Critical Environment Technologies Canada Inc.

www.critical-environment.com

Installation Manual for
AST-IS5
Infrared CO$_2$ / Temperature Transmitter for Wall (Office) Mount with LCD Display and 1 Relay

MANUAL REVISION-C, August 2017

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.

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:

Critical Environment Technologies Canada Inc.
Unit 145, 7391 Vantage Way, Delta, BC, V4G 1M3, Canada
Toll Free: +1.877.940.8741
Telephone: +1.604.940.8741
Fax: +1.604.940.8745
Email: marketing@cetci.com
Website: www.critical-environment.com

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-IS5

The AST-IS5 is a reliable, long life, infrared Carbon Dioxide (CO_2) analog transmitter that measures both the concentration of carbon dioxide and temperature. It has been designed for use in the "climate zone". The AST-IS5 can transmit data to a BAS system or controller and the LCD display provides real time values for the user. The AST-IS5 offers an LCD display and a relay. The standard measurement range is 0-2000 ppm.

The enclosure is made of general purpose PVC and is a sleek design that would be appealing in an office environment.

SELF DIAGNOSTICS

The system contains complete self diagnostic procedures. A full system test is executed automatically every time the power is turned on. In addition, constantly during operation, the sensors are checked against failure by checking the valid dynamic measurement ranges. All EEPROM updates, initiated by the sensor itself are checked by subsequent memory read back and data comparisons. These different system checks return error bytes to the system RAM.

NOTE: The sensor accuracy is defined as continuous operation (at least 3-weeks after installation).

SPECIFICATIONS

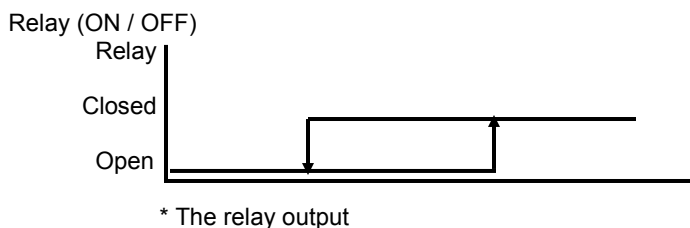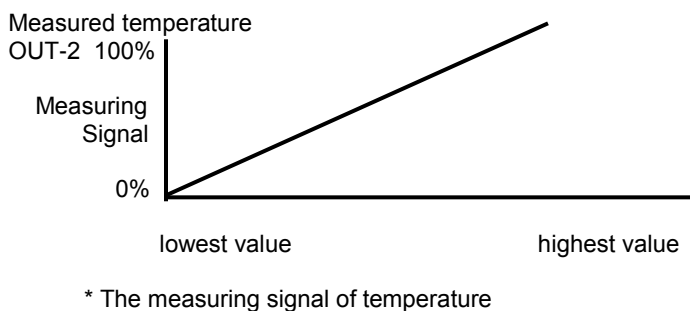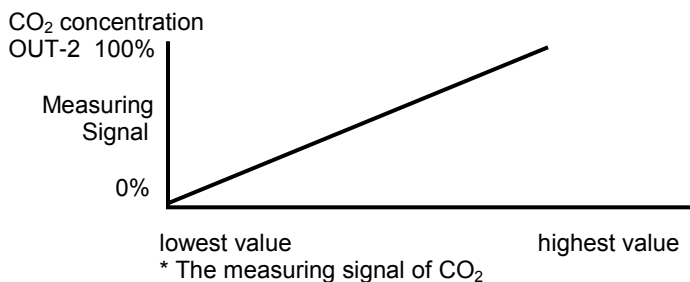| AST-IS5	
Measurement Range	0 - 2000 ppm
Power Supply	24 VDC or VAC, 50/60 Hz (half-wave rectifier input)
Power Consumption	<3 W average
Linear Output	0-10 VDC or 0-20 mA 2-10 VDC or 4-20 mA
Temperature Sensor Range	0°C to 50°C (32°F to 122°F)
Accuracy	+/- 30 ppm +/- 3% of reading
Operating Temperature	0°C to 50°C (32°F to 122°F)
Operating Humidity	0—85% RH non-condensing
Display	Yes
Enclosure Rating	General Purpose PVC, IP30 rated
Dimensions	120 x 82 x 30 mm 4.7 x 3.22 x 1.2 inches
Alarm	No
Mute button	No
Relay Output	Min load: 1 mA / 5V Rated load: 0.5 A / 125 VAC, 1 A / 24 VDC
Mounting Type	Wall mount
Probe length	na
Communication	Analog
Certifications	CE and EMC

FUNCTIONAL DESCRIPTION

OUT-1 = Measuring signal of CO_2 concentration lowest value - highest value.
OUT-2 = Measuring signal of temperature lowest value - highest value.
OUT-3 = ON / OFF signal of demand of air quality

The opening of the relay is controlled by the hysteresis of the relay.

CO_2 concentration
OUT-2 100%

Measuring
Signal

0%

lowest value   highest value
* The measuring signal of CO_2

Measured temperature
OUT-2 100%

Measuring
Signal

0%

lowest value   highest value

* The measuring signal of temperature

Relay (ON / OFF)
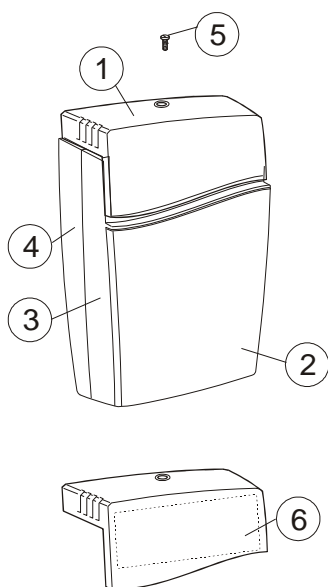Relay

Closed

Open

* The relay output

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

This product fulfills the following demands:
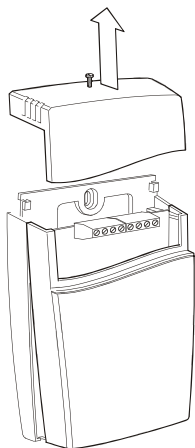EN 61000-4-2 Level 2, EN 61000-4-3 Level 2, EN 61000-4-4 Level 4, EN 61000-4-6, EN 61000-4-8 Level 4, EN 55022 Class B

CE

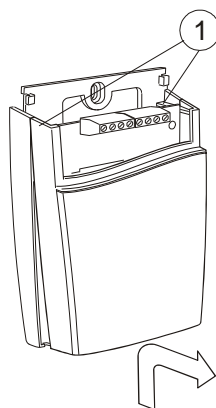## INSTALLING THE TRANSMITTER

DRAWING #1

ITEM LOCATORS

1 top portion
2 lid
3 front portion
4 wall plate
5 screw
6 label with settings inside the top portion

DRAWING #2

REMOVE THE SECURING SCREW FROM THE TOP PORTION, ITEM-5 IN ITEM LOCATOR ON PREVIOUS PAGE
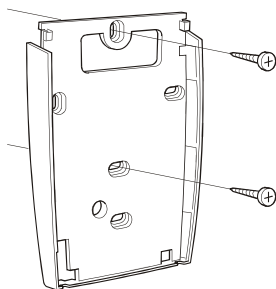
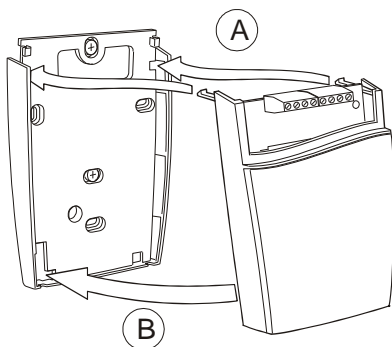**PULL THE TOP PORTION UPWARD TO REMOVE IT**

DRAWING #3

FOLD THE FRONT PORTION (ITEM-3, DRAWING-1) WITH THE LID (ITEM-2, DRAWING-1), FORWARD AND LOOSEN IT FROM THE HOOKS (ITEM-1, DRAW-ING-3)

INSTALLING THE TRANSMITTER, CONT'D…..
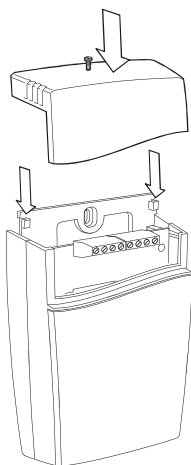
DRAWING #4

SECURE THE WALL PLATE WITH SCREWS. MAXIMUM SCREW HEAD DIAMTER SHOULD BE 7.5 mm. MAXIMUM SCREW HEAD HEIGHT SHOULD BE 2.5 mm.

DRAWING #5

A - PUT THE TOP TABS OF THE FRONT PORTION INTO THE TOP HOLES OF THE WALL PLATE.

B - PRESS THE LOWER EDGE OF THE CASE ONTO THE WALL PLATE TO LATCH IN PLACE.

NOTE: IF FOR SOME REASON THE PCB MUST BE REMOVED, HANDLE IT VERY CAREFULLY ONLY BY THE EDGES TO PROTECT IT FROM STATIC DISCHARGE DAMAGE. NORMALLY REMOVING THE PCB IS NOT REQUIRED.

DRAWING #6

THE TOP PORTION IS PUSHED UNDER THE LOCKING HOOKS OF THE WALL PLATE AND IS SECURED WITH A SCREW

ELECTRICAL CONNECTIONS

The power supply has to be connected to G+ and G0. G0 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-IS5 unit and for the control system!* Unless different transformers are used, special precautions need to be taken.
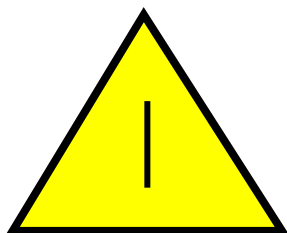
NOTE
The *AST-IS5* signal ground *is not* galvanically separated from the *AST-IS5* power supply!

NOTE
The same reference has to be used for the AST-IS5 unit and for the control system.

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

Connection Terminal	Function	Electrical Data	Remarks
G+ G0	Power (+) Power ground (-)	24 VAC/DC+ (+-20%), 3W 24 VAC/DC -	2W without output load *See NOTE 1*
OUT 1 OUT 2 M	Analog Output 1 (+) Analog Output 2 (+) Signal Ground (-)	0-10 VDC or 0-20 mA, 2-10 VDC or 4-20 mA, Same as Output 1 Connected to G0 via PTC fuse	According to positions of OUT1 and start point jumpers. *See NOTE 2* According to positions of OUT2 and start point jumpers. *See NOTE 2* *See NOTE 1*

NOTE 1: The ground terminal is used as negative power supply DC input or AC phase ground G0 (halfwave rectifier). The signal ground M, is protected by a PTC resistor, is the same as power ground G0 (permitting a "3-wire" configuration). A single transformer may be used for the entire system.

NOTE 2: AST-IS5 can deliver a voltage or a current loop for OUT1/OUT2. To change between voltage and current output mode the hardware jumpers are used. There is one jumper for OUT1 and one for OUT2, so that one output can be a voltage output and the other a current output. Both, voltage output and current output, can have start points 0 % (0-10 VDC or 0-20mA) or 20% (2-10 VDC or 4-20mA). The same start point is used for both outputs.

DEFAULT OUTPUT CONFIGURATION FOR AST-IS5

TERMINAL	DEFAULT OUTPUT	DEFAULT OUTPUT RANGE
OUT-1	4-20 mA	0-2000 ppm CO_2
OUT-2	2-10 VDC	0 - 50°C
RELAY	Closed Open	>1000 ppm CO_2 <900 ppm CO_2

FORMULAS FOR CALCULATING OUTPUT VALUES

| Configuration	Output Range	Formula for Calculation
0-10 VDC	0-2000 ppm CO_2 0 - 50°C	CO_2 value = Volt / 10 * 2000 Temperature value in C = Volt / 10 * 50
2-10 VDC	0-2000 ppm CO_2 0 - 50°C	CCO_2 value = (Volt-2) / 8 * 2000 Temperature value in C = (Volt-2) / 8 * 50
4-20 mA	0-2000 ppm CO_2 0 - 50°C	CO2 value = (nA-4) * 2000 / 16 Temperature value in C = (mA-4) * 50 / 16
a-b	c-d	Value = (reading-a) / (b-a) * (d-c) + c
		a = lowest value of the configuration b = highest value of the configuration c = lowest value of the range d = highest value of the range

NOTE: RED LED is lit when the relay output is closed.

OUTPUT CONFIGURATIONS

| JUMPER	POSITION	FUNCTION
Start point selection jumper	0%	Jumper top position provides 0VDC or 0mA start point for OUT-1, OUT-2 (0-20 mA or 0-10 VDC)
	20%	Jumper bottom position provides 2VDC or 4mA start point for OUT-1, OUT-2 (4-20 mA or 2-10 VDC)
OUT-1	Current	Connection in position "Current" provides 0/4-20 mA output range for OUT-1
	Voltage	Connection in position "Voltage" provides 0/2-10 VDC output range for OUT-1
OUT-2	Current	Connection in position "Current" provides 0/4-20 mA output range for OUT-2
	Voltage	Connection in position "Voltage" provides 0/2-10 VDC output range for OUT-2

WIRING TERMINAL STRIPS

The terminals and jumpers are located under the top portion.
The darker areas are indicating this transmitter has been set for voltage output.
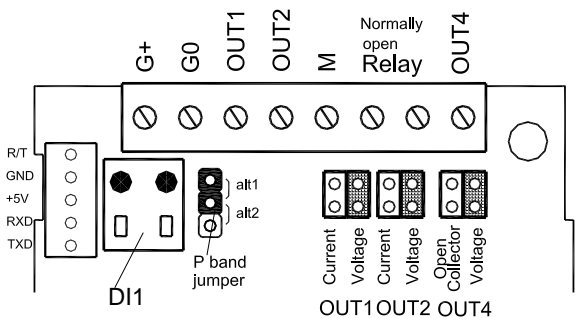
POWER 24VAC / DC+
POWER GROUND (-)
OUT-1   ANALOG OUT 4-20mA(+) CO$_2$
OUT-2   ANALOG OUT 2-10VDC(+) Temp
M - SIGNAL GROUND (-)
OUTPUT - 3 RELAY - CLOSED - >1000 PPM
OUTPUT - 3 RELAY - OPEN - <900 PPM

**NOTE: STANDARD
RANGE IS 0-2000 PPM**
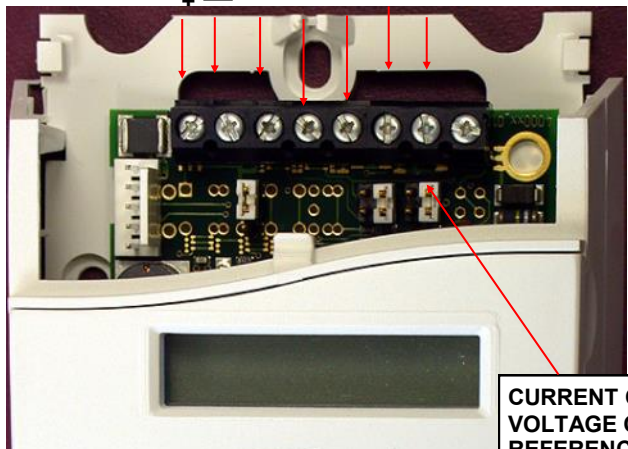
**CURRENT OUTPUT JUMPER SET
VOLTAGE OUTPUT JUMPER SET
REFERENCE DRAWING #8 ON
PAGE-7 FOR MORE DETAILS.**

kenelec scientific
measuring up

Critical Environment Technologies Canada Inc.

Unit 145, 7391 Vantage Way, Delta, BC, V4G 1M3, Canada

Toll Free: +1.877.940.8741

Tel: +1.604.940.8741

Fax: +1.604.940.8745

www.critical-environment.com

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