

USER GUIDE

**7 Day Programmable Thermostat - ARTTP001S and ARTTP002S
Rooftop, Roomtop and Large split A/C systems**



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1 - Specifications

1.1 - Product range

• ARTTP002S (SHP-2)

This thermostat may be used with the following units:

- SOH/SIH 076-240 (with or without electrical heating)
- RTH 07→30 (with or without electrical heating)
- SCOH/SIH 076-240 (with or without electrical heating)

• ARTTP001S (SMS-1)

This thermostat may be used with the following units:

- D2IC 090→300A50 (with or without electrical heating)
- B2IH090→300A50 (with or without single stage electrical heating)
- D2IG090→300A50.
- RTC07→30 (with or without electrical heating)
- SOC/SIC 076-240 (with or without electrical heating)
- SCOC/SIC 076-240 (with or without electrical heating)

1.3 - Introduction

The ARTTP Programmable Thermostats represent the most advanced solid-state, microcomputer temperature controls on the market today. The incorporates state-of-the-art technology packaged in an extremely low profile designer series case. Ultra-Touch controls are combined with an easy-to-read, full function liquid crystal display to provide the ultimate in "user friendly" operation of your heating and air conditioning equipment.

1.4 - Standard features

- No batteries required - always remembers scheduled events and temperatures
- 100% Solid State circuitry
- Computerized heat anticipation and cooling droop
- Built-in short cycle equipment protection
- Tamper proof electronic keyboard lockout
- Auto or Manual fan operation
- Auto or Manual Heat/Cool changeover
- Constant Hold feature allows continuous override

- Temporary temperature override
- Selectable 12 or 24 hour clock display
- Selectable Fahrenheit or Celsius temperature display
- Full Function Liquid Crystal Display (LCD)

1.2 - Technical data

Description	Values
Rated voltage	20-30 Vac, or DC 24V nominal
Rated A.C. current	0.05 Amps to 0.75 Amps continuous per output with surges to 3 Amp max
Rated D.C. current	0 Amps to 0.75 Amps continuous per output with surges to 3 Amp max
Control range	Heating: 5 to 30°C; 1°C steps Cooling: 16 to 40°C; 1°C steps
Thermostat measurement range	0 at 48°C
O.D.T. measurement range	-48 at 48°C
Control accuracy	± 0,5° C at 20°C
Minimum deadband	Between heating and cooling: 1°C

Note : This thermostat contains electronic circuitry replacing the conventional mechanical anticipator.

1.5 - Temperature accuracy

Full temperature accuracy will only be realised after the thermostat has been installed and powered for at least one hour.

2 - Installation

2.1 - Introduction

Your new electronic programmable thermostat has been made even better by the introduction of several new and improved features. Building on its reputation for efficient and dependable operation, your thermostat now offers the following list of enhancements.

Progressive recovery

Selecting progressive recovery on your programmable thermostat causes the thermostat to anticipate the programmed setpoint change, thus allowing the climate-controlled area to reach the desired setpoint when required. The progressive recovery option is selected by pressing the FAN and PROGRAM buttons simultaneously.

Thermostat and Sensor Calibration

Allows easy calibration of the thermostat and remote sensors. Simply press and hold the FAN button for 10seconds and adjust with the up or down buttons.

Programming Revert Time Extended

The programming revert time has been extended to 2 minutes.

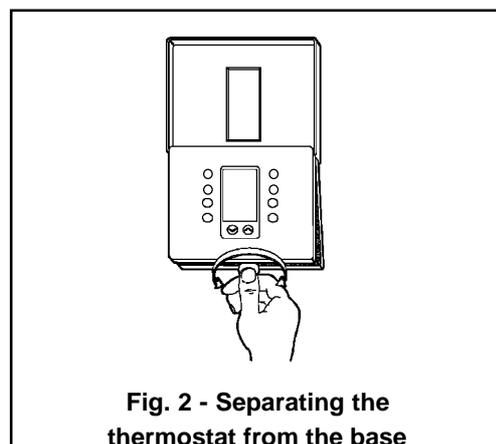
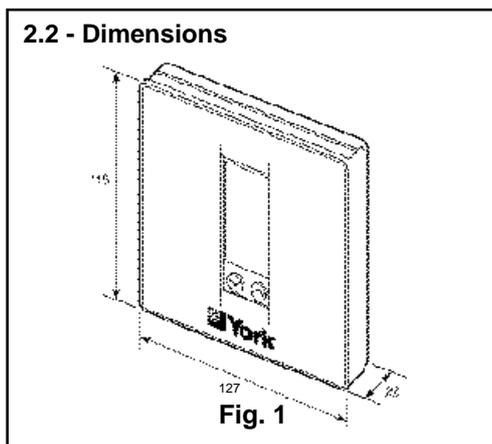
Push Button Auto Repeat

Programming is easier with the push button auto repeat feature.

2.3 - Location

Locate as follows:

- On an inside wall, and approximately 1,5 m above the floor in a location with freely circulating air of an of average temperature.
- Away from direct sunlight or radiant heat, outside walls or behind doors, air discharge grills, stairwells, or outside doors
- Away from steam or water pipes, warm air stacks, unheated/uncooled areas, or sources of electrical interference.



2 - Installation (cont'd)

2.4 - Installation and wiring

To install the thermostat:

1. Lift the thermostat cover and insert a flat blade screwdriver or coin into the slot located in the bottom center of the thermostat case and twist 1/4 turn. Grasp the base from the bottom two corners and separate from the thermostat. (See figure 2).
2. Swing the thermostat out from the bottom, and lift up and off the base. Place the rectangular opening in the base over the equipment control wires protruding from the wall and, using the base as a template, mark the location of the two mounting holes. No leveling is required.
3. Use the supplied anchors and screws for mounting on drywall or plaster. Drill two 5 mm holes at the marked locations, and tap nylon anchors flush to the wall surface and fasten. (See figure 3).
4. Connect the wires from the existing system to the thermostat terminals according to Wiring Tables 2 and 3. Push extra wire back into the wall. Wires must be flush to the plastic base.

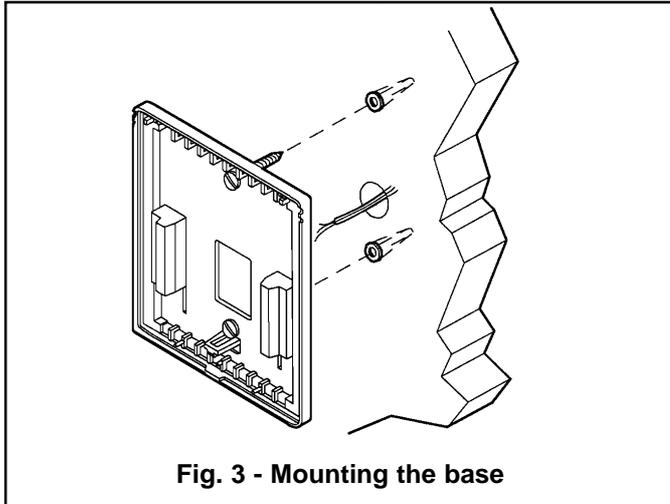


Fig. 3 - Mounting the base

2.6 - Dip Switch options and functions for ARTTP001S (SMS-1)

Positioning the DIP switches in either the ON or OFF position enables you to choose between two different options. The table below shows the description of the functions.

ARTTP001S (SMS-1)

	Switch/Jumper selections	Description
1	2 or 4 events per day	2 events include day and night 4 events include morning, day, evening and night
2	Smart fan ON/OFF	Smart fan on will run fan continuously in occupied mode but cycle the fan in unoccupied mode with a call for heat or cool.
3	Heat/Cool: 4 or 2 min. minimum on and off	Allows selection of minimum on/off time for compressors on heating and cooling.
4	Keyboard unlocked/locked	Allows user to disable buttons to prevent tampering
5	Fan immediate with heat call; or with plenum switch	Allows selection of immediate fan run with heat call or run upon activation of plenum switch
6	Single stage/Multistage	Allows selection of multiple stage heating or cooling
7	LED1 icon OFF/ON	Optional selection: LCD icon comes on with LED1 (dirty filters)
8	LED2 icon OFF/ON	Optional selection: LCD icon comes on with LED2 (compressor fault)

2.5 - Fixing the thermostat and cover to the installed based

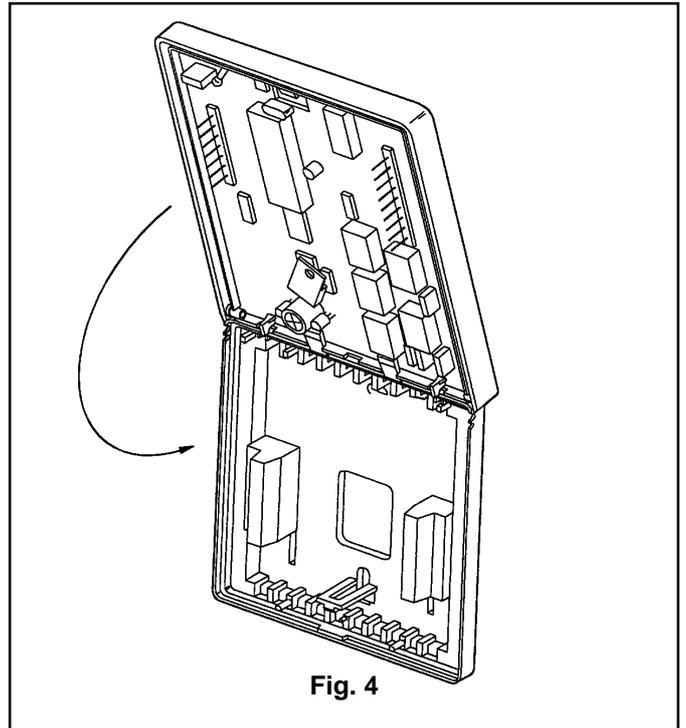


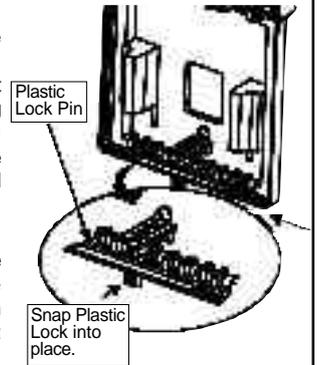
Fig. 4

1. Position the thermostat inside the cover and attach on the hinged tabs located at the top of the base.
2. Swing the thermostat and cover down, and press on the bottom centre edge until they snap in place. (See figure 4).

Thermostat cover lock

If desired, insert the plastic lock piece into the bottom of the mounted base. The ends of the lock piece should fit snugly under the lock pins extending from the bottom of the mounted base. The tab in the middle of the lock piece should extend downward from the mounted base.

To release the locking mechanism, press the lock piece up and into the base while gently prying open the cover at the same time. Use caution to avoid cracking the thermostat base or cover.



4 events per day	1 <input type="checkbox"/> ON	2 events per day
Smart fan disabled	2 <input type="checkbox"/>	Smart fan enabled
4 minutes (minimum on)	3 <input type="checkbox"/>	2 minutes (minimum on)
Keyboard unlocked	4 <input type="checkbox"/>	Keyboard locked
Fan with heat/cool call	5 <input type="checkbox"/>	Fan with plenum switch
Single stage	6 <input type="checkbox"/>	Multistage
LED 1 icon off	7 <input type="checkbox"/>	LED 1 icon (dirty filters)
LED 2 icon off	8 <input type="checkbox"/>	LED 2 icon (Compressor fault)

2 - Installation (cont'd)

2.7 - DIP switch options and functions for ARTTP002S (SHP-2)

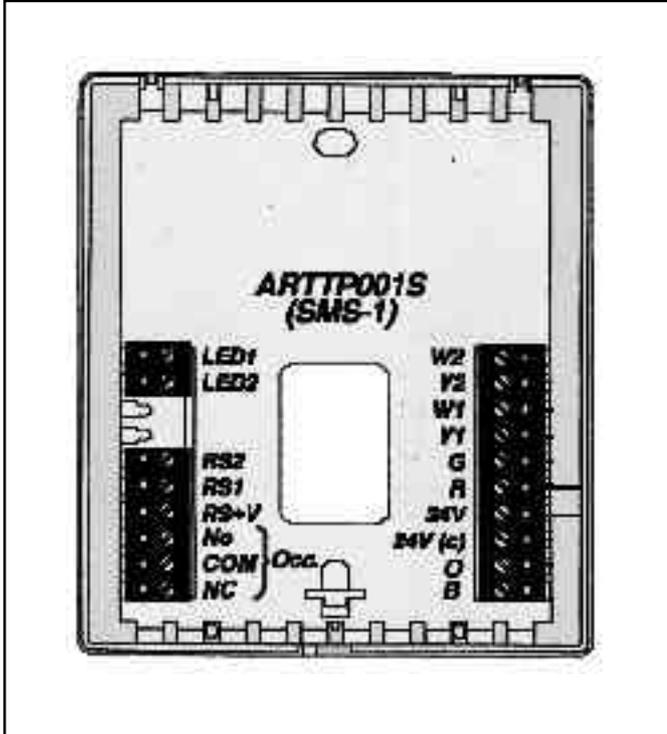
Switch/Jumper selections		
1	2 or 4 events per day	2 events include day and night 4 events include morning, day, evening and night
2	Smart fan ON/OFF	Smart fan on will run fan continuously on occupied mode but cycle the fan in unoccupied mode with a call for heat or cool.
3	Heat/Cool: 4or 2 min. minimum on and off	Allows selection of minimum on/off time for compressors on heating and cooling.
4	Keyboard unlocked/locked	Allows user to disable buttons to prevent tampering
5	Not used	Not used
6	Single stage/ Multistage	Allows selection of multiple stage heating or cooling
7	LED1 icon OFF/ON	Optional selection: LCD icon comes on with LED1 (dirty filters)
8	LED2 icon OFF/ON	Optional selection: LCD icon comes on with LED2 (compressor fault)

Factory settings

4 events per day	1	<input type="checkbox"/>	NO	2 events per day
Smart fan disabled	2	<input type="checkbox"/>		Smart fan enabled
4 minutes (minimum on)	3	<input type="checkbox"/>		2 minutes (minimum on)
Keyboard unlocked	4	<input type="checkbox"/>		Keyboard locked
Normal	5	<input type="checkbox"/>		Not used
Single stage	6	<input type="checkbox"/>		Multistage
LED 1 icon off	7	<input type="checkbox"/>		LED 1 icon (dirty filters)
LED 2 icon off	8	<input type="checkbox"/>		LED 2 icon (Compressors fault)

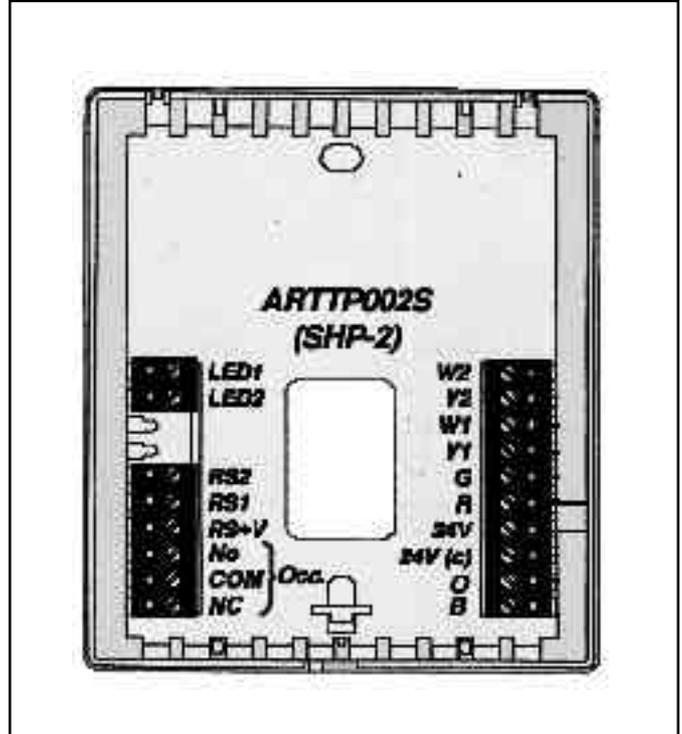
3 - Wiring

3.1 - Thermostat ARTTP001S terminals



⚡ Jumper between 24V and R must be installed.

3.2 - Thermostat ARTTP002S terminals



⚡ Jumper between 24V and R must be installed.

3 - Wiring (cont'd)

3.3 - Connections between thermostat and equipment terminals - ARTTP001S

Thermostat terminal	Unit terminal	Description
W2	W2	Energises on a call for 2nd stage heat
Y2	Y2	Energises on a call for 2nd stage cool
W1	W1	Energises on a call for 1st stage heat
Y1	Y1	Energises on a call for 1st stage cool
G	G	Energises the fan circuit
R	R	24 VAC Live from HVAC unit
24V		24 VAC live
24V(c)	B	24 VAC common
O		Energises 4- way valve in cooling mode
B	-	-
LED1	-	
LED2	X	Refrigerant circuit fault
RS2 RS1	-	Remote Sensor (option).
RS+V		
No		Contacts changeover in occupied mode
COM		
NC		

3.4 - Connections between thermostat and equipment terminals - ARTTP002S

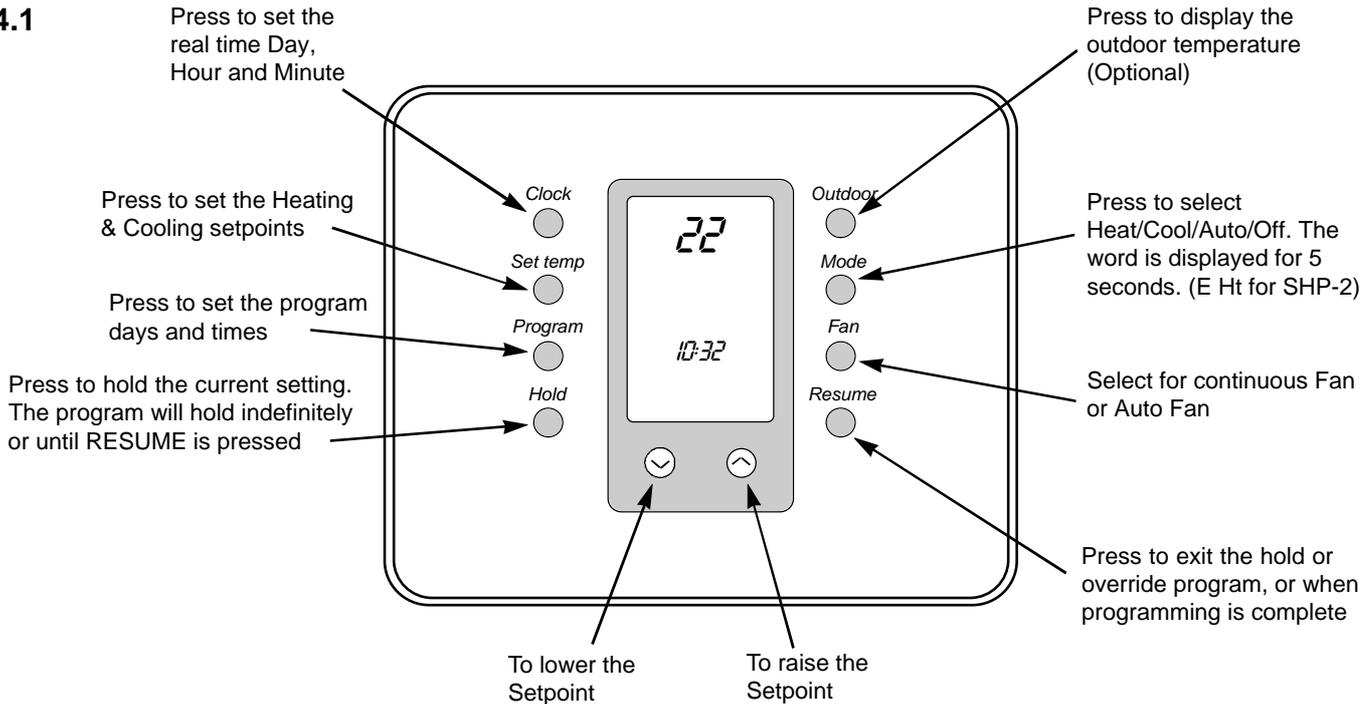
Thermostat terminal	Unit terminal	Description
W2	W2	Energises auxiliary heat as 2nd stage emergency heat
Y2	Y2	Energises on a call for 2nd stage heat or cool
W1	W1	Energises auxiliary heat as 1st stage emergency heat
Y1	Y1	Energises on a call for 1st stage heat or cool
G	G	Energises the fan circuit
R	R	24 VAC Live from HVAC unit
24V		24 VAC live
24V(c)	X	24 VAC common
O	O	Energises 4- way valve in cooling mode
B	B*	Energises 4 way valve in heating mode
LED1	optional	Dirty filters
LED2	LED2*	Refrigerant circuit fault
RS2 RS1	-	Remote Sensor (option).
RS+V		
No		Contacts changeover in occupied mode
COM		
NC		

☛ Use only copper conductors only. Section > 1mm².

* Only used on RTH-B, SOH-B and SCOH-B with Rol-on board.

4 - Operating the thermostat

4.1



4.2 - Description of icons

	Outdoor Temperature icon		Heat icon, two flickering lines when heat is on
	Morning, Evening, Day, Nights icons		Cool icon Flickers when the cooling is on
	Temporary Temperature Override icon		Keypad Locked icon
	Daylight Saving Time icon		Filter icon
	Wrench or fault icon		Fan icon
	5 second display when heat mode is selected and when the heating set point is changed		Mo Tu We Th Fr Sa Su Days of the week
	5 second display when cool mode is selected and when the cooling setpoint is changed		Displays indoor or outdoor temperature.
	5 second display when the auto mode is selected		Displayed when setpoints are showing
	Displayed when in the off mode		Progressive recovery flashes when active
	Displayed when in the emergency heat mode Normally displays the current time		Location of icons on LCD
	Displays programming times in program mode		

4.3 Power Failures During Regular Program Schedule.

Should your power fail at any time during the regular program, the thermostat will maintain the clock internally for up to 2 hours. If the power has not been restored during this time period, the clock will stop. When the power is restored, the thermostat clock defaults to a flashing 12:00 AM. **The thermostat will be held in the Night**

program until the user resets the clock. The thermostat will display AC when the 24 VAC is not powered. One of the unique features of your thermostat is that there is no battery required to maintain your selected setpoints in the event of a power loss, since the memory is unaffected by power failures of any duration. There is no reason to reprogram the setpoint temperatures or start times since the thermostat will retain these program parameters.

5 - Programming the thermostat

5.1 UNDERSTANDING 7 DAY PROGRAMMING

It is recommended that you read and understand these instructions before you attempt to program your new thermostat.

Events and temperatures (Setpoints)

Each day of the week is divided into 4 events. An event is a designated period of time during the day. The events are called *Morning*, *Day*, *Evening* and *Night*. Thus, Monday is divided into Morning, Day, Evening and Night or 4 events, as is every day of the week. Your thermostat allows you to choose between a 2 event (DAY and Night) or 4 event schedule. This is a DIP switch selectable option. To exit programming at any time, press and release the *Resume* button, or 15 seconds after pressing the last button, the display will automatically change to the normal display.

Skipping an event (2 methods)

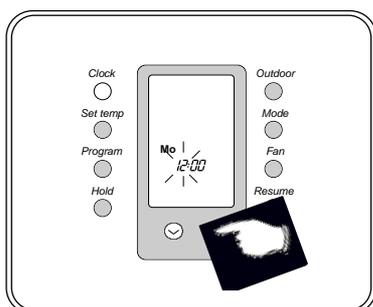
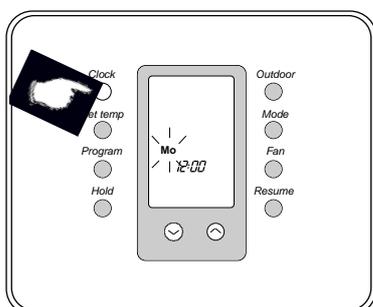
Your personal schedule may not require the use of all 4 events on a particular day. For example, if you wish to go from the *Day* event directly to the *Night* event, skipping over the *Evening*, event there are 2 methods you can apply :

A) - Press and release the *Program* button until you come to the day and event hour on that day that you wish to skip.

- Press and hold down the *Program* button and at the same time, press and release the *Mode* button. In the time display area, you

will see " _ _ : _ _ " indicating that the event is skipped.

B) - If any two or more events have the same start time, the latest event in the day has priority and therefore uses its setpoints.



For example you may program the *Morning* event setpoint to heat to 21°C. As a result, every *Morning* event of the week will heat to 21°C. Next select the *Day* event a Heating and/or Cooling setpoint. You will continue until you have programmed all 4 events in the same fashion. The setpoints that you have selected to represent your events will be consistent for all 7 days of the week. **If you change a setpoint in any of the events, it will change the corresponding setpoint for that particular event, for every day of the week.**

Event Times

You are only required to set a starting time for each event. An event ends at the same time that the next event begins. For example, you may choose to have the *Morning* event begin at 6:00 a.m. and the *Day* event set to begin at 9:00 a.m.. The *Morning* event ends and the temperature will automatically change to the *Day* event setpoint at 9:00 a.m.

You may however vary the start times for the events for each day of the week. For example, you may choose to have the *Morning* event begin at 6:00 a.m. from Monday to Friday but not until 8/00 a.m. on Saturday and Sunday. You may choose to program a different start time for each of the 4 events for each day of the week. Remember, the setpoints for these events remain the same day after day.

5.2 SETTING THE CURRENT DAY AND TIME

Step 1 : Press and release the CLOCK button. Display will flash MO (Monday).

Step 2 : Press the ☺ or ☹ button until current day appears on the display.

Note : Pressing the ☺ or ☹ buttons will remove the day backward and forward.

Step 3 : Press and release the CLOCK button. Display will flash the hour (12:).

Step 4 : Press the ☺ or ☹ button until current hour appears on the display. Be sure AM or PM corresponds to proper time.

Note : Pressing the ☺ or ☹ buttons will move the hours backward and forward.

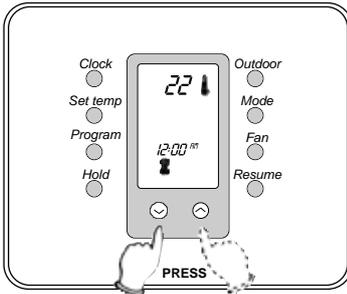
Step 5 : Press and release the CLOCK button. Display will flash minutes (:00).

Step 6 : Press the ☺ or ☹ button until current minutes appears on the display.

Note : Pressing the ☺ or ☹ buttons will move the minutes backward and forward.

Step 7 : Press RESUME or wait for the regular display to appear.

5 - Programming the thermostat (cont'd)

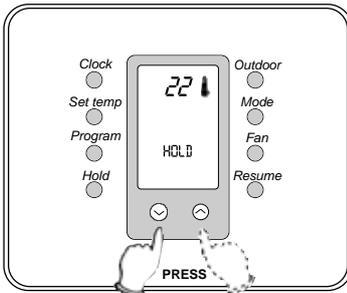


• TEMPORARY TEMPERATURE OVERRIDE

You can change the scheduled program temperature at any time without affecting the program. Pressing the or button temporarily changes the scheduled program setpoint for a 3 hour period. Pressing the *Resume* button cancels the override period.

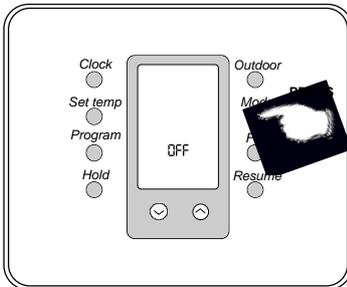
• TEMPORARY TEMPERATURE OVERRIDE WITH KEYBOARD LOCKED

You can change the scheduled program temperature by a maximum of $\pm 3^{\circ}\text{C}$ at any time without affecting the program. Pressing the or button temporarily changes either the Morning setpoint (using 4 programs per day) or the Day setpoint (using 2 programs per day) for a **1 hour** period. This 1 hour override period cannot be cancelled (keyboard is locked.)



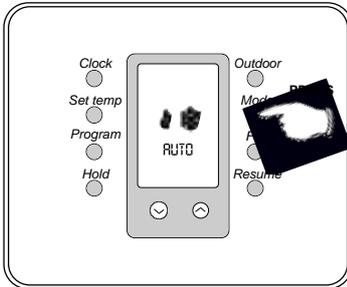
• CONSTANT OVERRIDE (HOLD)

To maintain a temperature setting for an indefinite period of time, press and release the *Hold* button and the word 'Hold' is displayed. The current scheduled temperature will be maintained. To set a different temperature, press the or button. The last temperature selected (scheduled or new) will be maintained continuously until the *Resume* button is pressed.



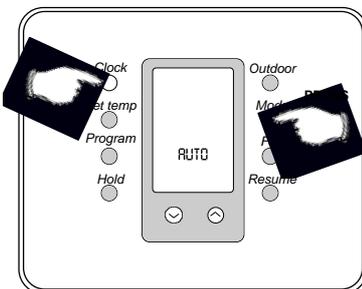
• OFF MODE :

To turn off the heating or cooling system, press and release the MODE button until the word OFF appears on the display. It will remain displayed until the mode is changed. The OFF mode prevents the systems from being energized, however, all programmed schedules will be remembered.



• AUTO CHANGE OVER MODE :

These thermostats can be used to automatically switch from heating and cooling through the Auto Changeover Mode. Press and release the MODE button until the word AUTO and both the heating and cooling icons appear on the display. The thermostat will energize the heating or cooling system based on the temperatures established for both modes.

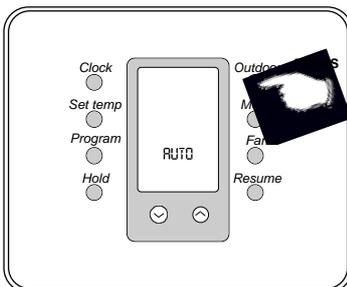


• CHANGING THE DISPLAY FROM FAHRENHEIT TO CELSIUS :

Simultaneously press & to switch between Celsius and Fahrenheit temperature display.

• CHANGING THE CLOCK FROM 12 TO 24 HOUR TIME :

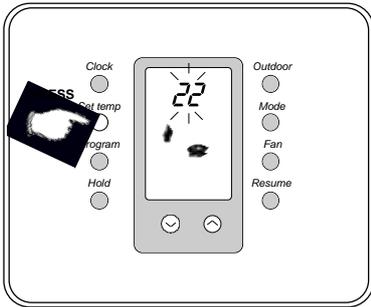
To change the time indicated from 12 hour to 24 hour, press and release the clock button then, press the mode button.



• VIEWING OUTDOOR TEMPERATURE (OPTION) :

If the thermostat has been installed with an outdoor remote sensor, you can view the outdoor temperature by simply pressing and holding the OUTDOOR button. After releasing the button, the thermostat will once again display the indoor temperature.

5 - Programming the thermostat (cont'd)



• SELECTING 2 OR 4 EVENTS PER DAY

These 7 day programmable thermostats have been designed so that you can select either 2 events (Day ☀ or Night ☾) programming or 4 events (Morn 🌄, Day ☀, Evening 🌃, or Night ☾) programs.

The switch is located inside the thermostat and should be set prior to any programming. (Switch #1 Off = 4 Events/day, Switch #1 On = 2 Events/day)

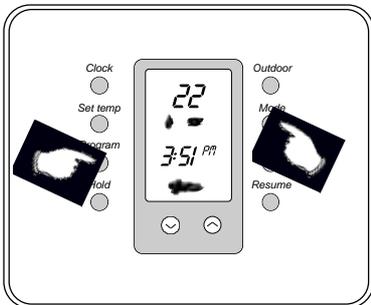
• SETTING THE PROGRAM TEMPERATURES

The heating and cooling setpoints can be programmed by pressing the SET TEMP button.

Press the SET TEMP button; the mode will appear on the display, as well as the temperature setpoint for that mode.

The number will flash and can be selected by pressing the ⏴ or ⏵ buttons.

Repeatedly pressing the SET TEMP button will allow all of your temperature settings to be displayed and adjusted.



• SETTING THE TIMED SCHEDULE FOR YOUR PROGRAM

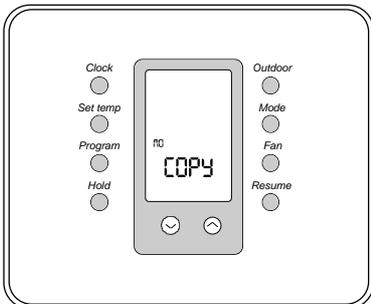
Press and release the PROGRAM button. MO will appear on the display with the morning symbol (🌄) (4 events per day) or the Day (☀) symbol (2 events per day).

Press the ⏴ or ⏵ button to select the day, ie. MO.

NOTE : Press the MODE button to select heat or cool.

Press and release the PROGRAM button to select the start time hour. Press the ⏴ or ⏵ button until the display shows the desired start time hour.

Press and release the PROGRAM button to select the start time minutes. Press the ⏴ or ⏵ button until the display shows the desired start time minutes. (Program minutes to the 10 minutes interval only, ie. 8:10, 8:20, 8:30, etc.)



• USING THE COPY FUNCTION

The copy function has been designed into the PROGRAM button. For example, with MONDAY programmed for DAY (☀) and NIGHT (☾), the final function will show the word COPY on the display. Press the ⏴ to display all 7 days of the week, then press PROGRAM to program the Monday programs to all 7 days of the week. Press the ⏴ to select individual days to copy the program to individual days.

• SETTING A SEPARATE DAY PROGRAM (ie. SATURDAY)

Use the ⏴ or ⏵ button to advance the day indicator to the day that may have a separate program. Press the program button to change that day's hour and minutes.

NOTE : If the RESUME button is not pressed, the thermostat will automatically start the program schedule within fifteen seconds after the last button is pressed.

• REVIEWING THE SCHEDULED TIMES

To review your programmed schedules, repeatedly press and release the PROGRAM button. Each scheduled event will be displayed, starting with the temperature, day, hour and minute for each day of the week. To cancel your review, simply press and release the RESUME button, or wait 15 seconds for the thermostat to resume automatically.

• REVIEWING THE PROGRAMMED TEMPERATURES

To review your programmed temperatures, repeatedly press the SET TEMP button. The display will change to show the Mode, Event (Day or Night) and the temperature selected.

5 - Programming the thermostat (cont'd)

• RECORD YOUR PERSONAL SCHEDULE

This blank list is for your own use. Start by selecting your heat/cool temperature setpoints. Determine the times you want the temperatures to be active. Write in the desired times in the appropriate location. Typically programming would begin on Monday allowing you to copy the Monday schedule to the consecutive days of the week.

NOTE : It is suggested that you set your desired Morning program times about 1 hour before the time that you actually require the conditioned space to reach the set temperature. If you wish to skip an event, refer to "Skipping an event".

Temperature Settings				Event Start Times						
				MON	TUE	WED	THU	FRI	SAT	SUN
MORNING*		Cool	°F/°C							
		Heat								
DAY		Cool								
		Heat								
EVENING*		Cool								
		Heat								
NIGHT		Cool								
		Heat								

* Available only when configured for 4 events per day.

• SETTING THE ELECTRONIC OUTDOOR HI & LO TEMPERATURE BALANCE POINTS (ARTTP002S ONLY)

When using the optional Outdoor temperature sensor, you can select the outdoor balance points to inhibit the auxiliary heat and/or compressor of your heat pump equipment.

HibP - Press and hold the outdoor button, then press the mode button. **HibP** will appear on the display. Raise or lower the **HibP** by pressing the  or  button to set the temperature above which the auxiliary heat is locked out. If another key is pressed, the thermostat will return to normal operation in 15 seconds. Press the outdoor button while showing the **HibP** and the thermostat will switch to show **LobP**. **LobP** is used to lock out the

compressor. Outdoor temperatures below the **LobP** will lock out the compressor. eg. If a heat pump is set with auxiliary heat **HibP** = 11°C, **LobP** = 2°C. When the outdoor ambient temperature is 11°C or above, the thermostat will not allow the auxiliary heat to energize, allowing the compressor to continue to run to achieve the setpoint. When the temperature is 2°C or lower, the thermostat will automatically lock out the compressor and allow only the auxiliary heat to energize. The factory **HibP** and **LobP** setpoints are +48°C and -48°C.

6 - Remote sensors

These thermostats will accept any combination up to a quantity of 6 indoor sensor(s), duct sensor(s) and outdoor sensor(s). The sensor(s) are connected in a daisy chain to thermostat terminals RS2, RS2 and RS+V, as shown in the relevant diagrams. The thermostat will recognize automatically, the type and number of sensors fitted.

INSTALLING an ALSRS001S INDOOR Sensor.

Introduction :

The indoor sensor is designed to sense the air temperature at a remote location and send this information by digital communications to the thermostat. Any number of sensors up to six can be connected together to provide temperature averaging. The sensor can also be modified for use with a duct sensor.

Single Sensor Installation :

1 - Install the ARTTP thermostat according to the instruction manual supplied with it. Check that the thermostat is operating. (Display shows the correct temperature.)

CAUTION : Remove the thermostat from the subbase while wiring the sensor to avoid damage from live wires. This is important.

2 - Install non-shielded 3 conductor wire from the thermostat to the remote sensor location. Maximum distance is (90m).

3 - Open the sensor case by depressing the button on the bottom edge of the case until the latch releases. Remove the cover by pulling it out and up at the bottom.

4 - Remove the board from the subbase by pulling back the latch that holds it at the center bottom.

5 - Use the sensor subbase as a template to mark the mounting hole locations on the wall. Drill size for the wall anchors is 6 mm. Mount the subbase over the wires coming out of the wall using the two screws and anchors provided. The angled corner on the subbase should be in the bottom right.

6 - Snap the board back into the subbase. Check to be sure that the latch holds the board properly. Check that the thermistor (sensor element) is positioned under the holes in the cover but not touching the cover or subbase.

7 - Strip 6 mm of insulation from the three wires at the Remote Sensor. Install the wires in the terminals labelled RS2, RS+V and RS1. Push any extra wire back into the wall cavity. Seal the hole in the wall around the cable to eliminate any draft that might affect the sensor. Refer to Figure 1.)

8 - Note the wire colour going to each terminal. The order of the wires on the thermostat is not the same as the sensor.

9 - Connect the wires on the thermostat subbase to the terminals labelled RS2, RS1 and RS+V. Make sure that each terminal on the sensor is wired to the terminal with the same name on the thermostat.

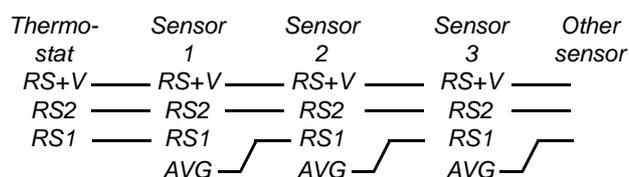
10 - Mount the thermostat on the subbase and check to be sure that it is showing the temperature.

11 - Re-install the cover on the remote sensor by hooking it on the top and snapping the bottom into place.

Using Multiple Sensors for Temperature Averaging :

Any number from two to six sensors may be connected together to provide temperature averaging in a large area or several zones being controlled by the same system. Maximum distance between any 2 sensors is 300 ft. (90m).

- 1** - Wire the first sensor using the single sensor instructions.
- 2** - **CAUTION** : Make sure that there is no power to the sensors by removing the thermostat from the subbase.
- 3** - Connect wires to each additional sensor in the following manner. An outdoor sensor can also be connected in an location in the chain. (Refer to Figure 2 also.)



- 4** - Replace the thermostat on the subbase. Check for proper operation of each sensor by connecting a jumper between terminals 1 and 2. This shorts out the thermistor. The displayed temperature will go up several degrees if the sensor is properly installed. Repeat for each sensor.

Using an ALSDS001S Duct Sensor :

The sensor and thermostat are designed to sense air temperature in a room. The fast moving air in a duct has small but rapid changes in temperature. This will affect the control algorithm of the thermostat. For better control, it is recommended that the air temperature is sensed in the room, however, if a duct sensor is specified, installation is as follows :

1 - Install the indoor sensor using the Single Sensor instructions.

2 - Clip the thermistor from the Indoor sensor with wire cutters as shown in Figure 3.

3 - Install the duct sensor in the return air duct according to the instructions supplied with it. Connect the two wires from the duct sensor to terminals 1 and 2 of the indoor sensor. If shielded cable was required because of a long distance to the sensor box, connect the shield to terminal 2 also.

Troubleshooting :

Thermostat has no display : Check wiring between thermostat and sensor. Incorrect wiring can damage the thermostat, transformer or blow a fuse. Check 24VAC supply.

Thermostat reads "AC" : 24VAC power is disconnected.

Not sure if display is showing local or remote temperature : Breathe on the wall near the bottom left corner of the thermostat. Temperature will go up for a few seconds if sensing locally.

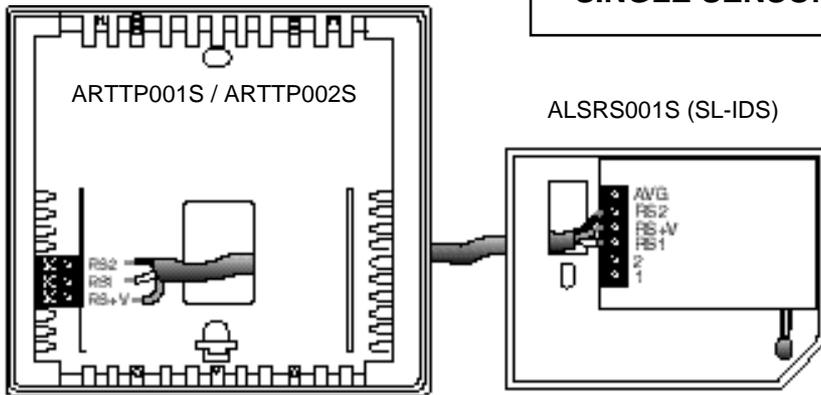
Thermostat displays very high temperature : Wires on sensor element are shorted together. Separate them.

Thermostat displays very low temperature : Check wiring of probe or duct sensor. Sensor element is not connected to board or is broken.

Temperature display jumps up and down several degrees within seconds : Thermostat requires a few seconds to stabilize after power is turned on. If display continues to be erratic, there is too great a distance between the indoor sensor box and the duct sensor. Move the box closer to the duct sensor or use shielded cable.

6 - Remote sensors (cont'd)

SINGLE SENSOR



PLEASE NOTE :

- Max cable length between any 2 units : 300ft. (90m)
- Max. number of indoor sensors in daisy chain : 6
- Max. number of duct sensors in daisy chain : 1
- Max. number of outdoor sensors in daisy chain : 1

FIGURE 1

MULTIPLE SENSOR (TEMPERATURE AVERAGING)

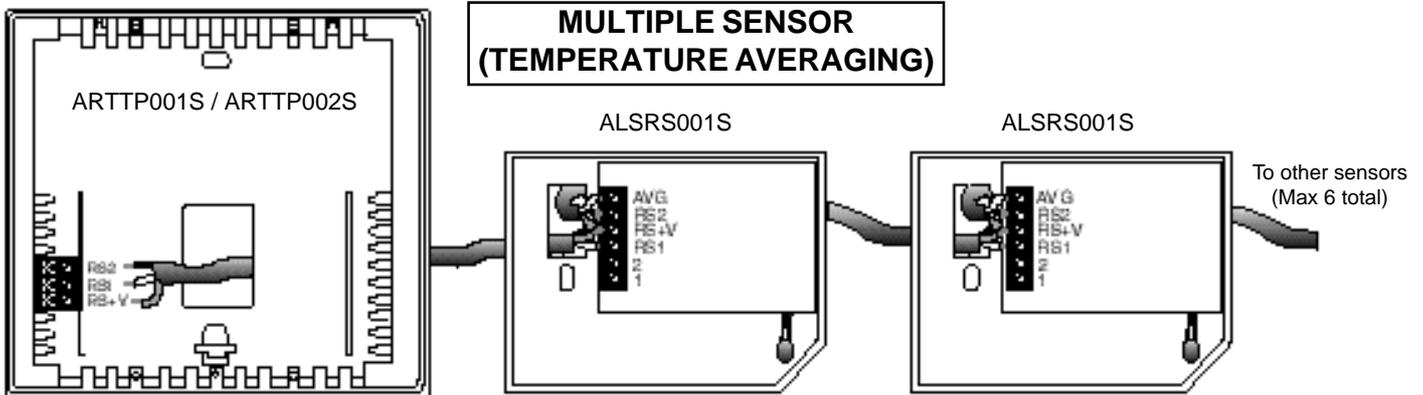


FIGURE 2

INSTALLING AN ALSDS001S DUCT SENSOR

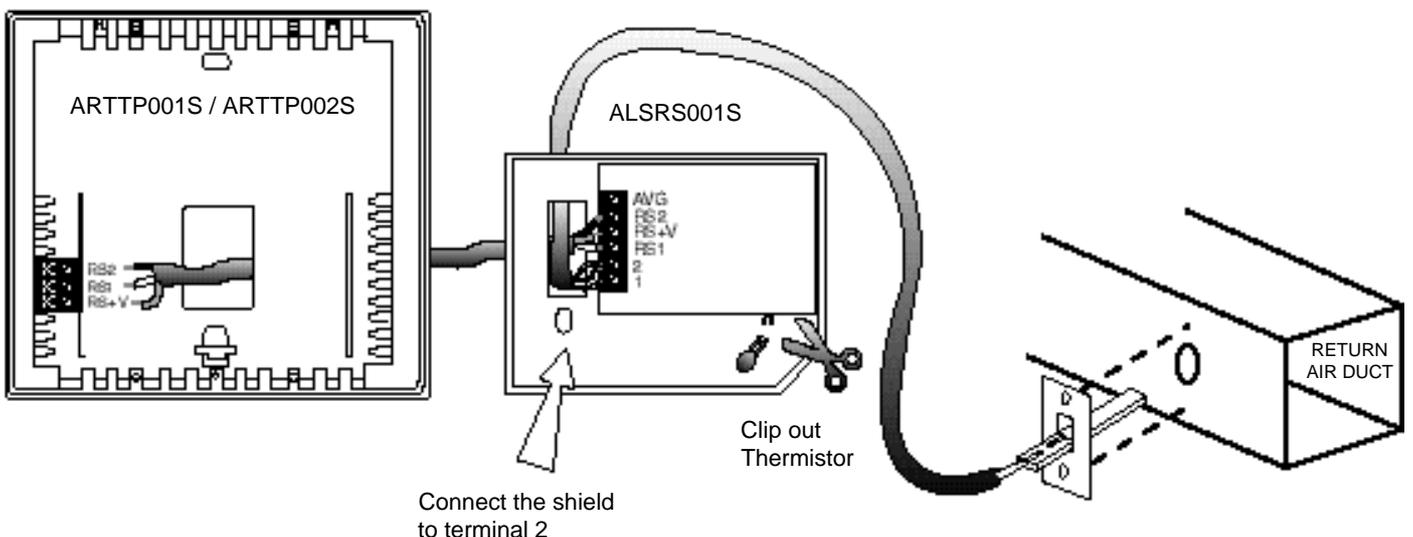


FIGURE 3

ALSDS001S DUCT SENSOR

6 - Remote sensors (cont'd)

INSTALLING an ALSOS001S (SL-ODT) Outdoor temperature sensor

Introduction :

The ALSOS001S is designed to sense outdoor air temperature and send this information by digital communications to the thermostat. The outdoor temperature can then be displayed on the thermostat. In heat pump applications with the ARTTP002S thermostat, it can also be used to control the balance point and the auxiliary heat lockout temperatures.

Installation of outdoor sensor only :

1 - Install the thermostat according to the instruction manual. Check that the thermostat is operating. (Display shows the correct temperature.)

2 - Select a location for the outdoor probe that will give accurate readings. Do not locate the probe where it will be influenced by sunlight. The north side of the building or under the shadow of the eaves are often good locations. Avoid locations such as near dryer vents or other sources of heat.

3 - Mount the probe on the outside of the building using the screw and wall anchor provided so that the tip is well away from the surface of the wall. The cable may be routed directly through the wall or bent at the probe and routed along the surface to enter at a more convenient place.

4 - Locate the sensor box indoor in a controlled air space near the probe. The cable with the probe is about 1.8 m long. Additional 2-conductor cable may be spliced on if necessary to increase the length.

5 - Open the sensor case by depressing the button on the bottom edge of the case until the latch releases. Remove the cover by pulling it out and up at the bottom.

6 - Remove the board from the subbase by pulling back the latch that holds it at the centre bottom.

7 - Mount the subbase over the wires coming out of the wall using the two screws and anchors provided. Drill size for the wall anchors is 1/4 inch. The angled corner on the subbase should be in the bottom right.

8 - Snap the board back into the subbase. Check to be sure that the latch holds the board properly.

9 - Strip 6 mm of insulation from the two wires coming from the probe to the sensor box. Connect the wires to terminals 1 and 2. Polarity is not important on the probe.

10 - Install three-wire cable from the thermostat to the outdoor sensor box. **CAUTION** : Remove the thermostat from the subbase while wiring the sensor to prevent damage from live wires.

11 - Strip 6 mm of insulation from the three wires coming from the thermostat. Install the wires in the terminals labelled RS2, RS+V and RS1. Push any extra wire back into the wall cavity.

12 - Note the wire on the thermostat going to each terminal.

13 - Connect the wires on the thermostat subbase to the terminals labelled RS2, RS1 and RS+V. Make sure that each terminal on the sensor is wired to the terminal with the same name on the thermostat.

14 - Mount the thermostat on the subbase and check to be sure that it is showing the temperature. It may take a few seconds to stabilize.

15 - Press the Outdoor button on the thermostat. The out-

door temperature should be displayed with the tree and thermometer symbol.

16 - Re-install the cover on the outdoor sensor by hooking it on the top and snapping the bottom into place.

Using multiple sensors :

Only one outdoor sensor may be installed with a thermostat. However, any number from one to six indoor sensors may also be connected for indoor remote sensing and temperature averaging.

Refer to the instructions with the indoor sensor for connecting multiple sensors. The outdoor sensor may be connected with one or more indoor sensors in the same way that an indoor sensor is wired. The only difference in wiring is the additional two wires from the probe which go to terminal 1 and 2.

Heat pump applications:

If the sensor is being used with an ARTTP002S thermostat with auxiliary heat, the thermostat can be configured to disable the use of auxiliary heat during warm weather and to lock out the compressor when the outdoor temperature is too cold. This can make the most efficient use of energy.

At warmer temperatures, a heat pump will operate much more efficiently than the auxiliary heat. It can save energy to disable auxiliary heat in some cases; for example, when returning from setback on a mild day. The temperature above which auxiliary heat is disabled is the *auxiliary lock-out temperature or high balance point*.

Air-to-air heat pumps become less efficient as the outdoor temperature drops. The temperature at which it becomes more efficient to use auxiliary heat instead of the heat pump is the *balance point or low balance point*.

To display the high and low balance points, while holding down the outdoor button, press the mode button. The display will indicate the high or low balance point and the selected temperature. Press outdoor again to toggle between the two settings.

The factory settings allow the use of the heat pump and auxiliary heat over the entire temperature range of the outdoor sensor.

Adjust either setting using the up and down arrow keys. Consult a qualified installer or the heat pump manufacturers instructions for appropriate settings.

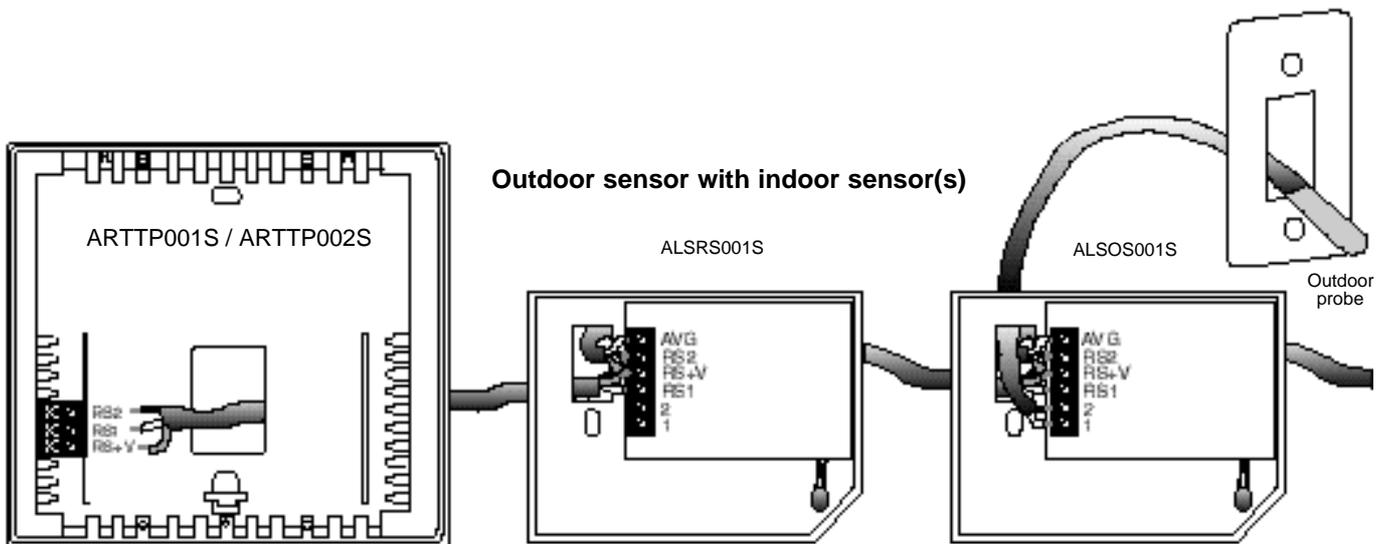
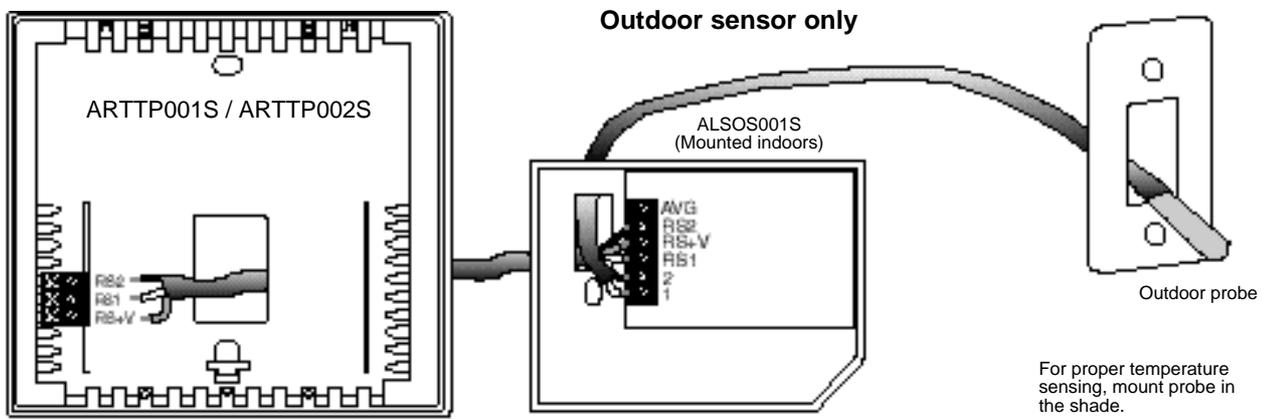
CAUTION : Do not set the high balance point below the low balance point as this will create a 'dead band' with no temperature control.

Troubleshooting :

Display shows two dashes when outdoor button is pressed : Sensor not connected properly. Check wiring between thermostat and sensor. Check that sensor is not an indoor sensor. Indoor sensor has a thermistor sticking out from the bottom right corner of the board.)

6 - Remote sensors (cont'd)

Outdoor sensor installation wiring diagrams



SPECIFICATIONS :

- Max number of outdoor sensors in daisy chain : 1
- Accuracy : +/-2°C from -20 to 30°C after 30 minutes of continuous operation.
- Max. number of indoor sensors in daisy chain : 6

NOTE :

Outdoor sensor may be located before, after or between indoor sensors.

