



**PYROBOX3**  
**PYROBOX3C**  
**PYROBOX5**

**Installation and Operating manual**

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## Introduction

The PYROBOX3/3C/5 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 up to 4 snow melting zones and one auxiliary zone, with selectable sequencing method.

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

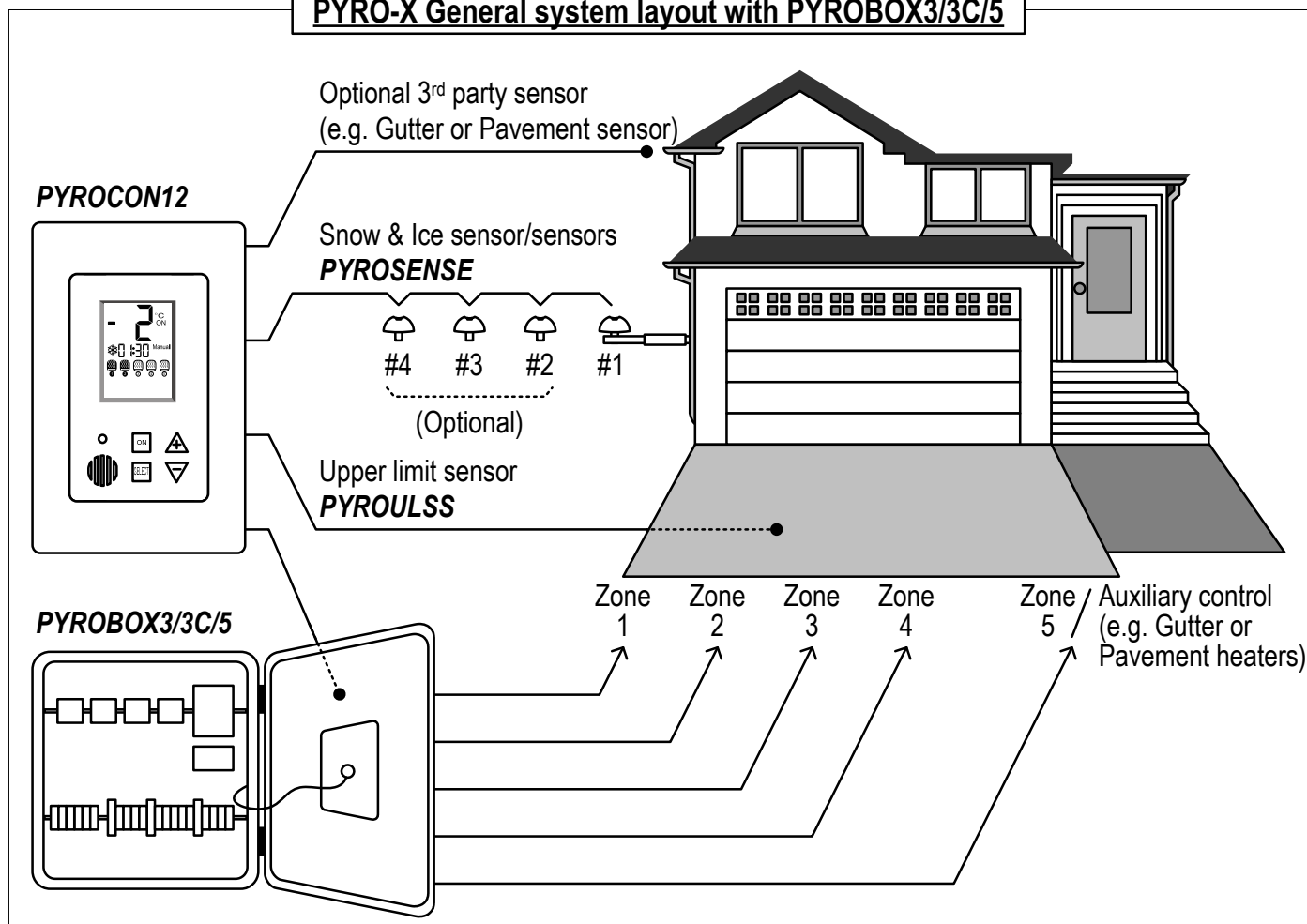
The backlit LCD screen provides full interface and information of the system status.

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 (°F or °C)
- Adjustable Lower ambient temperature limit to stop heaters (lockout)
- Both Automatic and Manual modes
- Energy saving upper temperature limit
- Adjustable heaters cycle and splitting times
- Adjustable snow sensor sensitivity (%Rh)
- Adjustable heaters hold on, off & delay
- Commissioning/Test mode
- Optional auxiliary control by 3<sup>rd</sup> party snow sensor (e.g. Gutter sensor)

### PYRO-X General system layout with PYROBOX3/3C/5



## 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 circuit interrupter (GFCI)

- The ground fault interrupter/residual current detector installed in this system is a Non class A GFCI, intended for equipment protection.
- Familiar yourself with its operation and required setting.
- At installation and commissioning stage use a calibrated milliamp meter to read and record the heating systems natural leakage.

Set the GFI/RCD to no more than 30 milliamps higher than that reading.

- This step might have to be repeated a few times, to avoid nuisance tripping.

# PYROBOX3/3C/5

# PYROBOX3/3C/5

## Wiring the PYROBOX3

### Heater load connection

Provide contactors C1, C2, C3 and C4 with up to 300 VAC, 30 AMP.

Make sure the wire Gauge (AWG) is suitable for the circuit Amperage draw, as specified in the NEC/CEC table 1.

### Main supply for the power box

Provide terminals L1, N1 with 120 VAC supply.



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

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

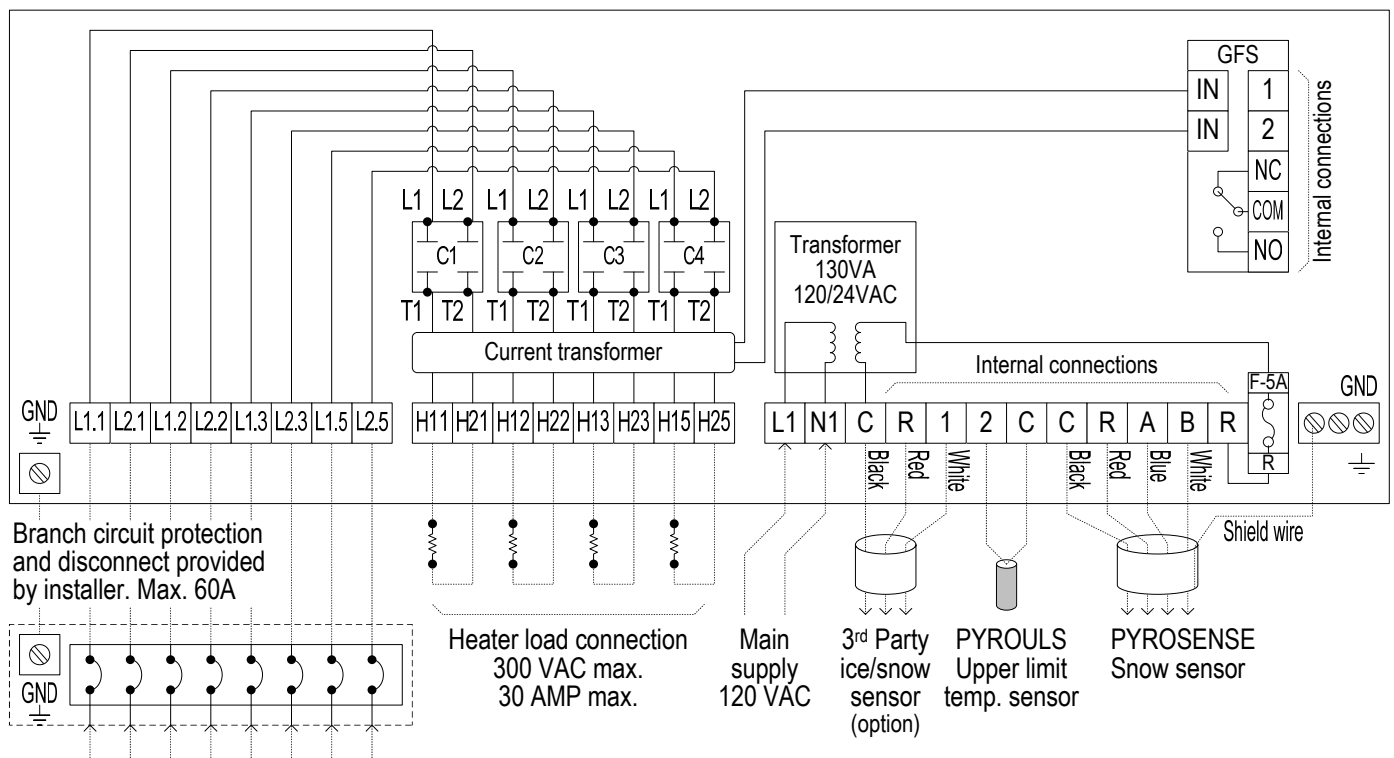
3-wire shielded cable

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 PYROSENSE snow sensors to the system

The PYROSENSE snow sensor is supplied with a built in 4 wire 33 ft. (10 m) cable. This cable can be extended using 2X22 AWG twisted shielded communication cable for wires A and B (White and Blue) and 18 -24 AWG CLASS 2, 24 VAC cable for wires R and C (Red and Black).

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

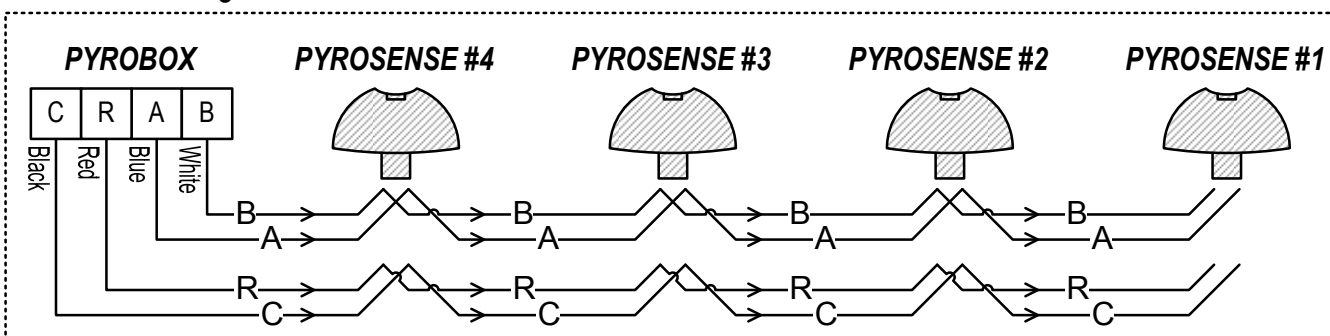
Each snow sensors must have different MAC (Media Access Control) address in order to communicate with the main board.

The **PYROSENSE** 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

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



The snow sensors will control zone upon the following logic:

### Connecting 1 snow sensor

The snow sensor will control all 4 zones (and zone 5 as an option)

### Connecting 2 snow sensors

Snow sensor 1 will control zones 1 and 2.

Snow sensor 2 will control zones 3 and 4 (and zone 5 as an option)

### Connecting 3 snow sensors

Snow sensor 1 will control zone 1.

Snow sensor 2 will control zone 2.

Snow sensor 3 will control zones 3 and 4 (and zone 5 as an option)

### Connecting 4 snow sensors

Snow sensor 1 will control zone 1.

Snow sensor 2 will control zone 2.

Snow sensor 3 will control zone 3.

Snow sensor 4 will control zone 4 (and zone 5 as an option)

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.



## Operating instructions

### Green POWER lamp

- The green power lamp will light when power is supplied to the unit (120 VAC)

### Red RESET GFS lamp and button

- The red RESET GFS lamp will light when the internal GFCI is tripped.
- Press and hold the RESET GFS button for 5 seconds to reset the unit.

### 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.

### 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 snow detection by the snow sensor/sensors.

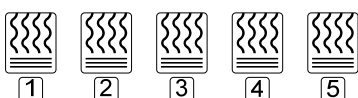
#### "Manual ON"

Heating will start regardless of snow sensor measurements and will stop after a preset time (pls. refer to the "Manual ON" section in the technician settings P05).

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

### Heaters indication

The number beneath the heater icon indicate the heater stage (1 to 5).



Stg. 1   Stg. 2   Stg. 3   Stg. 4   Stg. 5

Black icon – Heater ON

White icon – Heater OFF



Heater ON



Heater OFF

### Snow flake icon and digital time indication

A solid snow flake icon will appear on display while sensing snow and during normal heaters operation.



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

The snow flake icon will disappear from display as long as the heaters are turned off.

## Technician settings

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

P01	Temperature set point	P05	ON time for manual mode
P02	Lower ambient temperature limit to stop heaters	P06	Heaters cycle time / Splitting time
P03	Energy saving, upper slab temperature limit to stop heaters	P07	Sensors and heaters control logic
P04	Time delay before stopping the heaters	P08	Snow sensor sensitivity
		P09	Number of snow sensors connected
		P10	Commissioning / Test mode
			Restore defaults

**Enter technician settings - Move DIP switch S1 located on the side of thermostat to ON position.**

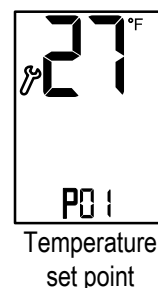
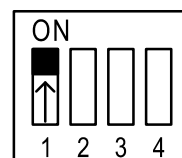
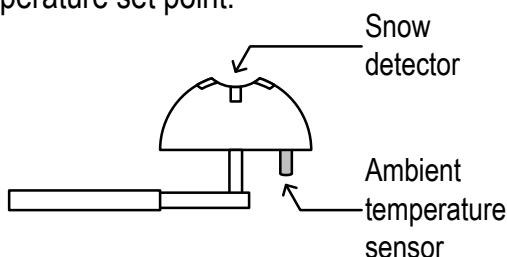
Press the [SELECT] and [+] buttons simultaneously to move forward to the next technician parameter.

Press the [SELECT] and [-] buttons simultaneously to return to the previous technician parameter.

### P01 - Temperature set point

- Move DIP switch S1 located on the side of thermostat to ON position.
- "P01" and the temperature set point will appear on display.
- Use the [+] and [-] buttons to adjust the temperature set point.

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.



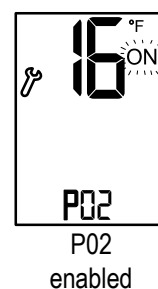
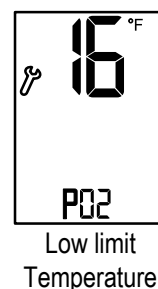
### P02 - Lower limit temperature for heating

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

When temperature on snow 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...-9°C      Default: -9°C / +16°F
- 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.

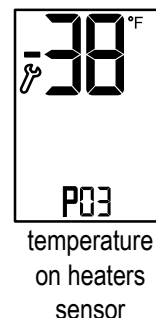
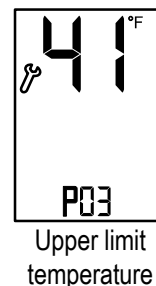
If disabled, the heating system will operate without low temperature limitations.



## Technician settings (Cont')

### 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...+59°F / +5...+15°C Default: +5°C / 41°F
- 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.



### P04 -Time delay before stopping the heaters

- Press the [SELECT] and [+] buttons simultaneously.
- “P04”, “dL” and the time delay before stopping the heaters (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



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.

→ Cont'

## Technician settings (Cont')

### 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 heaters remain 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 – Heaters cycle and splitting time

- Press the [SELECT] and [+] buttons simultaneously.
- "P06", "SP" and the splitting time will appear on display.  
The minutes will blink.  
The heaters cycle / splitting time parameter defines the working time of the heaters when working in sequence.  
Example: the splitting time is set to 10 minutes and 4 heaters work in sequence, each heater will be ON for 2.5 minutes ( $10/4=2.5$ ).
- Use the [+] and [-] buttons to adjust the splitting time.  
Range: 00...99 minutes                      Default: 24 minutes.



Splitting time

→ Cont'

## Technician settings (Cont')

### P07 - Heaters outputs logic controlled by PYROSENSE snow melt sensor or by 3<sup>rd</sup> party sensor

- Press the [SELECT] and [+] buttons simultaneously.
- "P07" and the figures "0", "1", "2" or "3" will appear on display.
- Use the [+] and [-] buttons to define the heaters logic as follows:

"0" - Outputs 1-5 controlled by PYROSENSE snow melt sensor.

Outputs 4 and 5 will turn ON or OFF together.

"1" - Outputs 1-4 controlled by PYROSENSE snow melt sensor.

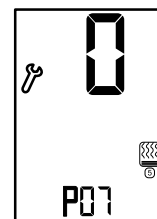
Output 5 controlled by 3<sup>rd</sup> party sensor.

"2" - Output 1-5 controlled by 3<sup>rd</sup> party sensor.

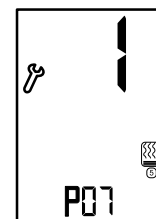
The display will not show the ambient temperature and will remain blank.

"3" - Outputs 1-3 controlled by PYROSENSE snow melt sensor.

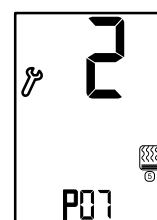
Output 4-5 controlled by 3<sup>rd</sup> party sensor.



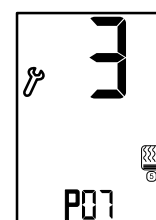
1-5 by PYROSENSE  
4 & 5 Together



1-4 by PYROSENSE  
5 by 3<sup>rd</sup> party sensor



1-5 by 3<sup>rd</sup> party sensor



1-3 by PYROSENSE  
4-5 by 3<sup>rd</sup> party sensor

Default: "0"

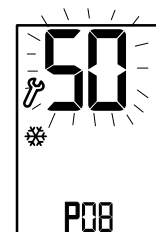
**Note:** 3<sup>rd</sup> party sensors - i.e. gutter or pavement sensors –  
CIT, GIT, SIT by eti.

### 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 sensitivity.

Range: 20...80 % (20% - Less sensitive, 80% - more sensitive)

Default: 50 %

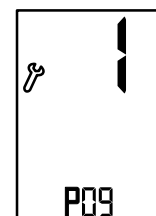


Snow sensor  
threshold

### P09 – Number of snow sensors connected

- Press the [SELECT] and [+] buttons simultaneously.
- "P09" and the number of snow sensors connected will appear on display.
- Use the [+] and [-] buttons to select 1, 2, 3 or 4 snow sensors.

Default: 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).

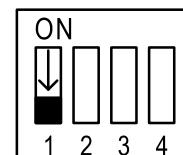
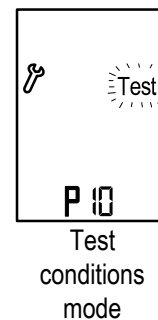
In test conditions, the Ambient temperature is always -5°C/23°F.

Note: In order to trigger the system and activate the heaters, 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 – the word "Test" will appear on display.
- Use the [+] button to manually exit test/commissioning mode – the word "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.

- In order to return to normal display, move DIP switch S1 back to OFF position.

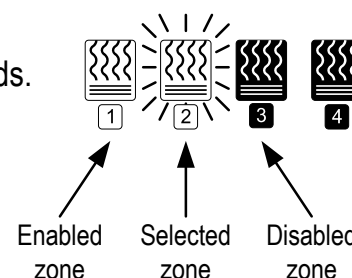


### Restore default values

- 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.

### Enable/Disable zones

- Turn the unit OFF.
- While OFF, Press both the [+] and [-] buttons simultaneously for 5 seconds.
- Press the [Select] button to select zone. Selected zone will flash.
- Press the [+] and [-] buttons enable/disable the selected zone.  
Black icon and "ON" on LCD - Enabled zone.  
White icon and "OFF" on LCD - Disable zone.
- Press and hold the [+] and [-] buttons simultaneously for 2 seconds to exit.



Note: Disabled zones will be ignored in splitting time calculations:

Example: the splitting time is set to 60 minutes and heaters are set work in sequence.

3 Heaters enabled and 1 heater disabled.

With all heaters enabled: Each heater will be ON for 15 minutes ( $60/4=15$ ).

With 3 heaters enabled and 1 heater disabled: Each heater will be ON for 20 minutes ( $60/3=20$ ).

## Technician settings (Cont')

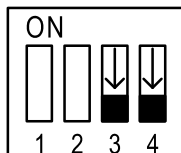
### DIP switch S2 - Short measuring times (test only)

- 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.

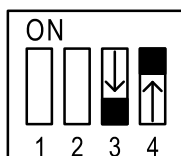
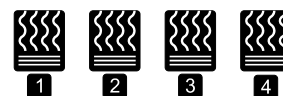
### DIP switches S3 and S4 – heaters sequencing logic

- Use DIP switches S3 and S4 to define the sequencing logic of the heater (zones) as follows:



S3 OFF, S4 OFF

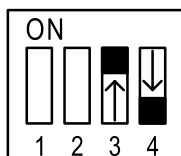
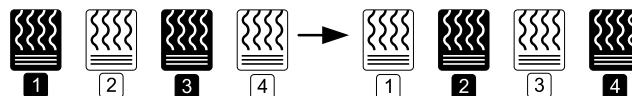
All 4 outputs work per request from the snow sensor(s)



S3 OFF, S4 ON

Outputs 1+3 and outputs 2+4 work together (according to splitting time)

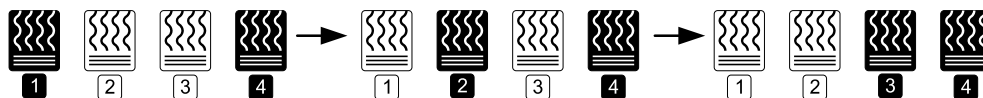
Note: Do not use this configuration with more than two snow sensors connected.



S3 ON, S4 OFF

Outputs 1,2 and 3 work in sequence (according to splitting time) and output 4 works continuously.

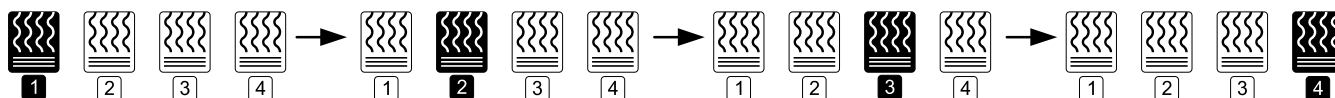
Note: Do not use this configuration with more than two snow sensors connected.



S3 ON, S4 ON

All 4 outputs work in sequence (according to splitting time)

Note: Do not use this configuration with more than two snow sensors connected.



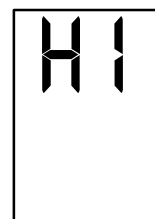
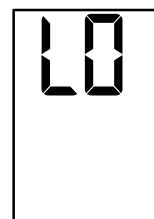
Note: if output 5 is set to work together with outputs 1-4, (see “Heater output no. 5 logic” in the technician settings), it will operate the same as output 4.

## 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



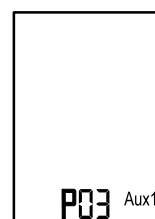
The system will continue to operate using constant predefined values. In addition, the display will alternate between "LO" and -11°F/-24°C for low temperature readings, and between "HI" and 55°F/13°C for high temperature readings.

### 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

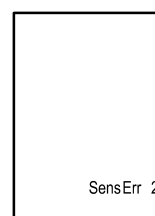
### Error 2 – Upper limit temperature sensor is not connected or short circuit

"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.



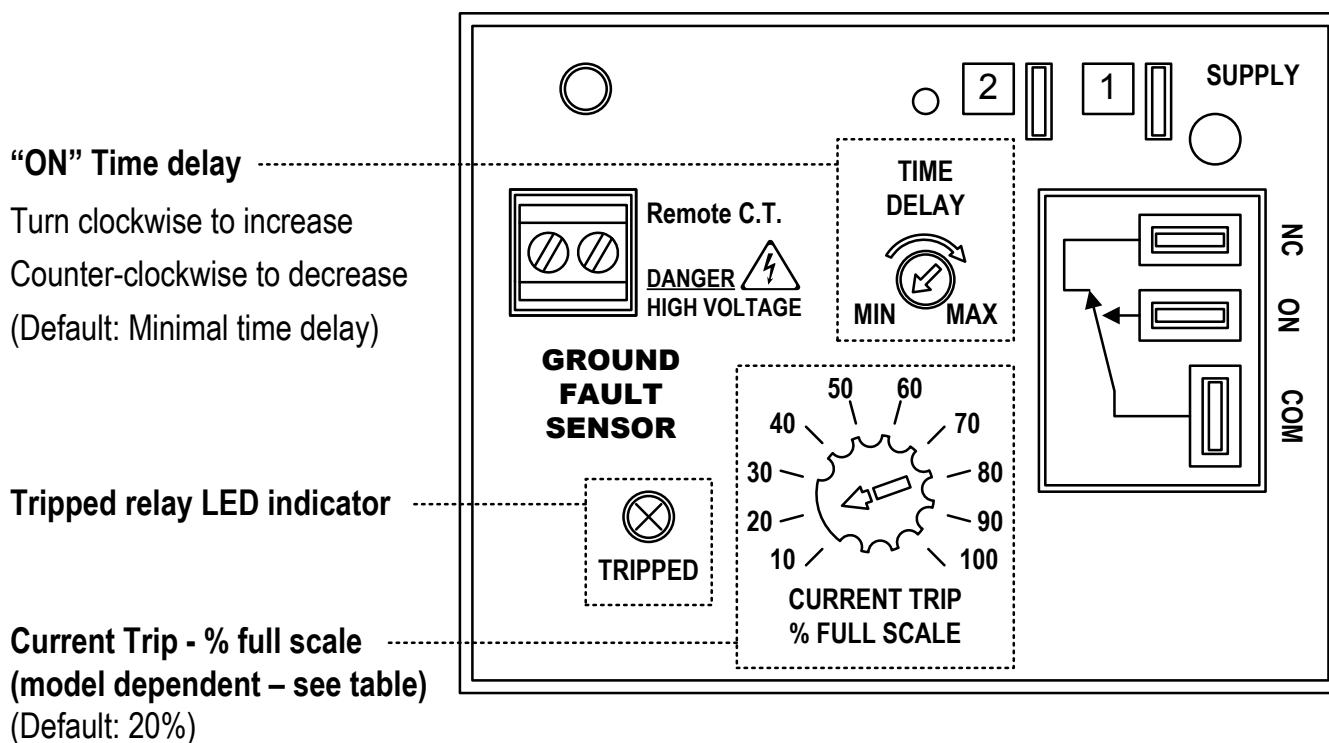
Upper limit temperature Sensor error



## Appendix 1

### Calibrating the internal GFS

The GFS (Ground Fault Sensor) is designed to provide protection for electrical equipment. The “ON” Time Delay and Current Trip should be configured to match application requirements.



Indicator (%)	Current trip (Amps)	
	PYROBOX5	PYROBOX3/3C
10	0.1	0.01
20	0.2	0.02
30	0.3	0.03
40	0.4	0.04
50	0.5	0.05
60	0.6	0.06
70	0.7	0.07
80	0.8	0.08
90	0.9	0.09
100	1.0	0.10

Notes

Notes



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