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This device complies with Part 15 of the FCC rules: Operation is subject to the following conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device

Antenna Connection - The Wirsbo Genius™ control system is designed to use a radio signal opposed to typical low voltage wiring. The external antenna provided ***must*** be connected for proper system operation.

Cooling Contact - When the Wirsbo Genius is operating in "cooling" mode, this connection can be used enable an air handle, furnace, etc., for air conditioning requirements. This contact is locked out in the heating and off modes. This is an unpowered or dry contact.

Heating Contact - When the Wirsbo Genius is operating in "heating" mode, this connection can be used to enable a boiler, pump relay or other types of heating devices. This is an unpowered or dry contact.

Mode Indicator LED - The LED changes color to indicate the mode of operation. The indicator will change from Orange (off) to Red (Heating) to Green (Cooling). These LEDs are visible through a display window on the front cover on the Genius™

Mode Selector Switch - Used to change mode of operation (Off-Heat-Cool) on the Genius™ When the front cover is installed, this switch can be operated by pressing the right hand corner of the display window.

Modular Connector - This port is used during the installation of the Radio Thermostats. Using the cable provided with this package, one end is plugged into this port and the other into the back of the Radio Thermostats. See Section XX for Radio Thermostat Initialization.

Modular Zone Output - These 10 connections are for operation and connection of the DC-style Motorized Valve Actuator (MVA). The female connector on the Genius board is keyed to ensure the plug on the DC-MVA is wired properly.
Important: The Wirsbo Genius is designed for use with the DC-MVA only. Use of other unapproved actuators will provide unsatisfactory operation.

Power Supply - The Wirsbo Genius Base Unit comes pre-wired with a 6' power cord and plug. Simply plug in to standard 115 volt receptacles.

Pump Connection - Power supply to a circulator (if used) in a radiant or other hydronic application. This output is only active in the heating mode.

Status Indicator LEDs - Visible through the display window when the cover is installed, these LEDs will change color and flash to provide systems feedback (communication,

error, valve failure, antenna signal strength, etc.). Through out this manual, these LEDs will be discussed in further detail based on the mode of operation.

Temperature Units Switch - This switch position will determine whether the Radio Thermostat will display temperature in °F or °C. Units must be selected prior to installing the Thermostats.

User Interface Buttons - These are used during system initialization and are not required for normal operation. See pages xx-xx for additional information.

Section 2: System Overview:

The Wirsbo Genius system is a radio controlled system for radiant floor heating and other hydronic applications. Primary system components are Radio Thermostat, the Base Unit and the DC-style Motorized Valve Actuator (MVA) as shown below.

Fig 1. **Fig.2** **Fig.3**

The **Radio Thermostat** (see Fig. 1) communicates with the Base Unit using a completely wireless link, highlighting ultimate flexibility of placement for indoor temperature feedback. The Radio Thermostat are mounted on a wall of an area designated as a "zone". A zone can be a single room, multiple rooms, a garage or any area where space temperature control is desired or required. The radio signal and frequency used to transmit information between the two pieces of hardware will not interfere with common household appliances such as the microwaves, garage door openers, televisions, etc. The Radio Thermostat transmits identification number, change in space temperature (actual vs. setpoint) and will also "talk" to the Base Unit on a random interval to ensure communication is uninterrupted. Upon a recognized change in room temperature sensed by the Radio Thermostat, the Base Unit will perform secondary operations based on the mode of operation (heating or cooling).

The **Base Unit** (see Fig. 2) upon receiving a change in temperature from the Radio Thermostat will provide the necessary switching for control outputs based on the mode of operation. The Wirsbo Genius™ will control:

Heating Mode

- Up to 10 DC-MVA, part number A302xxxx
- One 110 VAC circulation pump or other powered output; max rating ½ HP / 400 VA
- One optional dry contact for interfacing boiler operation or other heating controls; max rating 110 V, ½ HP / 400VA

Cooling Mode

- One optional dry contact for interfacing air conditioning; max rating 110 V, ½ HP / 400VA

The Base Unit is mounted at the manifold location(s) and can receive communication from up to 10 Radio Thermostat. Through the Base Unit, each Radio Thermostat has the ability to control 1 or more outputs to the DC-MVAs by "Zone Mapping". Simply, Zone Mapping is the relationship between the Radio Thermostat controlling the proper zone outputs or DC-MVAs, reacting to a fall in room temperature. Zone Mapping is

established during the installation of the Wirsbo Genius™ system and will be covered in greater detail in Section XX.

The DC-MVAs (see Fig. 3) will open and close, dependent on the signal that Base Unit receives from the Radio Thermostat, allowing water to circulate through the corresponding loops of the manifold. The DC-MVA is unique in its design as it does not require power to remain in the open position; power open/power close. The DC-MVA has an integral end switch that serves multiple functions. It will not allow the pump to start until a minimum of 1 end switch has closed during a call for heat and also provides system feedback through the User Interface to indicate a operator or DC-MVA failure.

Section 3: User Interface

Prior to progressing to the installation of the Wirsbo Genius, it is important to understand the User Interface and how it works. There are two parts: the buttons (User Interface Butttons and the Mode Selector Switch) and the LEDs (Status Indicator LEDs and the Mode Indicator LED). The buttons are used to provide a minimal amount of information in order to make the Wirsbo Genius operational. The LEDs change color to indicate certain system functions depending on the mode (installation or normal operation) and are visible through a clear window after the cover is installed. Once the Wirsbo Genius is programmed and the cover secured, only the Mode Selector Switch will be required to change the mode of operation from Off to Heat to Cool. See Fig. 4.

Section 4: Getting Started

To begin system start up and programming of the Wirsbo Genius, we highly recommend that the programming be completed prior to mounting the Base Unit at the manifold location. The installation of the Radio Thermostats to the Base Unit can be completed much easier on a flat surface, such as a desk or table top.

1.) Remove the Base Unit and the required number of Radio Thermostats from their packaging.
2.) Verify that all the necessary components are included in the packaging. As follows:

Base Unit

- Base Unit Control ≤
- Bag fastening hardware ≤
- Bag containing black wire w/modular connectors ≤
- Antenna with cord ≤
- Sheet of labels ≤
- Instruction Manual T

Radio Thermostat

- Thermostat Wall Unit ≤
- 3.6v Lithium Battery (installed) ≤

Other Tools Req'd (not incl.)

- Phillips Screwdriver ≤
- Pen
- Wire Cutters/Strippers ≤

3.) Using a phillips screw driver, loosen the three (3) screws on the front cover of the Base Unit and remove the cover. You are now ready to begin installation of the Genius™ Thermostats

Section 5: System Setup and Configuration/Initialization

Using a wireless frequency to transmit information from a room location to the Base Unit does not create a physical path (such as wiring) to follow from Point A to Point B. We will create this relation between the Radio Thermostat and the Base Unit through initialization. When we initialize a Radio Thermostat, a couple of things happen. The Radio Thermostat is woken up, a "hand-shake" is created between the two components and a special identification number/code is recognized by the Base Unit. The Base Unit will respond, as needed, when a transmission is received with that ID number. **Note**: The Radio Thermostat is shipped with the battery installed in a "sleeping" state and must be awaken to make operational. The "sleep" mode allows the Radio Thermostat to ship the battery installed while not reducing battery life.

With the background established on how the link is created on the Input side of the control (Radio Thermostat to Base Unit), we need to understand how to create the Output function. Simply, what is the Base Unit supposed to do when a change in room temperature is detected by the Radio Thermostat based on the mode of operation. This is accomplished through "Zone Mapping". Zone Mapping is the process of telling the Base Unit which outputs for the DC-MVAs (in heating mode only) are to operate when a fall in temperature is detected and is performed at the time of the Radio Thermostat initialization or wake up.

With the Base Unit laying on a flat surface with the front cover off and the User Interface Buttons exposed (as shown on page 2), use the following steps to initialize the Radio Thermostat to the Base Unit:

1.) Plug power cord of the Genius Base Unit into a standard 115V power outlet. Once this is done, power to the board is confirmed by an "orange" light at the Mode Indicator LED.

2.) Set Temperature Unit Selector to the proper position (°F or °C).

3.) Using one of the Radio Thermostats to be installed, remove the back cover, exposing the battery and a modular phone connector jack.

4.) Plug one end of the black cord (provided with the Base Unit) in to the back of the thermostat and the other into the Modular Connector on the Base Unit. If this is done properly, the Display on the Radio Thermostat is illuminated (fig. X) and 11 green LEDs are lit with the one in the number 1 position flashing. If the Temperature Units were set incorrectly in Step 2, simply unplug the Radio Thermostat at the Base Unit, correctly set the Units switch and reconnect the cord.

5.) The flashing LED indicates the current channel or output awaiting designation. The arrow buttons are used to change position of channel of the flashing LED and the OK button is to reserve and tie that output to the ID signature of the Radio Thermostat. Each number LED corresponds to DC-MVA output connector of that same number. Using the arrows buttons, move the flashing green LED to the desired channel.

6.) Once the proper channel is selected, press the OK button to confirm your selection. A solid orange LED is indicated at that position. Unplug the transmitter cable. If the current Radio Thermostat is to control 1 or more DC-MVAs, return to step 5 as many times as necessary until all of the actuators are installed. Each time the modular connector is disconnected and reconnected to the MC, dark LEDs indicate that these channels are used. The flexibility of Zone Mapping does not require the corresponding outputs to be side by side.

7.) When all of the actuator outputs have been entered for the current Radio Thermostat, use the label sheet provide to write in the room name and channel outputs. Remove this label and place on the back of the thermostat. To install a new Radio Thermostat, return to step 3.

Installing a Single Radio Thermostat for Cooling

When a Radio Thermostat is connected to the Base Unit, you'll notice 11 green LEDs are lit, but only 10 zones of heating can be used. The green LED indicated by the Mode Indicator LED is used to designate the cooling zone. Simply use the arrow and OK buttons to select. Now, the current thermostat will control x-number DC-MVAs (as setup) and provide a master thermostat for cooling. Once this channel is used, it will no longer illuminate when a Radio Thermostat is connect to the board. It is also suggested that a designation be placed on the label to indicate this thermostat the master cooling stat.

Section 6: Uninstalling a Radio Thermostat

In the event a thermostat is setup incorrectly and an output needs to be uninstalled, use the following procedure:

1.) Press and hold the OK button for 5 seconds. All outputs or channels that can be released are indicated by a solid red LED.
2.) Use the arrow button until the desired channel to be uninstalled is flashing Red.
3.) Press and hold the OK button for another 5 seconds. When the channel is uninstalled, all previously lit LEDs will turn dark.

Master Reset

Should you find it necessary to uninstall all of the Radio Thermostats and outputs, the following procedure will erase all data entered into the non-volatile memory during

initialization. By pressing and holding ∧, ∨ and OK simultaneously, the master reset procedure is initiated. The Status Indicator LEDs are used to indicate a countdown sequence. The LEDs will turn green one by one, then orange and finally red. When all the LEDs are Red, the non-volatile memory is erased and the Base Unit is in a virgin state for initialization. The Master Reset can be interrupted at any time by releasing the buttons.

Section 7: Mounting the Base Unit and Wiring

Before installing the Wirsbo Base Unit and connecting for operation, use the following steps:

1.) Place each of the Radio Thermostats in approximate positions in their dedicated rooms.

2.) Unscrew the three screws on the front of the Base Unit and remove the cover.

3.) On the enclosure fringe below the output connectors 1…10, dry contacts and the antenna connections where the material is thin, cut out to provide wire access to the DC-MVAs, equipment and the antenna. A wire cutter will work best.

4.) Connect power supply cord to 115 volt outlet at the manifold location.

5.) Using the MODE and OK buttons, press simultaneously to enter the Radio Signal Strength Mode and locate the antenna where reception is optimum and the DC-MVAs can still reach the Base Unit properly.

Note: The signal strength may be significantly influenced by the position. The Radio Signal Strength LEDs should be ORANGE or GREEN for all of the thermostats installed. A dark (unlit) or RED LED indicates the reception is poor and a new location must be found. See Section 8 for more information of signal strength.

6.) Mark the position of the antenna and the Base Unit

7.) Disconnect the power and antenna from the Base Unit.

8.) Mount the Base Unit in the marked position in a fixed horizontal position on the wall using the screws and anchors supplied with the unit. Note: The anchors may not be required when mounting the Genius unit to a solid wall or plywood. Mount the antenna in its marked position.

9.) If connecting a circulator to the Genius unit, remove plastic cap, allowing access to the pump terminal connections. Otherwise, skip to Step 11.

10.) Install a conduit connection or suitable connector as required by local codes. Insert

wires through connection hub and wire accordingly. Note: Proper grounding of the conduit hub must be ensured.

11.) If wiring in heating and cooling devices, such as a boiler or water heater, remove the terminal block and wire outside of the case. By doing so, the wiring connections can be easily made and the terminal blocks re-installed by pressing onto the posts attached to the control board. Run wires between tabs at the bottom of the plastic enclosure

12.) Connect the modular plugs of the DC-MVA to the designated outputs as set up in **Section 5**: System Setup and Initialization.

13.) Plug in external antenna and run wire between tabs at the bottom of the plastic enclosure. Read Section 8 before permanently fixing the antenna into position.

14.) Replace front cover to Genius unit

15.) Apply power to Genius unit by plugging attached power cord into standard convenience outlet. System is ready for operation indicated by the Orange LED on the Mode Status Indicator and can be put into Heating (Red LED) or Cooling (Green LED) modes of operation.

Section 8: Signal Strength

After installation and wiring of the Genius unit, it may be necessary to verify the signal strength based on the current position of the antenna and signal received from the Radio Thermostat. Signal strength can be checked by placing the Base Unit in Radio Quality Check Mode. By initiating this mode, LEDs #1 - #10 will indicate the strength of the last signal received from each of the thermostats by the color of the LED. This mode is activated by pressing the MODE and OK buttons simultaneously. Use the following table to determine signal strength:

LED Color	Signal Strength
None	Poor
Red	Fair
Orange	Good
Green	Excellent

To leave the Radio Quality Check Mode, press MODE and OK simultaneously

Section 9: Output Test Mode

After the Wirsbo Genius™ is initialized, mounted and wired, a software routine can be enabled to cycle all system outputs to verify equipment operation and valid wiring. To enter the Output Test Mode, press the Left and Right arrow buttons simultaneously. In this mode, the heating and cooling contacts can be activated and the DC-MVAs can be cycled open/close to verify valve and end switch operations. Use the follow tables to activate the desired equipment:

DC-MVA Output Test

LED Color	Operation
Flashing Orange	DC-MVA to be tested
Solid Orange	All possible outputs
Solid Green	Valve is opening
Off	Valve is closing
Buttons	**Function**
Left Arrow	Select previous output
Right Arrow	Select next output
OK	Start/Stop test on selected output

Note: If the open/close cycle is interrupted during either of the cycles, the valve will return to the full closed position.

Dry Contact Test

LED Color	Signal Strength
Solid Orange	Both heat and cool demands are open
Solid Red	Heat demand is closed Cooling demand is open
Solid Green	Cooling demand is closed Heat demand is open

Pressing the Left and Right Arrow button simultaneously will end the Output Test Mode.

Section 10: Radio Thermostat

The installation and set is nearly complete. Mounting the Radio thermostat and understanding the operation is all that remains.

****** Mounting ******

Using the information recorded on the label placed on the back of the Radio Thermostat back in Section xx, find the room(s) that this will monitor the room temperature for. Find

a flat surface suitable for mounting. Do not mount the thermostat or select a location where the thermostat may be affected adversely by temperature (fireplaces, windows, lamps, etc.). However, the design of a wireless system allows the thermostat location to be moved easily. Use the following steps for mounting the Radio Thermostats:

1.) Using a pencil, mark the wall for the upper mounting location.
2.) Use a level to draw a line down towards the floor. Line should be approximately 2.5" in length.
3.) Mark the lower screw position 2-3/8" from the upper mark on the level line.
4.) Install the screws and anchor combinations depending on the wall construction if required. Leave approximately 1/16" of threads exposed.
5.) Place holes in back cover of thermostat over screw heads and snug to the wall.
6.) Gently press down on the top of the thermostat to snap into position.

****** Operation ******

In order to make the Genius system functional, it is important to understand the operation. The thermostat continually monitors room temperature and any changes along with intermittent "checks" with the Base Unit. The LCD display on the thermostat will display:

- Temperature Unit (°F/°C)
- Set Room Temperature
- Current Room Temperature
- Low Battery Indicator

In heating mode, a decrease in room temperature will active the dedicated DC-MVAs, the dry heating and pump contacts. In cooling mode, a rise in room temperature will active the dry cooling contact. The Base Unit will carry out the proper function and maintain room temperature comfort based on the inputted setting. To set the room temperature, use the following steps:

1.) Press the gray dome to indicate the current room temperature setting. When the adjustment mode is activated, "**SET**" will be indicated in LCD display.
2.) Turn the gray dome to change desired room temperature. The display will automatically return to showing room temperature after 10 seconds. **Note**: Turning the dome will change the room set temperature without having "SET" displayed.

Section 11: System Ready

With all of the above steps completed, the Wirsbo Genius is now ready for operation. Returning to the location of the Base Unit, pressing the Mode Selector Switch will move the mode of operation from standby to heating (or cooling if pressed twice). This is visible and indicated by the Mode Indicator LED changing colors. Use the table below as a guide to interpreting system function and mode of operation:

LED Color	Status Indicator LEDs	Mode Indicator LED

Dark	Idle	No Power
Solid Orange	------	Standby Mode
Solid Red	------	Heating Mode
Solid Green	Heat Demand	Cooling Mode
Flashing Green	Communications from thermostat	------
Flashing Red	Missing communications	------

Section 11: Troubleshooting

Symptom	Cause	Remedy
• Genius will not switch to cooling mode	• Radio thermostat was not set up on channel 11	• See Section xx for Cooling Thermostat setup
• Base Unit not responding to changes in room temperature	• Verify that thermostat is initialized to base unit • Lost Communications • External Antenna missing	• See Section xx for checking signal strength • Change antenna position • Connect Antenna
• Radio thermostat operates wrong DC-MVA(s)	• DC-MVA Output(s) designated to wrong radio thermostat	• See Section xx for initialization and setup
• Flashing RED on Status Indicator LED	• Lost communication with Radio Thermostat • Missing Thermostat • Low battery life	• Check signal strength • Remount thermostat • Replace battery
• Solid RED on Status Indicator LED	• DC-MVA end switch not functioning properly • Motor Failure	• Check valve function - Section xx • Replace actuator
• "BAT" is indicated on LCD display of Radio Thermostat	• Lithium battery life is low	• Replace battery
• No display on Radio Thermostat LCD window	• Battery removed from unit • Radio thermostat has not been initialized	• Replace battery • See Section xx for Radio Thermostat initialization
• When Base Unit is plugged in, no ORANGE LED	• No power to at outlet • Short in power cord	• Contact qualified electrician • Replace Base Unit
• Base Unit receives call for	• Pump connections wired	• Check wiring connections

heat but pump will not operate	wrong • Fuse is blown	• Replace fuse
• Radio Thermostat display reads incorrect temperature units (°F/°C)	• Temperature Units Switch was set incorrectly on initialization	• See Section xx to correct
• Front cover on Base Unit will not close properly	• Cut outs for wiring connections not removed	• Remove plastic tabs to provide access for wiring. See Section xx - step x

Section 12: Technical Specifications

General

Ambient temperature:	32-122°F / 0-50°C
Ambient humidity	< 90%
Weight	aa Base Unit bb Radio Thermostat cc DC-MVA

Control Unit

Rated voltage:	110V, 60Hz
Incoming frequency:	433.92 MHz
Quiescent current consumption:	.15 Amps
Maximum current consumption:	4.1 Amps
Power consumption at max. system configuration:	470 VA
Protection class	P 30
Dimensions L x W x D	2.25” x 4.25” x 2.40”
Pump Output:	110 VAC, 1/3 HP max.
Boiler Relay Output	dry contact, 400VA max
Air Conditioning Relay Output	dry contact, 400 VA
User Settings after power failure:	Remain stored
Max number of radio thermostats to be installed	10
DC-MVA power consumption per unit	.025 Amps
Max. number of DC-MVA to be connected	10
Max. number of DC-MVAs to be connected per modular output	1
Approvals:	cUL, File # Exxxxx FCC, ID #yyyyy IC, # zzzzzzz

Radio Thermostat

Energy supply:	3.6 V lithium battery, service life appr. 2,000 mAh
Transmitter frequency	433.92 MHz
Range:	75 feet
Dimensions:	2.33” x 4.71” x 1.19”
Display:	Fahrenheit / Celsius
Display Range:	0 - 99°
Setpoint Range:	40 - 90°F / 4 - 32°C
Differential:	1°F / 0.5°C Heating 2°F / 1.1°C Cooling