

**Critical Environment Technologies
Canada Inc.**

www.critical-environment.com

**Installation Manual for
AST-IS5**

**Analog transmitters with Infrared CO2
& Temperature sensors with LCD display & relay**



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AST-IS5

ANALOG TRANSMITTER

with

INFRARED CO2 SENSOR & TEMPERATURE SENSOR

and

LCD DIGITAL DISPLAY

This AST-IS series are reliable, long life analog transmitters. Life expectancy of the infrared sensor is 15-years. The AST-IS5 is an advanced transmitter that has been designed for use in the "climate zone".

It provides an output for CO2 gas and an output for temperature. The local LCD display provides real time values for the user. Standard measurement range is 0-2000 ppm.

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).

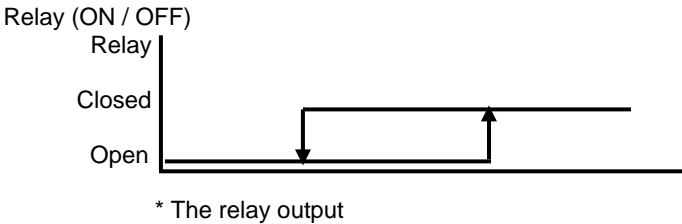
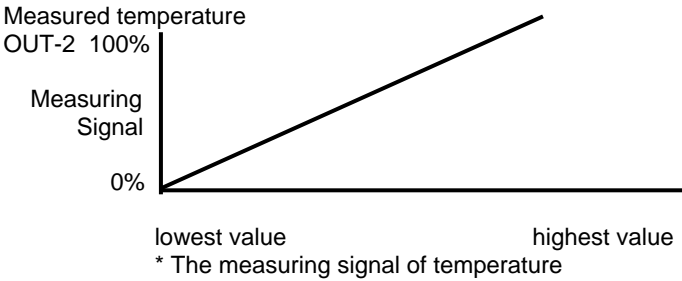
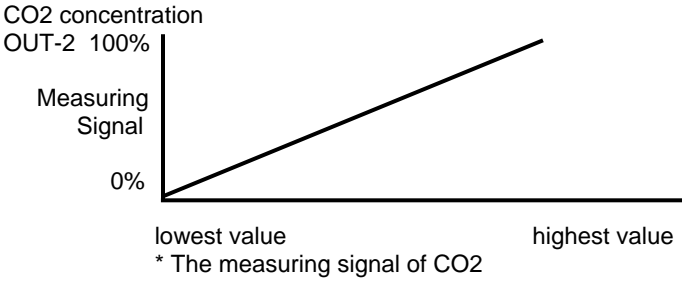
FUNCTIONAL DESCRIPTION

OUT-1 = Measuring signal of CO2 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.



DEFAULT OUTPUT CONFIGURATION FOR AST-IS5

TERMINAL	DEFAULT OUTPUT	DEFAULT OUTPUT RANGE	OUTPUTS OF THIS SENSOR	OUTPUT RANGE OF THIS SENSOR
OUT-1	4-20 mA	0-2000 ppm CO2		
OUT-2	0-10 VDC	0-50 deg. C.		
RELAY	Closed Open	>1000 ppm CO2 <900 ppm CO2		

FORMULAS FOR CALCULATING OUTPUT VALUES

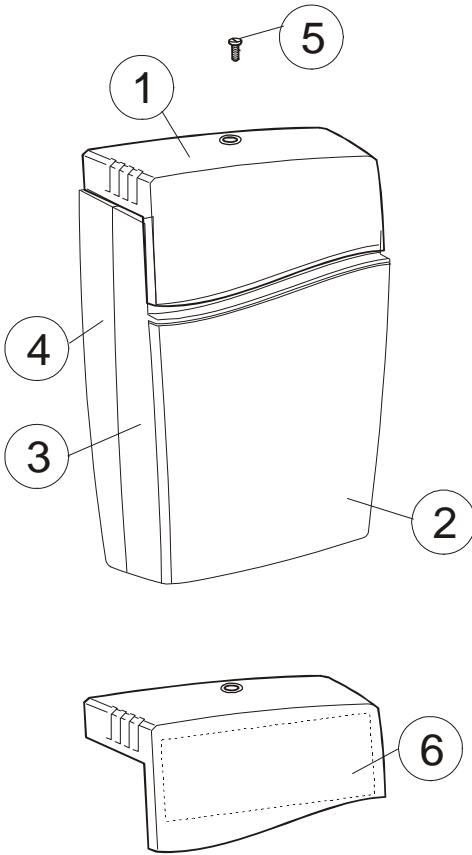
Configuration	Output Range	Formula for Calculation
0-10 VDC	0-2000 ppm CO2 0-50 deg. C.	CO2 value = Volt / 10 * 2000 Temperature value in C = Volt / 10 * 50
2-10 VDC	0-2000 ppm CO2 0-50 deg. C.	CO2 value = (Volt-2) / 8 * 2000 Temperature value in C = (Volt-2) / 8 * 50
4-20 mA	0-2000 ppm CO2 0-50 deg. C.	CO2 value = (mA-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

INSTALLING THE TRANSMITTER

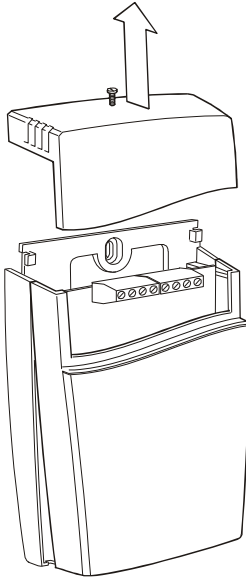


DRAWING #1

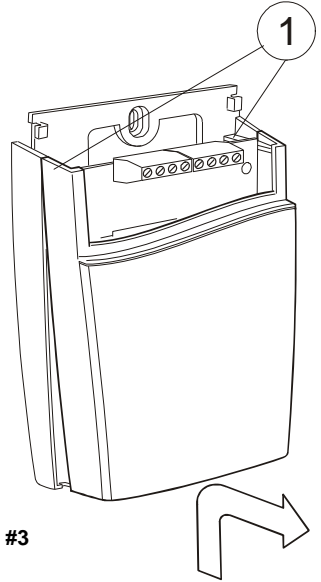
ITEM LOCATORS

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

INSTALLING THE TRANSMITTER, CONT'D.....



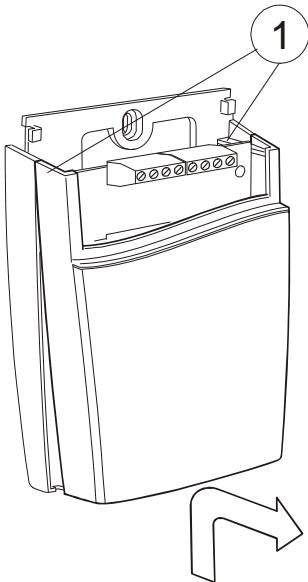
DRAWING #2



DRAWING #3

REMOVE THE SECURING SCREW FROM THE TOP PORTION, ITEM-5 IN ITEM LOCATOR ON PREVIOUS PAGE

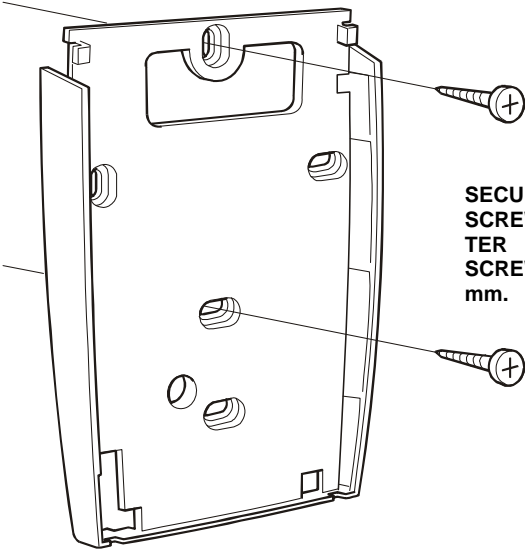
PULL THE TOP PORTION UPWARD TO REMOVE IT



DRAWING #4

FOLD THE FRONT PORTION (ITEM-3, DRAWING-1) WITH THE LID (ITEM-2, DRAWING-1), FORWARD AND LOOSEN IT FROM THE HOOKS (ITEM-1, DRAWING-4)

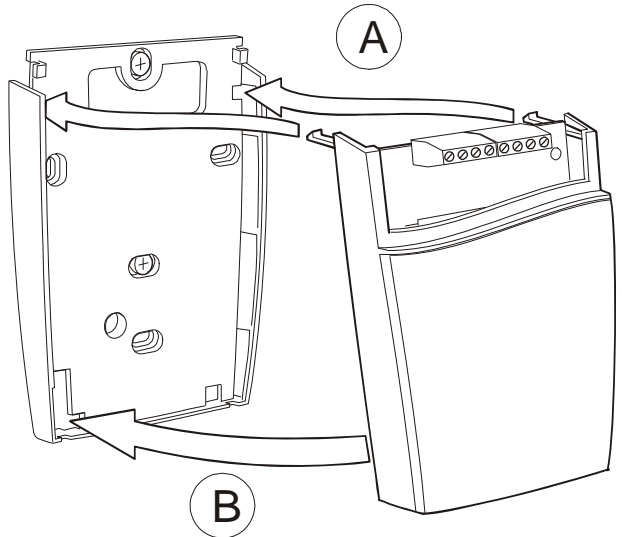
INSTALLING THE TRANSMITTER, CONT'D.....



DRAWING #5

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

DRAWING #6

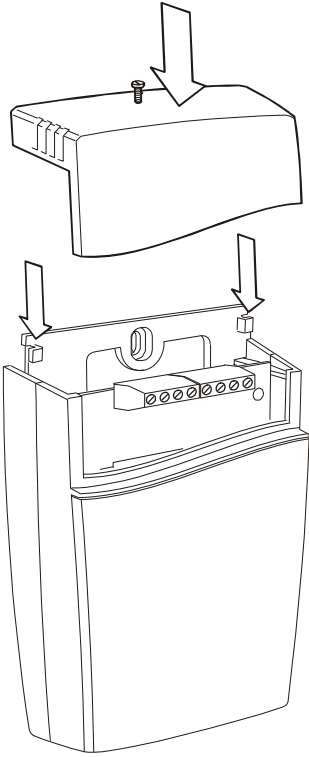


A - PUT THE TOP TABS OF THE FRONT PORTION INTO THE TOP HOLES OF THE WALL PLATE.

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

INSTALLING THE TRANSMITTER, CONT'D.....

DRAWING #7

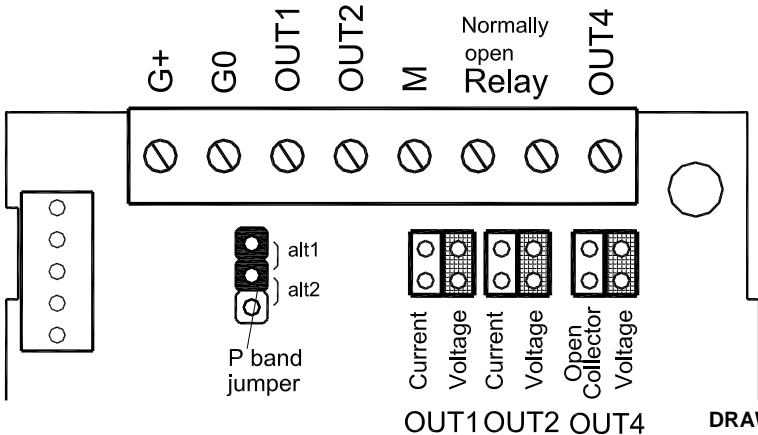


THE TOP PORTION IS PUSHED UNDER THE LOCKING HOOKS OF THE WALL PLATE AND IS SECURED WITH A SCREW

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.

TERMINALS & JUMPERS FOR AST-IS5:

THE TERMINALS & JUMPERS ARE LOCATED UNDER THE TOP PORTION. THE DARKER AREAS ARE INDICATING THIS TRANSMITTER HAS BEEN SET FOR VOLTAGE OUTPUT.



DRAWING #8

WIRING TERMINALS & SIGNAL OUTPUT JUMPER SETTINGS

NOTE: STANDARD RANGE IS 0-2000 PPM

- + L** POWER 24VAC / DC+
- F** POWER GROUND (-)
- OUT-1** ANALOG OUT 0-10VDC(+)
- OUT-2** ANALOG OUT 4-20 mA(+)
- M** - SIGNAL GROUND (-)
- OUTPUT - 3 RELAY - CLOSED - >1000 PPM**
- OUTPUT - 3 RELAY - OPEN - <900 PPM**



**CURRENT OUTPUT JUMPER SET
VOLTAGE OUTPUT JUMPER SET
REFERENCE DRAWING #8 ON
PAGE-7 FOR MORE DETAILS.**

PHOTO #1

WIRING TERMINALS & SIGNAL OUTPUT JUMPER SETTINGS, CONT'D....

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

The power supply has to be connected to G+ and G0. G0 is considered as system ground. If the analogue 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.

PLEASE NOTE! The *AST-IS5* signal ground **is not** galvanically separated from the *AST-IS6* power supply!

PLEASE NOTE!

The same ground reference has to be used for the *AST-IS5* unit and for the control system!

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. See the function manual.*