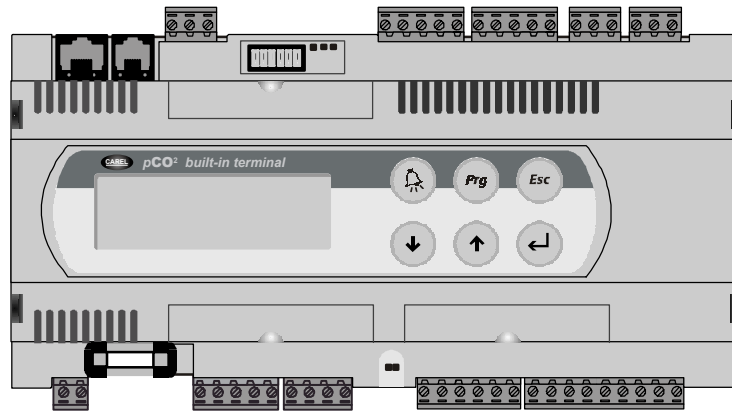


Installation, Operation, and Maintenance Manual



WARNING

Disconnect and secure all electrical power to the "OFF" position on the unit prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.

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Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of five years from the shipment date. Any units or parts which prove to be defective during the warranty period will be repaired or replaced at our option when returned to our factory, transportation prepaid.

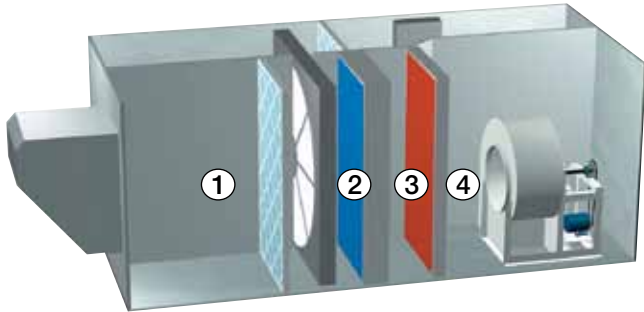
Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Temperature Control Package Description

The Temperature Control Package enables models ERH, ERCH, or ERT to temper outdoor air to desired temperature and relative humidity. The controller and accompanying sensors are mounted in the unit, wired, and fully programmed at the factory. Default settings are pre-programmed, but are field adjustable. This unit has been programmed for either discharge or room control. Discharge control will temper the outdoor air to the desired discharge condition. Room control will temper the outdoor air to meet the desired room air conditions with the use of a remote thermostat. An optional humidistat is available for tighter control of room humidity conditions.

Sensor locations



- ① Outdoor air sensor (summer/winter changeover)
- ② After-wheel temperature sensor (energy savings readout, coil freeze protection)
- ③ After-coil cooling temperature sensor (on units with cooling)
- ④ Discharge temperature sensor

Summer Sequence of Operation

1. Outdoor air sensor ① detects high enthalpy and activates summer operation mode.
2. The energy wheel cools and dehumidifies the outdoor air.

No Room Thermostat or Humidistat

- 3a. After-coil temperature sensor ③ sends signal to controller to regulate condensing unit stages or chilled water valve. DX or chilled water will cool air to the specified after-coil set point.
- 3b. Sensor ④ detects discharge air temperature (for reheat). Controller adjusts hot water valve, electric heat, or indirect fired furnace stages to meet the summer heat setting.

Room Thermostat only

- 3a. When the room temperature set point is met, the DX or chilled water coil will cool air to the specified after-coil set point. If the unit is equipped with reheat, the air will be reheated to the specified summer heat setting.
- 3b. When the room temperature is above the summer set point, the after-coil temperature will drop to the specified after-coil override setting and the discharge temperature will drop to the summer heat override setting (i.e. turn the heater off).

Room Humidistat only

- 3a. When the humidity set point is satisfied, the DX or chilled water coil will cool air to the specified after-coil set point. If the unit is equipped with reheat, the air will be reheated to the specified summer heat setting.
- 3b. When the humidity in the space is too high, the DX or chilled water coil will drop to the specified after-coil override setting with no change in reheat.

Room Thermostat and Humidistat

- 3a. When the room temperature and humidity set points are satisfied, the DX or chilled water coil will cool air to the specified after-coil set point. If the unit is equipped with reheat, the air will be reheated to the specified summer heat setting.
- 3b. If the temperature is met, but the humidity is high, the after-coil temperature will drop to the specified after-coil override setting with no change in reheat.
- 3c. If the temperature is high (regardless of the humidity conditions in the space), the after-coil temperature will drop to the specified after-coil setting and the discharge temperature will drop to the summer heat override setting (i.e. turn the heater off).

Winter Sequence of Operation

1. Sensor ① detects that the outdoor air enthalpy has fallen below the summer/winter changeover enthalpy and activates winter operation mode which disables the unit's cooling capabilities.
2. The energy wheel heats and humidifies the outdoor air.











No Room Thermostat

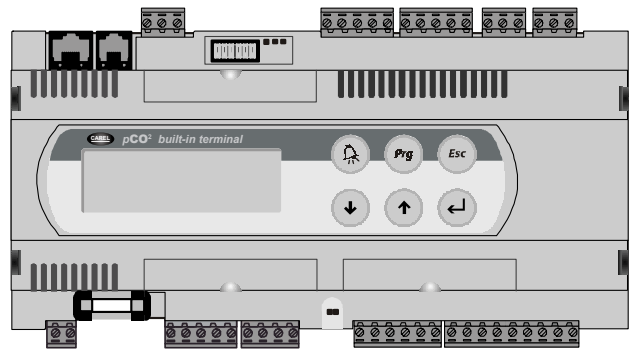
3. Discharge air sensor ④ senses temperature. Controller adjusts hot water valve, IG furnace, or electric heat stages to the winter heat setting.

With Thermostat

- 3a. When room temperature set point is met, the unit will discharge air at the winter heat setting.
- 3b. When room temperature is below the set point, the unit will discharge air at the heat override setting.

Navigating the Controller

-  Alarm indicator for water coil freeze protection
-  Access Set Point loop (See page 4)
-  Return to the Status screens (See page 3)
-   Used to scroll through the screens and change set points.
-  Used to enter a screen to change set points and advance to the next set point
-   Access Unit Set-Up Loop (See pages 5-6)
-   Access Time and Holiday Loop (See page 5)



Getting Started

Figure 1: Start-up screen

Greenheck Fan Corp. Version: 2.xx Temperature Control Cooling setting: 0

Figure 1 shows the screen that appears when power is initially supplied to the controller. It lists the program version and the cooling setting.

Table 1: Cooling settings








Cooling Method	Cooling Setting
0	Chilled Water
1	1-stage DX
2	2-stage DX

The cooling settings are as shown in Table 1. Compare the settings on the screen with the options on the unit. Jumpers control all the settings on the first screen. If there is a discrepancy between what was ordered and the first screen, compare the wiring on the controller to the wiring diagram on page 7 or on the unit's control center door and adjust accordingly.

To allow the fans and energy wheel in the unit to operate, wire a switch or jumper between terminals 2 and 3 in the unit's control center.

Programming Loops


Several programming loops may be accessed to change settings on the controller. Navigation through the loops remains the same throughout the program.

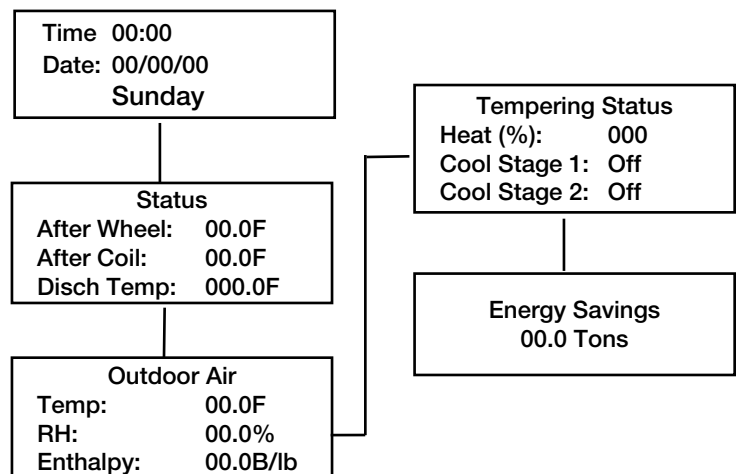
1. To scroll through the screens, use the  and  keys.
2. To enter a screen to change a set point, press .
3. Use  and  to change the set points.
4. Press  to advance to the next set point on the screen.
5. When the set points have been changed, press  until a solid box appears in the upper left corner of the screen. You may then resume scrolling through the screens.

Status Loop

The Status Loop monitors the following conditions:

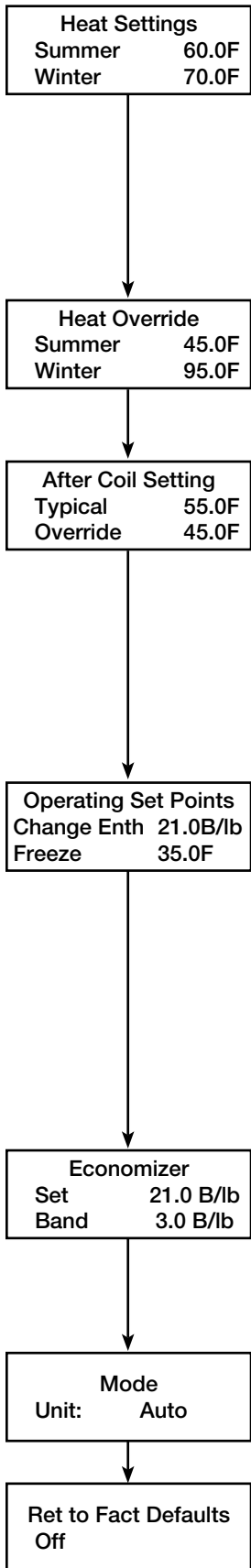
- 1) Date and Time
- 2) System set points
- 3) Outdoor air conditions
- 4) Tempering status
- 5) Energy savings calculation

To enter the Status Loop, press 



Set Point Loop Prg

All temperature settings may be accessed in the set point loop; default temperature settings are shown on the left. To access the Set Point Loop, press Prg.



Heat Settings

No Room Thermostat

If reheat in the summer is required, adjust the summer heat setting to the desired discharge temperature. If no reheat is required, set the summer temperature below the after-coil setting. Adjust the winter set point to the desired discharge temperature.

With Room Thermostat

The winter heat setting is the temperature the unit will discharge when the thermostat is satisfied.

Heat Override

Only applicable on units with Room Thermostat

The summer set point is the temperature the unit will discharge when the thermostat is calling for cooling in the summer. The winter set point is the temperature the unit will discharge when the unit is calling for heat in the winter.

After-Coil Setting

No Room Thermostat or Humidistat

The typical setting is the desired temperature leaving the cooling coil. The override setting is not applicable when no thermostat or humidistat is hooked to the controller.

With Room Thermostat and/or Humidistat

The typical setting is the temperature after the cooling coil when the thermostat is satisfied. The Override is the after-coil temperature when the room is above the summer thermostat setting or when the room humidity is higher than the humidity set point.

Operating Set Points

Change Enth

Change Enth is the enthalpy at which the controller will switch from summer to winter operation. This set point has a factory programmed 0.5 btu/lbm dead-band built-in to prevent the unit from rapidly switching from summer to winter operation.

Freeze (Visible with Chilled Water Coil only)

The controller protects chilled water coils from freezing. When conditions before the coil fall below the field-adjustable set point, the controller opens the water valves completely, shuts down the supply fan and energy wheel, and sounds an alarm on the controller in the unit. The controller also outputs a 10 VDC signal that may be monitored remotely.

Economizer (Visible with Internal Economizer only)

“Set” is the enthalpy at which the energy wheel will be de-energized for “free cooling” conditions.

“Band” is the range above and below the set point that the wheel will be de-energized. (i.e. For the default setting, the wheel will be de-energized between 18 and 24 Btu/lb.)

Mode

“Auto” allows all features to operate as programmed on the controller.

“On” overrides the functionality of the controller (i.e. the supply blower, exhaust blower and the energy wheel will always be energized).

Ret to Fact Defaults

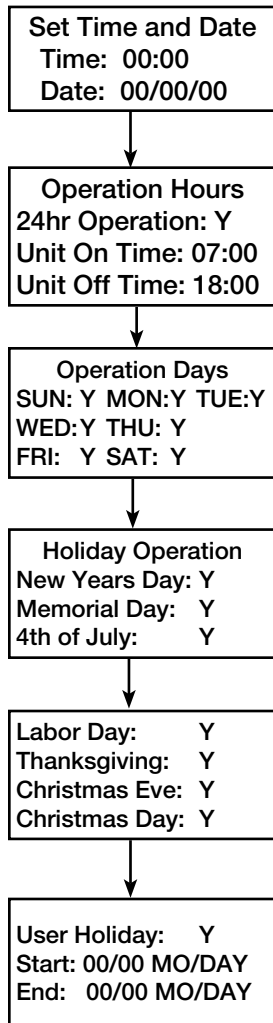
“On” returns all settings to the original factory settings. Once “On” is selected and ← is pressed, the display resets to the “Off” selection.

WARNING! When Return to Factory Defaults is turned to “On”, the blowers, energy wheel and tempering options will be energized.

Time and Holiday Loop



To set the days and times the unit will be operating, access the Time and Holiday Loop by depressing **Esc** and **Enter** simultaneously. Default operation is 24 hours a day, 7 days a week.



Set Time and Date

Set the current time and date. The controller does not adjust for daylight savings time.

Operation Hours

24 Hour Operation: Set to “Y” if the unit will be operating 24 hours per day. Set to “N” if the unit will not be. If “N” is selected, set the Unit On Time and Unit Off time to the time of day the unit will be turning on and off, respectively. All time settings are in military time.

Operation Days

For each day of the week, set to “Y” if the unit will be running, “N” if it will not.

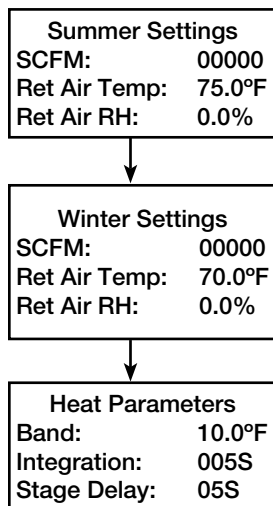
Holiday Operation

Several holidays are listed. Set to “Y” if the unit will be in operation on those days, “N” if it will not.

User Holiday

One User Holiday may be entered. If “N” is selected, set the day and month the unit will cease operation and the day and month it will start up again.

Unit Set-Up Loop



(Cont'd on next page)

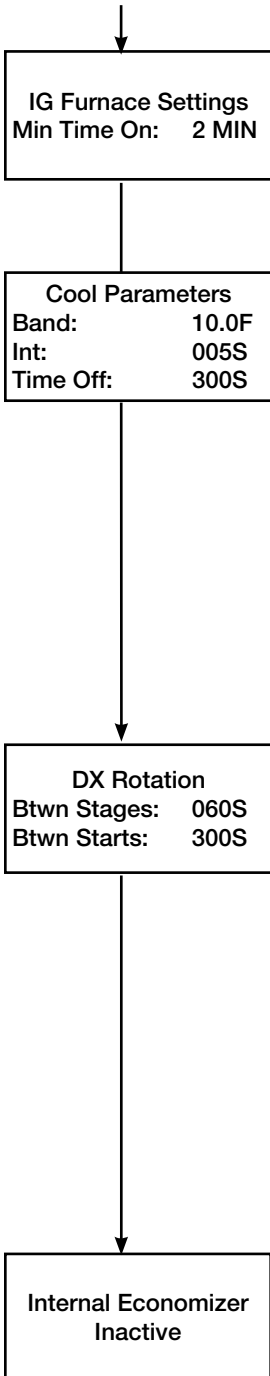
Summer / Winter Settings

The controller is programmed to calculate the real-time energy savings achieved by the use of the energy wheel in tons. The savings may be read at the controller, or it may be field-wired (see Controller Wiring on page 7) to track remotely by an analog output from the controller. 0-10 VDC output corresponds to 0-50 tons of energy savings. To initialize the energy savings analysis, set the outdoor air SCFM, as well as the return air temperature and relative humidity. Set these values for both summer and winter.

Heat Parameters

- Band** The band is the dead-band around the heating set points. The smaller the band setting, the more sensitive the controller will be to small temperature changes.
- Integration** The integration setting (in seconds) is the time necessary for the integer value to be doubled (i.e. increasing the time setting decreases the response time).
- Stage Delay** The stage delay is the minimum time between activation of stages for electric heat or 2-stage IG furnaces. The default setting for electric heat is 5 seconds and 60 seconds for IG furnaces.

Unit Set-Up Loop (cont'd)



IG Furnace Settings *(Visible with Indirect Fired Gas Furnace only)*

Min Time On The minimum time the furnace stages on.

Cool Parameters

Band The dead-band around the cooling set points. The smaller the band setting, the more sensitive the controller will be to small temperature changes.

Integration The integration setting (in seconds) is the time necessary for the integer value to be doubled (i.e. increasing the time setting decreases the response time).

Time Off For DX cooling only. The delay (in seconds) before an "On" signal is sent to the compressor upon initial power being supplied to the controller. This feature provides a safety delay for the compressors to prevent short-cycling during power interruption to the controller. This delay will be in addition to any time delays built into the compressor.

DX Rotation *(2-stage condensers only)*

To avoid short-cycling the condensing unit, a time delay between stages and a time delay between starts may be set. The condensing unit may also have delays built-in, so ensure compatibility between the times set in the controller and condenser.

Btwn Stages Minimum time which must elapse between different compressors turning on.

Btwn Starts Minimum time which must elapse between a compressor turning off and turning on again.

The controller has stage auto-rotation programmed into it to equalize the run time between the stages. On a call for cooling, the first stage will be activated. If, after the time delay, the cooling load is not met, the second stage will start. When the cooling load is satisfied, the first stage will turn off and the second stage will continue to run.

Internal Economizer

Select between Inactive and Active. Internal economizer is recommended when the energy recovery unit provides 100% of the outdoor air. During economizer mode, the energy wheel is de-activated to enable "free-cooling". Refer to page 4 to set the enthalpy at which economizer mode will be activated.

The controller also has external economizer capabilities. External economizer is recommended when the energy recovery unit is used in conjunction with an air-handling unit that has its own economizer section. When the energy recovery unit gets the economizer signal from the air handler, the supply blower, outdoor damper, and energy recovery wheel are de-energized. Refer to the wiring diagram on page 7 for wiring the external economizer contact into the controller.

Options

Thermostat (Supplied by GREENHECK or others)

A summer and winter thermostat are required for use with this controller. The thermostat contacts must close on a call for cooling in the summer and heating in the winter.

Humidistat (Supplied by GREENHECK or others)

The humidistat must close on the call for dehumidification.

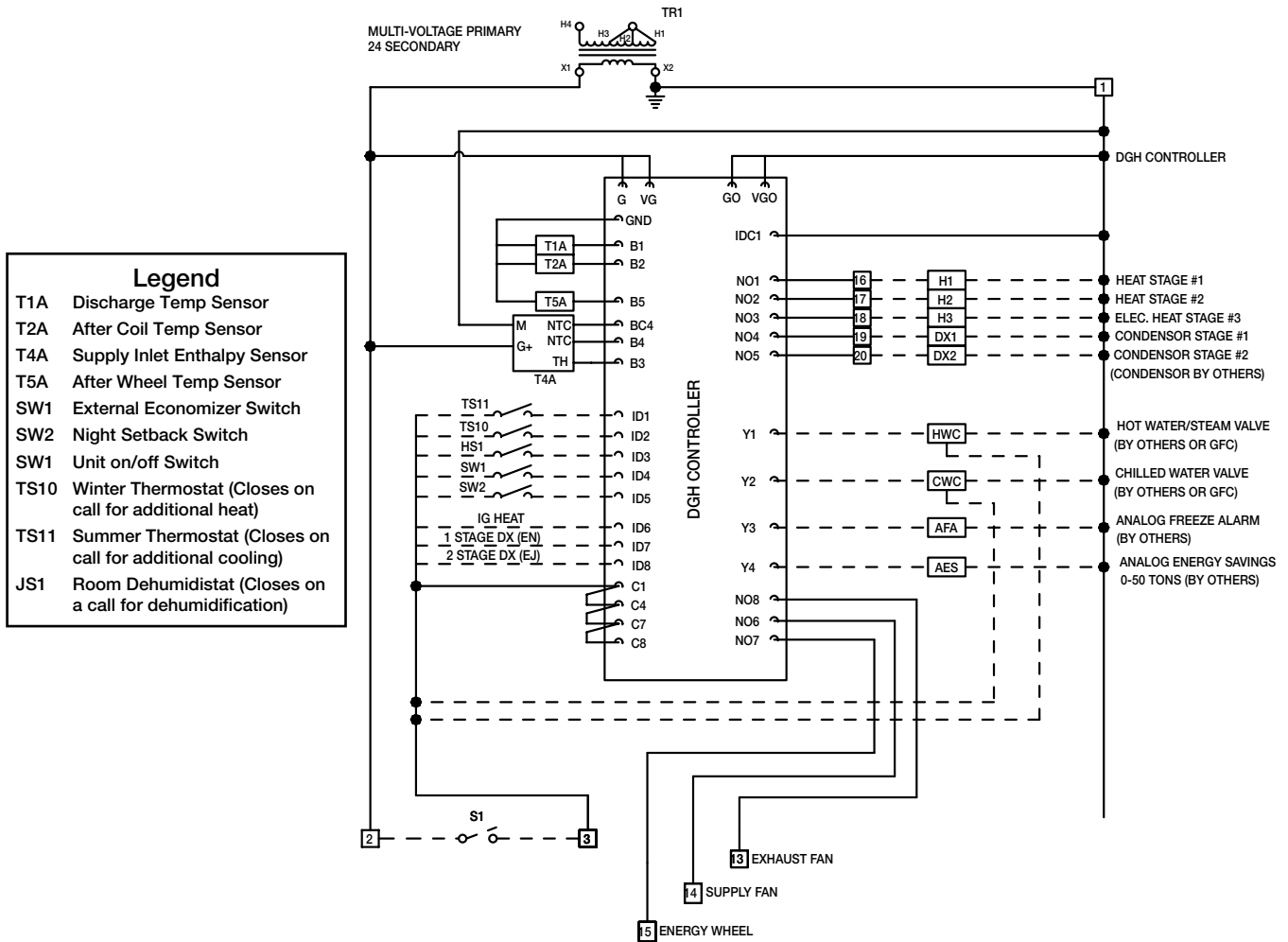
Water Valves (Supplied by GREENHECK)

Water valves must be Normally Closed and use a 0-10 VDC control input.

Night Setback (Switch supplied by GREENHECK or others)

If a recirculation damper is provided on the unit, a remote switch or timer may be wired into the controller to put the unit in night setback operation. Night setback will close the outdoor air and discharge damper, shut off the energy wheel and exhaust blower, and open the recirculation damper to recirculate air during unoccupied mode.

Controller Wiring

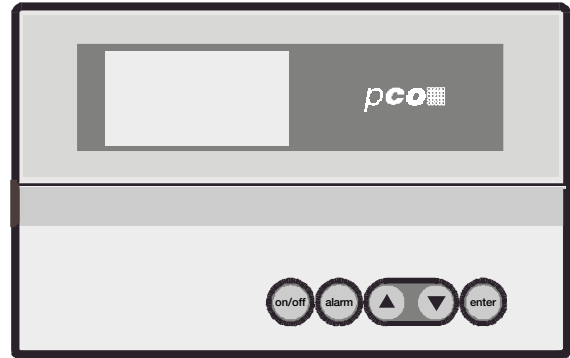


Note: When no jumpers or both jumpers are wired into ID7 and ID8, the unit is setup for chilled water control.

Remote Interface Panel

If a Remote Interface Panel is ordered, it may be mounted in the desired location in the building and connected to the controller in the energy recovery unit by a telephone cable. The controller may then be monitored and programmed from that location.

The face of the panel contains five buttons, but the face of the panel may be flipped down to reveal more buttons.



- on/off Turns the unit on and off
- alarm Signals that the unit is in freeze protection mode
- ▲ ▼ Used to scroll through the screens and change set points
- enter Used to enter a screen to change set points and advance to the next set point
- prog. Used to access the Set Point loop (under the face of the panel)
- set Return to the Status Screen (under the face of the panel)
- enter set Used to access the Time and Holiday Loop
- prog. ▲ Used to access the Unit Set-Up Loop

Troubleshooting for Temperature Controller

Symptom	Possible Cause	Corrective Action
Unit not running	Unit is in unoccupied mode	Ensure date, time, and operational days are set correctly.
Supply blower not running	External economizer functioning Freeze protection functioning	Ensure economizer setting is correct. Check for freeze alarm on the controller. Check freeze protection set point.
Exhaust blower not running	Unit is in night setback mode	Check field mounted night setback switch or timer for correct settings.
Energy wheel not running	External economizer functioning Internal economizer functioning Freeze protection functioning Unit is in night setback mode	Ensure economizer mode setting is correct. Check set point for internal economizer. Check for alarm on the controller and the freeze protection set point. Check field mounted night setback switch or timer for correct settings.

