

**Critical Environment Technologies
Canada Inc.**

www.critical-environment.com

**Installation Manual for
AST-IS12**

**Infrared CO₂ / Temperature Transmitter for
mounting in ventilation ducts
With LCD Display, 1 Relay & Modbus® Output**



MANUAL REVISION-A, December 21, 2016

#145, 7391 VANTAGE WAY
DELTA, BC CANADA V4G 1M3
PH: 604-940-8741 TOLL FREE: 877-940-8741

IMPORTANT NOTE

Read and understand this manual prior to using this instrument. Carefully read the warranty policy, service policy, notices, disclaimers and revisions on the following pages.

This product must be installed by a qualified electrician or factory trained technician and according to instructions indicated in this manual. This instrument should be inspected and calibrated regularly by a qualified and trained technician. For more information, refer to Sections *8 Calibration* and *10 Maintenance* of this manual.

This instrument has not been designed to be intrinsically safe. For your safety, **do not** use it in classified hazardous areas (explosion-rated environments).

INSTRUMENT SERIAL NUMBER:

PURCHASE DATE:

PURCHASED FROM:

WARRANTY POLICY

Critical Environment Technologies Canada Inc. (CETCI), also referred to as the manufacturer, warrants this instrument, (excluding sensors, battery packs, batteries, pumps and filters) to be free from defects in materials and workmanship for a period of **two years from the date of purchase from our facility**. The sensors have a warranty period of **one year on a pro-rated basis from the date of purchase from our facility**. If the product should become defective within this warranty period, we will repair or replace it at our discretion.

The warranty status may be affected if the instrument has not been used and maintained as per the instructions in this manual or has been abused, damaged, or modified in any way. This instrument is only to be used for purposes stated herein. The manufacturer is not liable for auxiliary interfaced equipment or consequential damage.

Due to ongoing research, development, and product testing, the manufacturer reserves the right to change specifications without notice. The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data.

All goods must be shipped to the manufacturer by prepaid freight. All returned goods must be pre-authorized by obtaining a Returned Merchandise Authorization (RMA) number. Contact the manufacturer for a number and procedures required for product transport.

SERVICE POLICY

CETCI maintains an instrument service facility at the factory. Some CETCI distributors / agents may also have repair facilities; however, CETCI assumes no liability for service performed by anyone other than CETCI personnel.

Repairs are warranted for 90 days after date of shipment (sensors have individual warranties).

Should your instrument require non-warranty repair, you may contact the distributor from whom it was purchased or you may contact CETCI directly.

Prior to shipping equipment to CETCI, contact our office for an Returned Merchandise Authorization (RMA) number. All returned goods must be accompanied with an RMA number.

If CETCI is to do the repair work, you may send the instrument, prepaid, to:

Attention: Service Department
Critical Environment Technologies Canada Inc.
Unit 145, 7391 Vantage Way
Delta, BC, V4G 1M3

Always include your RMA number, address, telephone number, contact name, shipping / billing information, and a description of the defect as you perceive it. You will be contacted with a cost estimate for expected repairs, prior to the performance of any service work.

For liability reasons, CETCI has a policy of performing all needed repairs to restore the instrument to full operating condition.

Pack the equipment well (in its original packing if possible), as we cannot be held responsible for any damage incurred during shipping to our facility.

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DISCLAIMER

Under no circumstances will CETCI be liable for any claims, losses or damages resulting from or arising out of the repair or modification of this equipment by a party other

than CETCI service technicians, or by operation or use of the equipment other than in accordance with the printed instructions contained within this manual or if the equipment has been improperly maintained or subjected to neglect or accident. Any of the foregoing will void the warranty.

Under most local electrical codes, low voltage wires cannot be run within the same conduit as line voltage wires. It is CETCI policy that all wiring of our products meet this requirement.

It is CETCI policy that all wiring be within properly grounded (earth or safety) conduit.

REVISIONS

This manual was written and published by CETCI. The manufacturer makes no warranty or representation, expressed or implied including any warranty of merchantability or fitness for purpose, with respect to this manual.

All information contained in this manual is believed to be true and accurate at the time of printing. However, as part of its continuing efforts to improve its products and their documentation, the manufacturer reserves the right to make changes at any time without notice. Revised copies of this manual can be obtained by contacting CETCI or visiting www.critical-environment.com

Should you detect any error or omission in this manual, please contact CETCI at the following address:

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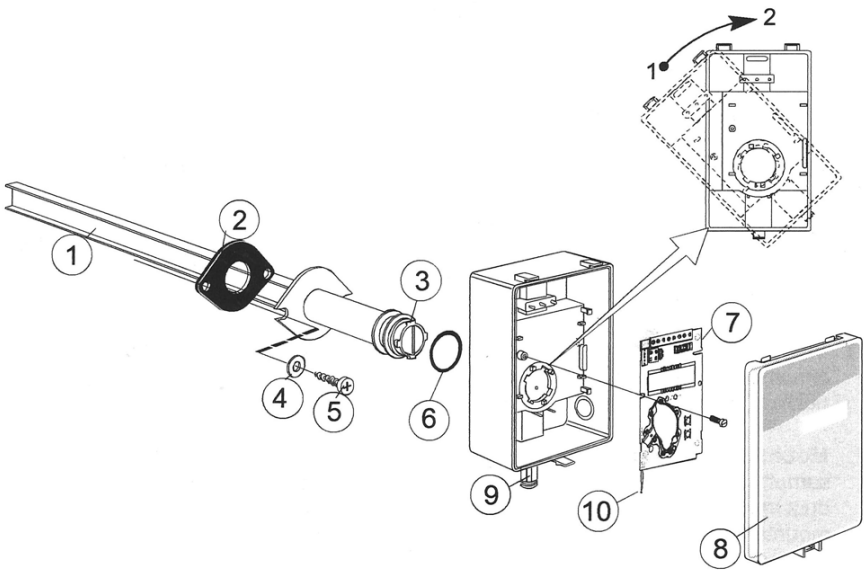
In no event will CETCI, its officers or employees be liable for any direct, special, incidental or consequential damages resulting from any defect in any manual, even if advised of the possibility of such damages.

AST-IS12

The AST-IS12 is a reliable, long life, infrared Carbon Dioxide (CO₂) analog transmitter that measures both the concentration of carbon dioxide and temperature in ventilation ducts. It can transmit data to a BAS system or controller and the LCD display provides real time values for the user. The standard measurement range is 0—2,000 ppm. The AST-IS12 offers a programmable output relay and Modbus® communication.

The enclosure cover has a built-in rubber gasket and all other connections must be tight and sealed to prevent water intrusion. Linear output functions are pre-programmed as CO₂ and temperature transmitters with jumper selected outputs 0 - 10V / 2 - 10V / 0 - 20mA / 4 - 20mA.

Figure 1



ITEM LOCATORS

- | | | | |
|---|--------------------------|----|-------------------------|
| 1 | Sampling probe | 6 | O-ring 29,2x3,53 |
| 2 | Sealing gasket | 7 | PCB |
| 3 | Largest locking knob | 8 | Snap-in lid |
| 4 | 2 washers (not included) | 9 | PG9 cable entry bushing |
| 5 | 2 screws (not included) | 10 | Temperature sensor |

KEY FEATURES:

- State of the art non-dispersive infrared (NDIR) technology to measure carbon dioxide gas
- Maintenance free in normal applications
- Membrane covered sample chamber for a stable, reliable and highly accurate carbon dioxide sensor
- Reliable and accurate built-in NTC thermistor for measuring temperature
- Fully coated PCB together with a special filter equipped housing for resistance towards dust and humidity
- Two programmable analog outputs
- Modbus communication
- One contact free relay

TECHNICAL SPECIFICATIONS

GAS TYPE

Carbon Dioxide (CO₂)

MECHANICAL

| | |
|--------------|---|
| Enclosure | Industrial Housing PVC., IP54 rated |
| Size | 151.3 mm x 84 mm x 46 mm (5.96" x 3.31" x1.81") |
| Probe Length | 246 mm (9.68") |

USER INTERFACE

| | |
|---------|--|
| Display | LCD, 4 digits, 7 segments with ppm indicator |
|---------|--|

ELECTRICAL

| | |
|----------------|--|
| Linear Outputs | Linear 4 - 20 mA or 0 - 10 VDC signal |
| Relay Output | Min load: 1 mA / 5V Rated load: 0.5 A / 125 VAC, 1 A / 24 VDC |
| Communication | RS-485 Modbus® |

ELECTRICAL

| | |
|-------------------|---|
| Power Requirement | 24 VDC or VAC, 50/60 Hz (half-wave rectifier input) |
| Power Consumption | <1 W average |

TECHNICAL SPECIFICATIONS CONTINUED

SENSORS

| | |
|---------------------------------|-------------------------------|
| Infrared CO ₂ Sensor | |
| Sampling Method | Non-dispersive infrared |
| Monitoring Method | Diffusion |
| Range | 0—2,000 ppm |
| Life Expectancy | > 15 years |
| Temperature Sensor Range | 0°C to 50°C (32°F to 122°F) |
| Accuracy | +/- 30 ppm, +/- 3% of reading |

ENVIRONMENTAL

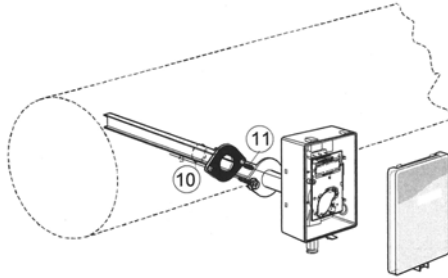
| | |
|-----------------------|-----------------------------|
| Operating Temperature | 0°C to 50°C (32°F to 122°F) |
| Humidity | 0—85% RH non-condensing |

DUCT MOUNTING INSTRUCTIONS

If cover must be removed for any reason, loosen single securing screw on bottom of enclosure, press tab to release cover and hinge upward to remove.

Normally the PCB should not be removed from the housing. If for some reason the PCB must be removed it must be handled carefully and protected from electrostatic discharge.

Figure 2



Since there might be a substantial pressure difference in duct mounting applications, it is essential to avoid ambient air from suction into the duct mounting box. For correct function, it is indispensable that the seals of the box cover, the cable entry bushings, the cable feed through and the duct entrance are absolutely tight. The duct entrance may need extra sealing paste in order to prevent leakage.

1) Electrical cable entry: The box has a factory mounted cable entry bushing in dimension PG9, item-9 in drawing on previous page. Never feed more than one cable through each cable entry bushing, or else gas might leak through.

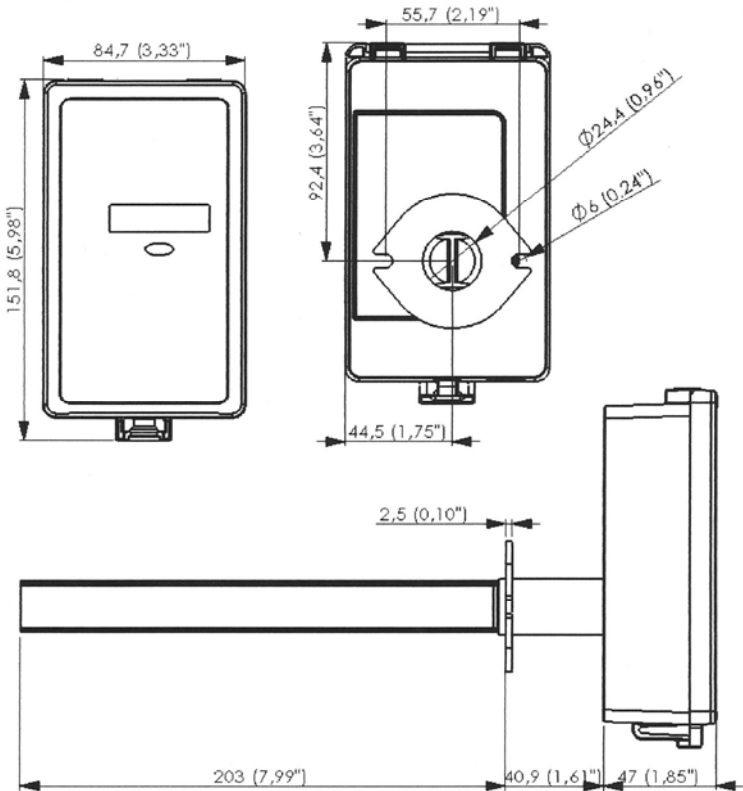
2) Mounting the tube: Drill a hole with 25 mm diameter (or 1 inch) for the sampling probe and two holes with 4 mm diameter for the screws into the air duct and mount the tube with the gasket. The sampling probe should be mounted with the largest locking knob on top. The unit can be mounted with the air coming from the left or the right.

3) Attaching the sensor box: Carefully thread the temperature probe through the locking knob top into the sampling probe. The sampling probe attaches to the sensor box by a snap-in bayonet fitting. Orient the box onto the sampling probe so that the box upside is on the same side as the largest locking knob. When the probe is fitted into the notches of the box, turn the box clockwise until it stops upright. See Figure 1: Position 1 indicates open where the box can be removed from the sampling probe. Position 2 the box is locked to the probe.



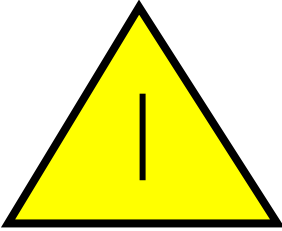
If for some reason the PCB must be removed it must be handed carefully and protected from electrostatic discharge! Normally, removing the PCB is not required.

DIMENSIONS



ELECTRICAL CONNECTIONS

The power supply has to be connected to \sim and \oplus . \oplus is considered as system ground. If the analog output is connected to a controller *the same ground reference has to be used for the AST-IS12 unit and for the control system!* Unless different transformers are used, special precautions need to be taken.



PLEASE NOTE!

The AST-IS12 signal and power supply grounds are common.

If possible, keep the sensor powered up after mounting. Connect analog output before measuring.

| Connection Terminal | Function | Electrical Data | Remarks |
|---------------------|---|---|---|
| \sim \oplus | Power (+) | 24VAC/DC+ (+20%), 1W | Absolute maximum ratings 10.5 to 40VDC |
| \oplus | Power ground (-) | 24VAC/DC- | See note-1 |
| Out(1) | Analog Output 1 (+) | 0-10 VDC or according to the label | According to positions of Out(1) and start point jumpers. See note-2 |
| Out(2) | Analog output 2 (+) | Same as Output 1 | According to positions of Out(2) and start point jumpers. See note-2 |
| 5 6 7 | Normally closed relay Relay COM Normally open relay | Contact free relay minimum load 0.5mA/5V rated load 0.5A/125VAC; 1A/24VDC | Triggered by register Out(3) |
| 8 | Not used | | |

Note 1: The ground terminal is used as negative power supply DC input or AC phase ground \oplus (halfwave rectifier). A single transformer may be used for the entire system.

Note 2: The AST-IS12 can deliver a voltage or current loop for Out(1) and Out(2). To change between voltage and current output mode the hardware jumpers are used. There is one jumper for Out(1) and one for Out(2), so that one output can be a voltage and the other a current output. Both voltage output and current outputs can have start points 0% (0-10 VDC or 0-20 mA), or 20% (2-10 VDC or 4-20mA). The same start point is used for both outputs.

OUTPUTS CONFIGURATION

| Jumper | Position | Function |
|------------------------------|----------|--|
| Start Point Selection jumper | 0% | Jumper top position provides 0 VDC or 0 MA start point for OUT(1) and OUT(2) |
| | 20% | Jumper bottom position provides the start point given by the file. The start point can be reconfigured with the UIP |
| OUT(1) | Current | Connection in position "Current" provides 0/4-20 mA output range for OUT(1). Current output is not recommended for temperature measurements. |
| | Voltage | Connection in position "Voltage" provides 0/2-10 VDC output range for OUT(1) Please note, temperature measurements accuracy is valid only for units configured in voltage outputs mode. |
| OUT(2) | Current | Connection in position "Current" provides 0/4-20 mA output range for OUT(2). Current output is not recommended for temperature measurements. |
| | Voltage | Connection in position "Voltage" provides 0/2-10 VDC output range for OUT(2) Please note, temperature measurements accuracy is valid only for units configured in voltage outputs mode. |

The default factory settings for the AST-IS12 are:

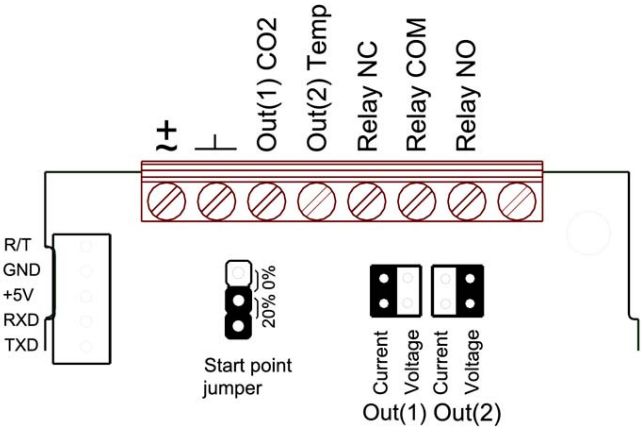
Start Point Jumper on 20%

OUT1: 4 - 20 mA (0—2,000 ppm, CO₂)

OUT2: 2 - 10 V (0—50°C temperature)

Current output is not recommended for Temperature measurements.

WIRING TERMINAL STRIPS



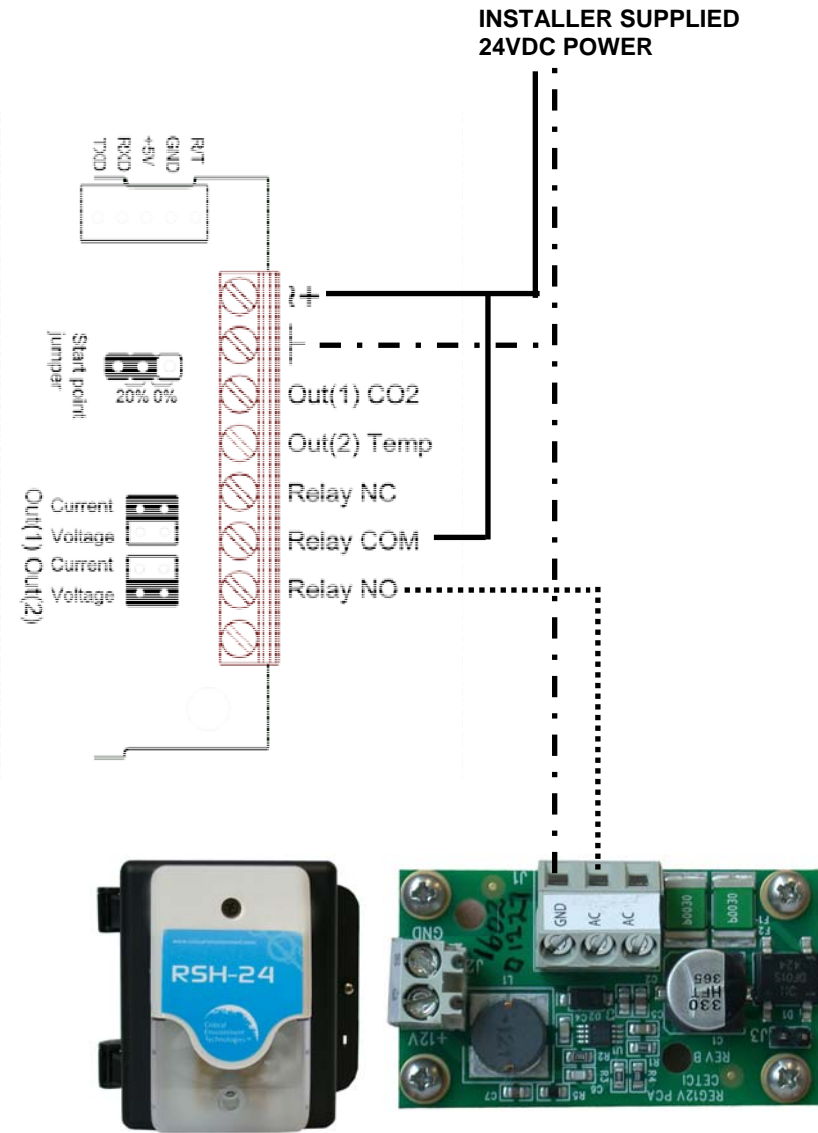
The blackened areas indicate the default settings.

This product is in accordance with the EMC 2004/108/EC, RoHS 2011/65/EU, 92/31/EEG including amendments by the CE-marking Directive 93/68/EEC

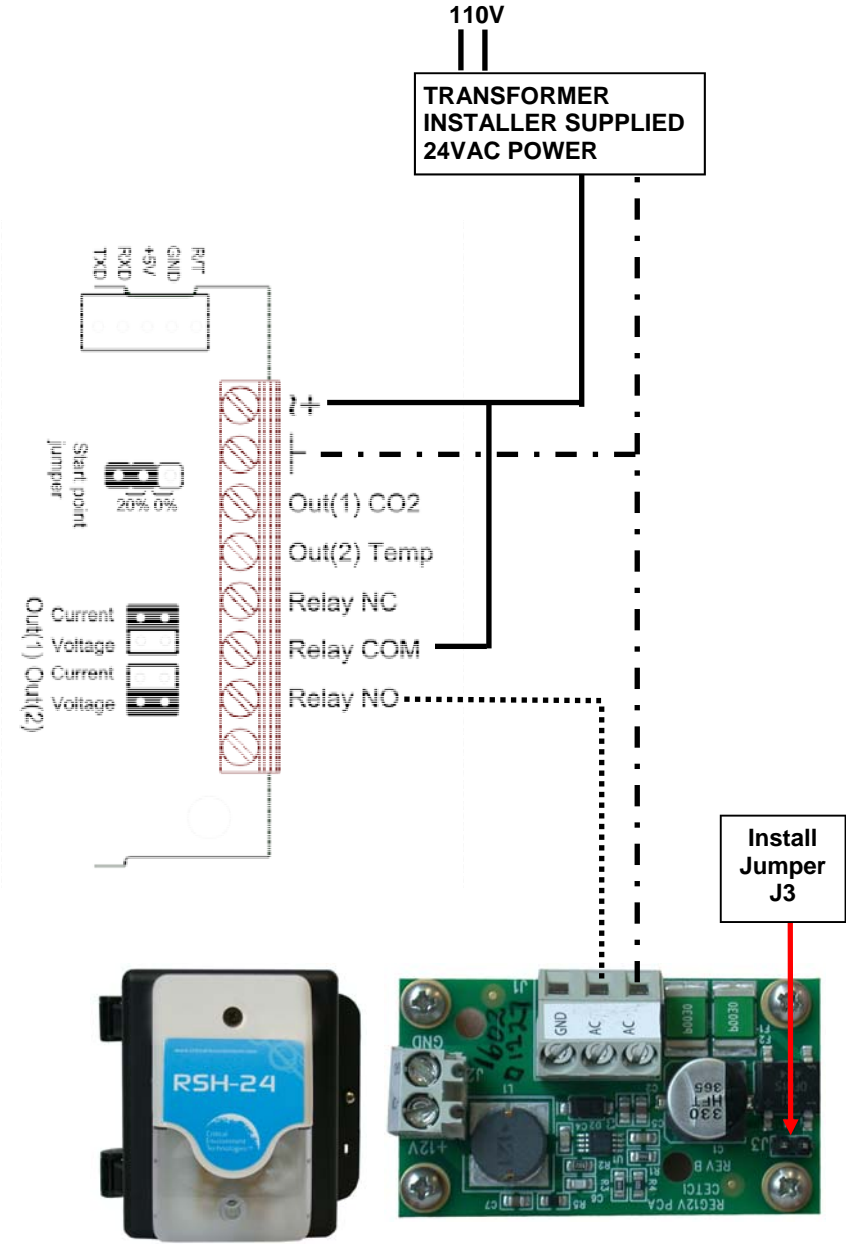
The product fulfils the following demands: EN 61000-4-2 level 2, EN 61000-4-3 level 2, EN 61000-4-4 level 4, EN 61000-4-6, EN 61000-4-8 level 4, EN 55022 class B



24VDC POWER—WIRING TO REMOTE STROBE & HORN COMBO (RSH-24V)



24VAC POWER—WIRING TO REMOTE STROBE & HORN COMBO (RSH-24V)



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