

Overview and Identification

The BAPI 900 MHz unit receives a **repeated** or **re-transmitted** RF signal from one or more wireless temperature or humidity transmitters. The signal from the transmitter (418 MHz) is received by a **BAPI Repeater** and then re-transmitted at 900 MHz up to 1,000 feet to the 900 MHz Receiver.

The receiver then outputs the values to any Analog Output Module through an RS485 four-wire bus. The Analog Output Modules convert the signal to an analog voltage, current or resistance for the controller. The receiver can accommodate up to 127 different Analog Output Modules. It is surface, snaptrack or DIN rail mountable with a 79" extendable antenna for optimum reception.

Note: The 900 MHz Receiver will only receive a signal from a Repeater. It will not receive the signal from the transmitters, which transmit at 418 MHz.

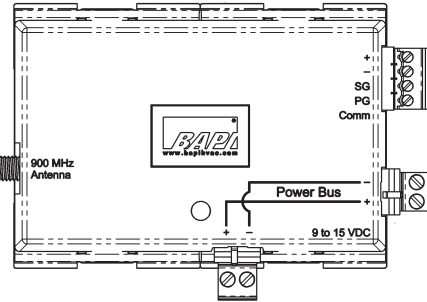
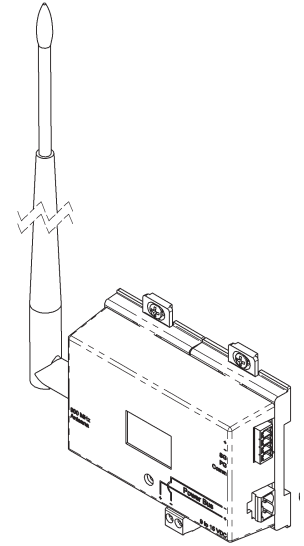


Fig. 1: Two views of the 900 MHz Receiver.



Customer Provided Tools and Materials

#2 Philips Screwdriver, Drill, Wire

Analog Output Module Training

The installation process requires that each transmitter is trained to its associated output module or modules so that they receive communications from the correct transmitter. Pushing buttons in a defined sequence on the transmitter and output module will bind the two units together. The training process is easiest on a test bench so that the transmitter and receiver/output modules are within arm's reach of each other. Training can be done in the field but will require two people and a set of walkie talkies or cell phones. Be sure to place a unique identification mark on the transmitter and associated output module or modules after they have been trained so that they can be matched together at the job site.

If more than one variable is transmitted by the room transmitter (temperature, humidity and setpoint for instance), 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.

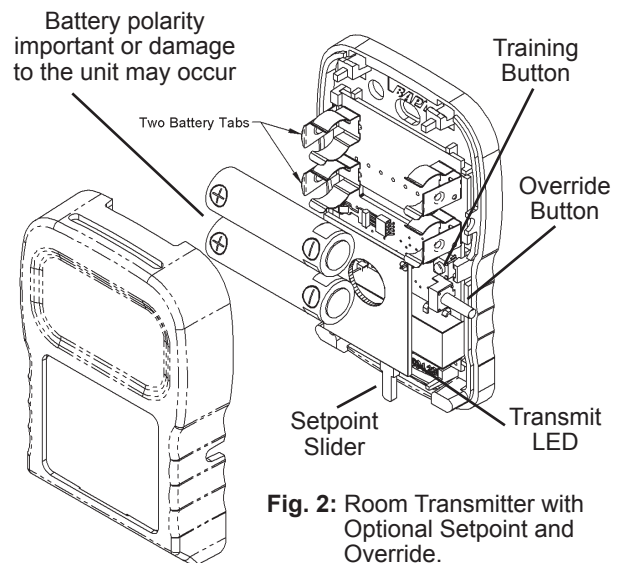


Fig. 2: Room Transmitter with Optional Setpoint and Override.

TEMPERATURE OR HUMIDITY VARIABLE TRAINING

1. To train an output module to a Temperature or Humidity variable, select the Resistance, Voltage or Current Output Module calibrated to the temperature or humidity range you need and connect it to the wireless receiver. Note: Multiple output modules can be trained to the same transmitter variable if desired.
2. Apply power to the receiver which will supply power to the connected output modules. The power LED on the receiver will light and remain lit. **(Current Output Modules must have loop power supplied to the module itself before they can be trained.)**
3. Remove the cover of the room transmitter and remove the battery tabs or install the batteries, observing polarity as shown in Fig 2. The small LED at the bottom right of the circuit board, next to the setpoint, will flash approximately once every 20 seconds, indicating a transmission. (The flash is very quick.)

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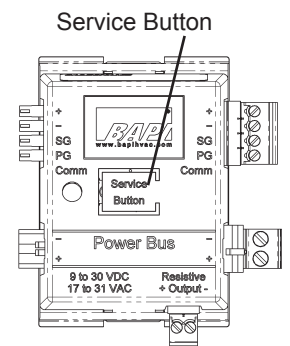


Fig. 3: Output Module

Specifications subject to change without notice.

Analog Output Module Training continued...

4. Press and hold down the “Service Button” on the top of the output module (Fig 3) that you wish to train. Then, press and release the “training button” (see Fig 2) on the room transmitter. When the output module receives the “training transmission” from the room transmitter, the output module’s red LED will light. Release the “Service Button” on the output module and the red LED will go out. The transmitter and output module are now trained to each other. During normal operation, the output module’s LED will flash about once every 20 seconds indicating data reception from the transmitter trained to it.

Note: The room transmitter sends both the temperature and humidity information when the “Training Button” is pressed. However, each Analog Output Module is configured at the time of order as a temperature, humidity, Setpoint or Override module and will only recognize the relevant information and will ignore the rest.

5. Mount the transmitter at the desired location. If needed, remove the batteries to do so. The units will remain trained to one another through power failures and battery replacement. Replace the transmitter’s cover and back out the security screws.

SETPOINT VARIABLE TRAINING

1. To train an output module to a Setpoint variable, select the Setpoint Output Module (SOM) calibrated to the setpoint range you need and connect it to the wireless receiver. Note: Multiple output modules can be trained to the same transmitter variable if desired.
2. Apply power to the receiver which will supply power to the connected output modules. The power LED on the Receiver will light and remain lit. (**Setpoint Output Modules with current output must have loop power supplied to the module itself before they can be trained.**)
3. Remove the cover of the room transmitter and remove the battery tabs or install the batteries, observing polarity as shown in Fig 2. The small LED at the bottom right of the circuit board, next to the setpoint, will flash approximately once every 20 seconds, indicating a transmission. (The flash is very quick.)
4. Press and hold down the “Service Button” on the top of the output module (Fig 3). Then, press and release the **VERRIDE** button on the transmitter (See Fig 2). (Note: If the unit was not ordered with an override function, then the **VERRIDE** button will be shorter and will not extend outside the case but will still be accessible upon removing the cover.) When the output module receives the “Training Setpoint” info from the transmitter, the output module’s red LED will light. Release the “Service Button” on the output module and the red LED will go out. The transmitter and output module are now trained to each other. During normal operation, the output module’s LED will flash about once every 20 seconds indicating data reception from the transmitter trained to it.
5. Mount the transmitter at the desired location. If needed, remove the batteries to do so. The units will remain trained to one another through power failures and battery replacement. Replace the transmitter’s cover and back out the security screws

Mounting and Locating of the 900 MHz Antenna

The 900 MHz Receiver comes with the “Whip” Antenna but a 900 MHz Extendable Dipole Antenna is also available.

The receiver may be located inside a metal enclosure but the antenna must be outside the enclosure. The “Whip” Antenna simply screws onto the receiver. Mounting the receiver and antenna on a metal surface may block reception from behind the surface and frosted windows may block reception too.

For the Extentable Dipole Antenna, peel off the protective film from the adhesive pad and stick the antenna to a wall or other non-metallic support. Mounting the antenna on a metal surface may block reception from behind the surface and frosted windows may block reception too. A wooden or plastic furring strip attached to a ceiling beam makes a great mount. The antenna may be hung from any ceiling fixture using fiber or plastic twine. Do not use wire to hang, and do not use perforated metal strapping, commonly called plumbers tape.

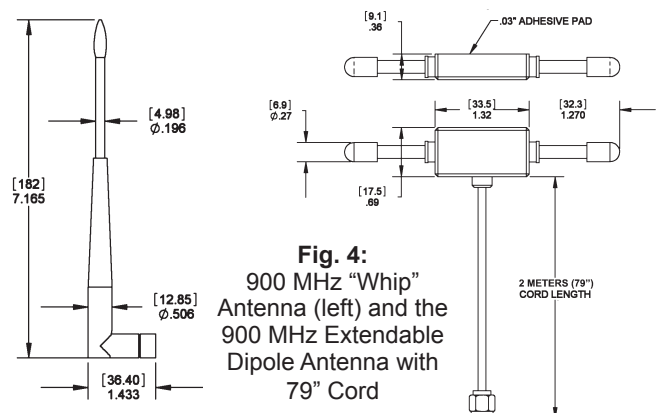


Fig. 4:
900 MHz “Whip”
Antenna (left) and the
900 MHz Extendable
Dipole Antenna with
79” Cord

Specifications subject to change without notice.

Mounting of Receiver and Analog Output Modules

The Wireless Receiver and Analog Output Modules can be mounted in snap track, DIN Rail or surface mounted.

SNAPTRACK MOUNTING

Push in the blue mounting tabs on the receiver and output modules. These units will now fit into the board slots of 2.75" snap track. Insert the receiver at the far left of the snap track, then insert each analog output module and slide it to the left until its connectors are fully mated into the receiver or the next analog output module. You may attach up to 127 analog output modules to a receiver.

If your output modules cannot fit in one piece of snap track, then mount another piece of snap track nearby and insert your additional modules. Connect wires from the right side of the first string of modules to the left side of the second string of modules on the second snap track. This configuration requires one or more Pluggable Terminal Block Connector Kits (BA/AOM-CONN) for the extra wire terminations on the left and right side of the Analog Output Modules. Each kit includes 4 connectors.

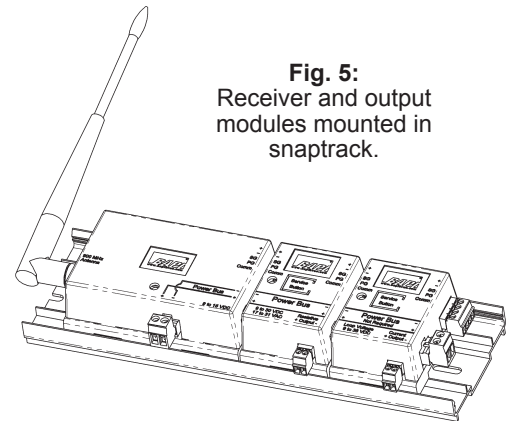


Fig. 5:
Receiver and output modules mounted in snaptrack.

DIN RAIL MOUNTING

Push out the blue mounting tabs on the receiver and output modules. These units will now snap onto DIN Rail. Catch the EZ mount hook on the edge of the DIN rail as shown in Figure 6. The rotate into place.

Attach the receiver at the far left of the DIN Rail, then attach each analog output module and slide it to the left until its connectors are fully mated into the receiver or the next analog output module. You may attach up to 127 analog output modules to a receiver.

If your output modules cannot fit onto one piece of DIN Rail, then mount another piece nearby and attach your additional modules. Connect wires from the right side of the first string of modules to the left side of the second string of modules on the second DIN Rail. This configuration requires one or more Pluggable Terminal Block Connector Kits (BA/AOM-CONN) for the extra wire terminations on the left and right side of the Analog Output Modules. Each kit includes 4 connectors.

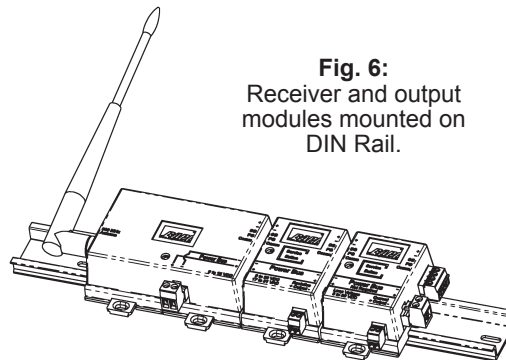


Fig. 6:
Receiver and output modules mounted on DIN Rail.

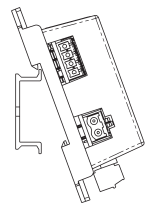


Fig. 7:
Catch the EZ Mount hook on the edge of the DIN Rail, then rotate into place.

SURFACE MOUNTING

Push out the blue mounting tabs on the receiver and output modules. Attach the receiver to the surface using four screws, one in each blue tab. Attach Analog Output Modules by placing each one against the surface and sliding it to the left until its connectors are fully mated into the receiver or the next analog output module. Attach each module to the surface with two screws, one in each blue tab. You may attach up to 127 analog output modules to a receiver.

If your output modules cannot fit in one straight line on the surface, then mount a second string of modules nearby. Connect wires from the right side of the first string of modules to the left side of the second string of modules. This configuration requires one or more Pluggable Terminal Block Connector Kits (BA/AOM-CONN) for the extra wire terminations on the left and right side of the Analog Output Modules. Each kit includes 4 connectors.

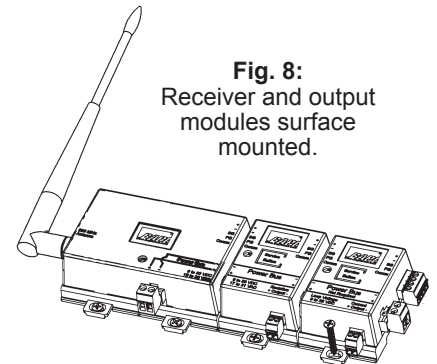


Fig. 8:
Receiver and output modules surface mounted.

Pluggable Terminal Block Kit

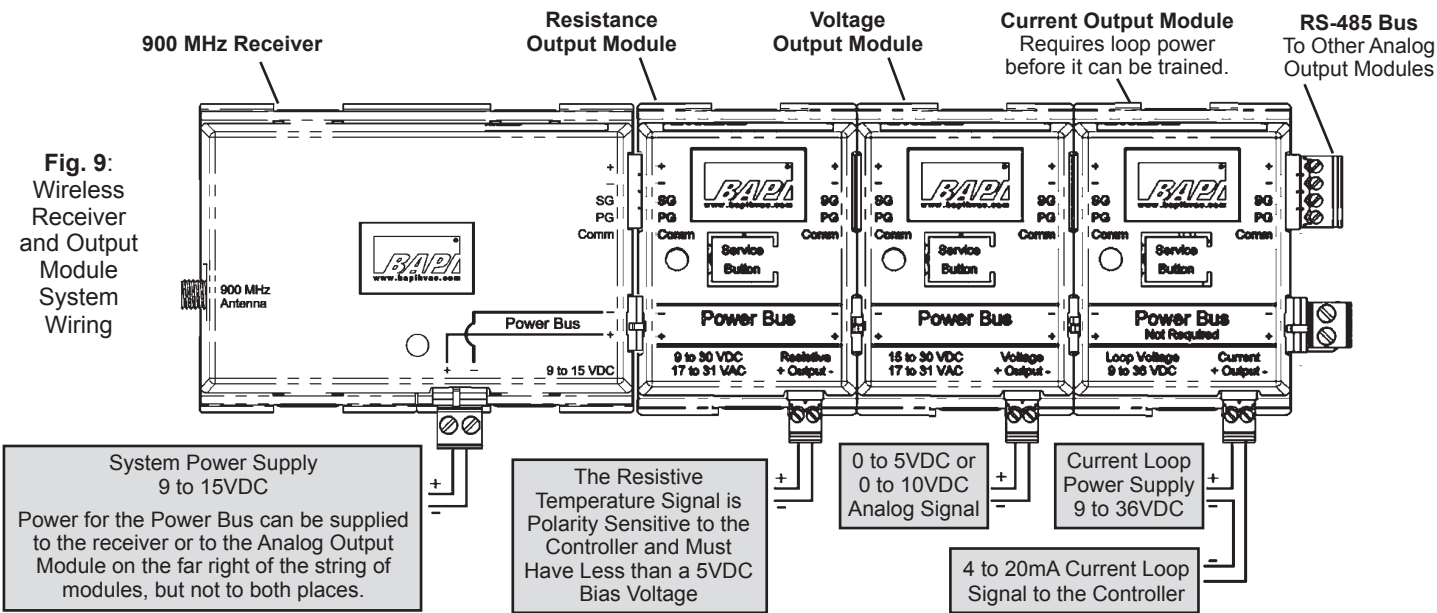
Remotely mounted Analog Output Modules require one or more Pluggable Terminal Block Connector Kits (BA/AOM-CONN) which come as a 4-connector kit.



Pluggable Terminal Block Connector Kit (4 Connectors)

Specifications subject to change without notice.

Termination



1. The wireless receiver and Analog Output Modules are interconnected and require module power along the "Power Bus" terminals. The bus can be powered from either the receiver end on the left or the last output module on the right side. Be sure you have enough DC current or AC VA for all the devices on the bus.
2. **The Current Output Module (BA/COM) signal is LOOP POWERED and must be externally powered with 9-36 VDC separate from the Power Bus. The Loop Power must be connected to Current Output Module before it can be trained.**
3. Be sure to follow the polarity (+ or -) symbols listed on each receiver and the output modules to maintain communication and Power Bus integrity.

Extending the RS485 Network between the Receiver and the Analog Output Modules

The Analog Output Modules may be mounted up to 4,000 feet away from the receiver. The total length of all the shielded, twisted pair cables shown in Fig. 9 is 4,000 feet (1,220 meters). Connect the terminals together as shown in Fig. 9. If the distance from the receiver to the group of Analog Output Modules is greater than 100 feet (30 meters), provide a separate power supply for that group of Analog Output Modules. BAPI's VC350A EZ Voltage Converter and a small transformer can be used to power the group of Analog Output Modules.

Note: This configuration requires one or more Pluggable Terminal Block Kits for the extra wire terminations on the left and right side of the Analog Output Modules. Each kit includes 4 connectors.

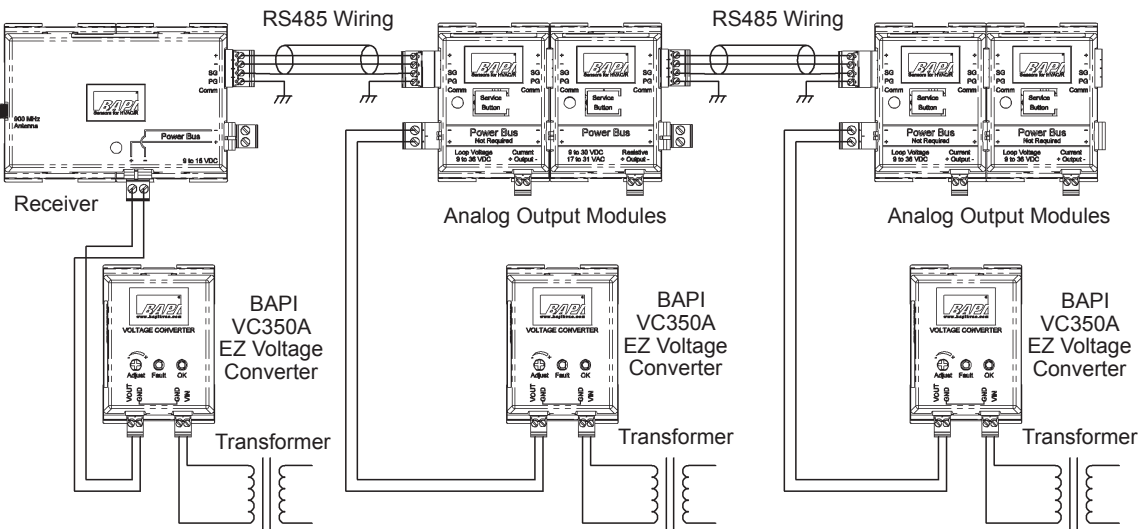
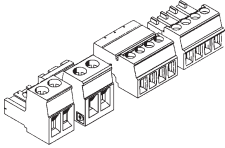


Fig. 10: Extended RS485 Network between the 900 MHz Receiver and the Analog Output Modules



Wireless System Diagnostics

Possible Problems:

Temperature or Humidity is reading its low limit:

The LED on the top of the Analog Output Module is blinking rapidly:

Temperature or Humidity reading is coming out the wrong output module

Temperature or Humidity reading is incorrect

Possible Solutions:

- Check for proper wiring and connections from the output modules to the controller.
- Check to see if the controller's software is configured properly.
- Check the room transmitter to see if its LED flashes about every 20 seconds. If not, replace the batteries.
- Check for proper power to the Repeater, Receiver and Analog Output Modules.

- Retrain the Analog Output Module.
- Check that the associated room transmitter is transmitting (the LED will flash about once every 20 seconds) and that the Repeater and the 900 MHz Receiver are receiving the transmissions. (The Repeater's LED will blink right after the transmitter's LED if it receives that transmission. The 900 MHz Receiver LED will blink right after the Repeater's LED if it is receiving that transmission.)
Note: The Repeater will receiver transmissions from all transmitters that are within range, not just the one you are testing.

- Retrain the Analog Output Modules.

- Check for proper wiring and connections from the output modules to the controller.
- 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.

Default Status when wireless transmission is interrupted:

If an output module does not receive data from its assigned transmitter for 15 minutes, the red LED on the top of the module will blink rapidly. If this happens, the individual Analog Output Modules will react as follows:

- Resistance Output Modules (BA/ROM) calibrated for temperature will output the highest resistance in their output range.
- Voltage Output Modules (BA/VOM) calibrated for temperature will set their output to 0 volts.
- Current Output Modules (BA/COM) calibrated for temperature will set their output to 4 mA.
- Voltage Output Modules (BA/VOM) calibrated for humidity will set their output to their highest voltage (5 or 10 volts).
- Current Output Modules (BA/COM) calibrated for humidity will set their output to 20 mA.
- Setpoint Output Modules (BA/SOM) will hold their last value indefinitely.
- Relay Output Modules (BA/RyOM, BA/RyOL) will go to their default state (example: open for a normally open unit).

When a transmission is received, the output modules will revert to normal operation in 60 seconds or less.

Specifications

900 MHZ WIRELESS RECEIVER

Supply Power: 9 to 15 VDC

Power Consumption: 80 mA max. DC,
5 VA max AC

Inputs: 900 MHz

Bus Cable Distance:

4,000 ft with shielded, twisted pair cable
(Belden 9841, Belden 8132 or equivalent)

Maximum Output Modules per Receiver: 127

Environmental Operation Range:

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

Material: ABS Plastic

Material Rating: UL94, V-0

WIRELESS TRANSMITTER

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

Compliance: This device complies with Part 15 of the FCC rules Operation is subject to the following conditions.

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency Interference Statement:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15, Subpart B, of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause interference to radio communications.

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