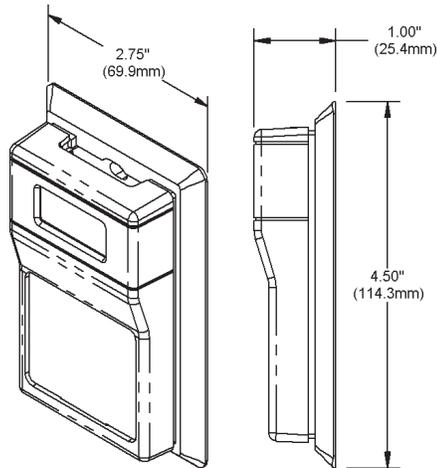
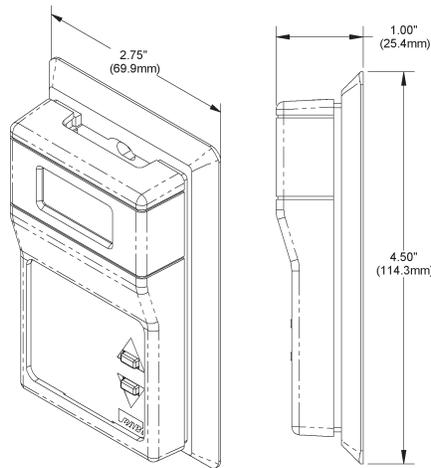
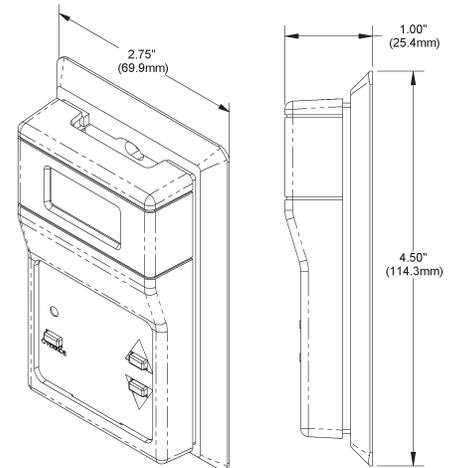


Product Identification

Fig 1: X-Combo, 0-Button

Fig 2: X-Combo, 2-Button

Fig 3: X-Combo, 3-Button
Tool and Material List

#2 Phillips Screwdriver, 1/8" Screwdriver (**BA/116W**), Wire Stripper, Drill, Voltmeter, Wire

Mounting

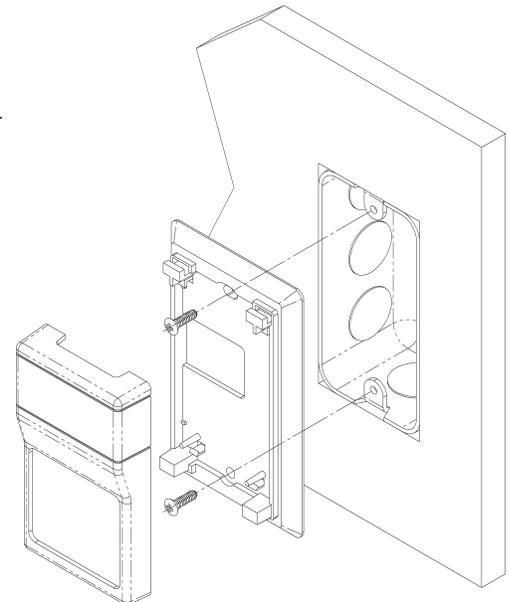
Mounting hardware is provided for both junction box and drywall installation (junction box installation shown).

Junction Box

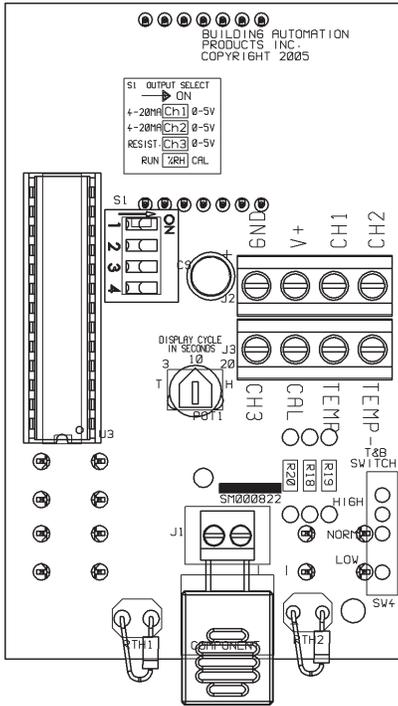
1. Pull the wire through the wall and out of the junction box, leaving about six inches free.
2. Pull the wire through the hole in the base plate.
3. Secure the plate to the box using the #6-32 x 1/2 inch mounting screw provided.
4. Terminate the unit according to the **Terminations** Section.
5. Attach Cover by latching it to the top of the base, rotating the cover down and snapping it into place.
6. Secure the cover by backing out the lock-down screws using a 1/16" Allen wrench until they are flush with the bottom of the cover.

Drywall Mounting

1. Place the base plate against the wall where you want to mount the sensor.
2. Using a pencil mark out the two mounting holes and the area where the wires will come through the wall.
3. Drill two 3/16" holes in the center of each marked mounting hole. Insert a drywall anchor into each hole.
4. Drill one 1/2" hole in the middle of the marked wiring area.
5. Pull the wire through the wall and out of the 1/2" hole, leaving about six inches free.
6. Pull the wire through the hole in the base plate.
7. Secure the base to the drywall anchors using the #6 x 1 inch mounting screws provided.
8. Terminate the unit according to the Terminations Guidelines Section.
9. Attach cover by latching it to the top of the base, rotating the cover down and snapping it into place.
10. Secure the cover by backing out the lock-down screws using a 1/16" Allen wrench until they are flush with the bottom of the cover.


Fig 4: Mounting to a Junction Box

NOTE : *In a wall-mount application, the wall temperature and the temperature of the air within the wall cavity can cause erroneous readings. The mixing of room air and air from within the wall cavity can lead to condensation, erroneous readings and premature failure of the sensor. To prevent these conditions, seal the conduit leading to the junction box and use BAPI's adhesive backed, foam insulating pad centered over the hole (order part number **BA/FOAMBACK**).*

Terminations


Terminal	Function
GND (Common)	To GND(Common) of controller
V+ (Power)	From +24VDC of controller or power supply OR From +24VAC of controller or power supply (See specifications Page 4.)
CH1	To Analog Input of Controller - FACTORY SET Humidity Setpoint or Output, 0 to 5V or 4 to 20mA OR Temperature Setpoint 0 to 5V or 4 to 20mA
CH2	To Analog Input of Controller - FACTORY SET Humidity Setpoint or Output, 0 to 5V or 4 to 20mA OR Temperature Setpoint 0 to 5V or 4 to 20mA
CH3	To Analog Input of Controller - Factory Set Temperature Setpoint Resistive or 0 to 5V, with or without Override Function, OR Humidity Setpoint Resistive or 0 to 5V, with or without Override Function, OR Override ONLY Resistive or Voltage
CAL	Factory Use Only
Temp-	Optional Temp. Sensor, To Analog Input of Controller (- for Semiconductor)
Temp+	Optional Temp. Sensor, To Analog Input of Controller (+ for Semiconductor)

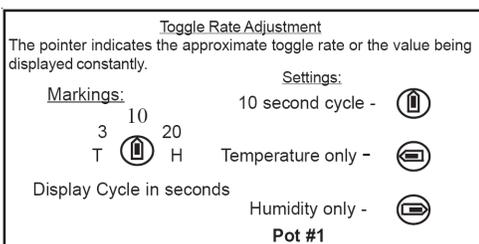
Fig 5: X-Combo Printed Circuit Board

Channel	Output Variable					Output Type			
	Temperature Output	Humidity Output	Temperature Setpoint Output	Humidity Setpoint Output	Override Output	Voltage Output	Current Output	Resistive Output	592/334
CH1	X		X	X		X	X		
CH2		X	X	X		X	X		
CH3			<50KΩ	X	X	X		X	
TEMP+	X							Sensor	V+
TEMP-	X							Sensor	V-

Table 1: Output Terminations

BAPI recommends using twisted pair of at least 22AWG and sealant filled connectors for all wire connections. Larger gauge wire may be required for long runs. All wiring must comply with the National Electric Code (NEC) and local codes. Do NOT run this device's wiring in the same conduit as AC power wiring of NEC class 1, NEC class 2, NEC class 3 or with wiring used to supply highly inductive loads such as motors, contactors and relays.

BAPI's tests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. If you are experiencing any of these difficulties, please contact your BAPI representative

Optional Test & Balance Switch - S2

Fig 6: Toggle Rate Adjustment

Sensor Type	Low Temperature (40° F)	High Temperature (105° F)
	Resistance Value	Resistance Value
1000Ω RTD	1.02KΩ (41.2°F)	1.15KΩ (101.5°F)
3000Ω Thermistor	7.87KΩ (39.5°F)	1.5KΩ (106.8°F)
10K-2 Thermistor	30.1KΩ (39.2°F)	4.75KΩ (105.8°F)
10K-3 Thermistor	26.7KΩ (35.9°F)	5.11KΩ (108.4°F)
10K-3(11K) Thermistor	7.32KΩ (43.7°F)	3.65KΩ (105.2°F)

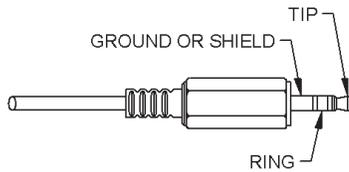
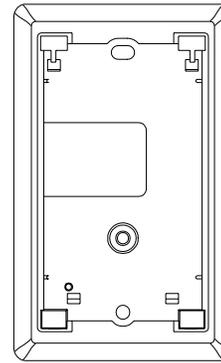
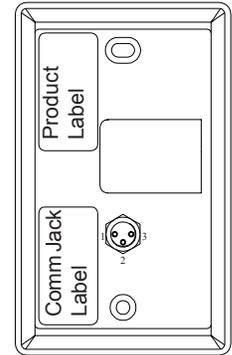
HI: Will set the sensor value to High temp
RUN: Temperature sensor will operate Normally
LO Will set the sensor value to Low temp

Note: The GND (Common) terminal is common between the Power, Temperature and Setpoint.

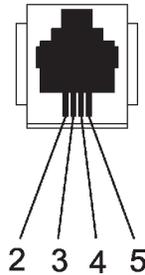
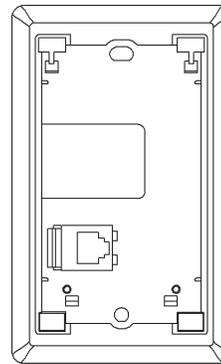
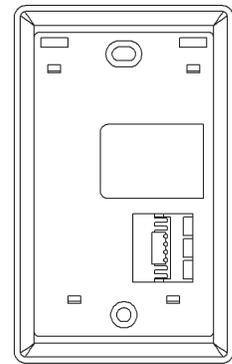
Specifications subject to change without notice

Optional Communications Jack In Base
C35 Comm Jack

C35 Wiring	
	Wire Color
Ground	Black
Tip	White
Ring	Red


Fig 7

Front Side

Fig. 8
Wall Side
C11 and C22 Comm Jack

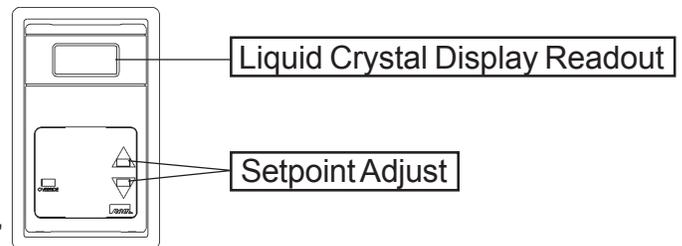
C11 Wiring	
Comm Jack Pin	Wire Color
1	Not Connected
2	Black
3	Red
4	Yellow
5	White or Green
6	Not Connected


Fig 9

Front Side

Fig.10
Wall Side
Button Operation

When the setpoint buttons are pressed "UP" or "DOWN" the current setpoint will display, then as the buttons are pressed again the display will change with each press.

While in setpoint mode, the override button toggles between temperature setpoint and humidity setpoint.

If an override has been selected by pressing the override once, a momentary override will occur on Channel 3, and (Or) will flash on the display.


% RH and Temperature Adjustment

Use the following procedure to set the output of the X-Combo to your temperature or humidity standard.

- 1) Determine the value adjustment needed.
- 2) Remove cover from backplate and slide the "Run/Cal" switch on SW2 to the "CAL" position. (See Figure 5)
- 3) Use the up and down arrows on front to select the calibration needed. Use the Override button to toggle back and forth from Humidity to Temperature. The adjustment for both the display and output can be +/-5 for both Humidity and Temperature. (For units that do not have buttons showing, remove the Logo Plate and actuate the switches with a toothpick or similar non-conductive object.)
- 4) Set the "Run/Cal" switch on SW2 back to "RUN" and put the cover on the backplate.

Specifications subject to change without notice



Diagnosics

Possible Problems:

Possible Solutions:

Unit is not working

- Is the power turned on?
- Determine that the input is set up correctly in the controller's and building automation software.
- Check wiring at the sensor and controller for proper connections.
- Check for corrosion at either the controller or the sensor. Clean off the corrosion, re-strip the interconnecting wire and reapply the connection. In extreme cases, replace the controller, interconnecting wire and/or sensor.
- Label the terminals that the interconnecting wires are connected to at the sensor end and the controller end. Disconnect the interconnecting wires from the controller and the sensor. With the interconnecting wires separated at both ends measure the resistance from wire-to-wire with a multimeter. The meter should read greater than 10 Meg-ohms, open or OL depending on the meter you have. Short the interconnecting wires together at one end. Go to the other end and measure the resistance from wire-to-wire with a multimeter. The meter should read less than 10 ohms (22 gauge or larger, 250 feet or less). If either test fails, replace the wire.

Temperature is incorrect

- Check that the temperature sensor's wires are connected to the correct controller input terminals and are not loose.
- Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor's wires (TEMP+, TEMP-) and measure the temperature sensor's resistance across the sensor output pins with an ohmmeter. Put the ohmmeters black lead on TEMP- and the red lead on TEMP+. Compare the temperature sensor's resistance to the appropriate temperature sensor table on the BAPI web site. If the measured resistance is different from the temperature table by more than 5% call BAPI technical support. Find BAPI's web site at www.bapihvac.com; click on the button labeled SENSORS on the left of the screen and then click on the type of sensor you have. Don't forget to reconnect the wires.
- Make sure that the test and balance switch is in the correct position.
- Make sure that the temperature sensor element leads are not touching one another.
- Determine if the sensor is exposed to an external source different from the room environment (conduit draft). Plug the conduit or fill the handy box as necessary. **DO NOT** use silicon caulk.

Humidity is incorrect

- Verify that the sensor is not damaged.
- If available, check the sensor against a calibrated instrument such as a hygrometer. Use the 0 to 5V or 4 to 20mA signal formula to calculate the output. If the calculated value does not match your software reading, contact BAPI technical support. For 4 to 20mA Output %RH = (mA-4)/16. For 0 to 5VDC Output %RH = V/0.05
- Short the RH sensor with a piece of wire. The output should go to 100% RH. Contact BAPI technical support if the output does not move
- Remove the RH sensor from it's connector. The output should go to 0% RH. Contact BAPI technical support if the output does not move Determine if the sensor is exposed to an external source different from the room environment (conduit draft). Plug the conduit or fill the handy box as necessary. **DO NOT** use silicon caulk.
- Determine if the sensor is exposed to an external source different from the room environment (conduit draft). Plug the conduit or fill the handy box as necessary. **DO NOT** use silicon caulk.

Setpoint is incorrect

- Make sure that the setpoint output is correct. Remove the setpoint output wire (Channel 1, 2 or 3. See product label for configuration.) and check the output for the correct resistance, current or voltage output. Put the meters black lead on Ground (GND) and the red meter lead on the output channel for voltage or resistance. Place the meter in series with the output for current. See the product label for your specific range. Don't forget to reconnect the wire.

Display will not toggle from Temperature to Humidity

- Check "Toggle Rate Adjustment" pot on the back of the sensor. Make sure the adjustment is correct according to Fig. 6 of this document.

Specifications

Power:

12 VDC to 35 VDC (15 to 24 VDC recommended)
15 to 24 VAC (Requires a separate pair of shielded wires)

Power Consumption:

50 mA maximum DC
1.2 VA maximum AC

Sensing Elements:

Temperature - Thermistor or RTD
Humidity - Impedance Type, ±2% or ±3% RH

Wiring: 2 to 4 pair of 16 to 22 AWG*

Comm. Jack:

Optional 3.5mm (1/8") Phono Jack, RJ11 or RJ22
Modular Telephone Jack

Mounting:

Standard 2" by 4" J-box or drywall mount - screws provided

Environmental Operation Range:

Temperature: 32 to 122°F (0 to 50°C)
Humidity: 0 to 95%, non-condensing

Material: ABS Plastic

Material Rating: UL 94, V-0

Specifications subject to change without notice