ClimaTrax

Technical Operations Manual

REV 2022.03.03

For ClimaTrax
Environmental Monitor

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PLEASE NOTE: The newest revision of this manual will be available online at accutroninstruments.com. If you require any assistance in configuring your new ClimaTrax, please call our technicians at +1-705-628-0814 or email at info@accutroninstruments.com.

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Section 1: General Information

1.1 The Manual

Refer to this manual for proper installation, operation and maintenance of the ClimaTrax Instrument.

Special attention must be paid to warnings and notices highlighted from the rest of the text by gray boxes.

Warning: failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

Note: important information about the actual product or specific part of the operating manual.

- These instructions do not claim to cover all details or variations in equipment, or to provide for every possible contingency that may arise during installation, operation, or maintenance.
- For further information or to resolve issues not covered in the manual, consult your Accutron representative.
- The contents of the manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The Sales contact contains the entire obligation of Accutron Instruments Inc. The warranty contained in the contract between the parties is the sole warranty of Accutron Instruments Inc.

IMPORTANT: All specifications are subject to change without notice. Please ensure that any safety-related information is confirmed with a qualified Accutron Instruments representative.

1.1 Safety Guidelines

This device should only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Warning: This Product can only function properly and safely if it is correctly transported, stored, installed, set up, operated and maintained.

Note: Always use the product in accordance with the specifications.

1.2 Information About Your System

ClimaTrax
Model Number (located behind cover):
Serial Number (located behind cover):
Code Version (displayed on start-up):

Section 2: ClimaTrax Specifications

Display Readout:	2 x16 Backlit LCD display.
	Each digit is 4.99mm (H) X 2.55mm (W)
Power Input:	12VDC to 30VDC
	20VDC to 30VDC with optional relay output
Power Consumption:	70mA, 130mA with all four 4-20mA connected and outputting 20mA
Output type:	Four self-powered 4-20mA outputs, Modbus RS485
Modbus:	9600bps or 19200bps, No Parity
Max loop resistance:	700Ω
Fault/Alarm Output:	Two dry contacts, N.O. (optional)
Enclosure:	NEMA 4X – Noncorrosive
	- Polycarbonate enclosure: ACC-CLMT-Ax
	- Stainless Steel Enclosure: ACC-CLMT-Bx
Programming:	Local buttons for configuring.
Sensor Ranges:	
Temperature:	-40° to +85° Celsius, ±0.8°C, Resolution 0.01°C
	Long term drift: < 0.04 °C/yr
Humidity:	0% to 100%, non-condensing, ±1.8%, Resolution 0.7%
	Long term drift: < 0.5 %RH/yr
Pressure:	300 to 2000 millibar, ±1.5mbar, Resolution 0.1 mbar
	Long term stability: -1 mbar/yr

Calculated Variables:	Wet Bulb Temperature
	Wet Bulb Globe Temperature
	Dew Point
	Heat index
	Air Density

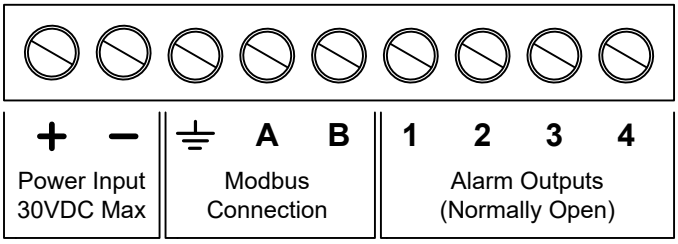
Section 3: Installation

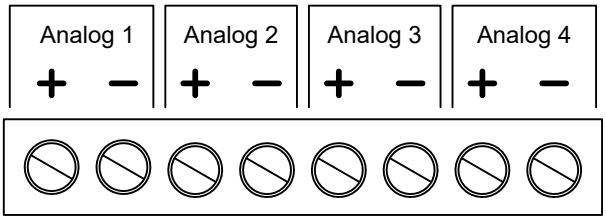
3.1 Choosing a Location

Choose a location that is not excessively wet. The probe end of the ClimaTrax is not waterproof.

3.2 Wiring the Unit

Open the unit to reveal the terminal blocks.





Analog Outputs (Powered)

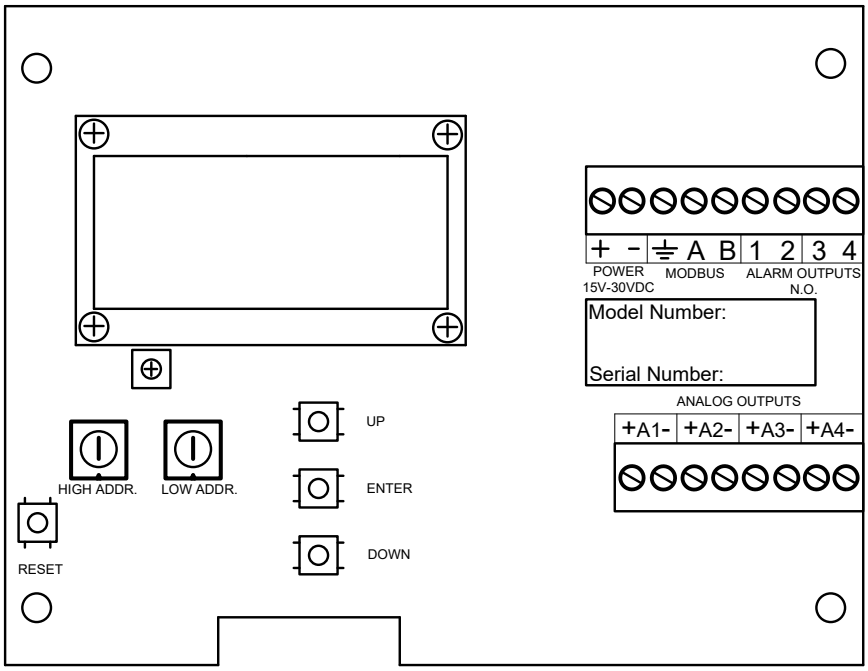
Power input: Apply 12VDC to 30VDC between **+** & **-**.
Modbus: A is non-inverting input & B is inverting input, Ground is cable shield connection.
Alarm Outputs (optional): Two dry contacts, one between 1&2, and the other between 3&4.

The four 4-20mA outputs are self powered. Scaling of each channel can be set in the menu, along with changing the process variable for that specific channel.

Analog 1 by default represents Temperature.
Analog 2 by default represents Humidity.
Analog 3 by default represents Pressure.
Analog 4 by default represents Wet Bulb Temperature**.**

Section 4: Programming

4.1 Description of Buttons



ENTER = Enter Menu mode, accept selection, select next digit.

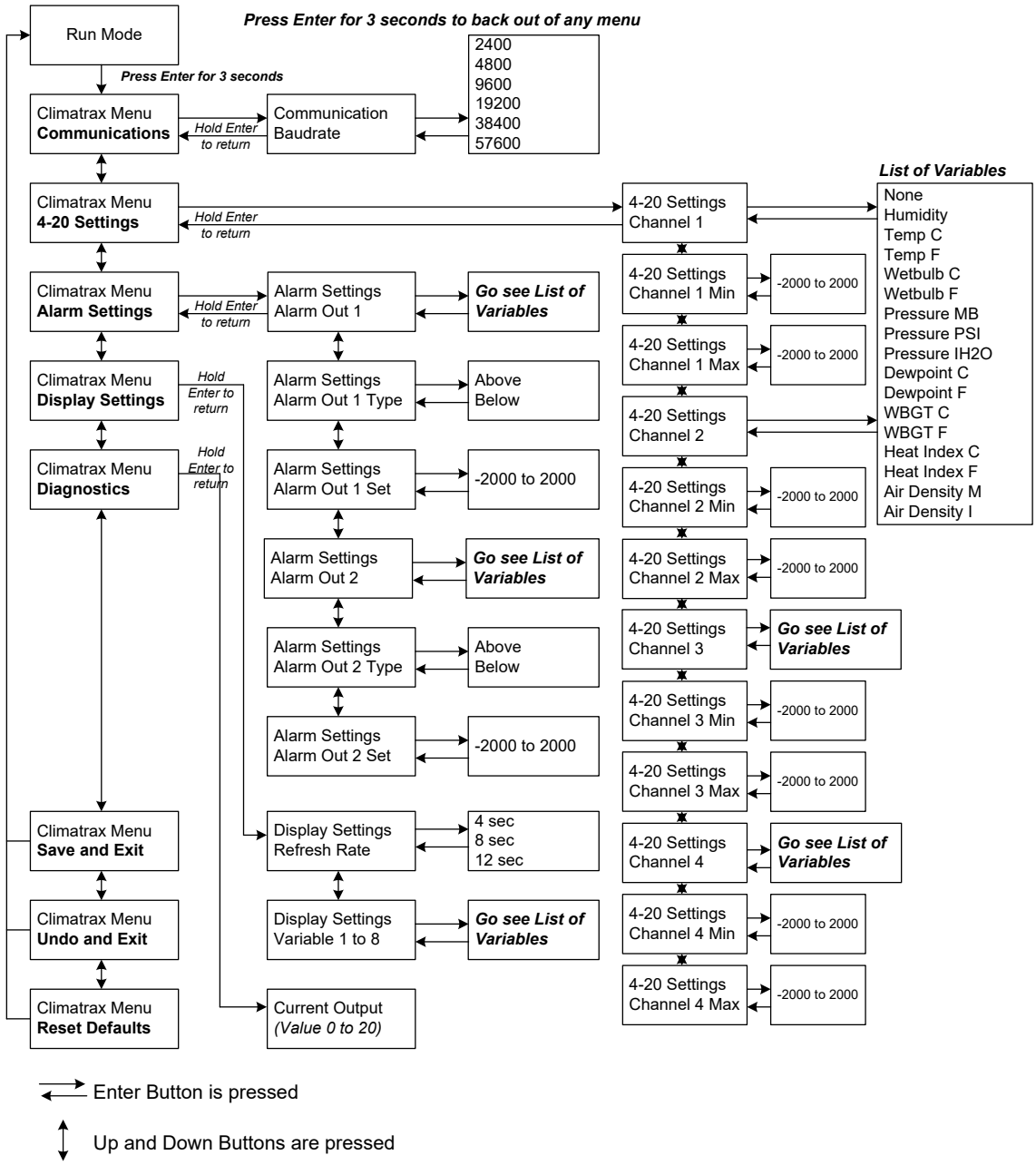
UP &DOWN = Scroll up or down, change selected digit.

RESET = Reboots the CPU. Does not reset the settings.

HIGH ADDR. = Sets Modbus Address, See section 5.

LOW ADDR. = Sets Modbus Address, See section 5.

4.1 ClimaTrax Menu Flow Chart



4.2 Flow Chart Description/Information

Communications: Baud rate is chosen in this menu, default is 9600. Unit must be reset for new baud rate to take effect. Parity is always set to None.

4-20 Settings: This menu allows the user to change the span of the variables regarding the 4-20mA signal associated with it. It also allows the user to select what process variable they would like to use for the four analog outputs.

Min: This value will represent 4mA

Max: This value will represent 20mA

Default Settings for Analog output Variables:

Default Variable		Default Span Setting	Maximum Span Setting
Chan. 1	**Humidity**	0 – 100%	0 – 100%
Chan. 2	**Temperature C**	-40 – 125 ˚C	-40 – 125 ˚C
Chan. 3	**Pressure mBar**	900 – 1100 millibar	0 – 5000 millibar
Chan. 4	**Heat Index C**	-40 – 125 ˚C	-40 – 125 ˚C

Variables/Process: There are sixteen different process variables that can be selected and measured by the Climatrax:

Variable	Range	Units of Measure
Humidity	0 – 100	%RH
Temp C	- 40 – +85	˚C
Temp F	- 40 – +185	˚F
Wet bulb C	- 40 – +125	˚C
Wet bulb F	- 40 – +185	˚F
Pressure mBar	300 – 2000	millibar
Pressure PSI	4.3 – 29	PSI
Pressure IH2O	120.3 – 802.6	inches of water
Dew point C	- 40 – +85	˚C
Dew point F	- 40 – +185	˚F
WBGT1	- 40 – +85	˚C
WBGT2	- 40 – +185	˚F
Heat Index C	- 40 – +85	˚C
Heat Index F	- 40 – +185	˚F
Air Density		Kg/m^3
Air Density		lbs/ft^3

Alarm Settings: There are two alarms associated with the Climatrax Unit. This menu allows the user to select a maximum of two variables and associate a setpoint with those variables. If the reading is either above or below the setpoint depending on the desired settings an alarm will be activated.

Setpoint: A desired setpoint can be entered in this section, this value is one that is selected to ensure the user is notified if the variable/process exceeds or is less than the desired setpoint.

Type: This section allows the user to select whether the alarm will react to the variable/ process when it is above or below the setpoint entered.

Diagnostics: Diagnostics allow you to force all the 4-20mA outputs at the same time. Using up and down sets the outputs to what is displayed on the LCD.

Save and Exit: Allows the user to save all the changes and return to Run mode.

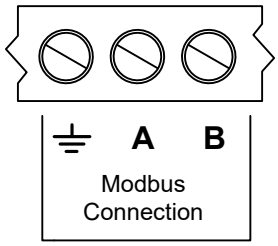
Undo and Exit: Allows the user to undo any changes without saving and returns them to Run mode.

Reset Defaults: Reset the unit to factory set defaults. The unit will go back into Run mode once this is selected.

Note: To change values in the menu press enter on the setting you want to change Use Up or Down to change the number, press Enter to switch to the next digit.

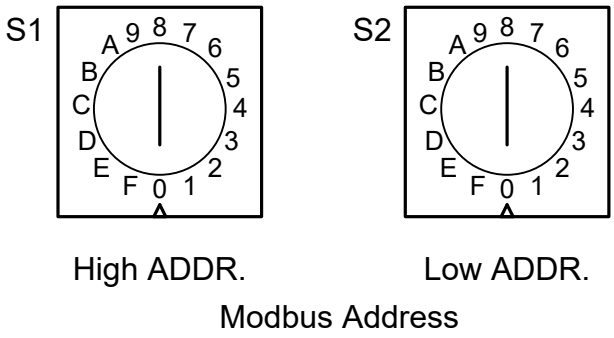
Section 5: MODBUS

5.1 Wiring Modbus



A and B are for connecting to your MODBUS network, and ground is supplied for cable shielding. A is non-inverting and B is inverting.

5.2 Setting Modbus Address



The Modbus Address is displayed during boot up on the Climatrax. The Modbus Address can be set to 1 through 255 using the hexadecimal switches above. Refer to the table below.

S1	S2	Modbus Address	S1	S2	Modbus Address	S1	S2	Modbus Address
0	0	0	1	0	16	2	0	32
0	1	1	1	1	17	2	1	33
0	2	2	1	2	18	2	2	34
0	3	3	1	3	19	2	3	35
0	4	4	1	4	20	2	4	36
0	5	5	1	5	21	2	5	37
0	6	6	1	6	22	2	6	38
0	7	7	1	7	23	2	7	39
0	8	8	1	8	24	2	8	40
0	9	9	1	9	25	2	9	41
0	A	10	1	A	26	2	A	42
0	B	11	1	B	27	2	B	43
0	C	12	1	C	28	2	C	44
0	D	13	1	D	29	2	D	45
0	E	14	1	E	30	2	E	46
0	F	15	1	F	31	F	F	255

5.3 Modbus Registers

Process Variables – Read-Only

REGISTER	READING	TYPE	MULTIPLIER
40001 & 40002	Relative Humidity %	Float32	
40003 & 40004	Temperature C	Float32	
40005 & 40006	Temperature F	Float32	
40007 & 40008	Wet bulb C	Float32	
40009 & 40010	Wet bulb F	Float32	
40011 & 40012	Pressure MB	Float32	
40013 & 40014	Pressure PSI	Float32	
40015 & 40016	Pressure IH2O	Float32	
40017 & 40018	Dewpoint C	Float32	
40019 & 40020	Dewpoint F	Float32	
40021 & 40022	WBGT C	Float32	
40023 & 40024	WBGT F	Float32	
40025 & 40026	Heat Index C	Float32	
40027 & 40028	Heat Index F	Float32	
40029 & 40030	Air Density (Metric)	Float32	
40031 & 40032	Air Density (Imperial)	Float32	

40033	Alarm1	Uint16	
40034	Alarm2	Uint16	

40035	Relative Humidity %	Int16	100
40036	Temperature C	Int16	100
40037	Temperature F	Int16	100
40038	Wet bulb C	Int16	100
40039	Wet bulb F	Int16	100
40040	Pressure MB	UInt16	10
40041	Pressure PSI	UInt16	100
40042	Pressure IH2O	UInt16	10
40043	Dewpoint C	Int16	100
40044	Dewpoint F	Int16	100
40045	WBGT C	Int16	100
40046	WBGT F	Int16	100
40047	Heat Index C	Int16	100
40048	Heat Index F	Int16	100
40049	Air Density (Metric)	Int16	100
40050	Air Density (Imperial)	Int16	100

Section 6: Frequently Asked Questions

A) Why am I not seeing anything on the display?

- Check power connections. When the instrument is powered on, it should read "Accutron Instruments" followed by the code version before entering run mode.
- Ensure that the Climatrax was not damaged in any way during shipping. If this is the case, please contact your supplier.

B) The Climatrax is displaying Error: CRC Fail, Cannot Connect.

- This means the Climatrax is not able to communicate with the probe.
- Make sure the probe has not been damaged.
- Check the connections inside to ensure the wires are not damaged or disconnected.

C) Modbus is not working.

- Check that the Modbus address has been set correctly. Use table 1 to help set the address. The currently set Modbus address is displayed when the instrument is powered on.
- Try reversing the connections on A and B.

D) The Climatrax display is constantly looping through displaying "Accutron Instruments" & version number.

- This means the Climatrax is not able to communicate with the probe.
- Make sure the probe has not been damaged.
  Check the connections inside to ensure the wires are not damaged or disconnected.

Appendix A - Glossary

Dew1:	Dew Point in degrees Celsius
Dew2:	Dew Point in degrees Fahrenheit
Heat1:	Heat index in Celsius
Heat2:	Heat index in Fahrenheit
Humidity:	Relative Humidity %
mbar:	Millibar
Temp1:	Temperature in degrees Celsius
Temp2:	Temperature in degrees Fahrenheit
Wetbulb1:	Wet Bulb Temperature in degrees Celsius
Wetbulb2:	Wet Bulb Temperature in degrees Fahrenheit
WBGT1:	Wet Bulb Globe Temperature in degrees Celsius
WBGT2:	Wet Bulb Globe Temperature in degrees Fahrenheit
AirD1:	Air density in kilograms per cubic meter
AirD2:	Air density in pounds per cubic foot

Equations:

Wet Bulb =

WBGT = 0.7 Tw + 0.3 Td

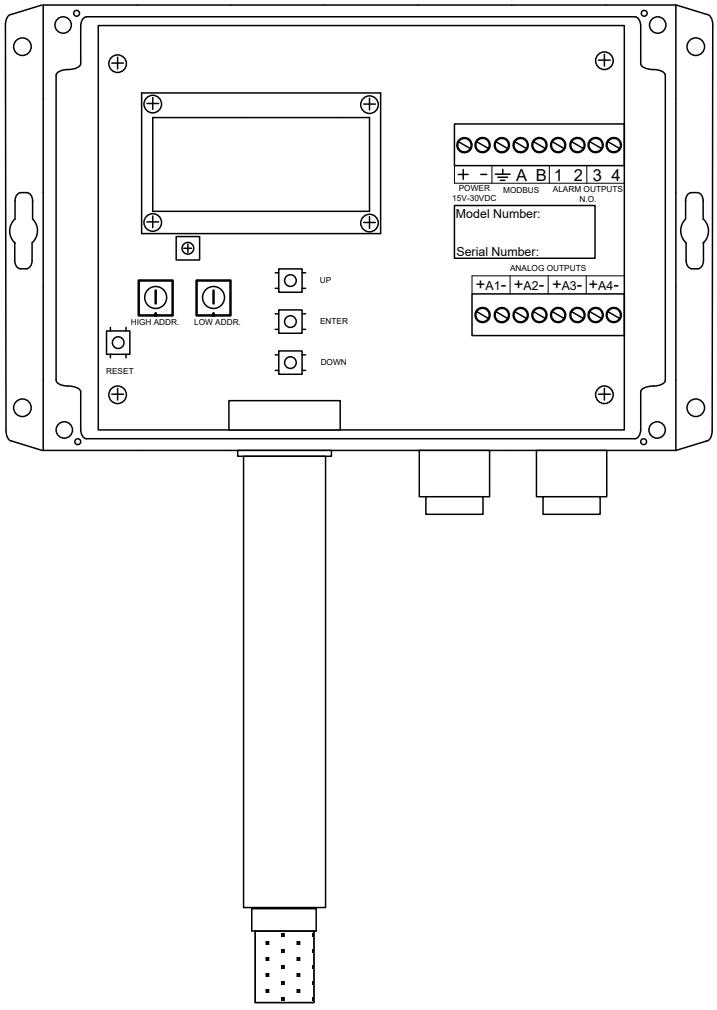
Where Tw is the wet bulb temperature, (calculated by ClimaTrax)

Td is the dry bulb temperature

Tg is the Globe Thermometer Temperature

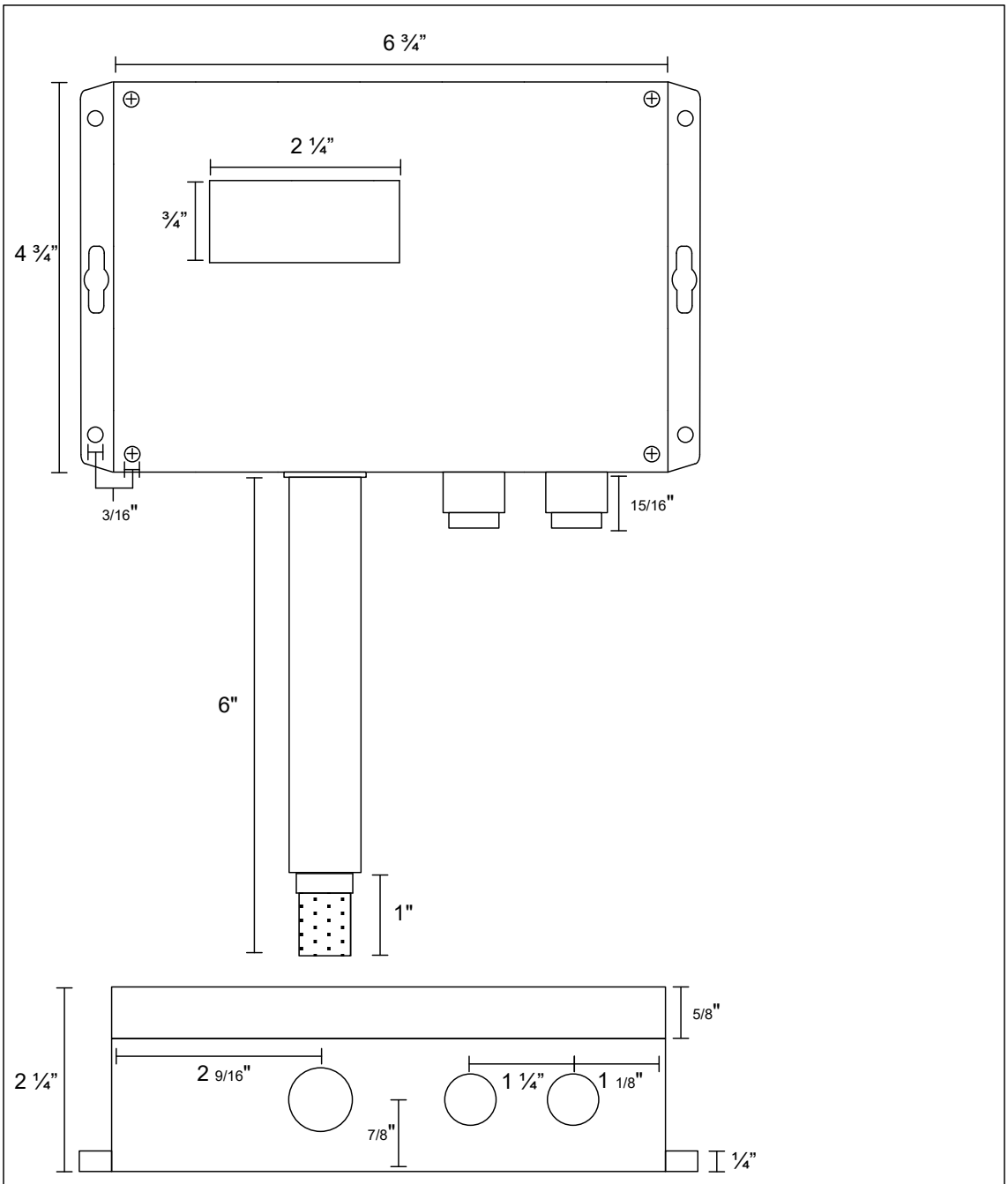
Using this formula, globe temperature will be the same as dry bulb temperature, as will be the case in the underground mining environment.

Appendix B – Diagrams

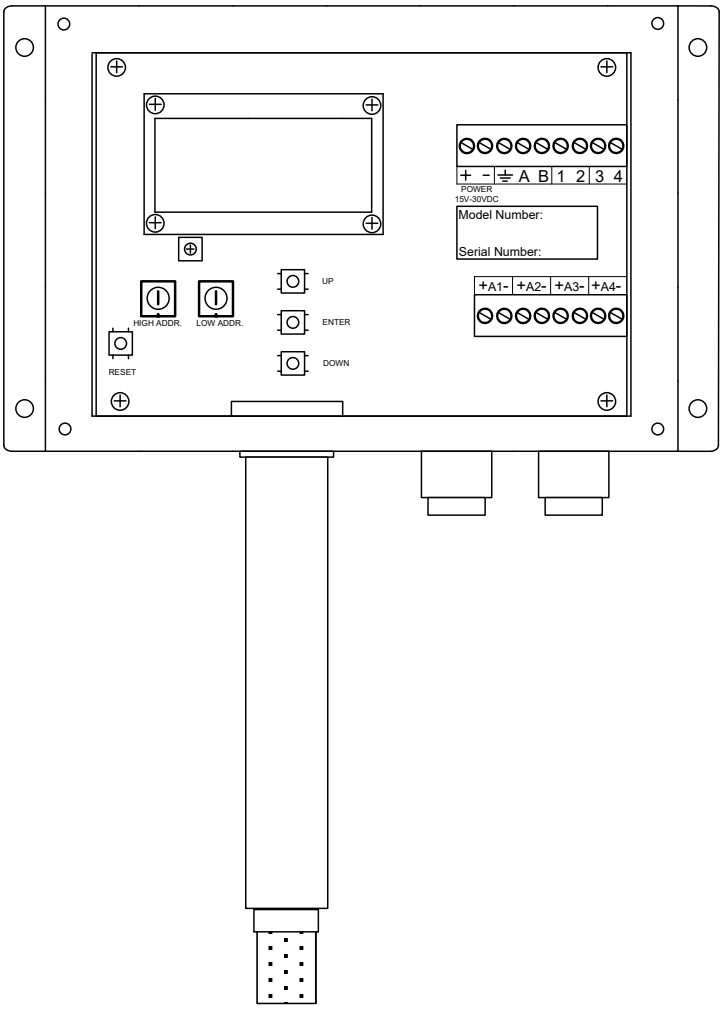


Internal Diagram: Polycarbonate Enclosure	
Accutron Instruments Inc	July 09, 2012
Climatrax Diagrams	1 of 4

1 inch = ————

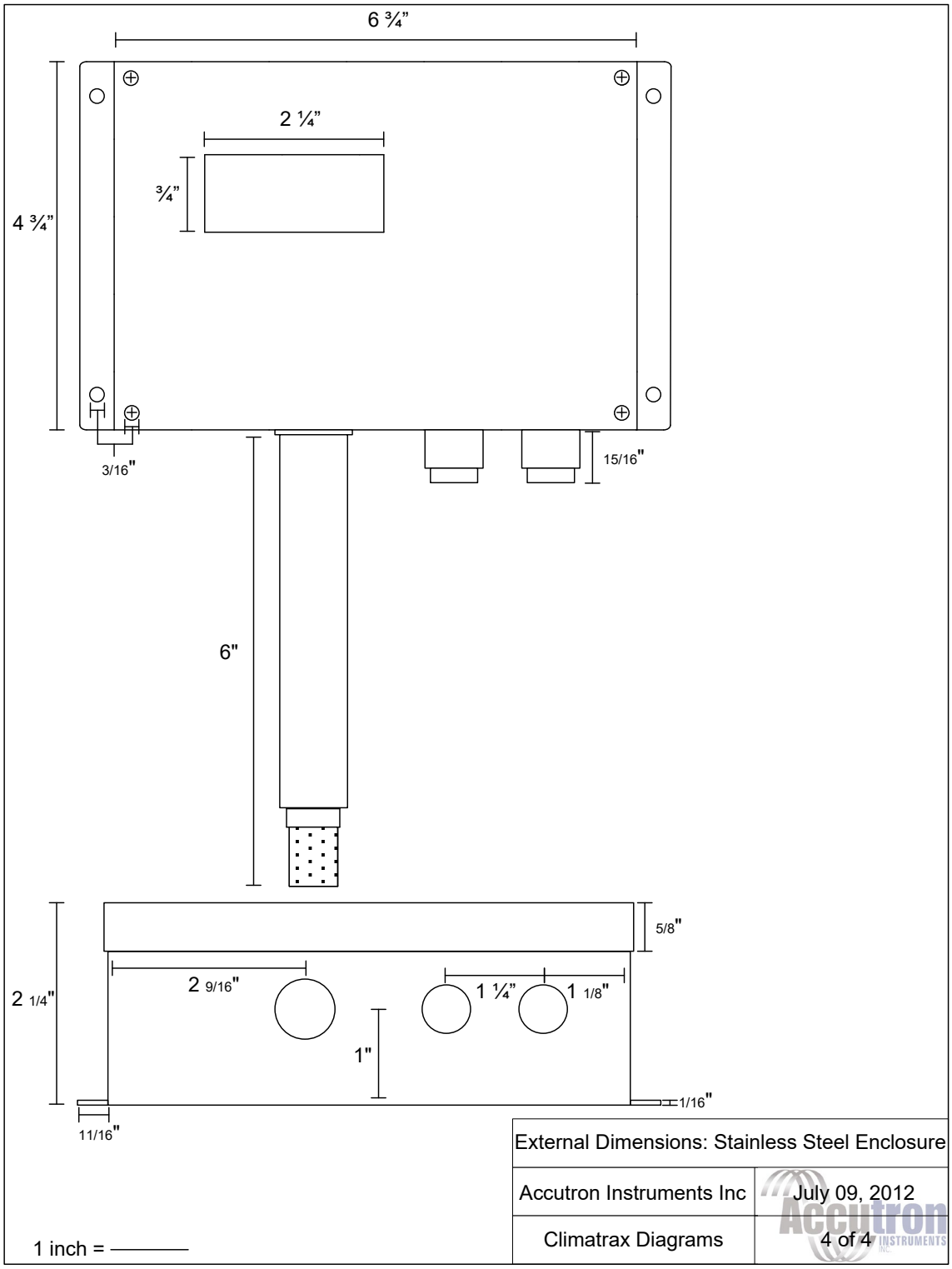


External Dimensions: Polycarbonate Enclosure	
Accutron Instruments Inc	July 09, 2012
Climatrax Diagrams	2 of 4

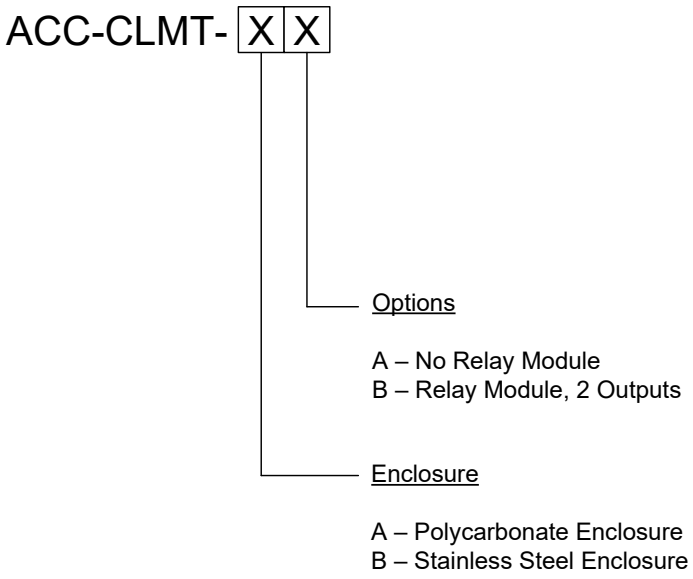


Internal Diagram: Stainless Steel Enclosure	
Accutron Instruments Inc	July 09, 2012
Climatrax Diagrams	3 of 4

1 inch = ————


6 ¾”
2 ¼”
¾”
4 ¾”
3/16"
15/16"
6"
5/8"
2 1/4"
2 9/16"
1 ¼”
1 1/8"
1"
1/16"
11/16"
1 inch = ————
External Dimensions: Stainless Steel Enclosure
Accutron Instruments Inc
July 09, 2012
Climatrax Diagrams
4 of 4

Accutron Climatrax Part Number Creator



Replacement Part Numbers

ACC-CLMT-SCR01: Probe Filter

ACC-CLMT-PRBASY-P: Replacement polycarbonate probe with filter

ACC-CLMT-PRBASY-S: Replacement Stainless steel probe with filter

Appendix C – Sensor Information

Relative Humidity:

Response Time: 8 seconds
Hysteresis: ±1%RH

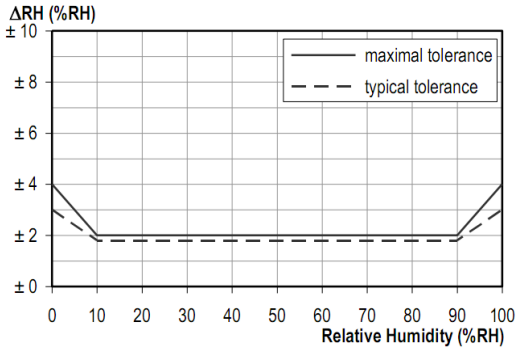


Figure 2 Typical and maximal tolerance at 25°C for relative humidity.

1.2 RH accuracy at various temperatures

Maximal tolerance for RH accuracy at 25°C is defined in Figure 2. For other temperatures maximal tolerance has been evaluated to be within limits displayed in Figure 5.

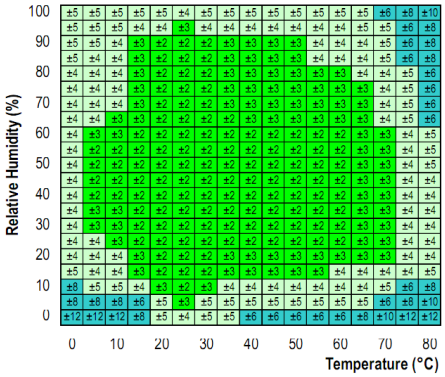


Figure 5 Maximal tolerance of relative humidity measurements given in %RH for temperatures 0 – 80°C.

Temperature:

Response Time: 5 seconds

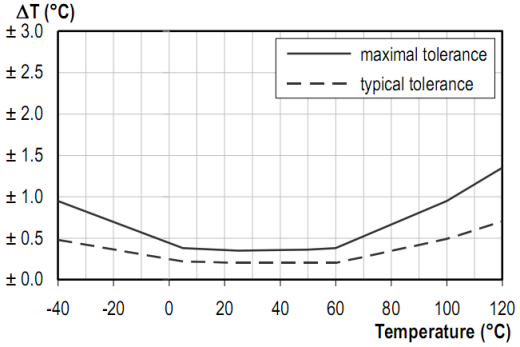


Figure 3 Maximal tolerance for temperature sensor in °C.

Pressure:

Response Time: 8.22 milliseconds

Parameter	Conditions	Min	Max	Unit
Absolute Accuracy	at 25°C, 700..1100 mbar	-0.5	0.5	mbar
	at 0..50°C, 300..1100 mbar	-1	1	mbar
	at -20..85°C, 300..1100 mbar	-2.5	2.5	mbar
	at -40..85°C, 300..1100 mbar	-5	5	mbar

Accutron INSTRUMENTS

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