

PYROBOX1

Installation and Operating manual



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Introduction

The PYROBOX1 power boxes together with the PYROCON12 controller and interface panel, offer smart and easy control over the PYRO Snow & Ice Melting system.

It can operate one snow melting zone.

Typical applications include driveways, sidewalks, loading docks, stairs, pavements and gutters.

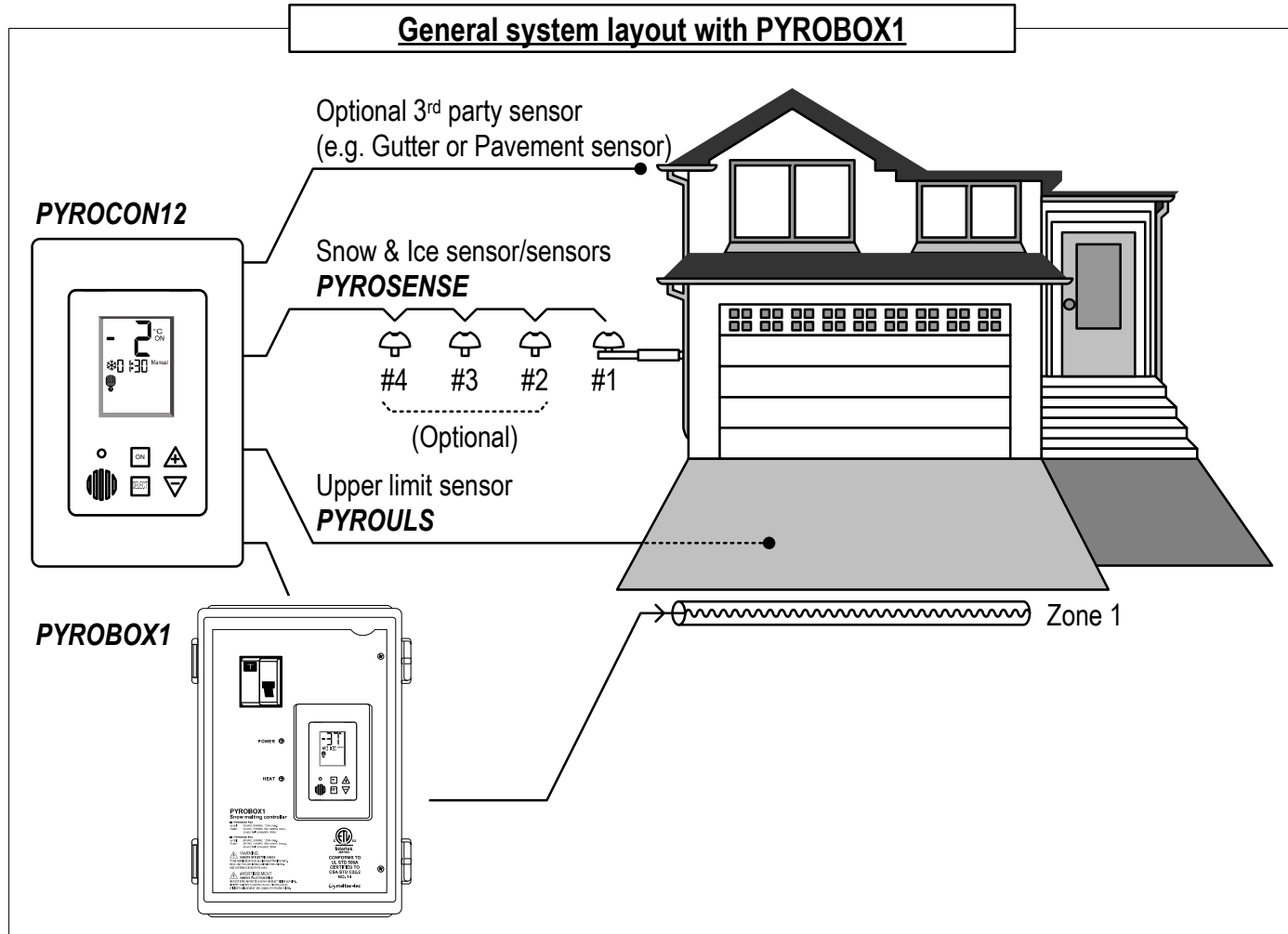
The backlit LCD screen provides full interface and information of the system status.

The use of several zones staggering allow covering larger area for snow melting with a limited available electrical power.

The PYROCON12 offers various operating and programming options such as:

- Switchable temperature scales ($^{\circ}\text{F}$ or $^{\circ}\text{C}$)
- Adjustable Lower ambient temperature limit to stop heater (lockout)
- Both Automatic and Manual modes
- Energy saving upper temperature limit
- Adjustable heater hold on, off & delay
- Adjustable snow sensor sensitivity (%Rh)
- Optional auxiliary control by 3rd party snow sensor (e.g. Gutter sensor)
- Commissioning/Test mode

General system layout with PYROBOX1



PYROBOX1

Owner's manual & Technician Settings

Pg. 3

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PYROBOX Series Installation

PLEASE READ THIS MANUAL AND THE SAFETY WARNINGS CAREFULLY BEFORE INSTALLING AND USING THE CONTROLLER AND SAVE IT FOR FUTURE USE

Installation notes

- Familiarize yourself with the markings, warnings, components and terminology.
- The PYROBOX power boxes and its accessories must be installed by a qualified electrician in accordance with local regulations and the requirements of the NEC (NFPA 72) and the CEC part 1.
- **WARNING:** Ensure the power is disconnect from all circuits before mounting the power box and making any connections. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.
- **Installer must ensure the installation of approved disconnect means, for all power supply circuits feeding this unit.**
- The power boxes are suitable for indoor wall mount installation only.
- Ensure wiring according to the provided schematics using copper conductors only.
- Make sure the wire gauge (AWG) is suitable for the circuit amperage draw, as specified in the NEC/CEC table 1.
- Ensure that the main breakers (fuses) are suitable for the heating systems rating (80% load).
- Grounding means must comply with local regulations and CEC/NEC.
- Ensure that the heating system/de-icing system connected to this unit complies with the UL 499 or UL 515 & CSA 22.2 # 130.3 standard and is certified / listed by an NRTL.
- Ensure that all wiring is rated for the application at 60°C (140°F as per UL 515 CSA 22.2 #130 clause 12 table 12.1.
- Ensure that any holes punched for conduit are to compromise the integrity of the enclosure ratings.

Ground Fault Equipment Protector (GFEP)

- The GFEP installed in this system is a Non class A GFCI, intended for equipment protection.
- Familiar yourself with its operation and required setting.
- The internal GFEP circuit breaker should be tested monthly. Please refer to the GFEP testing instructions section in this manual.

Wiring the PYROBOX1

Main supply for the power box

Provide terminals L1, N1 with 120 or 240 VAC supply (model dependent).



Caution: Incorrect voltage may cause fire or seriously damage the unit.

Connection to 3rd party ice/snow sensor (GIT-1 / CIT-1 / SIT/6E) - option

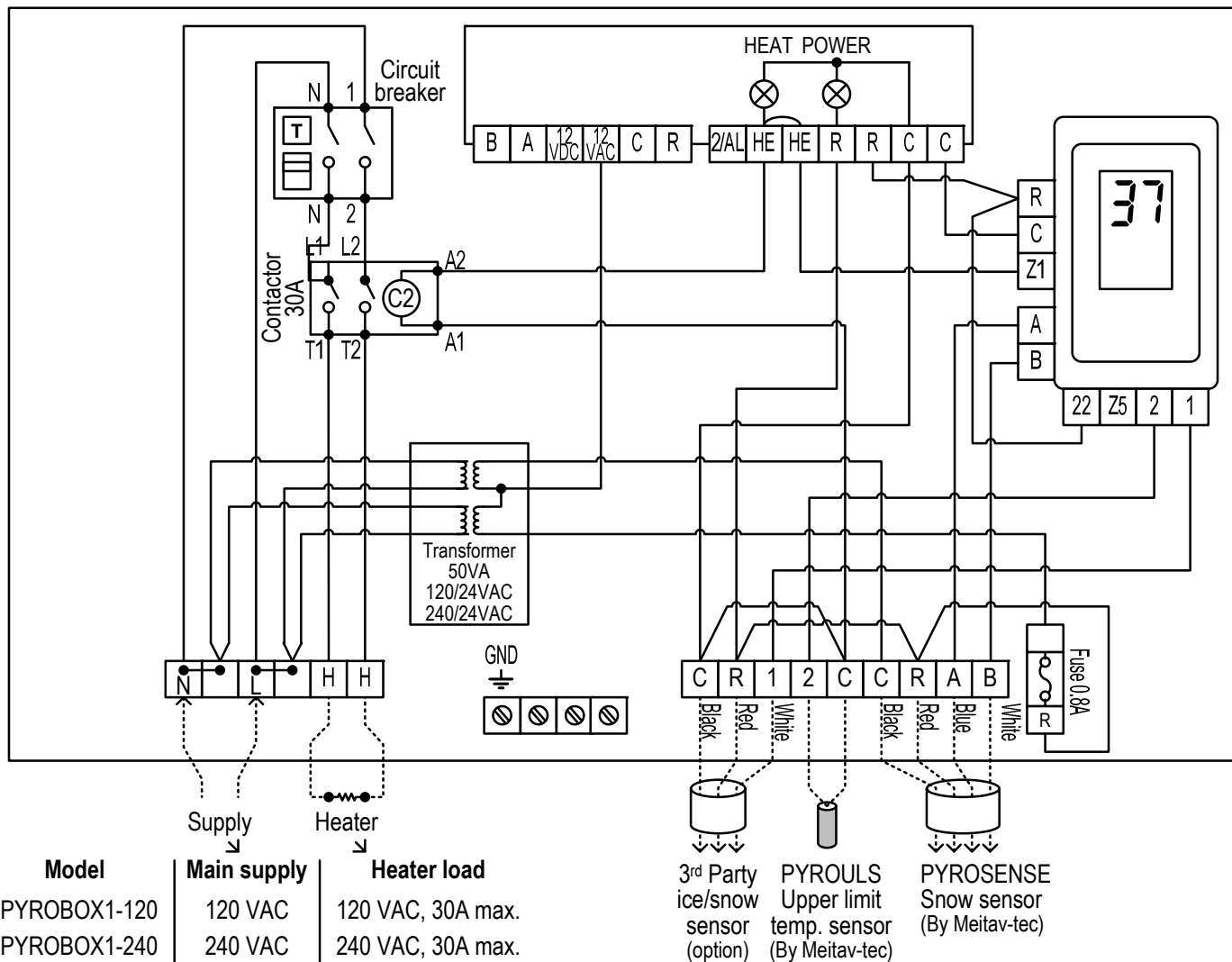
3-wire shielded cable

Up to 2,000 ft (609 m) using 12 AWG 3-wire shielded cable.

Up to 500 ft (152 m) using 18 AWG 3-wire shielded cable.

Connection to snow sensor (PYROSENSE)

Please refer PYROSENSE installation section of this manual.



Connecting snow sensors to the system

The system can be configured to operate with 1, 2, 3 or 4 snow sensors.

Each snow sensors must have different MAC address in order to communicate with the main board.

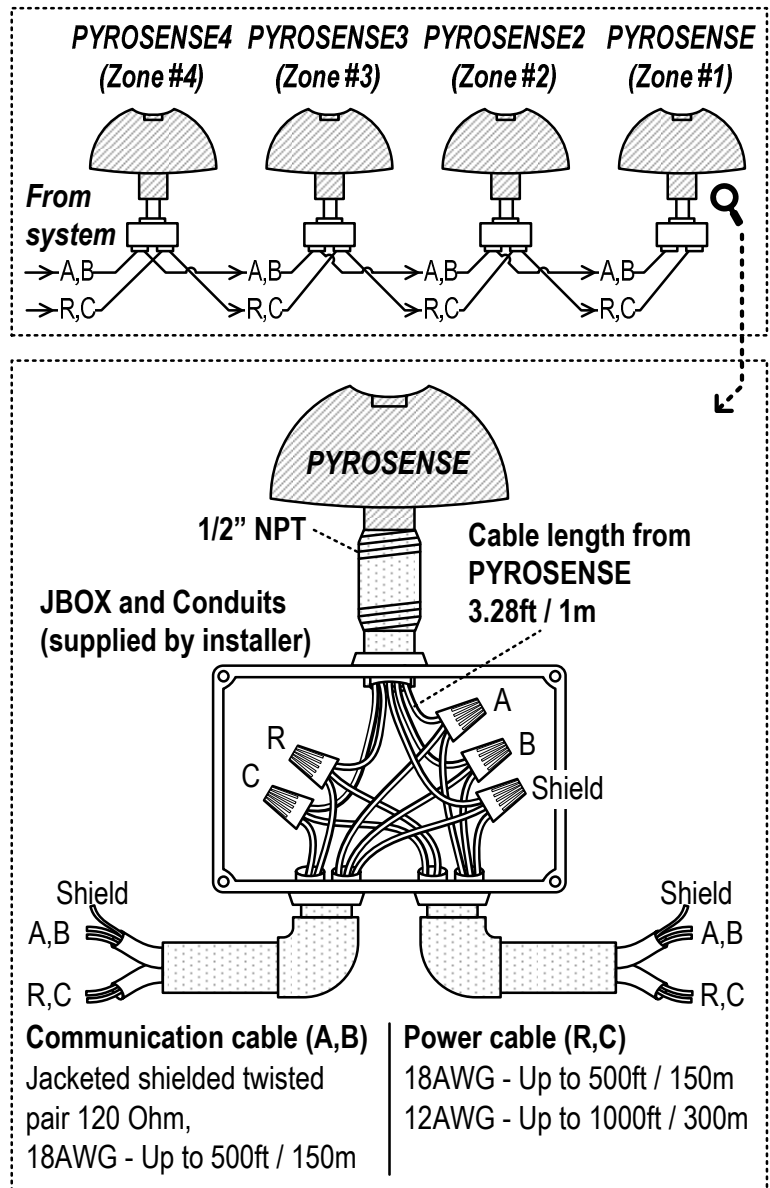
The **PYROSESE** snow sensors series includes 4 different part numbers, each is factory pre-configured with unique MAC address as follows:

PYROSENSE	MAC Address 1
PYROSENSE2	MAC Address 2
PYROSENSE3	MAC Address 3
PYROSENSE4	MAC Address 4

Important! When connecting more than one sensor, snow sensor 1 must be connected last in communication line.

Notes:

- The number of snow sensors connected must be configured in section P09 of the technician settings.
- When one of the snow sensors cannot be viewed through communication (faulty or not connected), the values on snow sensor 1 will be used instead.



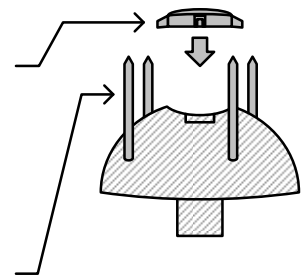
The PYROSENSE is supplied with:

1. A plastic cap, to protect the sensor from dust and debris for when the sensor is not in use (off season).

Important! The protective cap must be removed before use of the sensor.

If the protective cap is not removed, the sensor will not detect snow!

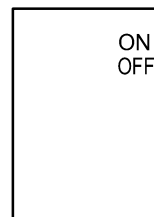
2. Plastic spikes, to be used if necessary, to keep birds off the sensor.



Operating instructions

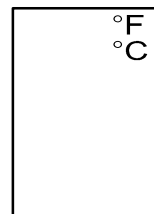
Turning the system ON and OFF

- Press and hold the [ON] button for 0.5 seconds to turn the system ON or OFF.
- The words "ON" or "OFF" will appear on display.
- When ON, the green LED on the front panel will also turn ON.



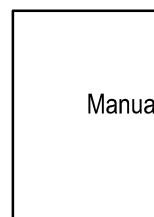
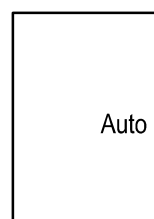
Selecting temperature scale

- Press the [+] button for Celsius.
- Press the [-] button for Fahrenheit.



Selecting Automatic or Manual mode

- Press the [SELECT] button to switch between modes:
 - "Automatic"** Heating will start and stop automatically depending on the set point and ambient temperatures.
 - "Manual ON"** Heating will start regardless of the set point and ambient temperatures and will stop after a preset time (pls. refer to the "Manual ON" section in the tech. settings).



Note: Mode will always return to "Automatic" after switching the unit OFF and ON.

Heater indication

Black icon – Heater ON

White icon – Heater OFF



Heater ON



Heater OFF

When ON, the red LED on the front panel indicating heater operation will also turn ON.

Snow flake icon and digital time indication

A solid snow flake icon will appear on display during normal heater operation.



A blinking snow flake icon will appear on display during heater off delay or when manual mode is activated. The digital clock will count down the remaining time until the heater is turned off.

The snow flake icon will disappear from display as long as the heater is turned off.

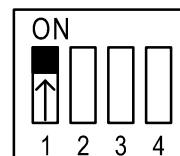
Technician settings

Use the technician settings mode to view and adjust the following parameters:

P01	Temperature set point	P06	Not in use
P02	Lower ambient temperature limit to stop heater	P07	Not in use
P03	Energy saving, upper slab temperature limit to stop heater	P08	Snow sensor sensitivity
P04	Time delay before stopping the heater	P88	Snow detection threshold
P05	ON time for manual mode	P09	Number of snow sensors connected
		P10	Commissioning / Test mode
			Restore defaults

Enter technician settings mode

- Move DIP switch S1 located on the side of thermostat to ON position.
- Press the [SELECT] and [+] buttons simultaneously to move forward to the next technician parameter.
- Press the [SELECT] and [-] buttons simultaneously to return to the previous technician parameter.

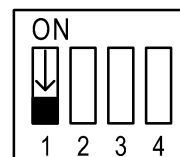


Enter technician settings mode

Save changes and exit technician settings mode

- Move DIP switch S1 located on the side of thermostat to OFF position.

Important: Changes made to technician parameters will not take effect as long as DIP switch S1 is in ON position.



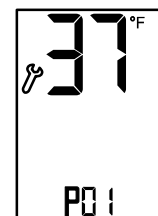
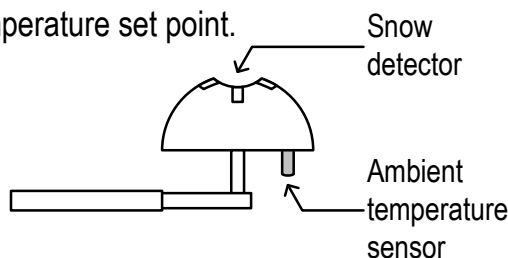
Save changes and exit technician settings mode

Parameters:

P01 - Temperature set point

- Move DIP switch S1 located on the side of thermostat to ON position to enter technician settings mode.
- "P01" and the temperature set point will appear on display.
- Use the [+] and [-] buttons to adjust the temperature set point.
Range: 19...45°F / -7...+7°C

As long as the ambient temperature is lower than the temperature set point P01, the PYROCON will turn ON upon receiving a positive snow signal from the snow detector.



Temperature set point

Technician settings (Cont')

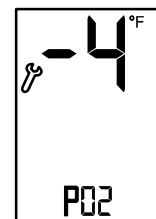
P02 - Lower limit temperature for heating

- Press the [SELECT] and [+] buttons simultaneously.
- "P02" and the low limit temperature will appear on display.

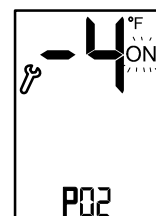
When the temperature on the temperature sensor drops below the low temperature limit, the heating system will stop.

- Use the [+] and [-] buttons to adjust the temperature set point.
Range: -4...+23°F / -20...-5°C Default: -4°F / -20°C
- Press the [SELECT] and [+] buttons simultaneously again.
- The word "ON" or "OFF" will appear on display.
- Use the [+] and [-] buttons enable (ON) or disable (OFF) the P02 parameter.

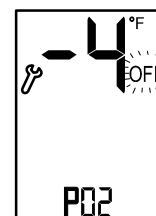
If disabled, the heating system will operate without low temperature limitations.



Low limit
Temperature



P02
enabled



P02
disabled

P03 – Upper limit temperature for heating

- Press the [SELECT] and [+] buttons simultaneously.
- "P03" and the slab upper limit temperature will appear on display.
- Use the [+] and [-] buttons to adjust the upper limit temperature.

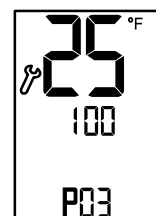
Range: +41...+125°F / +5...+52°C Default: 125°F / +52°C

*For numbers above 100, "100" will appear on display.

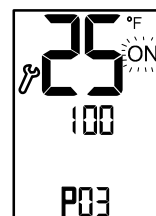
- Press the [SELECT] and [+] buttons simultaneously again.
- The word "ON" or "OFF" will appear on display.
- Use the [+] and [-] buttons enable (ON) or disable (OFF) the P03 parameter.

If disabled, the heaters will work regardless of the upper limit.

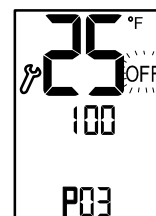
- Press the [SELECT] and [+] buttons simultaneously again.
- The display will show the temperature on the upper limit sensor.



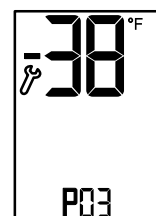
Upper limit
temperature



Set point
enabled



P03
disabled



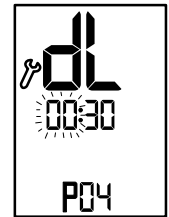
temperature
on heaters
sensor

→ Cont'

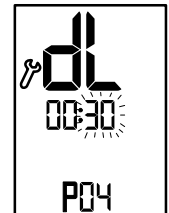
Technician settings (Cont')

P04 -Time delay before stopping the heater

- Press the [SELECT] and [+] buttons simultaneously.
- "P04", "dL" and the time delay before stopping the heater (Hold ON) will appear on display. The hours will blink.
- Use the [+] and [-] buttons to adjust the hours of the time delay.
Range: 00...99 hours Default: 00 hours
- Press the [SELECT] and [+] buttons simultaneously again.
- The minutes will blink.
- Use the [+] and [-] buttons to adjust the minutes of the time delay.
Range: 00...59 minutes Default: 30 minutes



Time delay
hours



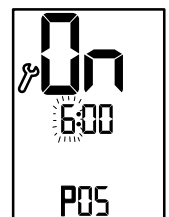
Time delay
minutes

Note 1. The time delay countdown will start when the snow detection signal from snow sensor will switch from positive to negative.

Note 2. The staggering sequence will continue during the time delay period.

P05 - Manual mode ON time

- Press the [SELECT] and [+] buttons simultaneously.
- "P05", "On" and the "Manual ON" mode time period will appear on display. The hours will blink.
The delay time parameter defines a time frame in which the heater remains ON after receiving an "Manual ON" command.
- Use the [+] and [-] buttons to adjust the hours of the working time.
Range: 00...99 hours Default: 6 hours
- Press the [SELECT] and [+] buttons simultaneously again.
- The minutes will blink.
- Use the [+] and [-] buttons to adjust the minutes of the working time.
Range: 00...59 minutes Default: 00 minutes



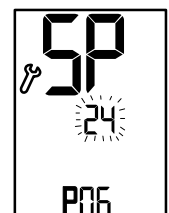
Manual ON
hours



Manual ON
minutes

P06 – Not in use

- Press the [SELECT] and [+] buttons simultaneously.
- "P06" and the letters "SP" will appear on display.
Do not change the default value "24"



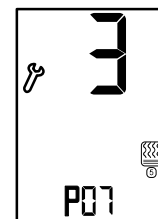
Not in use

→ Cont'

Technician settings (Cont')

P07 – Not in use

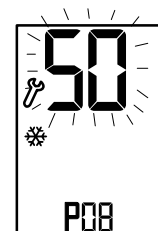
- Press the [SELECT] and [+] buttons simultaneously.
- "P07" and the figure "3" will appear on display.
- Do not change the default value "3".



Not in use

P08 - Snow sensor sensitivity

- Press the [SELECT] and [+] buttons simultaneously.
- "P08" and the snow sensor sensitivity value will appear on display.
- Use the [+] and [-] buttons to adjust the sensitivity.
Range: 20...80 % (20% - Less sensitive, 80% - more sensitive), Default: 50 %



Snow sensor
sensitivity

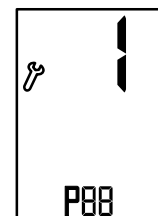
P88 - Snow detection threshold

- Press the [SELECT] and [+] buttons simultaneously.
- "P88" and the snow sensor threshold will appear on display.
- Use the [+] and [-] buttons to adjust the threshold.

Range: 00...60 minutes Default: 5 minutes

If the threshold is not reached, the logic of turning the heater either ON or OFF will not be affected by snow detection.

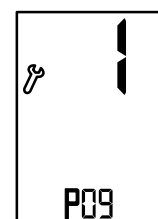
During countdown to threshold time, the snow flake icon will flash.



Snow detection
threshold

P09 – Number of snow sensors connected

- Press the [SELECT] and [+] buttons simultaneously.
- "P09" and the number "1" will appear on display.
- Do not change the default value "1".



Number of
snow sensors

→ Cont'

Technician settings (Cont')

P10 - Test conditions mode / Technician commissioning mode

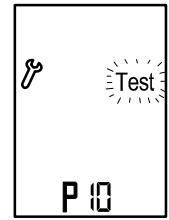
Turn ON test conditions to check the functionality of the system regardless of sensors parameters (i.e. during the summer).

In test conditions, the Ambient temperature is always -5°C/23°F.

Note: In order to trigger the system and activate the heater, use some water to wet the circuit on top of the snow sensor.

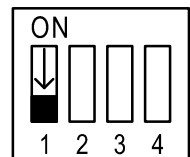
- Press the [SELECT] and [+] buttons simultaneously.
- "P10" will appear on display. The hours will blink.
- Use the [+] button to enter test/commissioning mode – "Test" will appear on display.
- Use the [+] button to manually exit test/commissioning mode – "Test" will disappear from display.

Note: If the technician did not manually exit test/commissioning mode, the unit will automatically return to normal mode after 5 hours.



Test
conditions
mode

Save changes
and return to
normal display



In order to save changes and return to normal display,
move DIP switch S1 back to OFF position.

Technician settings (Cont')

Restore default values

Important: Make sure the unit is turned OFF (the word "OFF" should appear on display).

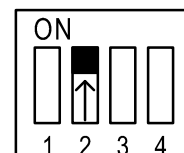
- Move DIP switch S1 to ON position.
- Press and hold the [ON] button for 10 seconds. The thermostat will beep.
- Move DIP switch S1 back to OFF position.

DIP switch S2 - Short measuring times (test only)

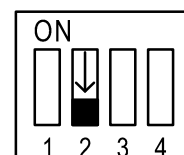
- Use DIP switch S2 to short the measuring times as follows:
 - "ON" - Short measuring times – for test/commissioning only (measuring times will be divided to 60).
 - "OFF" - Normal operation.

Short measuring times:

A real 1 hour will take 1 minute and a real 1 minute will take 1 second.

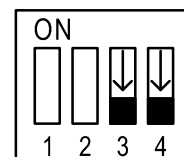


Short measuring times (test)



Normal operation

DIP switches S3 and S4 – Not in use – must remain OFF

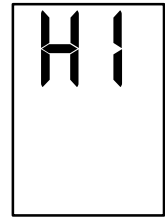
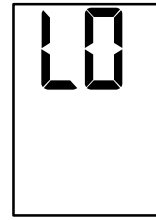


Temperature reading errors

Ambient temperature sensor readings (on snow sensor) are out of reliable measuring range

Ambient temperature < -9°F/-23°C

Ambient temperature > 54°F/12°C



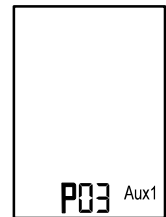
The system will continue to operate using constant predefined values. In addition, the display will alternate between "LO" and -11°F/-24°C for low temperature readings, and between "HI" and 55°F/13°C for high temperature readings.

Error 1 – Communication error with one (or more) snow sensors

"SensErr 1" Will appear on display.

If the system is configured to work with more than 1 snow sensor, the faulty snow sensor number will appear on display: P01, P02, P03 or P04.

The system will use readings from snow sensor 1 instead of the missing readings from the faulty snow sensor.



Communication error with snow sensors

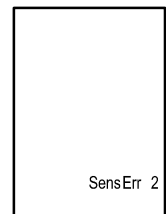
Error 2 – Upper limit temperature sensor is not connected or short circuit

"SensErr 2" Will appear on display.

The system will continue to operate regardless of the upper limit temperature.

Required actions:

1. Refer to P03 section of the technician settings.
2. Check the temperature value and disable the sensor if needed.
3. Replace the sensor.



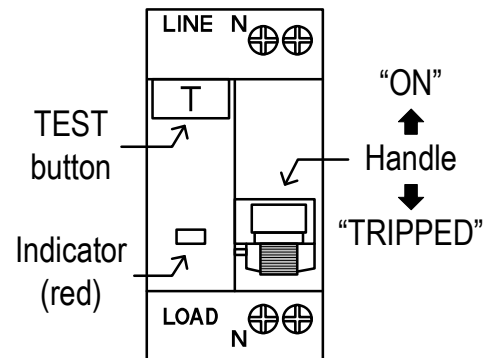
Upper limit temperature Sensor error

Testing the internal GFEP circuit breaker

The GFEP is designed to protect circuits by sensing when a ground fault or earth leakage is greater than 30mA and automatically open the circuit.

The GFEP should be tested regularly, at least once per month.

- Press TEST button "T", GFEP should open automatically and the red indicator should act.
- Move the handle back to "ON" position to return to normal operation and reestablish power and protection.
- Test button should be pressed 3 times and the GFEP should work normally.
- If GFEP can't work normally, it must be replaced.





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Enter technician settings		Move DIP switch S1 located on the side of thermostat to ON position.
P01 Temperature set point	Adjust 19...45°F -7...+7°C Def: 3°C/37°F	Adjust the temperature set point. Above this temperature the outputs to the heaters will not be activated.
P02 Low limit temperature	Adjust -4...+23°F -20...+5°C Def: -20°C/-4°F	Adjust and enable/disable the low limit temperature. When temperature on snow sensor drops below the low temperature limit, the heating system will stop.
P03 Upper limit temperature	Adjust +41...+125°F +5...+52°C Def: 52°C/125°F	Adjust and enable/disable the upper limit temperature, and display temperature on heaters sensor. Note: If the upper limit control is disabled, the heaters will work regardless of the upper limit.
P04 Time delay	Adjust hours 00...99 Def: 00	Adjust the time delay before stopping the heaters. Note 1. The time delay countdown will start when the snow detection signal from snow sensor will switch from positive to negative. Note 2. The staggering sequence will continue during the time delay period.
P05 Manual ON	Adjust minutes 00...59 Def: 30	Adjust the "Manual ON" mode time period. The delay time parameter defines a time frame in which the heaters remain ON after receiving a "Manual ON" command.
P06 Not in use	Def: 24	Not in use
P07 Not in use	Def: 3	Not in use
P08 Snow sensor sensitivity	Adjust 20...80% Def: 50%	Adjust the snow sensor sensitivity value (20% - Less sensitive, 80% - more sensitive)
P88 Snow sensor threshold	Adjust minutes 00...60 Def: 1	Adjust the threshold. If the threshold is not reached, the logic of turning the heaters either ON or OFF will not be affected by snow detection. During countdown to threshold time, the snow flake icon will flash.
P09 Number of snow sensors	Select 1, 2, 3 or 4 Def: 1	Select the number of PYROSENSE snow sensors connected.
P10 Test mode (commissioning)	Enable/Disable	Turn ON test conditions to check the functionality of the system regardless of sensors parameters. Use some water to wet the circuit on top of the snow sensor. Note: If the technician did not manually exit test/commissioning mode, the unit will automatically return to normal mode after 5 hours.
Save changes and Exit technician settings		Move DIP switch S1 located on the side of thermostat to OFF position.

Important: Changes made to technician parameters will not take effect as long as DIP switch S1 is in ON position.

Restore default values

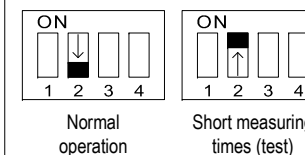
Important: Make sure the unit is turned OFF (the word "OFF" should appear on display).

- Move DIP switch S1 to ON position.
- Press and hold the [ON] button for 10 seconds.
- Move DIP switch S1 back to OFF position.

DIP switch S2 - Short measuring times (test only)

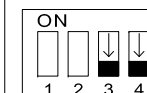
- "ON" - Short measuring times – for test/commissioning only (measuring times will be divided to 60).
- "OFF" - Normal operation.

Short measuring times: A real 1 hour will take 1 minute and a real 1 minute will take 1 second.



DIP switches S3 and S4 – Not in use

- Must remain in OFF position.



"0" - 1-5 by PYROSENSE. 4 & 5 operate together.
"1" - 1-4 by PYROSENSE. 5 by 3rd party.
"2" - 1-5 by 3rd party. Temperature display blank.
"3" - snow on any of the sensors will trigger all zones.