Wireless Temp/Setpoint & Override Room Transmitter

Installation and Operating Instructions

20357_ins_wireless_temp_xmtr_set_ovr rev. 9/23/08

Overview

The BAPI Wireless Combination Transmitter measures the room temperature and relative humidity and transmits the data at 418MHz or 433MHz RF to a receiver. Temperature setpoint and override button status is also transmitted. The transmitter is mounted in a BAPI-Stat 2 style enclosure and has an open-air range of 100 feet.

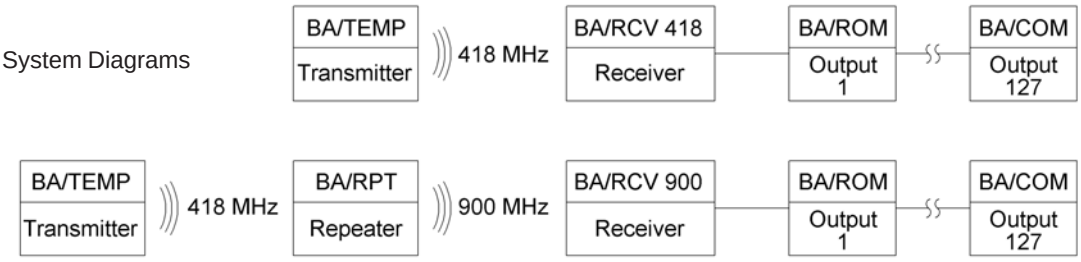
The transmit rate is approximately once every 10 seconds with an estimated battery life of 5 to 8 years using two high-capacity 3.6V lithium batteries. Each transmitter has a unique address with built in error detection. Each variable sent by the transmitter is picked up by the receiver and converted by a separate BAPI Analog Output Module to a voltage, current or resistance signal which is sent to the controller.

Note: The installation process requires that each transmitter and its associated output module or modules be trained in a binding process. This teaches each output module to receive communications from the correct transmitter. The binding process is easiest to do on a test bench so that the transmitter and receiver/output module are within arm's reach of each other. Pushing buttons in a defined sequence on the transmitter and associated output module will bind the two units together in non-volatile memory. Binding the units together is easiest when the units are within arm's reach of each other but can be done in the field. Field binding will require two people and a set of walkie talkies or cell phones. (See output module training later in this document for details) Be sure to place a unique identification mark on the transmitter and associated output modules after they have been trained so that they can be matched together at the job site.

If more than one variable is transmitted, each variable requires a separate output module. Perform the training sequence for each output module. Any transmitted variable can be trained to more than one output module.

There are two sections that describe how to train the override function; 1. Override in parallel with setpoint or in parallel with space temperature; 2. Override as a separate output. Please remember that the override is trained by pressing the **override** button, not the transmitter **training** button

Fig. 1: Wireless System Diagrams



Product Identification

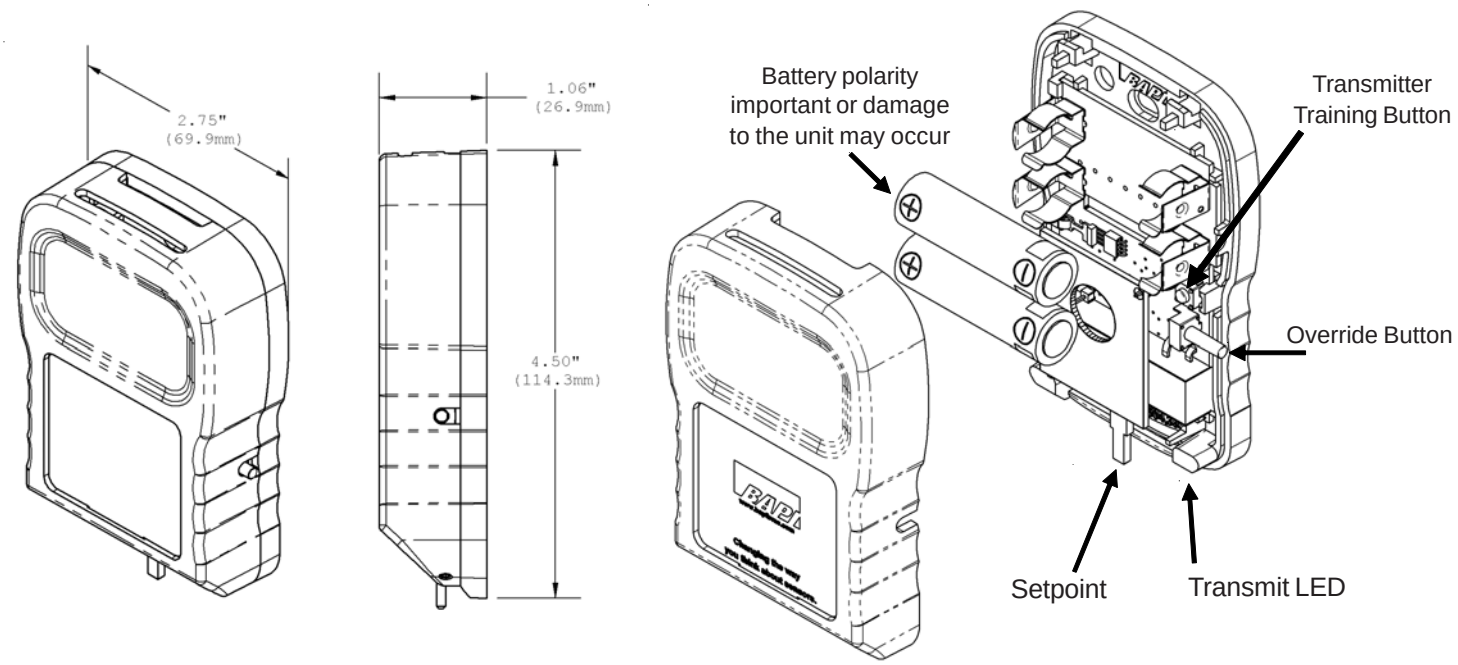


Fig. 2 Wireless Temperature, Humidity, Setpoint & Override Room Transmitter

Specifications subject to change without notice.

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Mounting

(a) The wireless installation process is most effectively accomplished by training the room transmitters first with the output modules before they are mounted in their final location. After each module is trained, the batteries can be removed for mounting. The training is permanently retained by the modules in non-volatile memory.

Note: The transmitter should have been trained to the output module at this point of the installation.

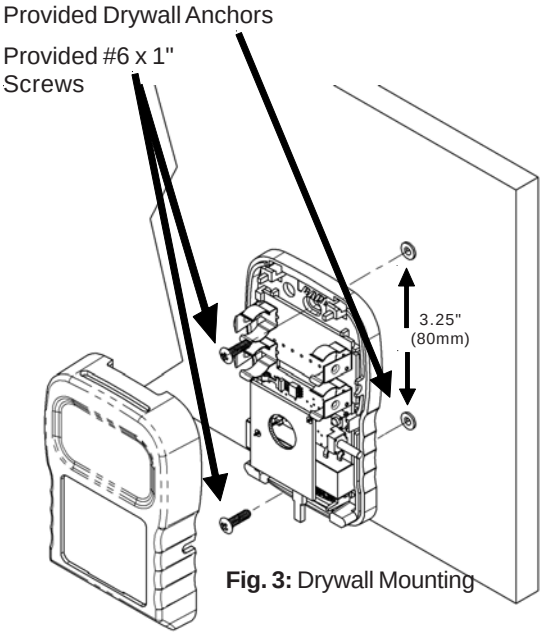

Fig. 3: Drywall Mounting

Drywall Mounting

1. Place the base plate against the wall where you want to mount the sensor. Typically 5 feet above the floor.
2. Using a pencil, mark out the two mounting holes.
3. Drill two 3/16" (4.7 mm) holes in the center of each marked mounting hole. Insert a drywall anchor into each hole.
4. Secure the base to the drywall anchors using the #6 x 1 inch mounting screws provided.
5. Install provided batteries and follow polarity as shown above in figure 2 or damage may occur. The unit will work on just one battery however the battery life will be cut in half.
6. Attach cover by latching it to the top of the base, rotating the cover down and snapping it into place.
7. 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.

Output Module Training

Temperature - Analog Output Module Training

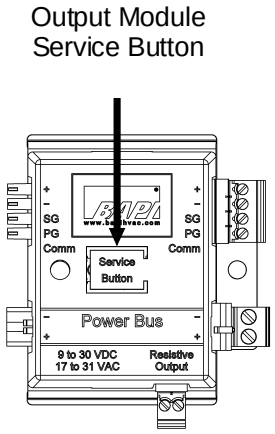

Fig. 4: Output Module

1. To bind an output module to a ***Temperature*** variable, select an output module, BA/(VOM, ROM,COM), calibrated to the temperature range you need and connect it to the receiver.
2. Apply power to the receiver and output modules. The power LED on the Receiver should light and remain lit. **Reminder:** Loop power must be connected and turned on for current output modules, BA/COM.
3. Remove the cover of the transmitter and install the batteries, observe polarity or damage to the unit may occur. The small LED at the bottom right of the circuit board, next to the setpoint (see Figure 2), should flash approximately once every 10 seconds, indicating a transmission. (The flash is very quick.)
4. Press and hold down the *Service Button* on the output module (Figure 4). hen, press and release the training button (Figure 2) on the transmitter. When the output module has received a valid data packet from the transmitter the output module's red LED will light and remain lit as long as you hold down the output module's service button. Release the service button on the output module and the output module's LED will go out. During normal operation the output module's LED will flash indicating data reception approximately once every 10 to 20 seconds in time with the transmitter trained to it. The output module is now receiving data from the transmitter.
5. Mount the transmitter at the desired location. See **Mounting** above.

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Output Module Training Continued

Humidity - Analog Output Module Training

To bind an output module to a ***Humidity*** variable, select an output module,

BA/(VOM, COM)-M calibrated to the humidity range you need and connect it to the receiver.

1. Apply power to the receiver and output modules. The power LED on the Receiver should light and remain lit. **Reminder:** Loop power must be connected and turned on for current output modules, BA/COM.
2. Remove the cover of the transmitter and install the batteries, observe polarity or damage to the unit may occur. The small LED at the bottom right of the circuit board, next to the setpoint (see Figure 2), should flash approximately once every 10 seconds indicating a transmission. (The flash is very quick.)
3. Press and hold down the *Service Button* on the output module (Figure 4). Then, press and release the training button (Figure 2) on the transmitter. When the output module has received a valid data packet from the transmitter the output module's red LED will light and remain lit as long as you hold down the output module's service button. Release the service button on the output module and the output module's LED will go out. During normal operation the output module's LED will flash indicating data reception approximately once every 10 to 20 seconds in time with the transmitter trained to it. The output module is now receiving data from the transmitter.
4. Mount the transmitter at the desired location. See **Mounting** above.
5. Replace the transmitter's cover and back out the security screws.

Setpoint - Analog Output Module Training

1. To bind an output module to a ***Setpoint*** variable, select an output module, BA/SOM, calibrated to the setpoint range you need and connect it to the receiver.
2. Apply power to the receiver and output modules. The power LED on the Receiver should light and remain lit. **Reminder:** Loop power must be connected and turned on for current output modules BA/SOM-16.
3. Remove the cover of the transmitter and install the batteries, observe polarity or damage to the unit may occur. The small LED at the bottom right of the circuit board, next to the setpoint (see Figure 2), should flash approximately once every 10 seconds indicating a transmission. (The flash is very quick.)
4. Press and hold down the *Service Button* on the output module (Figure 4). Then, press and release the **OVERRIDE** button (Figure 2) on the transmitter. (NOTE: If unit was not ordered with an override button, the button is inside the case). When the output module has received a valid data packet from the transmitter, the output module's red LED will light and remain lit as long as you hold down the output module's service button. Release the service button on the output module and the output module's LED will go out. During normal operation the output module's LED will flash indicating data reception approximately once every 10 to 20 seconds in time with the transmitter trained to it. The output module is now receiving data from the transmitter.
5. Mount the transmitter at the desired location. See **Mounting** above.

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Output Module Training Continued

Override in Parallel with Setpoint or Temperature – Analog Output Module Override Training

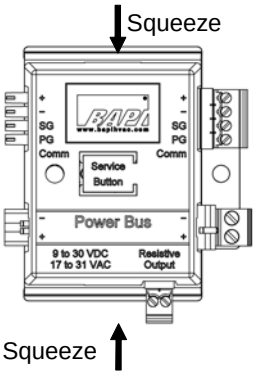

Figure 5: Remove Cover

1. An ***Override*** variable can only be bound in parallel with a previously trained ***Setpoint*** or ***Temperature*** output module. Train the ***Setpoint*** or ***Temperature*** output module as described above. Remove the Output Module's cover by squeezing the top and bottom of the cover as shown in Figure 5. Apply power to the receiver and output modules BA/(VOM,ROM,COM). **Note:** Loop power must be connected and turned on for current output modules, BA/COM.
2. The power LED on the Receiver should light and remain lit.
3. Remove the cover of the transmitter and install the batteries, observe polarity or damage to the unit may occur. The small LED at the bottom right of the circuit board, next to the setpoint (see Figure 2), should flash approximately once every 10 seconds indicating a transmission. (The flash is very quick.)
4. Place the previously trained ***Temperature*** or ***Setpoint*** output module's jumper J4 in the Override Training Position. (See Figures 6 and 7) Press and hold down the *Service Button* on the output module (Figure 4). Then, press and release the **OVERRIDE** button (Figure 2) on the transmitter. When the output module has received a valid data packet from the transmitter, the output module's red LED will light and remain lit as long as you hold down the output module's service button. Release the service button on the output module and the output module's LED will go out. During normal operation the output module's LED will flash indicating data reception approximately once every 10 to 20 seconds in time with the transmitter trained to it. The output module is now receiving data from the transmitter. Remove the jumper on J4 and store it on the right Storage Position Pin. (Figure 7) Replace the Output Module's cover.
5. If you wish to un-attach the override function on an output module you re-teach the output module to the first variable, ***Temperature*** or ***Setpoint***. This erases the override function on the output module.
6. Mount the transmitter at the desired location. See **Mounting** above.

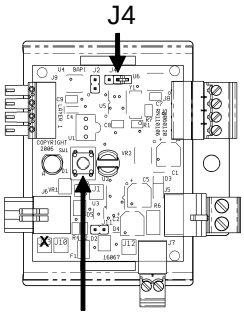

Figure 6: Service Button & Jumper Positions

Fig. 7: J4 Jumper Positions

Override as Separate Output – Relay Output Module Override Training

1. To bind an output module to an ***Override*** variable, connect a **BA/RYOM** output module the receiver.
2. Apply power to the receiver and output modules. The power LED on the Receiver should light and remain lit.
3. Remove the cover of the transmitter and install the batteries, observe polarity or damage to the unit may occur. The small LED at the bottom right of the circuit board, next to the setpoint (see Figure 2), should flash approximately once every 10 seconds indicating a transmission. (The flash is very quick.)
4. Press and hold down the *Service Button* on the output module (Figure 4). Then, press and release the **OVERRIDE** button (Figure 2) on the transmitter. When the output module has received a valid data packet from the transmitter, the output module's red LED will light and remain lit as long as you hold down the output module's service button. Release the service button on the output module and the output module's LED will go out. During normal operation the output module's LED will flash indicating data reception approximately once every 10 to 20 seconds in time with the transmitter trained to it. The output module is now receiving data from the transmitter.
5. Mount the transmitter at the desired location. See **Mounting** above.

Table 1 **Under Cover J4 Position to Train Output Modules**

Room Transmitter Variable Training	Output Module J4 Position J4, ON or OFF, (Fig. 6 & 7)	Output Module Training Button		Field Transmitter Training Button
Room Temperature	OFF (standard VOM,COM,Rom Modules	Service Button	+	SW1 Training Button
Room Humidity	ON (standard for all -M or -N modules)	Service Button	+	SW1 Training Button
Setpoint Temperature	OFF (standard for SOM analog modules)	Service Button	+	SW2 Override Button
Override Button	ON (standard for RYOM, DO modules)	Service Button	+	SW2 Override Button
Output Module Override Training	**Analog Output Module J4 Position J4, ON, (Fig. 6 & 7)**	**Analog Output Module Training Button**		**Field Transmitter Training Button**
Override Training**	ON* (Change as needed, see above)	Service Button	+	SW2 Override Button

* After override training, put J4 back to the OFF position on standard analog output modules VOM, COM, ROM, & SOM types. Leave J4 in the ON position for -M or -N analog output modules (RH%) and on RYOM digital output (DO) modules.
**Note:Standard variable signal training must be completed first before override training is attempted. If the standard signal is re-taught to the same output module again, the training is erased.

Operation Sequence

The variable outputs are trained to the output modules as selected and represent the measured signal value (Temp, RH, & Setpoint) from the transmitter. After override training, the output modules selected receive the override button operation wirelessly and change its measured signal output to a low signal value (see specs) for 5 seconds then resumes back to the measured signal value.

Operating Notes

1. If you need to bind any temperature, humidity, setpoint or override value from a single transmitter to more than one controller, you may train multiple output modules to that value.
2. If an output module does not receive data from its assigned transmitter for 15 minutes the red LED on the output module will blink rapidly. The module output signals will react as follows;
   - Voltage output modules calibrated for temperature will set their output to zero volts.
   - Current output modules calibrated for temperature will set their outputs to 4 milli-Amps
   - Resistance output modules calibrated for temperature will set their outputs to their highest resistance, lowest temperature, values.
   - Voltage output modules calibrated for humidity will set their outputs to the maximum of 5 VDC or 10 VDC.
   - Current output modules calibrated for humidity will set their outputs to the maximum of 20 milli-Amps.
   - Setpoint output modules will hold their last values indefinitely.
   - Relay output modules will go to their normal output, open or closed depending on module selected.
   - When transmitted data is restored the output modules will revert to normal operation in 30 seconds or less.
3. Output modules are trained to a transmitter simulator during BAPI's final test. When you receive them they will not be trained to any of the transmitters in your shipment. Do not be alarmed if the output module's LED blinks rapidly upon power up or shortly thereafter, just train the output module to a transmitter and all will be OK.
4. The BA/RCV receivers and BA/xOM output modules are inter-connected and require module power along the power bus on the two bottom terminals. The bus can be powered from either the receiver end (left side) or the last output module (right side). Be sure you have enough DC current or AC VA for all the devices on the bus.
5. The BA/COM-a or BA/SOM-16 (Current Analog Output Module) signal is **LOOP POWERED** and must be externally powered (9-36 VDC) so that the BAS input receives the analog current signal. Other Analog Output Modules source the analog output from the power bus.
6. The printed lines on the BA/RCV receivers represent the power buss flow and are just there for appearance. They **do not** represent an electrical wire connection. Always be sure to follow the polarity (+ or -) listed on each module to maintain communication and power buss integrity.

Diagnostics

Temperature or Humidity is reading its low limit or not reading at all.	- Check wire from output modules to controller for proper connections and polarities. - Check to see if the controller's software is configured properly. - Check transmitter to see if its LED flashes about every 10 seconds. If not replace the batteries. - Check power to the receiver and output module. - Check output modules LED, if it is blinking fast Check the associated transmitter and receiver for proper operation Retrain the output module If there are repeaters in the data stream, check for proper operation - Move the transmitter next to the receiver (~ one meter away)
Temperature or Humidity reading is coming out the wrong output module	- Retrain the modules.
Temperature or Humidity is reading incorrectly	- Check wire from output modules to controller for proper connections and polarities. - Check to see if the controller's software is configured properly. - Check to see if the correct output module is connected to the correct controller.

Specifications

Supply Power: Two AA 3.6V Lithium batteries, 2.25 AH
5 to 8 year battery life at 10 second transmit rate

Potential Inputs:
Temperature - Thermistor
Relative Humidity – Capacitive
Setpoint – Potentiometer
Override – SPST switch

Accuracy: ±0.54°F (±0.3°C) / ±2% RH

Transmitted Range:
-40° to 185°F (-40° to 85°C)
0-100% RH

Output Module override value for 5 seconds:

BA/VOM	0v
BA/COM	4 mA
BA/SOM	0v or 4mA (Module Dependent)
BA/ROM	Less than 100Ω
BA/RYOM	Energized

Antenna: Built inside the enclosure

Environmental Operation Range:
Temp: 32° to 140°F (0° to 60°C)
Humidity: 5% to 95% RH non-condensing

Material: ABS Plastic

Material Rating: UL94 V-0

Radio Frequency:
418 MHz North America
433 MHz International

Transmitter Interval: ~10 seconds

FCC Approval:
FCC ID# T4F061213RSO (418MHz only)

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