)

2.990
2.500
1.402
1.904
Ø0.186 (2 PLCS.)

## TYPICAL WIRING



SENVA

RZM10

VIN | GND | GND | RH | TEMP
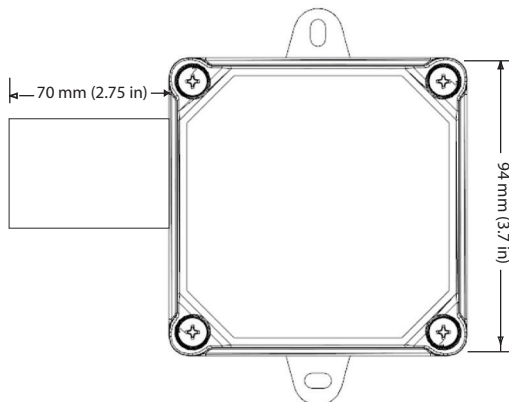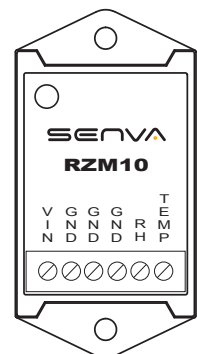
VIN = Power supply excitation voltage
GND = Ground/Common
RH = RH Voltage output, 0-10vdc
TEMP = Temperature output, 0-10vdc

# Wall Temperature Sensors
# CO2/Humidity/Temp

Available with analog outputs or protocol for BACnet RS-485
Integrated set-point relay
Optional field replaceable NDIR CO2 and RH elements

**Designed and Assembled**

**In the U.S.A**

## DESCRIPTION

The AQW series design allows customization for a sensor that meets project requirements for monitoring temperature, CO2 and relative humidity. The sensor can be ordered as stand alone temperature, CO2/Temp, RH/Temp or all-in-one CO2/RH/Temp with a 0-5/10V analog or BACnet RS485 output. Lower material costs and installation time by combining multiple sensors into a single sensor housing with standard LCD and optional add-on features.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

**Customize to meet project requirements**

- Standard LCD and temperature on each device
- Options to add CO2 and/or RH sensing elements
- Field replaceable elements for CO2 and RH
- Available with 0-5/10V Analog or BACnet protocol communication

**Protocol Version**

- BACnet RS-485 ready
- Auto-configuration wizard detects baud rate and MAC address
- Adjustable set-point using button menu or optional 10k slider

**Analog Version**

- LCD for easy setup of all parameters (concealment cover included)
- Programmable set-points for complete control
- Provision to offset CO2 reading
- Optional thermistors, sliders and override button

**High performance field replaceable NDIR CO2 element**

- Selectable auto-calibration mode returns sensor to baseline values

**2% RH field replaceable sensor**

- On-board temperature compensation for RH eliminates temp coefficient errors achieving excellent measurement accuracy, high repeatability and offset stability.
- State of the art testing facilities. 8-point NIST traceable certification available—consult factory

**Quality**

- Industry leading 7-year limited warranty/ 2-year RH element, 3-year CO2 element limited warranties

## ORDERING INFORMATION

| | Output | CO2 | RH | SLD | BTN | RTD/TH | Color |
|---|---|---|---|---|---|---|---|
| **AQW -** | | | | | | | |

**Output Type**

A = Analog (0-5/10V)
B = BACnet RS-485

**CO2 Sensor**

A = None
B = CO2 Sensor

**RH Sensor**

A = None
B = 2% RH Sensor

**Set-Point Slider**

A = None
B = 1k (Not valid w/ BACnet)
C = 10k

**Push Button**

A = None
B = Override Button (Requires thermistor)
C = User Push Button

**RTD/Thermistor***

A = None
C = 100Pt (385) RTD
D = 1000Pt (385) RTD
E = 10k type 2
F = 10k type 3
G = 10k w/11k
H = 3k
I = 2k2
J = 1k8
K = 20k

**Color**

1 = White
2 = Ivory
4 = Light Almond

*Add-on RTD/Thermistor not readable via BACnet; Temperature output is standard on AQW devices, Add-on RTD/Thermistor is option for Analog.

| **Example** | Output | CO2 | RH | SLD | BTN | RTD/TH | Color |
|---|---|---|---|---|---|---|---|
| **AQW -** | B | B | B | A | A | A | 1 |

(AQW sensor with BACnet RS-485, Temp, CO2, 2% RH, no set-point slide, no user push button, no RTD/thermistor, white color)

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Analog Outputs | Temperature | 0--5/10V standard, Scaling 50°F to 95°F (10°C to 35°C); thermistor/RTD values optional |
| | CO2 and RH | 0-5/10V |
| | Update Rate | Continuous |
| | Programmable Relay | Solid-state output, 1A @ 30VAC/DC, N.O. |
| Analog LCD Menu Parameters [2] | 5Pt, Set point, Hi (On) | Sets relay turn-on threshold (800ppm default) |
| | 5Ph, Set point, hysteresis (Off) | Sets the relay turn-off hysteresis (100ppm default) |
| | 5CL, Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | AdJ, Adjustment | CO2 Offset adjustment +/-250ppm (0 default) |
| | CAL, Auto Calibration Period | Off, 7 days, 14 days, 30 days, 60 days (14 days default) |
| | °FC, Displayed Temp Unit | °F degrees fahrenheit (default), °C degrees celsius |
| | LuL Analog Output Scale | 5u 5.0V full scale, I0u 10.0V full scale (default) |
| | RUN, Run Mode | Displays temp and optional CO2 and RH |
| Protocol Output | Protocol | BACnet (Isoloated) |
| | Connection | 3-wire RS-485, with isolated ground |
| | Data Rate | Locally set baud rate up to 115200 (9600, 19200, 28800, 38400, 57600, 76800, 115200) |
| | Address Range | 0-127 |
| Protocol Relay Set-point | Programmable | Solid-state output, 1A @ 30VAC/DC, N.O. |
| | | Source selectable: CO2, RH, Temperature |
| CO2 | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading (400-2000ppm) |
| | Range | 0-2000/5000ppm; Programmable up to 10,000ppm |
| | Response time | 60 seconds to 90% reading |
| | Sample rate | 3 seconds |
| Relative Humidity | Type | Digital CMOS |
| | Accuracy | 2% models, +/-2% over 10 to 90%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Temperature coefficient | Compensated on-board |
| | Response time [3] | 30s |
| | Sample rate | 3s |
| | Operating range/Output Scale | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [4] | -20° C to 60° C @ RH>90%; -20° C to 80° C @ RH=50% |
| Temperature (with RH option) | Type | Silicon Bandgap |
| | Nominal Accuracy | +/-0.3° C (operating range) |
| | Maximal Accuracy | +/-0.5° C (at 25° C), +/-1.0° C (operating range) |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time (3) | 30s |
| | Sample rate | 3s |
| Temperature (without RH option) | Type | NTC Thermistor |
| | Nominal Accuracy | +/-0.5° C (operating range) |
| | Maximal Accuracy | +/-1.0° C (at 25° C), +/-2.0° C (operating range) |
| | Resolution | 0.05° C |
| | Repeatability | +/-0.2° C |
| | Sample Rate | 100 milliseconds |
| Operating Environment | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS Plastic |
| | Dimensions | 4.85"h x 3.25"w x 1.19"d |

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.
(2) Quick Start Menu parameters shown, for additional capabilities see installation manual.
(3) Time for reaching 63% of reading at 25° C and 1 m/s airflow
(4) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)

*BACnet® is a registered trademark of ASHRAE.*

# Recessed Wall
# Temperature Sensor

Wide range of thermistor options
Set-point & override options
Low-profile design
Decor color options

| Ivory | White | Light Almond | Almond | Black | Brown | Gray |
|---|---|---|---|---|---|---|

## DESCRIPTION

The TR series is designed for use in energy management systems in buildings. The flush mount sensor housing accomodates a wide range of thermistor options for sensing room temperature. Optional setpoint slider and override button can be added for additional control.

## APPLICATIONS

- Room temperature measurement for building automation control

## FEATURES

### The industry's best looking temp sensor

- Fits in any standard j-box or low voltage bracket.
- No exposed screws; unobtrusive tamper resistant design
- Popular colors to match any decor
- Complements CO2 sensor installations

### User Friendly

- Wide range of thermistor options
- Set-point options
- Override options

*Alerton TR-ES002 shown*

*Optional Trim Ring for surface mount applications or mis-sized j-boxes*

## ORDERING

| therm | color | ovrd | s-p |
|---|---|---|---|

**TR -**

**Temperature**

C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F= 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

**Color**

1 = White
2 = Ivory
3 = Brown
4 = Light Almond
5 = Almond
6 = Black
7 = Gray

**Override**

A = None
B = N.O.

**Set-point**

A = None
B = 1000 ohm setpoint slider
C = 10k ohm setpoint slider

*(Write your selected Temperature, Color, Override and Set-Point letters/numbers in the boxes above)*

## SPECIFICATIONS

| Enclosure | Material | ABS Plastic |
|---|---|---|
| | Dimensions | 4.7"h x 2.9"w x 1.24"d (0.48" wall profile) (fits low-voltage bracket) |

**Designed and Assembled**

In the U.S.A

7 year limited warranty

# SENVA THERMISTOR RESISTANCE-TEMPERATURE TABLES

| | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|
| | 100Pt | 1000Pt | 10K T2 | 10K T3 | 10K T3 | 3K | 2K2 | 1K8 (100 C) | 20K | 100K |
| | 385 | 385 | B=3892 | B=3694 | 11K Shunt | B=3892 | B=3976 | B0/100=4300 | B=4262 | B=4461 |
| Temp F | Resistance [Ω] | | | | | | | | | |
| 0 | 93.0 | 930 | 85.41K | 70.40K | 9513 | 25.62K | 19.21K | 327.5K | 193.0K | 1015K |
| 5 | 94.1 | 941 | 72.96K | 61.02K | 9320 | 21.89K | 16.41K | 276.6K | 163.5K | 858.0K |
| 10 | 95.2 | 952 | 62.50K | 53.28K | 9118 | 18.75K | 14.06K | 234.3K | 139.7K | 732.0K |
| 15 | 96.3 | 963 | 53.69K | 46.39K | 8892 | 16.11K | 12.08K | 199.1K | 118.8K | 620.7K |
| 20 | 97.4 | 974 | 46.24K | 40.49K | 8650 | 13.87K | 10.41K | 169.6K | 101.3K | 527.6K |
| 25 | 98.5 | 985 | 39.93K | 35.41K | 8393 | 11.98K | 8989 | 145.0K | 86.73K | 450.6K |
| 30 | 99.6 | 996 | 34.57K | 31.19K | 8132 | 10.37K | 7783 | 124.2K | 74.87K | 388.1K |
| 32 | 100.0 | 1000 | 32.66K | 29.49K | 8012 | 9799 | 7352 | 116.8K | 70.14K | 362.9K |
| 35 | 100.7 | 1007 | 30.01K | 27.39K | 7848 | 9004 | 6756 | 106.7K | 64.43K | 332.8K |
| 40 | 101.7 | 1017 | 26.11K | 24.11K | 7554 | 7834 | 5878 | 91.87K | 55.55K | 285.1K |
| 45 | 102.8 | 1028 | 22.77K | 21.26K | 7249 | 6832 | 5127 | 79.32K | 48.07K | 245.7K |
| 50 | 103.9 | 1039 | 19.91K | 18.79K | 6938 | 5972 | 4482 | 68.66K | 41.56K | 212.3K |
| 55 | 105.0 | 1050 | 17.44K | 16.70K | 6632 | 5233 | 3927 | 59.57K | 36.31K | 184.7K |
| 60 | 106.1 | 1061 | 15.31K | 14.81K | 6312 | 4595 | 3448 | 51.80K | 31.56K | 160.0K |
| 65 | 107.1 | 1071 | 13.48K | 13.16K | 5992 | 4043 | 3035 | 45.15K | 27.50K | 138.8K |
| 70 | 108.2 | 1082 | 11.88K | 11.72K | 5675 | 3565 | 2676 | 39.44K | 24.04K | 120.9K |
| 75 | 109.3 | 1093 | 10.50K | 10.50K | 5371 | 3150 | 2365 | 34.53K | 21.17K | 106.1K |
| 77 | 109.7 | 1097 | 10.00K | 10.00K | 5238 | 3000 | 2252 | 32.76K | 20.00K | 100.0K |
| 80 | 110.4 | 1104 | 9298 | 9375 | 5061 | 2789 | 2094 | 30.30K | 18.58K | 92.72K |
| 85 | 111.5 | 1115 | 8249 | 8389 | 4760 | 2475 | 1858 | 26.64K | 16.31K | 80.95K |
| 90 | 112.5 | 1125 | 7333 | 7520 | 4467 | 2200 | 1651 | 23.47K | 14.38K | 71.05K |
| 95 | 113.6 | 1136 | 6530 | 6752 | 4184 | 1959 | 1471 | 20.71K | 12.70K | 62.47K |
| 100 | 114.7 | 1147 | 5826 | 6094 | 3922 | 1748 | 1312 | 18.32K | 11.29K | 55.29K |
| 105 | 115.8 | 1158 | 5207 | 5489 | 3662 | 1562 | 1173 | 16.24K | 9993 | 48.71K |
| 110 | 116.8 | 1168 | 4663 | 4951 | 3414 | 1399 | 1050 | 14.41K | 8865 | 42.98K |
| 115 | 117.9 | 1179 | 4182 | 4473 | 3180 | 1254 | 942 | 12.82K | 7888 | 38.05K |
| 120 | 119.0 | 1190 | 3757 | 4062 | 2966 | 1127 | 846 | 11.42K | 7058 | 33.90K |
| 125 | 120.0 | 1200 | 3381 | 3680 | 2758 | 1014 | 761 | 10.20K | 6301 | 30.11K |
| 130 | 121.1 | 1211 | 3047 | 3338 | 2561 | 914 | 686 | 9116 | 5623 | 26.71K |
| 135 | 122.2 | 1222 | 2751 | 3033 | 2378 | 825 | 620 | 8164 | 5036 | 23.80K |
| 140 | 123.2 | 1232 | 2487 | 2760 | 2206 | 746 | 560 | 7324 | 4518 | 21.24K |
| 145 | 124.3 | 1243 | 2252 | 2522 | 2052 | 676 | 507 | 6581 | 4076 | 19.06K |
| 150 | 125.4 | 1254 | 2043 | 2301 | 1903 | 613 | 460 | 5922 | 3664 | 17.04K |

The "Triple Threat Combo": CO2, RH, and temp in a compact unit with optional BACnet in the **AQW Series.**

BACnet® is a registered trademark of ASHRAE.

# The new IAQ standard

## CO2, Humidity, and Temperature in a single compact unit

Senva has packed a high accuracy NDIR, integrated humidity IC, and a full complement of temperature sensing into a stylish housing. Now you can offer a total indoor air quality solution in one easy to install unit.



*Recessed wall mount for great looks and tamper resistance in schools*

## Introducing the worlds only slimline CO2

This flush mount design fits in any single-gang box and sets the new standard for attractive and functional CO2 sensing. It's recessed to complement the most demanding architectural standards; it also deters tampering. Available in most popular wall plate colors, the CO2RL is proof that beauty is more than skin deep.

## Intuitive installation

Thanks to an Integrated display with push-button menu, it's easy to select your scale to 2000 or 5000 ppm. You can select automatic daily calibration or manual calibration to a known source. There's even a provision to offset the reading. For compatibility, 4-20mA and jumper selectable 0-5V or 0-10V outputs are provided.

# INDOOR AND OUTDOOR AIR QUALITY

## AIR QUALITY

## CO2, Humidity, and Temperature all-in-one duct mounted unit!

Our duct mounted **CHTDL** monitors CO2, RH and temperature in one combination unit. Mount all three sensing points in one enclosure accompanied with a standard LCD and field replaceable CO2 element.
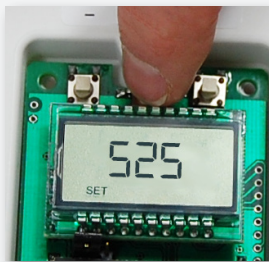
*LCD with menu for easy set-up and parameter sections*

*Field replaceable CO2 NDIR element*

### High reliability CO2

Our non-dispersive infrared sensing element (NDIR) offers high performance—accurate to ±40ppm, ±3% of reading to be exact. And while you'll probably never have to change it out, it is field replaceable in case you are in a caustic environment or if the IR source should falter. And thanks to our auto calibration mode, the sensor will adapt to the environment, ensuring effects of long term drift are negligible. Our sensing element has a life expectancy of 15+ years.

# Wall Combo Sensors
# CO2/Humidity/Temp

ASHRAE **BACnet**®

Available with analog outputs or protocol for BACnet RS-485
Integrated set-point relay
Optional field replaceable NDIR CO2 and RH elements

**Designed and Assembled
In the U.S.A**

## DESCRIPTION

The AQW series design allows customization for a sensor that meets project requirements for monitoring temperature, CO2 and relative humidity. The sensor can be ordered as stand alone temperature, CO2/Temp, RH/Temp or all-in-one CO2/RH/Temp with a 0-5/10V analog or BACnet RS485 output.  Lower material costs and installation time by combining multiple sensors into a single sensor housing with standard LCD and optional add-on features.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

### Customize to meet project requirements

- Standard LCD and temperature on each device
- Options to add CO2 and/or RH sensing elements
- Field replaceable elements for CO2 and RH
- Available with 0-5/10V Analog or BACnet protocol communication

### Protocol Version

- BACnet RS-485 ready
- Auto-configuration wizard detects baud rate and MAC address
- Adjustable set-point using button menu or optional 10k slider

### Analog Version

- LCD for easy setup of all parameters (concealment cover included)
- Programmable set-points for complete control
- Provision to offset CO2 reading
- Optional thermistors, sliders and override button

### High performance field replaceable NDIR CO2 element

- Selectable auto-calibration mode returns sensor to baseline values
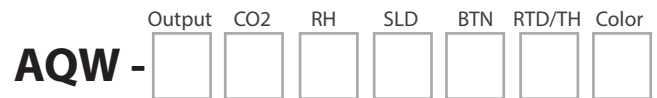
### 2% RH field replaceable sensor

- On-board temperature compensation for RH eliminates temp coefficient errors achieving excellent measurement accuracy, high repeatability and offset stability.
- State of the art testing facilities. 8-point NIST traceable certification available—consult factory

### Quality

- Industry leading 7-year limited warranty/ 2-year RH element, 3-year CO2 element limited warranties

## ORDERING INFORMATION

| | Output | CO2 | RH | SLD | BTN | RTD/TH | Color |
|---|---|---|---|---|---|---|---|
| AQW - | | | | | | | |

**Output Type**
A = Analog (0-5/10V)
B = BACnet RS-485

**CO2 Sensor**
A = None
B = CO2 Sensor

**RH Sensor**
A = None
B = 2% RH Sensor

**Set-Point Slider**
A = None
B = 1k (Not valid w/ BACnet)
C = 10k

**Push Button**
A = None
B = Override Button (Requires thermistor)
C = User Push Button

**RTD/Thermistor***
A = None
C = 100Pt (385) RTD
D = 1000Pt (385) RTD
E = 10k type 2
F = 10k type 3
G = 10k w/11k
H = 3k
I = 2k2
J = 1k8
K = 20k

**Color**
1 = White
2 = Ivory
4 = Light Almond

*Add-on RTD/Thermistor not readable via BACnet; Temperature output is standard on AQW devices, Add-on RTD/Thermistor is option for Analog.

| **Example** | Output | CO2 | RH | SLD | BTN | RTD/TH | Color |
|---|---|---|---|---|---|---|---|
| AQW - | B | B | B | A | A | A | 1 |

(AQW sensor with BACnet RS-485, Temp, CO2, 2% RH, no set-point slide, no user push button, no RTD/thermistor, white color)

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[(1)], 100mA max. |
| **Analog Outputs** | Temperature | 0--5/10V standard, Scaling 50°F to 95°F (10°C to 35°C); thermistor/RTD values optional |
| | CO2 and RH | 0-5/10V |
| | Update Rate | Continuous |
| | Programmable Relay | Solid-state output, 1A @ 30VAC/DC, N.O. |
| **Analog LCD Menu Parameters** [(2)] | *SPt*, Set point, Hi (On) | Sets relay turn-on threshold (800ppm default) |
| | *SPh*, Set point, hysteresis (Off) | Sets the relay turn-off hysteresis (100ppm default) |
| | *SCL*, Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | *Adj*, Adjustment | CO2 Offset adjustment +/-250ppm (0 default) |
| | *CAL*, Auto Calibration Period | Off, 7 days, 14 days, 30 days, 60 days (14 days default) |
| | *oFC*, Displayed Temp Unit | *oF* degrees fahrenheit (default), *oC* degrees celsius |
| | *LuL* Analog Output Scale | *5u* 5.0V full scale, *10u* 10.0V full scale (default) |
| | *rUn*, Run Mode | Displays temp and optional CO2 and RH |
| **Protocol Output** | Protocol | BACnet (Isoloated) |
| | Connection | 3-wire RS-485, with isolated ground |
| | Data Rate | Locally set baud rate up to 115200 (9600, 19200, 28800, 38400, 57600, 76800, 115200) |
| | Address Range | 0-127 |
| **Protocol Relay Set-point** | Programmable | Solid-state output, 1A @ 30VAC/DC, N.O. |
| | | Source selectable: CO2, RH, Temperature |
| **CO2** | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading (400-2000ppm) |
| | Range | 0-2000/5000ppm; Programmable up to 10,000ppm |
| | Response time | 60 seconds to 90% reading |
| | Sample rate | 3 seconds |
| **Relative Humidity** | Type | Digital CMOS |
| | Accuracy | 2% models, +/-2% over 10 to 90%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Temperature coefficient | Compensated on-board |
| | Response time [(3)] | 30s |
| | Sample rate | 3s |
| | Operating range/Output Scale | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [(4)] | -20° C to 60° C @ RH>90%; -20° C to 80° C @ RH=50% |
| **Temperature (with RH option)** | Type | Silicon Bandgap |
| | Nominal Accuracy | +/-0.3° C (operating range) |
| | Maximal Accuracy | +/-0.5° C (at 25° C), +/-1.0° C (operating range) |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time [(3)] | 30s |
| | Sample rate | 3s |
| **Temperature (without RH option)** | Type | NTC Thermistor |
| | Nominal Accuracy | +/-0.5° C (operating range) |
| | Maximal Accuracy | +/-1.0° C (at 25° C), +/-2.0° C (operating range) |
| | Resolution | 0.05° C |
| | Repeatability | +/-0.2° C |
| | Sample Rate | 100 milliseconds |
| **Operating Environment** | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| **Enclosure** | Material | ABS Plastic |
| | Dimensions | 4.85"h x 3.25"w x 1.19"d |

*(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) Quick Start Menu parameters shown, for additional capabilities see installation manual.*
*(3) Time for reaching 63% of reading at 25° C and 1 m/s airflow*
*(4) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)*

*BACnet® is a registered trademark of ASHRAE.*

SENVA

*Duct*
# CO2/Humidity/Temp

LCD display with field calibration menu
2000/5000 ppm CO2; 2% RH
Integrated set-point relay
Field replaceable NDIR CO2 element

## DESCRIPTION

Senva CO2 sensors maximize energy savings by ensuring optimal ventilation. Measuring exhaled CO2 levels ensures air is conditioned only when needed. This unit combines CO2, humidity, and temperature sensing all in one compact device, reducing sensors required, installation labor and provides a cleaner IAQ solution.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

**CO2, humidity, and temperature all in one device...fewer units to buy and install**

- LCD display for easy set up of all parameters
- Options for complete control including set-point
- 0-10V outputs standard. Thermistors optional

**High performance NDIR CO2 with set-point relay**

- Non-dispersive infrared sensing element (NDIR)
- Selectable auto-calibration mode returns sensor to baseline values
- Field replaceable CO2 sensor
- 2000 or 5000 ppm scale

**2% RH sensor**

- On-board temperature compensation for RH eliminates temp coefficient errors achieving excellent measurement accuracy, high repeatability and offset stability.

**Quality**

- Industry leading 7-year limited warranty/ 2-year RH element, 3-year CO2 element limited warranties
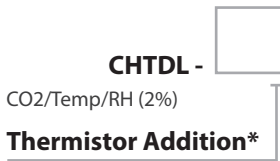
**Display and menu**

- Easy set point and calibration adjustments. Set offsets for CO2

**Field replaceable element**

- Display and menu
- Easy set point and calibration

**Designed and Assembled**

**In the U.S.A**

*7 year limited warranty*

## ORDERING

CHTDL -  ☐

CO2/Temp/RH (2%)

**Thermistor Addition***

A = None
C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F = 10k type 3
G = 10k w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k'
l=100K

*Addition of Thermistor requires the removal of the setpoint relay on the circuit board of the CHTDL.*

*To order replacement sensor elements, please consult factory*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Outputs | CO2, RH, and Temperature Transmitters | 3 wire 0-5/0-10V[2] (jumper selectable) |
| CO2 | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm ±3% of reading |
| | Response time | 60 seconds to 90% reading |
| | Output update rate | 3 seconds |
| | Output scaling | 0-2000 ppm (default), 0-5000 ppm (option) |
| | Programmable set point | Solid-state output, 1A @ 30VAC/DC, N.O. |
| Relative Humidity | Type | Dual RH Temp integrated circuit |
| | Accuracy | +/-2% over 10 to 90%RH range |
| | Resolution | 0.05%RH |
| | Hysteresis | +/-1%RH |
| | Non-Linearity | factory linearized <1%RH |
| | Temperature coefficient | fully compensated on-board |
| | Response time [3] | 30s |
| | Output update rate | 2s |
| | Operating range | 0 to 100%RH (non-condensing) |
| | Long term drift | <0.5%RH per year |
| | Operating conditions [4] | -20° C to 60° C @ RH>90%<br>-20° C to 80° C @ RH=50% |
| Temperature (transmitter specifications; thermistors optional) | Scaling | 32 to 122° F (0-50° C) |
| | Accuracy (-20 to 70° C range) | <+/-1° C; 0.5° C typ @ 25° C<br>3% models, <+/-2° C; 0.5° C typ @ 25° C |
| | Resolution | 0.01° C |
| | Repeatability | +/-0.1° C |
| | Response time (3) | 30s |
| | Output update rate | 2s |
| | Operating range | -40° C to 120° C (sensor only) |
| LCD Menu Setup Parameters | *SPH*, Setpoint, Hi (On) point | 500ppm to full-scale (700ppm default) |
| | *SPL*, Setpoint, Lo (Off) point | 400ppm to full-scale-50 (600ppm default) |
| | *SCL*, Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | *AdJ*, Adjustment | Offset adjustment +/-250ppm (0 default) |
| | *CAL*, Calibration mode | Automatic mode ON or OFF (default=ON) |
| | *run*, Run mode | Displays CO2 in ppm |
| Operating Environment | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS/Polycarbonate |
| | Dimensions | 4.0' h x 4.4"w x 2.1"d (+6.8" probe) |

(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.

(2) 15-30 VDC/24VAC power supply voltage required for 10V output

(3) Time for reaching 63% of reading at 25° C and 1 m/s airflow

(4) Long term exposures to conditions outside normal range at high humidity may temporarily offset the RH reading (+3%RH after 60 hours.)

# SENVA

## Recessed Wall
# CO2 Sensor

LCD display with field calibration menu
2000/5000 ppm CO2
Integrated set-point relay
Field replaceable NDIR element

| Ivory | White | Light Almond | Almond | Black | Brown | Gray |
|-------|-------|--------------|--------|-------|-------|------|

## DESCRIPTION

Senva CO2 sensors maximize energy savings by ensuring optimal ventilation. Measuring exhaled CO2 levels ensures air is conditioned only when needed.  The CO2RL is a flush mount design sensor with NDIR sensing element and features that include a standard LCD, setpoint relay, menu selectable auto-calibration and provision to offset the reading +/-250ppm.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

**The industry's best looking CO2 sensor meets demanding architectural standards.**

- Fits in most standard j-box or low voltage brackets.
- No exposed screws; unobtrusive tamper resistant design
- Popular colors to match any decor
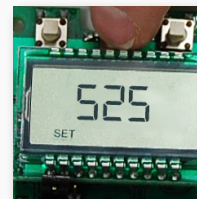
**Easy to install and maintain**

- Integrated display and push-button menus for field selectable scale, calibration, and operational modes
- Dual 4-20mA and 0-5V/0-10V output (jumper selectable)
- Integrated high-reliability solid-state set-point relay is ideal for direct control applications; easy to set up thanks to LCD

**High reliability reduces call backs**

- Non-dispersive infrared sensing element (NDIR)
- Field replaceable CO2 sensor
- 15+ year life expectancy on CO2 sensing element
- Industry leading 7-year limited warranty on electronics; NDIR module 3 years

**High accuracy for improved system performance**

- Selectable auto-calibration mode returns sensor to baseline values
- ±40ppm, ±3% of reading

**Display and menu**

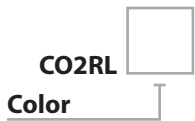- Easy set point and calibration adjustments

**Field replaceable element**

- Replaceable CO2 element for easy service

Designed and Assembled

In the U.S.A

*7 year limited warranty*

## ORDERING

**CO2RL**

**Color**

Blank = White
2 = Ivory
3 = Brown
4 = Light Almond
5 = Almond
6 = Black
7 = Gray

*To order replacement sensor elements, please consult factory*

*Optional Trim Ring for surface mount applications or mis-sized j-boxes*

## SPECIFICATIONS

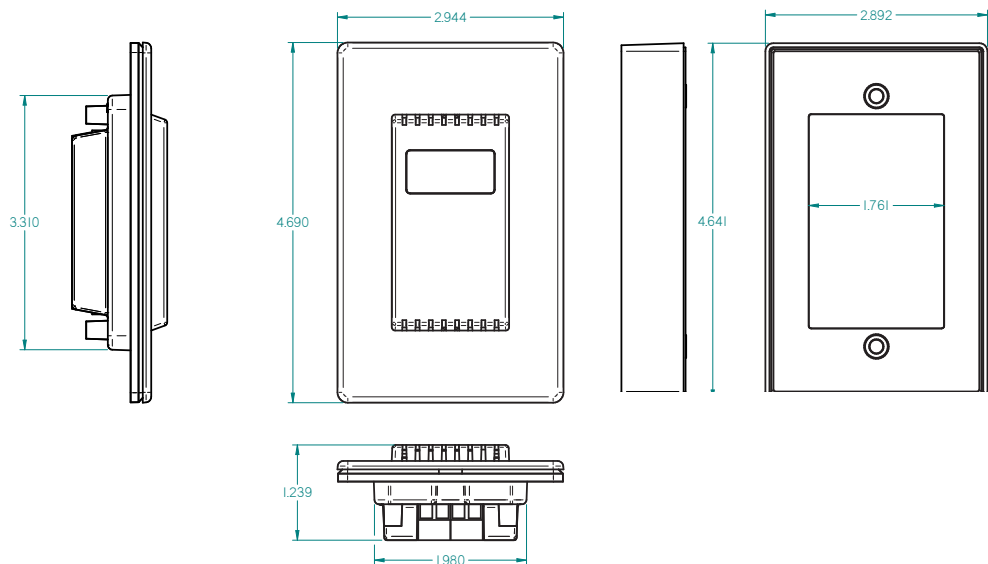| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Analog Outputs | Dual Analog | 3-wire 4-20mA and 0-5V/0-10V[2] (jumper) |
| | Output scaling | 0 - 2000 or 0 - 5000 ppm (selectable) |
| Digital Setpoint Output | Programmable | Solid-state, 1A @ 30VAC/DC, N.O. |
| Sensor Performance | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading |
| | Response time | 60 seconds to 90% reading |
| | Output update rate | 3 seconds |
| LCD Menu Setup Parameters | 5PH, Setpoint, Hi (On point) | 500ppm to full-scale (700ppm default) |
| | 5PL, Setpoint, Lo (Off point) | 400ppm to full-scale-50 (600ppm default) |
| | 5CL, Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | AdJ Adjustment | Offset adjustment +/-250ppm (0 default) |
| | CAL, Calibration mode | Automatic mode ON or OFF (default=ON) |
| | RUN, Run mode | Displays CO2 in ppm |
| Operating Environment | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS Plastic |
| | Dimensions (fits low-voltage bracket) | 4.7"h x 2.9"w x 1.24"d (0.48" wall profile) |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) 15-30VDC/24VAC power supply voltage required for 10 volt output.*

## DIMENSIONS

2.944 / 4.690 / 3.310 / 2.892 / 4.641 / 1.761 / 1.239 / 1.980

# Recessed Wall
## Bid Spec CO2 Sensor

2000 ppm CO2
Field replaceable NDIR element
Dual 3-wire 4-20mA and 0-5V/0-10V (selectable)

## DESCRIPTION

Senva CO2 sensors maximize energy savings by ensuring optimal ventilation. Measuring exhaled CO2 levels ensures air is conditioned only when needed.   The CO2-VAL is a flush mount design sensor with NDIR sensing element and auto-calibration mode.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

**The industry's best looking CO2 sensor meets demanding architectural standards.**

- Fits in any standard j-box or low voltage bracket.
- No exposed screws; unobtrusive tamper resistant design
- Popular colors to match any decor

**High reliability reduces call backs**

- Non-dispersive infrared sensing element (NDIR)
- Field replaceable CO2 sensor
- 15+ year life expectancy on CO2 sensing element
- Industry leading 7-year limited warranty on electronics; NDIR module 3 years

**High accuracy for improved system performance**

- Auto-calibration mode returns sensor to baseline values
- ±40ppm, ±3% of reading

*Optional Trim Ring for surface mount applications or mis-sized j-boxes*

**Field replaceable element**

- Replaceable CO2 element for easy service

**Designed and Assembled**

**In the U.S.A**

*7 year limited warranty*

## ORDERING

**CO2-VAL  Economy CO2**

*To order replacement sensor elements, please consult factory*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Analog Outputs | Dual Analog | 3-wire 4-20mA and 0-5V/0-10V[2] (jumper) |
| | Output scaling | 0 - 2000 ppm |
| Sensor Performance | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading |
| | Response time | 60 seconds to 90% reading |
| | Output update rate | 3 seconds |
| Operating Environment | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS Plastic |
| | Dimensions (fits low-voltage bracket) | 4.7"h x 2.9"w x 1.24"d (0.48" wall profile) |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*

*(2) 15-30VDC/24VAC power supply voltage required for 10 volt output.*

## DIMENSIONS

# Duct
# CO2 Sensor

LCD display with field calibration menu
2000/5000 ppm CO2
Integrated set-point relay
Field replaceable NDIR element

## DESCRIPTION

Senva CO2 sensors maximize energy savings by ensuring optimal ventilation. Measuring exhaled CO2 levels ensures air is conditioned only when needed.  The CO2D series is duct mount sensor with NDIR sensing element and features that include a standard LCD, optional thermistor for temperature, setpoint relay, menu selectable auto-calibration and provision to offset the reading +/-250ppm.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality
- Offices, conference rooms, and public assembly areas

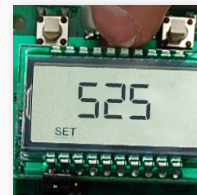## FEATURES

### Easy to install and maintain

- Integrated display and push-button menus for field selectable scale, calibration, and operational modes
- Dual 4-20mA and 0-5V/0-10V output (jumper selectable)
- Integrated high-reliability solid-state set-point relay is ideal for direct control applications; easy to set up thanks to LCD

### High reliability reduces call backs

- Non-dispersive infrared sensing element (NDIR)
- Field replaceable CO2 sensor
- 15+ year life expectancy on CO2 sensing element
- Industry leading 7-year limited warranty on electronics; NDIR module 3 years

### High accuracy for improved system performance

- Selectable auto-calibration mode returns sensor to baseline values
- ±40ppm, ±3% of reading

### Display and menu

- Easy set point and calibration adjustments.  Set offsets for CO2

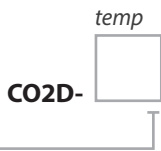### Field replaceable element

- Replaceable NDIR CO2 element for easy service

**Designed and Assembled**

**In the U.S.A**

*7 year limited warranty*

# SENVA

## ORDERING

*temp*

**CO2D-** ☐

**Temperature**

A = None
C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F= 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

*To order replacement sensor elements, please consult factory*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Analog Outputs | Dual Analog | 3-wire 4-20mA and 0-5V/0-10V [2] (jumper) |
| | Output scaling | 0 - 2000 or 0 - 5000 ppm (selectable) |
| Digital Setpoint Output | Programmable | Solid-state, 1A @ 30VAC/DC, N.O. |
| Sensor Performance | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading |
| | Response time | 60 seconds to 90% reading |
| | Output update rate | 3 seconds |
| LCD Menu Setup Parameters | 5PH, Setpoint, Hi (On point) | 500ppm to full-scale (700ppm default) |
| | 5PL, Setpoint, Lo (Off point) | 400ppm to full-scale-50 (600ppm default) |
| | 5CL, Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | AdJ_ Adjustment | Offset adjustment +/-250ppm (0 default) |
| | CAL_ Calibration mode | Automatic mode ON or OFF (default=ON) |
| | rUn_ Run mode | Displays CO2 in ppm |
| Operating Environment | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS/Polycarbonate |
| | Dimensions | 4.0' h x 4.4"w x 2.1"d (+6.8" probe) |

*(1) One side of transformer secondary is connected to signal common.*

*Dedicated transformer is recommended.*

*(2) 15-30VDC/24VAC power supply voltage required for 10 volt output.*

# Duct
# Bid Spec CO2 Sensor

2000 ppm CO2
Field replaceable NDIR element
Dual 3-wire 4-20mA and 0-5/0-10V (selectable)

## DESCRIPTION

Senva CO2 sensors maximize energy savings by ensuring optimal ventilation. Measuring exhaled CO2 levels ensures air is conditioned only when needed. The CO2D-VAL series is a duct mount sensor with a field replaceable NDIR sensing element and features that include auto-calibration and optional thermistor for temperature readings.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Facilitating compliance with ASHRAE 62.1-2001 standard for air quality
- Offices, conference rooms, and public assembly areas

## FEATURES

### Easy to install and maintain

- Dual 4-20mA and 0-5/0-10V output (jumper selectable)
- Field replaceable CO2 sensor

### High reliability reduces call backs

- Non-dispersive infrared sensing element (NDIR)
- 15+ year life expectancy on CO2 sensing element
- Industry leading 7-year limited warranty on electronics; NDIR module 3 years

### High accuracy for improved system performance

- Auto-calibration mode returns sensor to baseline values
- ±40ppm, ±3% of reading

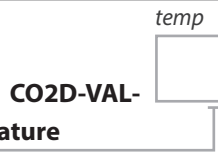### Field replaceable element

- Replaceable NDIR CO2 element for easy service

Designed and Assembled
In the U.S.A

7 year limited warranty

## ORDERING

*temp*

**CO2D-VAL-**

**Temperature**

A = None
C = 100Pt (385)
D = 1000Pt (385)
E = 10k type 2
F= 10k type 3
G = 10k type 3 w/11k shunt
H = 3k
I = 2k2
J = 1k8
K = 20k
L = 100k

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Analog Outputs | Dual Analog | 3-wire 4-20mA and 0-5V/0-10V [2] (jumper) |
| | Output scaling | 0 - 2000 ppm |
| Sensor Performance | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading |
| | Response time | 60 seconds to 90% reading |
| | Output update rate | 3 seconds |
| Operating Environment | Temperature | 32 to 122F (0 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS Plastic |
| | Dimensions | 4.0' h x 4.4"w x 2.1"d (+6.8" probe) |

*(1) One side of transformer secondary is connected to signal common.*

*Dedicated transformer is recommended.*

*(2) 15-30VDC/24VAC power supply voltage required for 10 volt output.*

SENVA

# Outside Air
# CO2 Sensor

LCD display with field calibration menu
2000/5000 ppm CO2
Integrated set-point relay
Field replaceable element
Internal heater for increased operating range

## DESCRIPTION

Senva CO2 sensors maximize energy savings by ensuring optimal ventilation. Measuring exterior CO2 levels ensures optimized economizer control. The CO2O series is an outside air sensor with NDIR sensing element and features that include a built-in heater, standard LCD, setpoint relay, menu selectable auto-calibration and provision to offset the reading +/-250ppm.

## APPLICATIONS

- Controlling ventilation in response to occupancy
- Economizer control
- Facilitating compliance with ASHRAE 62.1-2004 standard for air quality

## FEATURES

### Easy to install and maintain

- Integrated display and push-button menus for field selectable scale, calibration, and operational modes
- Dual 4-20mA and 0-5V/0-10V output (jumper selectable)
- Integrated high-reliability solid-state set-point relay is ideal for direct control applications; easy to set up thanks to LCD

### High reliability reduces call backs

- Non-dispersive infrared sensing element (NDIR)
- Field replaceable CO2 sensor
- 15+ year life expectancy on CO2 sensing element
- Industry leading 7-year limited warranty on electronics; NDIR module 3 years

### High accuracy for improved system performance

- Internal heater for reliable outdoor operation
- Selectable auto-calibration mode returns sensor to baseline values
- ±40ppm, ±3% of reading
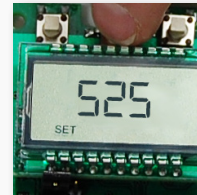
### Display and menu

- Easy set point and calibration adjustments. Set offsets for CO2

### Field replaceable element

- Replaceable NDIR CO2 element for easy service

Designed and Assembled

In the U.S.A

7 year limited warranty

## ORDERING

### CO2O-A  CO2 Outside Air

*To order replacement sensor elements, please consult factory*

## SPECIFICATIONS

| | | |
|---|---|---|
| Power Supply | | 12-30VDC/24VAC[1], 100mA max. |
| Analog Outputs | Dual Analog | 3-wire 4-20mA and 0-5V/0-10V [2] (jumper) |
| | Output scaling | 0 - 2000 or 0 - 5000 ppm (selectable) |
| Digital Setpoint Output | Programmable | Solid-state, 1A @ 30VAC/DC, N.O. |
| Sensor Performance | Type | Non-dispersive Infrared (NDIR) |
| | Accuracy | ±40ppm, ±3% of reading |
| | Response time | 60 seconds to 90% reading |
| | Output update rate | 3 seconds |
| LCD Menu Setup Parameters | SPH_ Setpoint, Hi (On point) | 500ppm to full-scale (700ppm default) |
| | SPL , Setpoint, Lo (Off point) | 400ppm to full-scale-50 (600ppm default) |
| | SCL , Scaling | 0-2000ppm or 0-5000ppm (2000ppm default) |
| | AdJ_ Adjustment | Offset adjustment +/-250ppm (0 default) |
| | CAL , Calibration mode | Automatic mode ON or OFF (default=ON) |
| | RUN, Run mode | Displays CO2 in ppm |
| Operating Environment | Temperature | 0 to 122F (-18 to 50C) |
| | Humidity | 0-95% non-condensing |
| Enclosure | Material | ABS Plastic |
| | Dimensions | 4.0' h x 4.4"w x 2.1"d |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*
*(2) 15-30VDC/24VAC power supply voltage required for 10 volt output.*

SENVA

# Wall & Duct
# CO & NO2 Sensor/Controller

Analog and BACnet/Modbus protocol options
Field replaceable sensing elements
Standard LCD with intuitive set up menu
Integrated LED indicators and audible alarm

## DESCRIPTION

Senva TG Series sensors can be ordered as individual CO or NO2 sensors or as a combination CO/NO2 sensor in a shared enclosure.

The analog output model features 2 outputs that support daisy chain wiring - multiple sensors may be used in a parallel sequence (0-10V) for cost effective coverage of large areas. The unit can also act as a stand alone controller, utilizing the relay for exhaust fan operation or the output for direct control of a VFD.

The BACnet/Modbus model supports BACnet MS/TP & Modbus network communication in one unit. Standard features include network auto-configuration, a programmable fan relay, LED indicators, integrated display and audible alarm.

## APPLICATIONS

▪ Ensure adequate air flow in occupied spaces
▪ Monitor multiple toxic gases with one mounted unit
▪ Alert occupants of elevated gas levels
▪ Directly control exhaust fans

Designed and Assembled
In the U.S.A

*7 year limited warranty*

## FEATURES

### Cost-effective dual gas sensing and control

▪ Integrated display, LED indicators, audible alarm
▪ Order as individual CO or NO2 sensor, or specify both sensing elements in one enclosure

### Flexibility of analog output model

▪ Menu selectable 0-5/10V, 1-5V and 4-20mA outputs (0-10V default)
▪ Dual outputs support daisy chain wiring to cost-effectively sense and control large areas
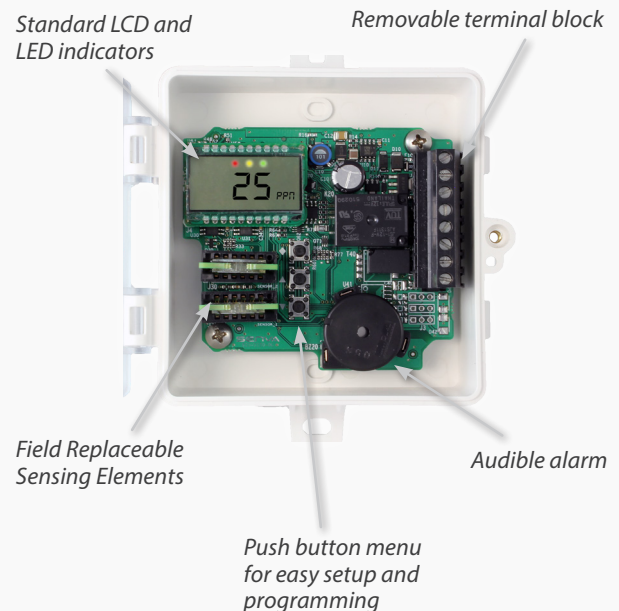
### Versatility with BACnet/Modbus model

▪ Supports BACnet MS/TP and Modbus RTU networks
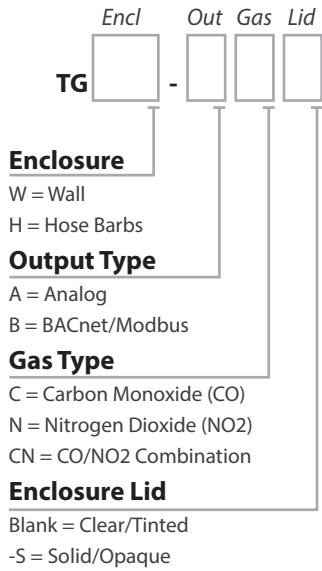▪ Auto-configuration detects network baud rate, serial format, protocol type and self-addresses

### High reliability reduces call backs

▪ Temperature compensated elements for maximum accuracy
▪ UL2034 recognized electrochemical CO sensing element
▪ 5 year life expectancy on CO and NO2 elements
▪ Warning indicators alert occupants when element's lifecycle is near end for replacement
▪ 7-year limited warranty on electronics; 2-year on elements

### Easy to install

▪ Test mode speeds up field commissioning for verifying warning indicators and relay functions
▪ Push buttons and LCD to navigate setting parameters

*Standard LCD and LED indicators*

*Removable terminal block*

*Field Replaceable Sensing Elements*

*Audible alarm*

*Push button menu for easy setup and programming*

# SENVA

Right margin:

AIR QUALITY

Toxic Gas Series

## ORDERING

*Encl* *Out* *Gas* *Lid*

**TG** ☐ - ☐☐☐

**Enclosure**
W = Wall
H = Hose Barbs

**Output Type**
A = Analog
B = BACnet/Modbus

**Gas Type**
C = Carbon Monoxide (CO)
N = Nitrogen Dioxide (NO2)
CN = CO/NO2 Combination

**Enclosure Lid**
Blank = Clear/Tinted
-S = Solid/Opaque

### Replacement Elements
**TGS-CO** = Carbon Monoxide
**TGS-NO2** = Nitrogen Dioxide

## SPECIFICATIONS

| Category | Sub | Value |
|---|---|---|
| Power Supply | | 15-30VDC/24VAC[1], 4W max, 120mA max. |
| Analog Outputs | 2 programmable outputs | 0-10V (default), 0-5V, 1-5V and 4-20mA (menu selectable) |
| | CO output scaling | 0-200ppm (default), ranges below 200ppm (menu selectable) |
| | NO2 output scaling | 0-10ppm (default), ranges below 10ppm (menu selectable) |
| | Temperature output scaling | -20 to 85°C |
| BACnet/Modbus | Baud Rates | 9600, 19200, 38400, 57600, 76800, 115200 |
| Fan Relay | Fan relay characteristics | N.C. 10A@125VAC, 5A@30VDC |
| | CO fan relay setpoint | 25ppm (default), 0-200 ppm (menu selectable) |
| | NO2 fan relay setpoint | 1ppm (default), 0-10ppm (menu selectable) |
| Alarm Relay (Analog model only) | Alarm relay characteristics | N.C. 0.5A@125VAC, 1A@30VDC |
| | CO alarm relay setpoint | 100ppm (default), 0-200ppm (menu selectable) |
| | NO2 alarm relay setpoint | 3ppm (default), 0-10ppm (menu selectable) |
| Display | 3-1/2 digit LCD | Indicates CO ppm, NO2 ppm (menu selectable) |
| LEDs | Green, Yellow, Red | Green = Normal, Yellow = Relay, Red = Alarm |
| Audible Alarm Exposure | 85dB Piezo transducer | 30 minutes above alarm setpoint per UL2034 (menu selectable) |
| CO Sensor Performance | Type | Electrochemical |
| | Accuracy | +/-10% of full scale @ 20°C |
| | Reproducibility | <+/-2% of reading |
| | Response time | <15 seconds |
| | Certifications | UL2034 Recognized Component |
| | Long term stability | <+/-5% per year |
| | Life expectancy | >5 years |
| NO2 Sensor Performance | Type | Electrochemical |
| | Accuracy | +/-10% of full scale @ 20°C |
| | Reproducibility | <+/-3% of reading |
| | Response time | <15 seconds |
| | Long term stability | <+/-5% per year |
| | Life expectancy | >5 years |
| Operating Environment | Temperature, continuous | -20 to 40°C |
| | Temperature, intermittent | -30 to 55°C |
| | Humidity | 15-95% continuous, 0-95% intermittent |
| Enclosure | Material | ABS/Polycarbonate |
| | Dimensions | 4.0"h x 4.4"w x 2.1"d |
| | Conduit Opening | Tapped 1/2" NPT |

*(1) One side of transformer secondary is connected to signal common. Dedicated transformer is recommended.*

warranty badge

" *These large and bright color displays can be seen all the way across the room!* "

## Reading air quality levels shouldn't be a guessing game

Our designer LED (RD) series feature large and bright numbers in 3 colors to choose from (red, green and blue) and can be seen across the room. Never squint again trying to guess room humidity and temperature levels.

### A spot leak detector that's easy to install and cost effective

Protect vital components from water damage with our WD series spot leak detector. The WD series utilizes solid state detection, so it is not prone to mechanical failure.

### Adding transformers to your order saves you time and shipping costs

Our transformer series with integrated circuit breakers make ordering a breeze, allowing you to add an accessory you already need on to your order without cutting additional purchase orders and paying additional shipping costs.

# Surface mount
# Water Sensor
Soild state
Gold plated sensing electrodes



## DESCRIPTION

The WD series detects water to prevent costly damage. Unlike float systems, it utilizes solid state detection, so is not prone to mechanical failure.

## APPLICATIONS

- Ideal for spot leak detection
- Computer rooms, critical equipment
- Monitor condensate pans and drains—turn of equipment when pans reach limit

## FEATURES

### Reliable water detection

- Simple installation—screw, or ram-set to floor or drip pan
- Simple operation—no maintenance
- Solid-state design… no moving parts to fail
- Fully potted for water-proofing… maximum durability

### Dimensions



Ø0.185
(2 PLCS.)

1.378
1.775

1.040
0.785
1.075
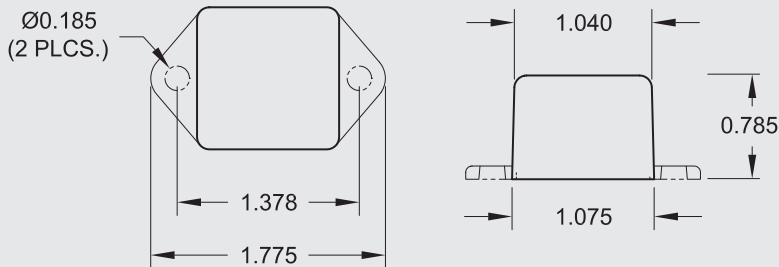
## ORDERING

**WD-1**            Water Detector, 9-30 VAC/DC

## SPECIFICATIONS

| | |
|---|---|
| Power Supply | 9-30VAC/DC, 10mA Max. |
| Output | N.C. (Form B) Solid State Relay, Isolated |
| Output Rating | 30VAC/DC, 0.1A (100mA) Max. |
| Sensing | Gold plated electrodes |
| Operating Environment | -20 to 80C |

SENVA

## Large LED
# Remote Displays

3 1/2 digit LED
Choose Red, green, or blue
Adjustable zero and span



### DESCRIPTION

These large bright displays are ideal for visual feedback of any measured value. Humidity, temperature, and pressure labels provided—others available—consult factory.

### APPLICATIONS

- Provides users with valuable visual verification of humidity and/or temperature status
- Process control feedback, including pharmaceutical, food, and coating applications

## FEATURES

### Easy to install and maintain

- Fits standard single or double gang boxes (depending on version)
- Accepts 0-10V input signal
- Pre-cut vinyl labels provided with temperature, pressure, humidity for each display ordered.
- Factory scaled; user adjustable zero and span

### Field Adjustable

- Adjust the scaling—both zero and span, for any application requirement.
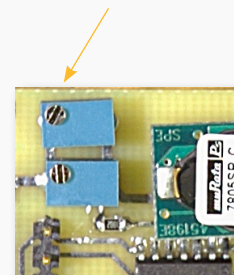
## ORDERING

type    #1 col    #2 col

**RD**

**Display Type**
1 = Single Gang
2 = Double Gang

**Display #1 LED Color**
A = Blue
B = Green
C = Red

**Display #2 LED Color**
A = Blue
B = Green
C = Red
D = None

*Consult factory for custom labeling and calibrations*

*(Write your selected Display Type, Display #1 and #2 LED Color numbers/letters in the boxes above)*
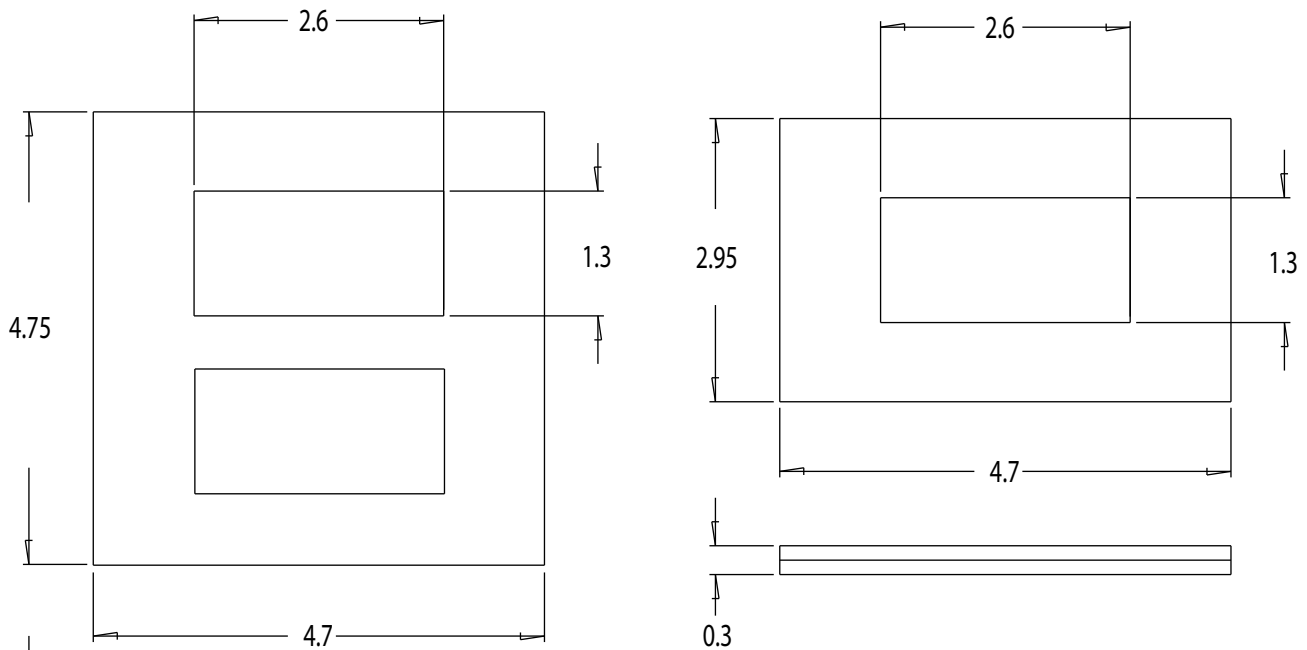
## SPECIFICATIONS

| | |
|---|---|
| Power supply | 12-30VDC/24VAC [1], 40mA max. (per display) |
| Signal input range | 0-10VDC |
| Scaling | Factory set for customer application |
| | Field adjustable zero and span |
| Display type | 3-1/2 digit LED; Red, Green, or Blue |
| Accuracy | +/-1% F.S. +/- 2 counts |
| Sampling Rate | 3 / second |
| Input Impedance | 100k ohm |
| Operating Temperature | 32-122oF (0-50oC) |

*(1) One side of transformer, secondary is connected to signal common. Dedicated transformer is recommended.*
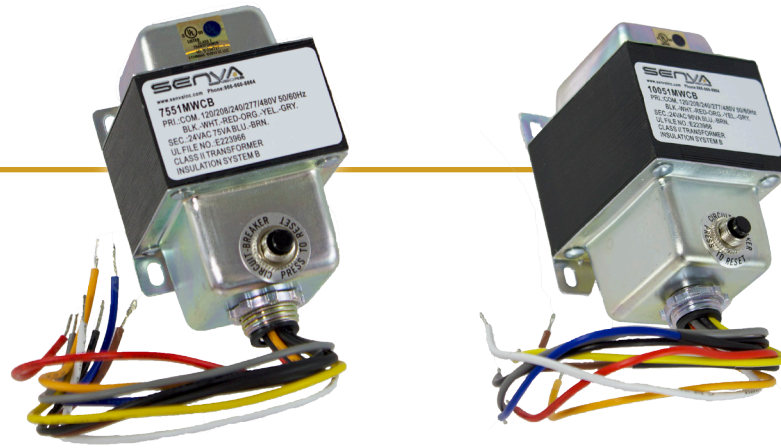
## WIRING (PER DISPLAY)
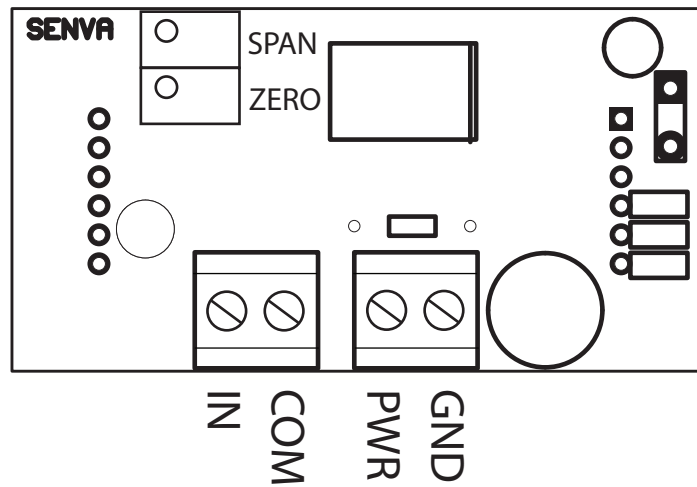


## DIMENSIONS

# Panel Mount
# Multi-tap Class 2 Transformers

120, 208, 240, 277, 480 primary inputs
50, 75, and 96VA models
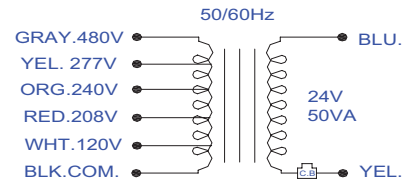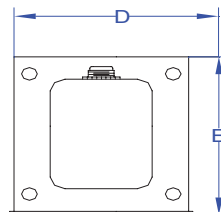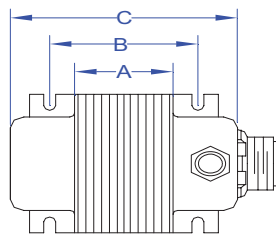Integrated overcurrent breaker

## SPECIFICATIONS

UNIT: Inch±0.04

| Model# | VA | PRI(VAC) | HZ | SEC | Over Current Protection | UL MARK | CE MARK | TYPE | A | B | C | D | E |
|--------|-----|----------------------|-------|-----|------------------|---------|---------|-------|--------|--------|--------|-------|--------|
| 5051MWCB | 50 | 120/208/240/277/480 | 50/60 | 24 | Circuit Breaker | (UL) | CE | A.B.C | 1.26" | 1.91" | 3.45" | 2.5" | 3.06" |
| 7551MWCB | 75 | 120/208/240/277/480 | 50/60 | 24 | Circuit Breaker | (UL) | CE | A.B.C | 1.67" | 2.31" | 3.87" | 2.5" | 3.06" |
| 10051MWCB | 96 | 120/208/240/277/480 | 50/60 | 24 | Circuit Breaker | (UL) | CE | A.B.C | 2.06" | 2.69" | 4.25" | 2.5" | 3.06" |

(UL)
CE:

UL Component Recognized, U.S. and Canada

Conformite Europende

## DIMENSIONS



GRAY.480V      50/60Hz          BLU.
YEL. 277V
ORG.240V                        24V
RED.208V                        50VA
WHT.120V
BLK.COM.                        YEL.

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## PAYMENT:

Payment terms are stated on each invoice. Buyer agrees to pay finance charges of 18% per annum on any past due amount. Buyer further agrees to pay any court costs, collections fees or attorney fees if legal action must be taken on any unpaid balance. For disputes, the prevailing party shall receive its costs and attorney fees (including costs and fee incurred at trial or an appeal). All legal rights shall be governed by Oregon law, excluding principles of conflict of law. Buyer consents to the jurisdiction of Oregon courts and agrees that such courts shall have personal jurisdiction over buyer. Venue shall be in Multnomah County, Oregon. Product specifications and pricing subject to change without any notice.

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