Model 122 RCN
PTAC/PTHP/FAN COIL CONTROL NODE OPERATION

OUTPUTS

G1 = FAN 1	**G2** = FAN 2	**G3** = FAN 3
O/B = Rev Valve	**W** = HEAT	**Y** = COMPRESSOR

Operating Modes Summary (Refer to Logic Tables 1 – 5):

1. **PTAC (Standard)** — Fan will Speed-Hunt† in AUTO. Fan speed 1*, 2 or 3 may be selected to run the fan continuously at that speed. **'Y'** terminal drives compressor. 3-minute short-cycle delay and minimum runtime active on **Y** terminal*.
2. **PTAC (Energy Saver)** — Fan will Speed-Hunt† in AUTO. Fan runs only when heating or cooling. Manually selecting fan speed 1*, 2 or 3 will cycle the fan with each call for heating or cooling at that speed. **Y** terminal drives compressor. 3-minute short-cycle delay and minimum runtime active on **Y** terminal.
3. **PTHP (Heat Pump)** — Fan will Speed-Hunt† in AUTO. Fan speed 1*, 2 or 3 may be selected to run the fan continuously at that speed. **Y** terminal drives compressor, **O/B** terminal drives reversing valve. 3-minute short-cycle delay and minimum runtime active on **Y** terminal*.
4. **FAN COIL (Without Flow Valve)** — Fan will Speed-Hunt† in AUTO. Fan runs only when heating or cooling. Manually selecting fan speed 1*, 2 or 3 will cycle the fan with each call for heating or cooling at that speed. **Y** and **W** are not connected.
5. **FAN COIL (With Flow Valves)** — Fan will Speed-Hunt† in AUTO. Fan speed 1*, 2 or 3 may be selected to run the fan continuously at that speed. Use **Y** to drive the cooling valve, **W** drives heating valve. 3-minute short-cycle delay on **'Y'** terminal is not enforced in this control configuration.

COOLING:
If Temperature is ≥1 °F above set point, **Y** is active. **O/B** terminal is active only in heat pump mode (discussed later). In FAN COIL mode, **Y** is used to operate the cooling flow valve.

HEATING:
If Temperature is ≥1 °F below set point, **W** is active. In heat pump mode **Y** is 1st stage heat, **W** is Aux / 2nd stage.

HEAT PUMP:
Mode = COOL and temperature is ≥1 °F above set point, **Y** is active. Mode = HEAT and temperature is ≥1 °F below set point **Y** is active 1st stage heat — 2nd stage heat (**W**) is active if temperature is ≥2 °F below set point. Selectable **O** or **B** reversing valve logic (discussed later). **O logic** = active with **Y** when in call for cooling. **B logic*** = active with **Y** when in call for heating.

SHORT CYCLE DELAY:
Y terminal remains off / delays 3-minutes from last cooling (or heating cycle in heat pump mode) and upon power-up*. This can be changed to zero delay in Configuration Setup. (Refer to Configuration Table 2 below.)

MINIMUM COMPRESSOR RUNTIME:
Short cycling due to sudden temperature changes is not permitted. Once called on, the **Y** terminal will remain active for a minimum of 3-minutes unless the user manually ends a call for cooling (or heating in heat pump mode) by changing the thermostat set point temperature or mode of operation.

* Factory default setting.

† Fan Speed-Hunt is a Fan Auto function that automatically sets the fan speed based on departure from the setpoint temperature. E.g., 1º from setpoint = Fan 1, 2º from setpoint = Fan 2, 3º from setpoint = Fan 3.

CONFIGURATION SETUP:

The 122 control node may require configuration changes before first operation depending on your application. Six configuration property tables guide the user to: 1. set Mode of Operation, 2. set compressor Short-Cycle delay ON or OFF, 3. set Max Fan Speed, 4. set Occupancy Mode, 5. set Occupancy Timeout Delay, 6. set Reversing Valve Logic. The configuration tables provide operational descriptions and factory default settings. Selections are indicated through the FLASH-COUNT of LED's D3 and D4. (Refer to Figure 1 at the end of this document.) D4 flashes 1 to 6 times to indicate the property table, D3 flashes as many as 6 times to indicate the specific operational logic or 'property' selected.

Referring to Figure 1, PB3 (Reset/Link button) switches the unit into or out of 'configuration' state, PB1 (Mode) selects which Table 1, 2, 3, 4, 5 or 6 is indicated by D4 FLASH-COUNT and PB2 (CLEAR) selects configuration as indicated by D3 FLASH-COUNT. **Pressing PB2 changes configuration of the RCN.** To review the current setup or change the configuration, refer to the configuration tables below for descriptions and perform the following:

1. If any device such as an occupancy sensor or door switch is wired to the J1 terminals, pull the terminal block off of the board before proceeding.
2. Press and hold PB3 until LED indicator lamps D4 & D3 flash alternately. (*NOTE: At any time during the setup process PB3 can be pressed again to return to normal operation.*)
3. D4 will flash once indicating Table 1, Operating Mode configuration, followed by D3 flashing 1 to 5 times indicating the specific configuration in Table 1 that is currently active. (*NOTE: D4 and D3 will flash repeatedly to indicate the Table and the configuration.*) Pressing PB2 will advance the configuration value by one. Press PB2 until the FLASH-COUNT corresponds to the desired configuration. (*Refer to Table 1.*)
4. Press PB1 to advance to Table 2, Short-cycle configuration, as indicated by D4 flashing 2 times, followed by D3 flashing 1 or 2 times. Since there are only two choices, PB2 will toggle between them. Press PB2 until the FLASH-COUNT corresponds to the desired configuration.
5. Press PB1 to advance to Table 3, Fan Speed configuration, as indicated by D4 flashing 3 times followed by D3 flashing 1, 2 or 3 times. Pressing PB2 will advance the configuration by one. Press PB2 until the FLASH-COUNT corresponds to the desired configuration.
6. Press PB1 to advance to Table 4, Occupancy Mode configuration, as indicated by D4 flashing 4 times. Pressing PB2 will advance the configuration value by one. (Refer to tables 4-1 and 4-2.) Press PB2 until the FLASH-COUNT corresponds to the desired configuration.
7. Press PB1 to advance to Table 5, Occupancy Timeout Delay configuration, as indicated by D4 flashing 5 times followed by D3 flashing 1 to 6 times. Pressing PB2 will advance the configuration value by one. Press PB2 until the FLASH-COUNT corresponds to the desired configuration.
8. Press PB1 to advance to Table 6, Reversing Valve Logic configuration, as indicated by D4 flashing 6 times followed by D3 flashing 1 or 2 times. Since there are only two choices, PB2 will toggle between them. Press PB2 until the FLASH-COUNT corresponds to the desired Reversing Valve logic configuration.
9. Press PB3 to return to normal control node operation. Reconnect terminal block J1 if it was removed.

NOTE: At this time the node is running in the configuration last indicated by D4 and D3 in each of the configuration property tables. Changes are saved in non-volatile memory.

CONFIGURATION PROPERTY TABLES:

CONTROL MODE CONFIGURATION — TABLE 1				
		D4	D3	
	CONFIGURATION	FLASH COUNT	FLASH COUNT	DESCRIPTION
1	PTAC * (Factory Default)	1	1	Fan will speed-hunt in AUTO. Fan speed 1, 2 or 3 may be selected to run the fan continuously. (SEE LOGIC TABLE 1.)
2	PTAC (ENERGY SAVER)	1	2	Fan will speed-hunt in AUTO. Selecting Fan speed 1, 2 or 3 will cycle the fan with each call for heating or cooling at that speed. Continuous fan not allowed (SEE LOGIC TABLE 2.)
3	PTHP (HEAT PUMP)	1	3	Fan will speed-hunt in AUTO. Fan speed 1, 2 or 3 may be selected to run the fan continuously. (SEE LOGIC TABLE 3.)
4	FAN COIL (NO FLOW VALVE)	1	4	Fan will speed-hunt in AUTO. Selecting Fan speed 1, 2 or 3 will cycle the fan with each call for heating or cooling at that speed. Continuous fan not allowed (SEE LOGIC TABLE 4.)
5	FAN COIL (FLOW VALVE)	1	5	Fan will speed-hunt in AUTO. Fan speed 1, 2 or 3 may be selected to run the fan continuously at that speed. (SEE LOGIC TABLE 5.)

* Factory default setting.

SHORT-CYCLE CONFIGURATION — TABLE 2				
		D4	D3	
	CONFIGURATION	FLASH COUNT	FLASH COUNT	DESCRIPTION
1	Short Cycle Active * (Factory Default)	2	1	Y (Compressor) control line is held off for 3-minutes after a compressor run cycle or upon power up.
2	Short Cycle In-active	2	2	Y (Compressor) control line is allowed to energize immediately after a compressor run cycle or upon power up.

* Factory default setting.

MAX FAN SPEED CONFIGURATION — TABLE 3				
		D4	D3	
	CONFIGURATION	FLASH COUNT	FLASH COUNT	DESCRIPTION
1	Fan Speed 1 * (Factory Default)	3	1	Fan will speed-hunt in AUTO. Fan speed 1 may be selected to run the fan continuously.
2	Fan Speed 1 & 2 Enabled	3	2	Fan will speed-hunt in AUTO. Fan speed 1 or 2 may be selected to run the fan continuously.
3	Fan Speed 1, 2 & 3 Enabled	3	3	Fan will speed-hunt in AUTO. Fan speed 1, 2 or 3 may be selected to run the fan continuously.

* Factory default setting.

NOTE: Table 4-1 applies to firmware versions 2.25 and lower (see Figure 1 for label location)

	OCCUPANCY MODE CONFIGURATION — TABLE 4-1			
		D4	D3	
	CONFIGURATION	**FLASH COUNT**	**FLASH COUNT**	**DESCRIPTION**
1	Disabled * (Factory Default)	4	1	System does not respond to unoccupied status conditions.
2	Sensor detection method: Contact Closure = Unoccupied	4	2	System recognizes an unoccupied state by a contact closure on Input #1.
3	Thermostat detection method: Key press Activity = Occupied	4	3	System recognizes occupancy by thermostat key press activity. If no key press activity for occupancy timeout period system goes unoccupied. Defaults to occupied status upon power up reset.

* Factory default setting.

D3 will flash in normal operation when the node goes into the unoccupied state.

NOTE: Table 4-2 applies to firmware versions 2.26 and higher (see Figure 1 for label location)

	OCCUPANCY MODE CONFIGURATION — TABLE 4-2			
		D4	D3	
	CONFIGURATION	**FLASH COUNT**	**FLASH COUNT**	**DESCRIPTION**
1	OFF	4	1	System does not respond to unoccupied status condition.
2	2 °F drift from set point Contact Closure = Unoccupied	4	2	Temperature will drift 2-degrees (down in HEATING, up in COOLING) when an unoccupied condition is in effect.
3	4°F drift from set point Contact Closure = Unoccupied	4	3	Temperature will drift 4-degrees (down in HEATING, up in COOLING) when an unoccupied condition is in effect.
4	6°F drift from set point * Contact Closure = Unoccupied	4	4	Temperature will drift 6-degrees (down in HEATING, up in COOLING) when an unoccupied condition is in effect.
5	8°F drift from set point Contact Closure = Unoccupied	4	5	Temperature will drift 8-degrees (down in HEATING, up in COOLING) when an unoccupied condition is in effect.
6	10°F drift from set point Contact Closure = Unoccupied	4	6	Temperature will drift 10-degrees (down in HEATING, up in COOLING) when an unoccupied condition is in effect.

* Factory default setting.

D3 will flash in normal operation when the node goes into the unoccupied state.

OCCUPANCY TIMEOUT CONFIGURATION — TABLE 5				
		D4	D3	
	CONFIGURATION	FLASH COUNT	FLASH COUNT	DESCRIPTION
1	2 Minute Delay *	5	1	System responds to an unoccupied status condition within 2-minutes.
2	1 Hour Delay	5	2	System responds to an unoccupied status 1-hour after condition is sensed.
3	4 Hour Delay	5	3	System responds to an unoccupied status 4-housr after condition is sensed.
4	8 Hour Delay	5	4	System responds to an unoccupied status 8-hours after condition is sensed.
5	16 Hour Delay	5	5	System responds to an unoccupied status 16-hours after condition is sensed.
6	24 Hour Delay (Factory Default)	5	6	System responds to an unoccupied status 24-hours after condition is sensed.

* Factory default setting.

REVERSING VALVE LOGIC — TABLE 6				
		D4	D3	
	CONFIGURATION	FLASH COUNT	FLASH COUNT	DESCRIPTION
1	**B** - Reversing Valve Logic *	6	1	Heat pump mode: Reversing valve output active in call for HEATING.
2	**O** - Reversing Valve Logic	6	2	Heat pump mode: Reversing valve output active in call for COOLING.

* Factory default setting.

CONTROL LOGIC TABLES

		PTAC Mode (Standard)				
	Output	**Off**	**Cooling Fan Auto**	**Cooling Fan 1, 2 or 3**	**Heating Fan Auto**	**Heating Fan 1, 2 or 3**
CONTROL OUTPUTS TABLE	**G1 FAN 1**	CONTINUOUS FAN ALLOWED	ON ≥ 1° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 1° / OFF ≤ 0°	CONTINUOUS FAN
	G2 FAN 2	CONTINUOUS FAN ALLOWED	ON ≥ 2° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 2° / OFF ≤ 0°	CONTINUOUS FAN
	G3 FAN 3	CONTINUOUS FAN ALLOWED	ON ≥ 3° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 3° / OFF ≤ 0°	CONTINUOUS FAN
	O / B Rev Valve	OFF	OFF	OFF	OFF	OFF
	W (HTG)	OFF	OFF	OFF	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	Y (COMP)	OFF	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°°	OFF	OFF

Y Terminal (COMP) short-cycle delay = 3-minutes. (D5 LED will light during the short-cycle delay period.) **Logic Table 1**
Y terminal will remain active for a minimum of 3-minutes unless the user manually ends a call for cooling

		PTAC Mode (Energy Saver)				
	Output	**Off**	**Cooling Fan Auto**	**Cooling Fan 1, 2 or 3**	**Heating Fan Auto**	**Heating Fan 1, 2 or 3**
CONTROL OUTPUTS TABLE	**G1 FAN 1**	OFF	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	G2 FAN 2	OFF	ON ≥ 2° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 2° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	G3 FAN 3	OFF	ON ≥ 3° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 3° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	O / B Rev Valve	OFF	OFF	OFF	OFF	OFF
	W (HTG)	OFF	OFF	OFF	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	Y (COMP)	OFF	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°	OFF	OFF

Y Terminal (COMP) short-cycle delay = 3-minutes. (D5 LED will light during the short-cycle delay period.) **Logic Table 2**
Fan will not operate by itself. Fan only operates during a call for heating or cooling.

		P T H P M o d e (Heat Pump)				
	Output	**Off**	**Cooling Fan Auto**	**Cooling Fan 1, 2 or 3**	**Heating Fan Auto**	**Heating Fan 1, 2 or 3**
CONTROL OUTPUTS TABLE	**G1 FAN 1**	CONTINUOUS FAN ALLOWED	ON ≥ 1° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 1° / OFF ≤ 0°	CONTINUOUS FAN
	G2 FAN 2	CONTINUOUS FAN ALLOWED	ON ≥ 2° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 2° / OFF ≤ 0°	CONTINUOUS FAN
	G3 FAN 3	CONTINUOUS FAN ALLOWED	ON ≥ 3° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 3° / OFF ≤ 0°	CONTINUOUS FAN
	O / B Rev Valve	OFF	ON / OFF	ON / OFF	OFF / ON	OFF / ON
	W (HTG)	OFF	OFF	OFF	ON >2° / OFF ≤ 0°	ON ≥ 4° / OFF ≤ 0°
	Y (COMP)	OFF	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°

Y Terminal (COMP) short-cycle delay = 3-minutes. (D5 LED will light during the short-cycle delay period.)
O Terminal (reversing valve) O logic = active in cooling. B logic = active in heating.

Logic Table 3

		F a n C o i l M o d e (without Valves)				
	Output	**Off**	**Cooling Fan Auto**	**Cooling Fan 1, 2 or 3**	**Heating Fan Auto**	**Heating Fan 1, 2 or 3**
CONTROL OUTPUTS TABLE	**G1 FAN 1**	OFF	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	G2 FAN 2	OFF	ON ≥ 2° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 2° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	G3 FAN 3	OFF	ON ≥ 3° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°	ON ≥ 3° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	O / B Rev Valve	OFF	OFF	OFF	OFF	OFF
	W (HTG)	OFF	OFF	OFF	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	Y (COMP)	OFF	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°	OFF	OFF

Fan will not operate by itself. Fan only operates during a call for heating or cooling.

Logic Table 4

Fan coil with no valves application only uses fan **G1** – **G3** outputs. Terminals **Y**, **W** and **O** are not used.

CONTROL OUTPUTS TABLE	Output	Fan Coil Mode (with Valves) Off	Cooling Fan Auto	Cooling Fan 1, 2 or 3	Heating Fan Auto	Heating Fan 1, 2 or 3
	G1 FAN 1	CONTINUOUS FAN ALLOWED	ON ≥ 1° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 1° / OFF ≤ 0°	CONTINUOUS FAN
	G2 FAN 2	CONTINUOUS FAN ALLOWED	ON ≥ 2° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 2° / OFF ≤ 0°	CONTINUOUS FAN
	G3 FAN 3	CONTINUOUS FAN ALLOWED	ON ≥ 3° / OFF ≤ 0°	CONTINUOUS FAN	ON ≥ 3° / OFF ≤ 0°	CONTINUOUS FAN
	O / B Rev Valve	OFF	OFF	OFF	OFF	OFF
	W (HTG)	OFF	OFF	OFF	ON ≥ 1° / OFF ≤ 0°	ON ≥ 1° / OFF ≤ 0°
	Y (COMP)	OFF	*ON ≥ 1° / OFF ≤ 0°	*ON ≥ 1° / OFF ≤ 0°	OFF	OFF

Y terminal is used for cooling flow valve – No short-cycle delay.
W terminal is used for heating flow valve.

Logic Table 5

IMPORTANT NOTES:

*1.) The model 122 control node factory defaults to fan speed 1. If your application requires 2 or 3 fan speeds, be sure to select the number needed as described in the Fan Speed Configuration table above. Otherwise, the system will only energize **G1**. Fan speed hunt and manually selecting higher fan speeds at the thermostat will not cause **G2** or **G3** to energize.*

2.) If an occupancy method is enabled (see Occupancy Mode Configuration Table 4) D3 will flash to indicate when the node has gone into the unoccupied state.

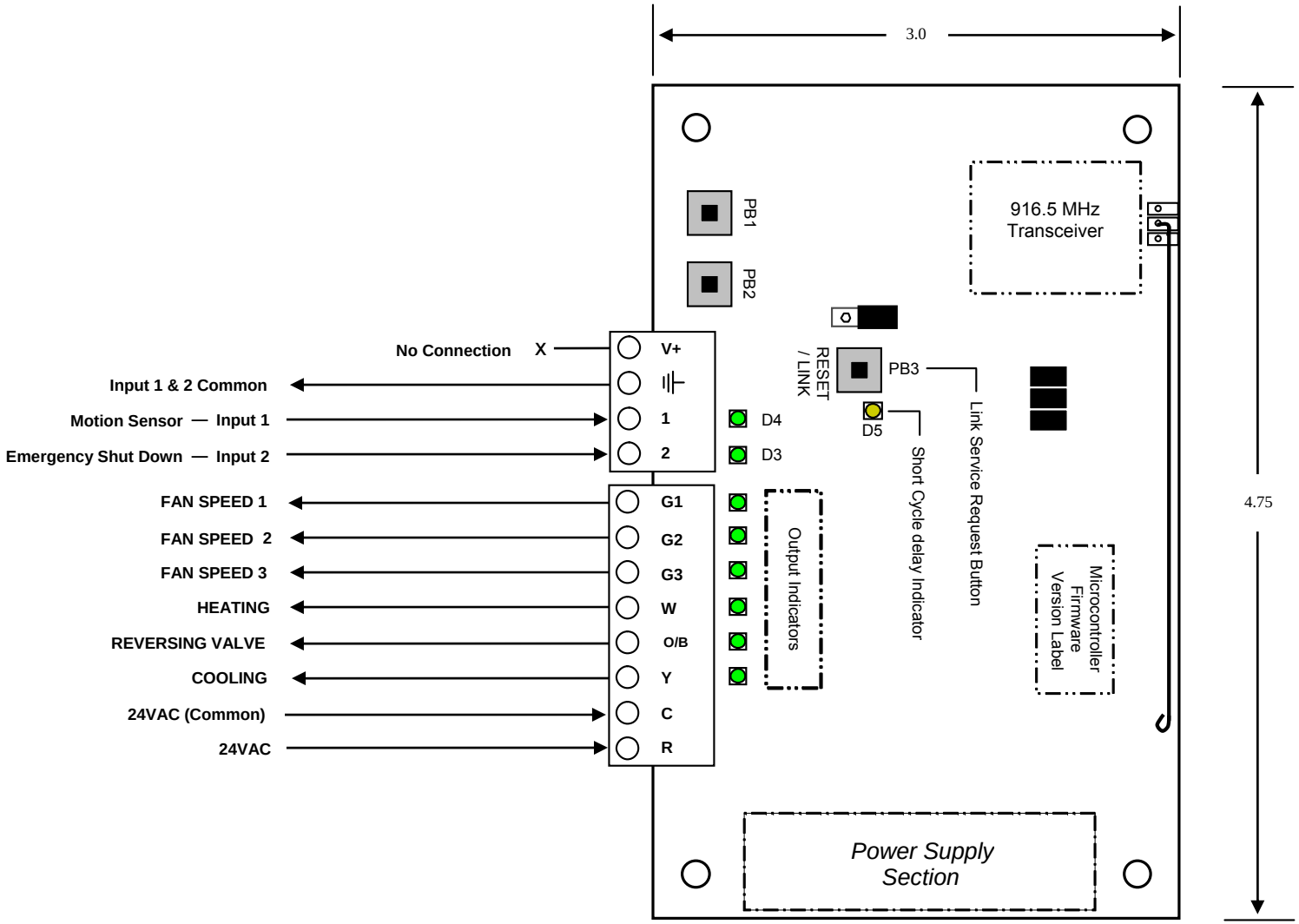

Figure 1

NOTES:
1.) D5 ON indicates a 3 minute short-cycle delay period is active.
2.) Use form A dry contact closure for input terminals 1 & 2
3.) D3 flashing in normal operation mode indicates the node has gone into an unoccupied state.
4.) Output 1 — 6 switches 24vac (R terminal potential) @ 0.50 amps each max.
5.) This device should be powered with a Class 2, U.L. listed transformer.
6.) Wiring should conform to all national and local electrical codes.
7.) See setup table and configuration instructions in this manual for setup options.

MODEL 122 PTAC CONTROL NODE — COAXIAL ANTENNA

The model 122 control node standard antenna option is a 1-meter long flexible coaxial cable. One end is permanently connected at the circuit board. Approximately 3" of the outside jacket and shield are striped back at the free end — this is the actual antenna. The coaxial antenna option allows the installer to mount the circuit board where most appropriate and secure, while positioning the antenna end in the most optimum position possible. Sheet metal control boxes, ductwork and pipes might inadvertently block the RF signal to and from the control node. For best RF performance, the installer should attempt to route the antenna to a location that is clear of potential signal shielding as much as possible. In PTAC equipment, the antenna is often located in front of the indoor coil, between the coil and the PTAC cover if the cover is plastic or near the makeup air opening at the bottom of the unit if it is metal. Depending on the model of PTAC, there is sometimes a plastic blank used to cover the area where the unit mounted controls once were. In this case, consider placement of the antenna end under that cover.

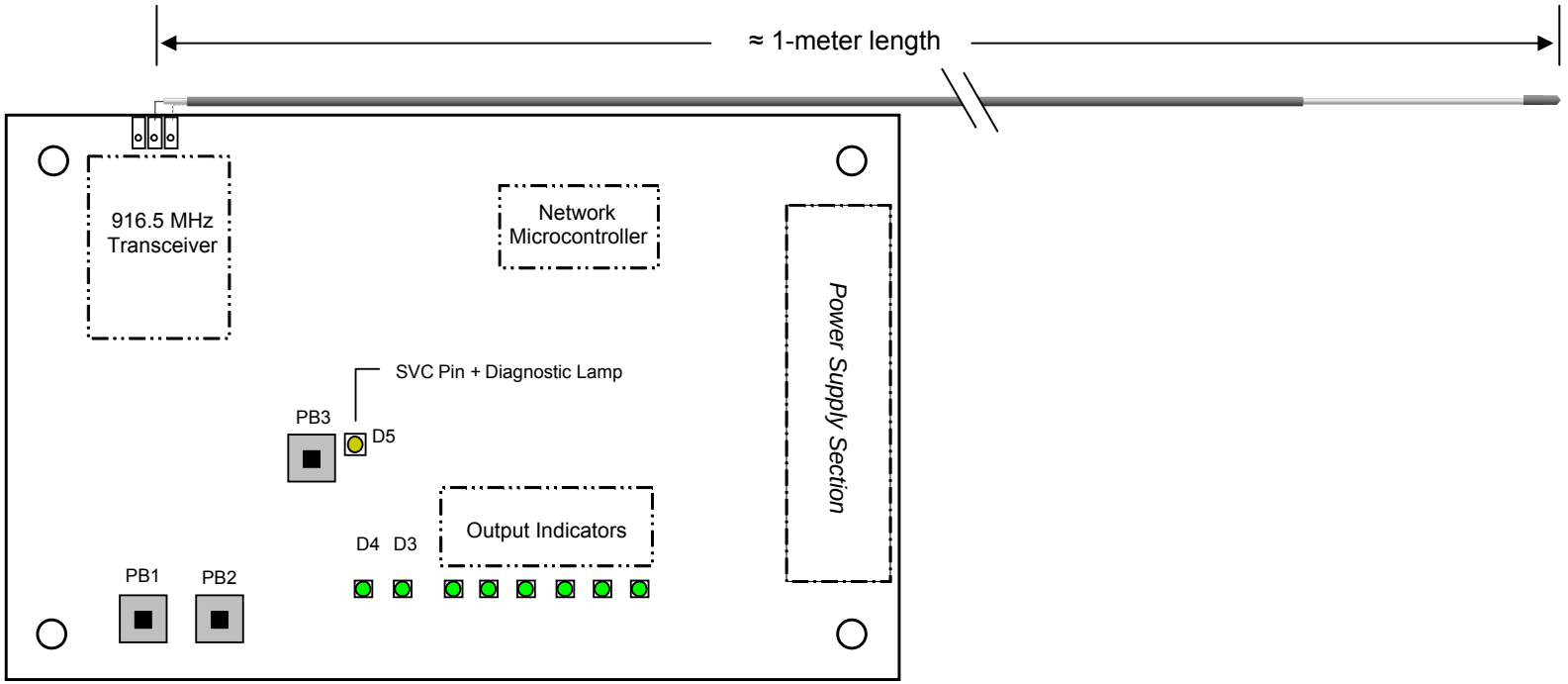

Figure 2 – Model 122 PCB with Coaxial Antenna