FANCOIL FEATURES

2-Pipe / 4-Pipe Jumper Selection

This feature is used to disable the secondary output.

2-Pipe Operation: In this configuration the thermostat will permanently disable the Secondary Output and disable the fan from cycling in an invalid mode. The Main Output configuration is dependent on the Pipe Sensor Input. With a pipe sensor connected the thermostat will automatically select heating or cooling depending on the sensed water temperature. If the Pipe Sensor Input is open (unconnected) the main output will cool only. If the pipe sensor input is shorted the main output will heat only. Normal thermostat default is for 4-pipe operation. A jumper should be placed on JP4 for 2-Pipe operation.

4-Pipe Operation: In this configuration both the Main Output (COOL) and the Secondary Output (HEAT) are available. These will both cycle on depending on the mode of the thermostat. With a pipe sensor connected the thermostat will automatically change the main output to heat and disable the secondary output if the main coil water is hot. The JP4 Jumper should be removed.

Pipe Sensor Operation

A pipe sensor can be connected when the thermostat is configured for either 2 or 4 pipe configuration. The Pipe sensor is used to determine the water temperature in the Main coil which should be connected to the Primary output.
Pipe Sensor Input: 10K Sunne Remote Probe or a standard On-Off Aqua-stat can be used for summer/ winter changeover.

Purge Cycle

With a pipe sensor connected, this thermostat will initiate a purge cycle if the sensed water temperature is ambiguous (not adequately hot or cold). Operational sequence for purge cycle operation is as follows:
1. Thermostat has a call for heat or cooling, a demand.
2. Thermostat checks the pipe sensor to verify water temperature.
3. If water is beyond 15F of set point, normal HVAC control occurs.
4. If water is not beyond 15F of set point the thermostat checks to see if the water is above 80F or below 60F.
5. If yes, normal HVAC control Occurs.
6. If no, thermostat opens main output (COOL) for three minutes.
7. After the three minute purge cycle occurs the thermostat checks to see if the water temperature is more than 15F from set point, or above 80F or below 60F.
8. If yes, Normal HVAC operation occurs.
9. If no, the valve is left open and the thermostat continues to look for a valid reading.
NOTE: If at any time the demand goes away the thermostat will stop the purge cycle.

The following table shows output operation depending on the sensed water temperature:

2/4 PIPE SELECTION	WATER TEMP	OUTPUT OPERATION	
		MAIN OUTPUT	SECONDARY OUTPUT
2- PIPE JP4 ON	Cold	Cooling Only The fan will not cycle on with a heat demand	Disabled
	Hot	Heating Only The fan will not cycle on with a cool demand	Disabled
4-PIPE JP4 OFF	Cold	Cooling	Heating
	Hot	Heating Only The fan will not cycle on with a cool demand	Disabled

HVAC SETBACK SYSTEMS

- Occupancy Detection
- Setback Operation
- Door Switch Only Operation

Occupancy Detection

Install jumper JP3

The T170 can be used with Sunne Controls S200 series occupancy detection equipment. The occupancy and door switch inputs are designed to connect to the SB200 slave sensor and SE200 door switch. The Occupancy sensor is a low-level switch that is open when there is occupancy and closed when unoccupied. The Door Switch is a low-level switch that is open when the door is open and closed when the door is closed. This system requires both an Occupancy Sensor and a Door Switch. Operation is as follows:

FROM OCCUPIED MODE:
1. A door close signal initiates an occupancy status detection.
2. If occupancy is detected the T170 will maintain normal HVAC control. It then waits for a door open signal before determining occupancy again.
3. If no occupancy signal is detected within 2 minutes the T170 changes to unoccupied mode and controls at setback values.

FROM UNOCCUPIED MODE:
1. The T170 continually monitors the room.
2. Any occupancy detection, including door open, will set the operation to occupied mode.

In either mode, if the door is left open for more that 2 minutes the T170 will disable the HVAC system. A one-time ten minute override can be initiated by pressing any thermostat key pad.

In an Occupied State the thermostat operates normally and looks for a door close. In the Unoccupied State the thermostat sets heating and cooling set points to setback values, as determined by factory or user settings. In this mode the fan is automatically set to cycle with demand. The T170 will continue to monitor the occupancy sensor and will go to occupied state anytime occupancy is detected.

Setback Operation

Remove jumper JP3.

This is a low level switch input that is normally open. When closed the T170 Heating and Cooling setback limits are used as temperature control points. Fan operation in setback is cycled with demand. Pressing any button will override setback for 1 hour. Setback will override any user setting except if the control is turned to OFF. Units with a controlled off factory setting will override the OFF setting.

Intelligent occupancy sensors like the SD200-001 and SD200-002 can be used with this input to set the HVAC system to control at setback limits.

Door Switch Only Operation

Install jumper JP3.

A stand alone door switch can be connected to the T170 to disable the HVAC system if the door is left open for more that 2 minutes. A one-time ten minute override can be initiated by pressing any thermostat key pad.

To use this feature a jumper must be placed on JP3 and the occupancy input must be shorted to circuit common.

T170 THERMOSTAT
24VAC / 120-277 VAC ON/OFF CONTROL

sunne controls

INSTALLATION INSTRUCTIONS

1. **Set the Voltage Selection Switch to the appropriate voltage for the application.** Failure to select the correct voltage will result in thermostat malfunction or damage the thermostat permanently.
2. Connect wires using the wiring diagram. Wire nut off all unused wires. All connections must be located in the outlet box.
3. Install the T170 base with the two furnished mounting screws to a standard 4 x 4 x 2-1/8" square device box with a 2" x 4" mud ring mounted horizontally. Tighten the screws evenly but do not over tighten.
4. To use a remote sensor on units with local sensing capability, remove jumper JP-1 to disable local sensing. Failure to remove JP-1 will cause improper operation of the thermostat with a remote probe installed.
5. Verify that the circuit board is firmly snapped into the cover and has not been dislodged during handling.
6. Install the cover assembly. Press firmly to engage the cover locking snaps.
7. Checkout: After wiring and installation is complete, energize the system. Set fan to ON. Select each fan speed, if available, to verify operation. Set the system button to AUTO, or available selection. Using the UP arrow adjust temperature more than 5F above ambient temperature to cycle on heating. Using the DOWN arrow adjust the temperature to 5F below ambient temperature to cycle on cooling.
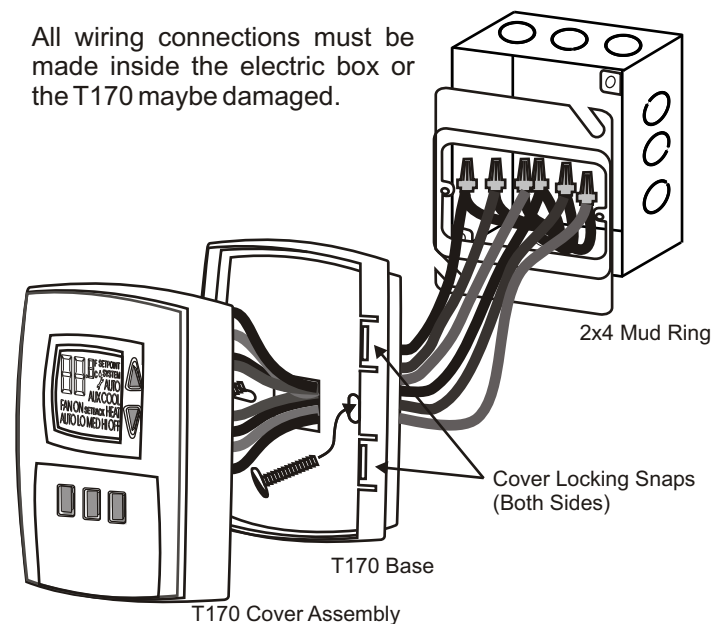
MOUNTING THE THERMOSTAT
Thermostat mounts to a 4x4 box with a 2x4 mud ring.

⚠ **CAUTION**

All wiring connections must be made inside the electric box or the T170 maybe damaged.

2x4 Mud Ring

Cover Locking Snaps (Both Sides)

T170 Base

T170 Cover Assembly

⚠ WARNING

READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.

Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.

To avoid electrical shock or damage to equipment, disconnect power before installing or servicing.

Before installing this control the Voltage Selection Switch must be placed in the correct position. See instructions.

To avoid potential fire and/ or explosion do not use in potentially flammable or explosive atmospheres.

Retain these instructions for future reference. This product, when installed, will be part of an engineered system whose specifications and performance characteristics are not designed or controlled by Sunne Controls. You must review your application and national and local codes to assure that your installation will be functional and safe.

TYPICAL OPERATION

SYSTEM BUTTON OPERATION
OFF	All thermostat outputs are off. Fan is still operational if FAN ON is selected.
AUTO	The thermostat automatically selects heating or cooling mode depending upon the set point and room temperature. The appropriate HEAT or COOL icon are illuminated if demand exists. A 3°F dead-band is provided to prevent short cycling between heating and cooling modes. After changeover, the control point automatically shifts so that the control off point equals the set point temperature.
COOL	The thermostat operates as a cooling only thermostat.
HEAT	The thermostat operates as a heating only thermostat.

UP/ DOWN ARROW BUTTON OPERATION
Up/Down arrows increased or decreased temperature.
FAN BUTTON OPERATION
In ON the fan output is continuous. In AUTO the output cycles with demand. In OFF all outputs are off. Some models are available with Controlled Off and or Staged Fan.
SPEED BUTTON OPERATION
Fan speed is determined by manual selection of HI, MED, or LO. Some models are factory configured for staged fan and do not have speed selection available. Holding this button in for 5 seconds will toggle the displayed temperature from Fahrenheit to Celsius.
F / C BUTTON OPERATION
Some models have a F/C button instead of a Speed Button. This button toggles from Fahrenheit to Celsius.

⚠ **CAUTION**

- Use copper wire only, insulate or wire nut all un-used leads.
- Care should be used to avoid electrostatic discharge to the T170 thermostat.
- This unit has configuration jumpers. You may need to re-configure this thermostat for your application. See page 3.

SERVICE MENU

SERVICE MENU ACCESS
Access to the Service Menu:
1. Hold the UP Arrow and DOWN Arrow buttons down for 5 seconds.
2. Current display icon will be turned off.
3. Service Menu numbers 1 through 9 are available. The SYSTEM button is used to scroll to the item to be changed.
4. The UP and DOWN buttons adjust the selection.

HOLD BOTH FOR 5 SECONDS — STEP THROUGH SELECTIONS

AND

SYSTEM

TEMPERATURE ADJUSTMENT
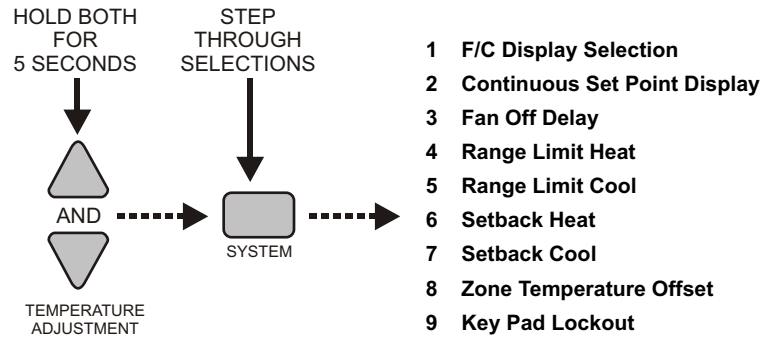
1 **F/C Display Selection**
2 **Continuous Set Point Display**
3 **Fan Off Delay**
4 **Range Limit Heat**
5 **Range Limit Cool**
6 **Setback Heat**
7 **Setback Cool**
8 **Zone Temperature Offset**
9 **Key Pad Lockout**

SERVICE MENU FUNCTIONS

1 - F/C DISPLAY SELECTION
At this feature the F and C icons are illuminated. The selected icon will be flashed. The Up or Down Arrow button can be depressed to toggle between F or C.

2 - CONTINUOUS SET POINT DISPLAY
At this feature either the F or C icon, current digits and the SETPOINT icon will be displayed. If the Continuous set point display is enabled the SETPOINT icon will flash. The Up or Down Arrow button will toggle between continuous display of set point and display of zone temperature.

3 - FAN OFF DELAY
The FAN, OFF and digits are displayed. Digits represent the number of seconds the fan will stay on after the heating and cooling outputs are turned off. The Up or Down Arrow button can be depressed to increase / decrease value from 0-255 seconds.

4 - RANGE LIMIT LO
The display reads the current minimum range setting, SETPOINT icon and LO icon. The Up or Down Arrow button can be depressed to increase / decrease value.

5 - RANGE LIMIT HIGH
The display reads the current maximum temperature range adjustment, SETPOINT icon and LO icon. The Up or Down Arrow button can be depressed to increase / decrease value.

6 - SETBACK HEAT
The display reads current temperature range adjustment, the SETBACK icon and the HEAT icon. The Up or Down Arrow button can be depressed to increase / decrease value.

7 - SETBACK COOL
The display reads current Cool setback value, the SETBACK icon and the COOL icon. The Up or Down Arrow button can be depressed to increase / decrease value.

8 - ZONE TEMPERATURE OFFSET
The display reads ones and tenths (0.0) with leading minus sign. The Up or Down Arrow button can be depressed to increase / decrease value +/- 9F. Increments are made in 1F and 0.5C.
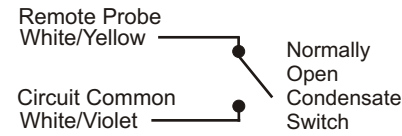
9 - KEYPAD LOCKOUT
The ON and OFF icons are displayed. The enabled icon is flashing. OFF is the default. ON disables the keypad except for entry into the service menu. The Up or Down Arrow button can be depressed to increase / decrease the value.
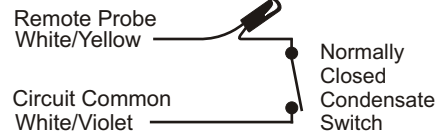Note: These values are stored and recalled in the event of a power failure.

CONDENSATE OVERFLOW INTERRUPT
The remote probe input can be used with a condensate overflow switch (CO), either in conjunction with a remote probe (normally closed CO switch) or with local sensing (normally open CO switch). When condensate switch activates, the T170 will display the service wrench and disable all outputs.
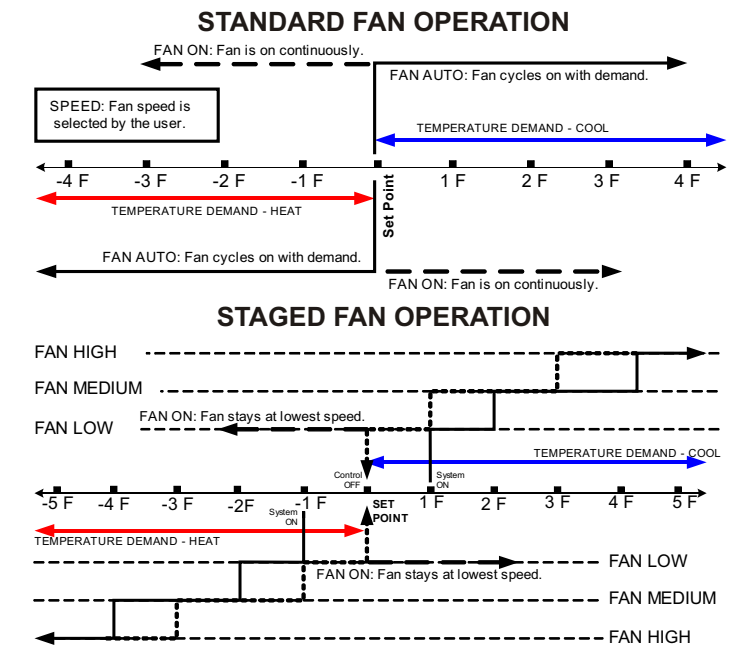
Local Sensor Installation
Remote Probe White/Yellow
Circuit Common White/Violet
Normally Open Condensate Switch

Remote Probe Installation
Remote Probe White/Yellow
Circuit Common White/Violet
Normally Closed Condensate Switch

FAN OPERATION
Your thermostat may be factory configured for standard or staged fan operation. Units with standard fan operation have a fan speed selection button.

Staged Fan Configuration: Factory configuration is available for automatic selection of fan speed to ensure occupant comfort while using the most effective fan speed.

STANDARD FAN OPERATION
FAN ON: Fan is on continuously.
FAN AUTO: Fan cycles on with demand.
SPEED: Fan speed is selected by the user.
TEMPERATURE DEMAND - COOL
-4 F -3 F -2 F -1 F Set Point 1 F 2 F 3 F 4 F
TEMPERATURE DEMAND - HEAT
FAN AUTO: Fan cycles on with demand.
FAN ON: Fan is on continuously.

STAGED FAN OPERATION
FAN HIGH
FAN MEDIUM
FAN LOW
FAN ON: Fan stays at lowest speed.
Control OFF   System ON
TEMPERATURE DEMAND - COOL
-5 F -4 F -3 F -2F System ON SET POINT 1 F 2 F 3 F 4 F 5 F
TEMPERATURE DEMAND - HEAT
FAN ON: Fan stays at lowest speed.
FAN LOW
FAN MEDIUM
FAN HIGH

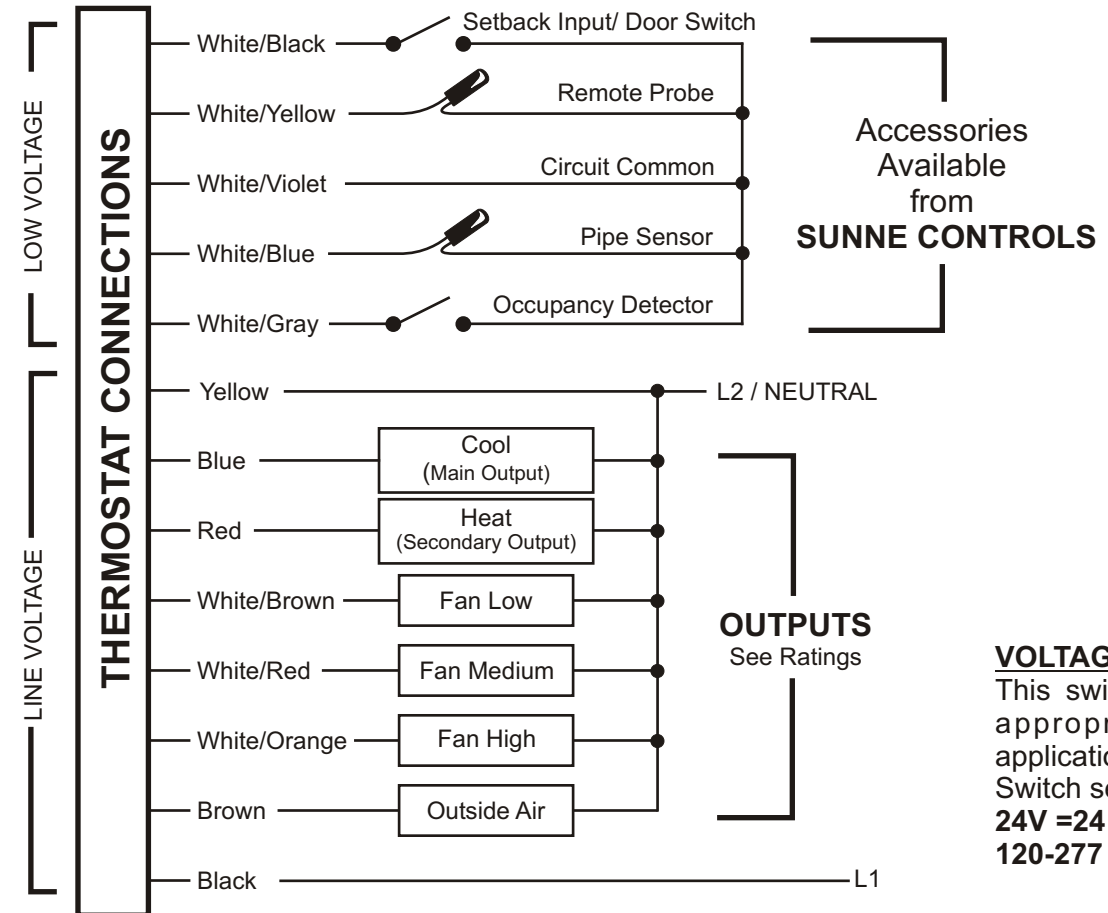## CONTROLLED OFF FACTORY CONFIGURATION
A factory configuration may be provided to ensure minimum heat and cool requirements. With this configuration the heat and cool outputs are automatically cycled on at the heat setback limit. Your thermostat may not have this feature.

OUTPUT RATINGS

VOLTAGE	INDUCTIVE		RESISTIVE AMPS	PILOT DUTY	HP
	FLA	LRA			
24 VAC	NA	NA	NA	24 VA	NA
120 VAC	5.8	34.8	6.0	125 VA	1/4
240 VAC	2.9	17.4	5.0	125 VA	1/4
277 VAC	2.4	14.4	4.2	125 VA	1/4

COMBINED LOAD CURRENT NOT TO EXCEED 20 AMPS
MOUNT ONLY TO A GROUNDED METALLIC BOX
LOW VOLTAGE WIRING IS CLASS 2

WIRING DIAGRAM

THERMOSTAT CONNECTIONS

LOW VOLTAGE
- White/Black — Setback Input/ Door Switch
- White/Yellow — Remote Probe
- White/Violet — Circuit Common
- White/Blue — Pipe Sensor
- White/Gray — Occupancy Detector

Accessories Available from SUNNE CONTROLS

LINE VOLTAGE
- Yellow — L2 / NEUTRAL
- Blue — Cool (Main Output)
- Red — Heat (Secondary Output)
- White/Brown — Fan Low
- White/Red — Fan Medium
- White/Orange — Fan High
- Brown — Outside Air
- Black — L1

OUTPUTS See Ratings

⚠ **CAUTION**

VOLTAGE SELECTION SWITCH
This switch must be placed in the appropriate position prior to application of power.
Switch selection is as follows:
24V =24 VAC
120-277 V= 120, 240 or 277 VAC

CAUTION: HIGH-VOLTAGE - REMOVE POWER BEFORE SERVICING
JP4 JUMPER
JP4
JP3 JUMPER
JP3
SWITCH
24V   110-277V
JP1
JP1 JUMPER

CIRCUIT BOARD
In Cover

VOLTAGE SELECTION SWITCH

JP4 JUMPER SELECTION
This jumper selects between 2-Pipe (jumper ON) and 4-Pipe (jumper OFF) operation. See page 4 for more detail.

JP3 JUMPER SELECTION
This jumper is shipped normally open. Placement of a jumper allows for Occupancy Detection and Door Switch Only Operation.

JP1 JUMPER SELECTION
Removal of this jumper allows the sensor to be located in a remote location. Accessory sensors are available in standard 60" lengths but can be extended to meet application requirements.