PYROBOX3
PYROBOX3C
PYROBOX5

Installation and Operating Manual

king

Index

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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)

- Both automatic and manual modes

- Adjustable heaters cycle and splitting times

- Adjustable heaters hold on, off & delay

- Optional auxiliary control by 3rd party snow sensor (e.g. Gutter sensor)

- Adjustable lower ambient temperature limit to stop heaters (lockout)

- Energy saving upper temperature limit

- Adjustable snow sensor sensitivity (%Rh)

- Commissioning/Test mode

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

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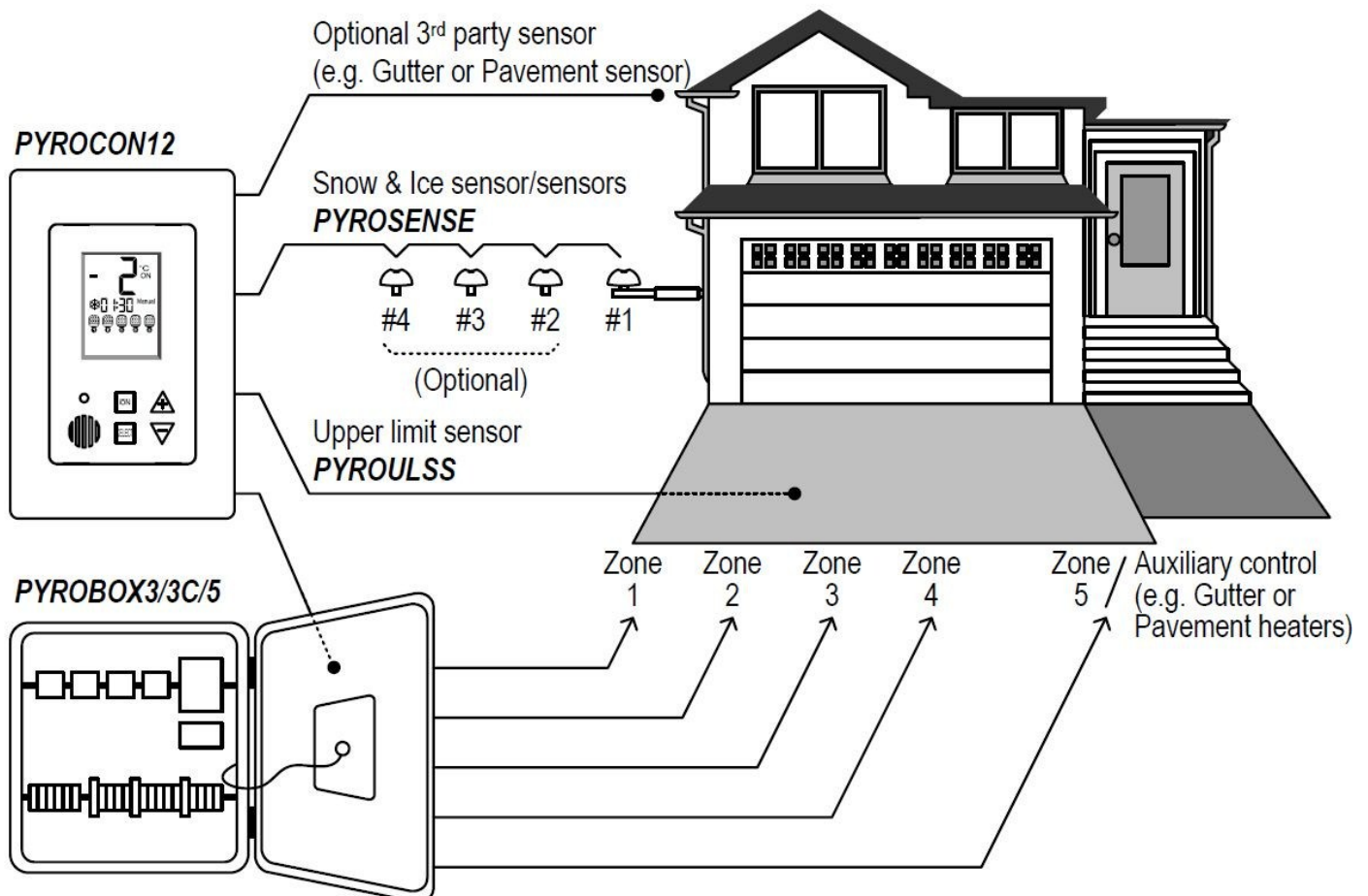
PLEASE READ THIS MANUAL AND THE SAFETY WARNINGS CAREFULLY BEFORE INSTALLING AND USING THE CONTROLLER AND SAVE IT FOR FUTURE REFERENCE

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.

- Familiarize yourself with it's 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 heat reading.

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

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Wiring the PYROBOX5

Heater load connection

Provide 3-Phase contactors C1, C2, C3 and C4 with up to 600 VAC, 50 Amp Maximum per pole.

Provide contactor C5 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 3rd party ice/snow sensor (GIT-1 / CIT-1 / SIT/6E) - option

3-wire shielded cable

Up to 2000 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.

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Wiring the PYROBOX3C

Heater load connection

Provide 3-Phase contactors C1 and C2 with up to 600 VAC, 50 AMP Maximum per pole.

Provide contactor C5 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 3rd party ice/snow sensor (GIT-1 / CIT-1 / SIT/6E) - option
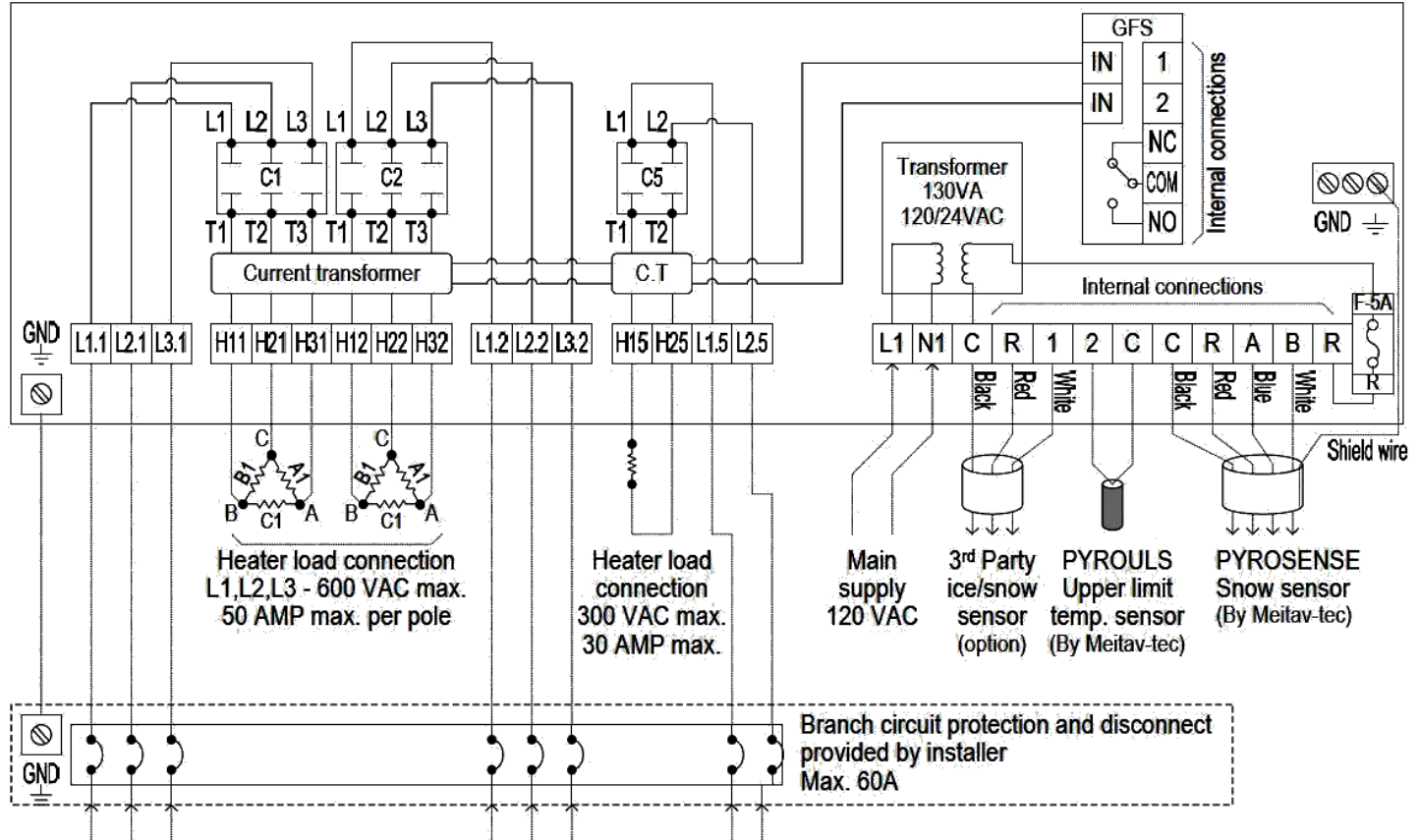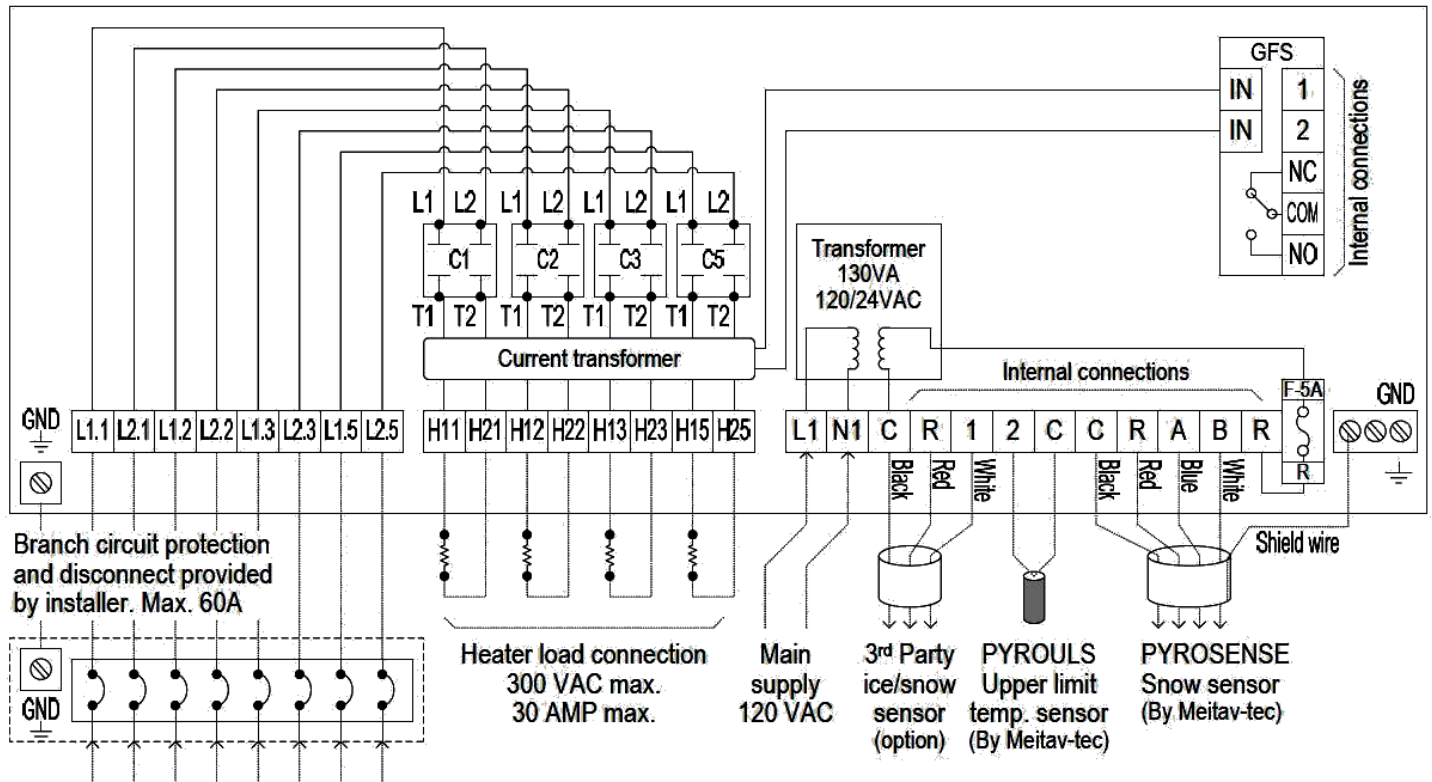
3-wire shielded cable

Up to 2000 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 to PYROSENSE installation section of this manual.

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Wiring the PYROBOX3C

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

3-wire shielded cable

Up to 2000 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.

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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 2 x 22 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 sensor must have a different MAC (Media Access Control) address in order to communicate with the main board.

The PYROSENSE snow sensor series includes 4 different part numbers, each is factory pre-configured with a 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.
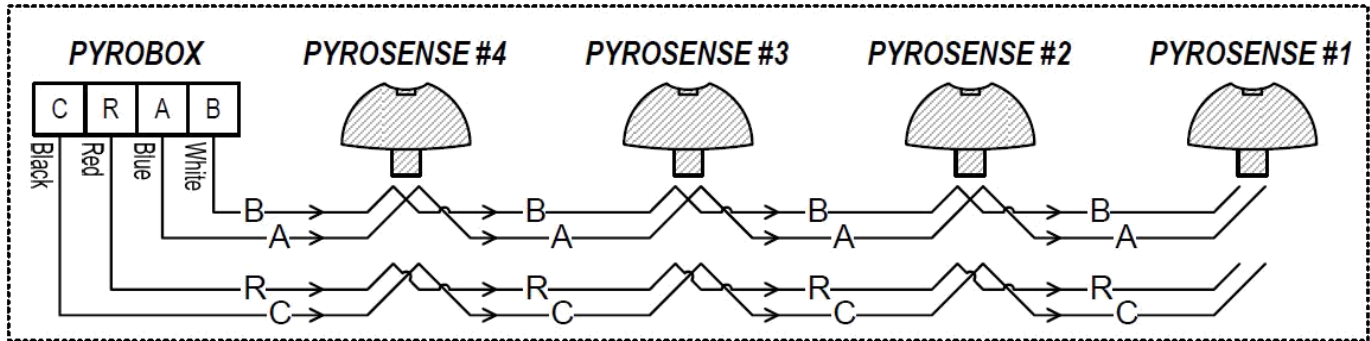
The snow sensors will control zone upon the following logic:

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.

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Operating Instructions

| Green POWER lamp	Red RESET GFS lamp and button
• The green power lamp will light when power is supplied to the unit (120 VAC)	• The red RESET GFS lamp will light when the internal GFCI is tripped.
	• Press and hold the RESET GFS button for 5 seconds to

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.

ON
OFF
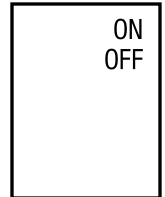
Selecting temperature scale

- Press the [+] button for Celsius.

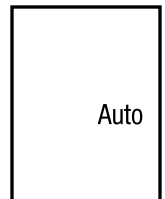- Press the [-] button for Fahrenheit.

°F
°C
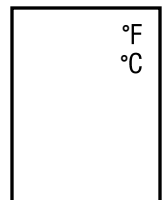
Selecting Automatic or Manual mode
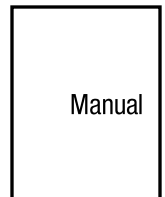
- Press the [SELECT] button to switch between modes:

   "Automatic"

   Heating will start and stop automatically depending on snow detection by the snow sensor/sensors.
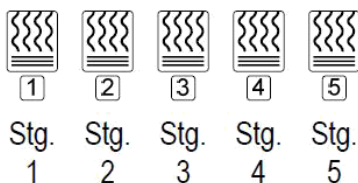
   Auto

   "Manual ON"

   Heating will start regardless of snow sensor measurements and will stop after a preset time (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.

Manual

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

Selecting Automatic or Manual mode

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

❄ 88:88

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Technician Settings

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

P01   Temperature set point

P02   Lower ambient temperature limit to stop heaters

P03   Energy saving, upper slab temperature limit to stop heaters

P04   Time delay before stopping the heaters

P05   ON time for manual mode

P06   Heaters cycle time / Splitting time

P07   Sensors and heaters control logic

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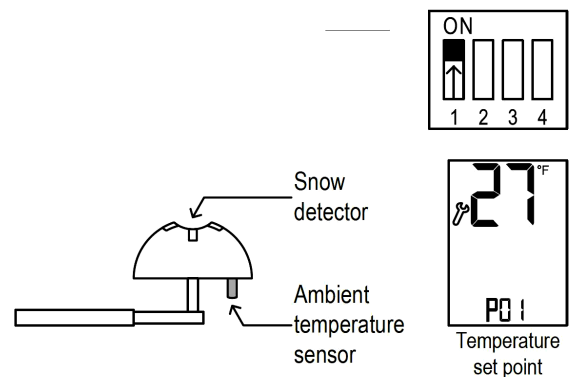
Press the [SELECT] and [+] buttons simultaneously to move forward to the next technician parameter.

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.
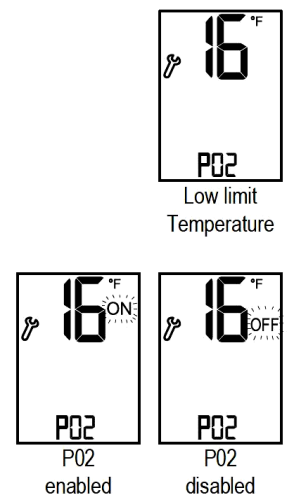 Range: 19...45° / -7…+7°C

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

Snow detector

Ambient temperature sensor

Temperature set point

P01—Temperature set point

- 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…-5°C   Default: -5°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.

Low limit Temperature

P02 enabled

P02 disabled

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Technician Settings Continued
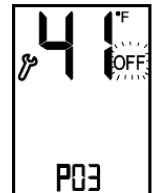
P03—Upper limit temperature for heating

- 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.

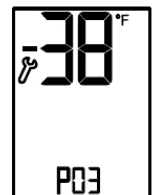- The display will show the temperature on the upper limit sensor.
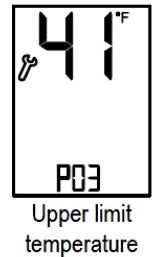
Upper limit
temperature

Set point
enabled

P03
disabled

temperature
on heaters
sensor

P03—Upper limit temperature for heating

- 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.

Time delay
hours

Time delay
minutes

↳ Cont'

Technician Settings Continued

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: 10...1999 minutes Default: 24 minutes.

Splitting time

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Technician Settings Continued

P07—Heaters outputs logic controlled by PYROSENSE snow melt sensor or by 3rd 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" - Out 1-4 controlled by PYROSENSE snow melt sensor.

  Output 5 controlled by 3rd party sensor.

  "2" - Out 1-5 controlled by 3rd 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 3rd party sensor.
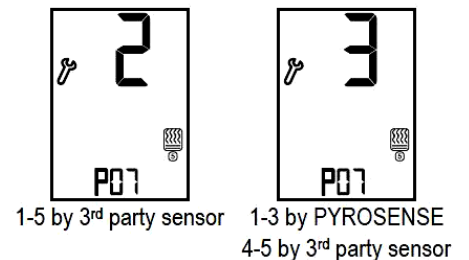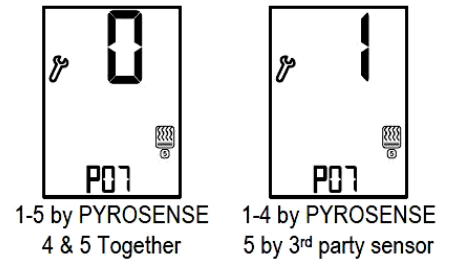
Default: "0"

Note: 3rd party sensors—i.e. gutter or pavement sensors—CIT, GIT, SIT by eti.

1-5 by PYROSENSE
4 & 5 Together

1-4 by PYROSENSE
5 by 3rd party sensor

1-5 by 3rd party sensor

1-3 by PYROSENSE
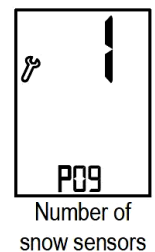4-5 by 3rd party sensor

P08—Snow sensor sensitivity

- Press the [SELECT] and [+] 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'

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# Technician Settings Continued

P10—Test condition 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 manually 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.
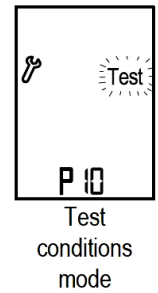
Note: If the technician did not manually exit test/commissioning mode, the unit will automatically return to normal mode after 5 hours.

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

Test conditions mode
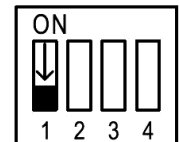
Restore default values

- 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.

Restore default values

- Turn the unit OFF.

- While OFF, Press both the [+] and [-] buttons simultaneously for 10 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 5 seconds to exit.

Enabled zone   Selected zone   Disabled zone
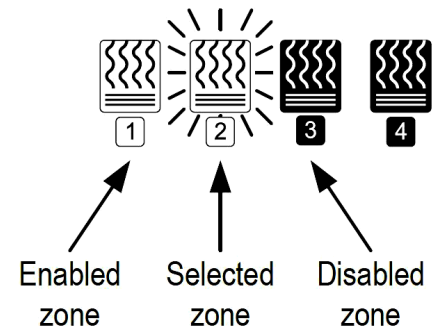
Note: Disable zones will be ignored in splitting time calculation:

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)

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# Technician Settings Continued

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).
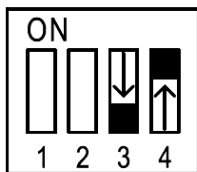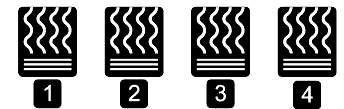
    - "OFF" - Normal operation.

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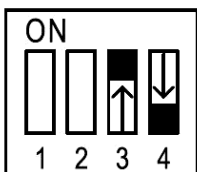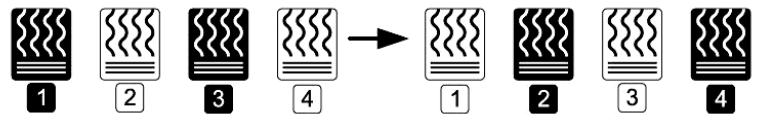
- Use DIP switches S3 and S4 to define the sequencing logic of the heater (zones) as follows:
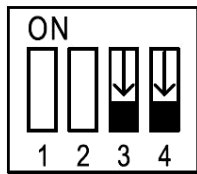
S3 OFF   S4 OFF

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 spitting 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 to splitting time) and output 4 works continuously.

Note: Do not use this configuration with more than two snow sensors connected.
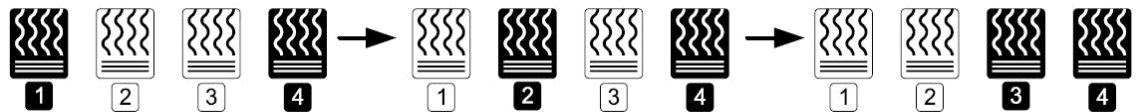
S3 ON   S4 ON

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

Note: Do not use this configuration with more than two snow sensors connected.
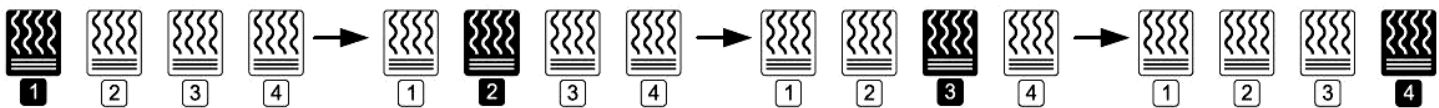
Note: If output 5 is set to work together with outputs 1-4, (see "Heater output no. 5 logic" in the technician settings), it will operate the same as output 4.

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Temperature reading errors

Ambient temperature sensor readings (on snow sensor) are out of reliable measuring range
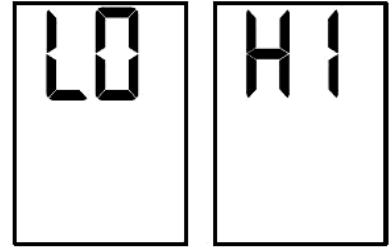
Ambient temperature < -9°F/-23°C

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
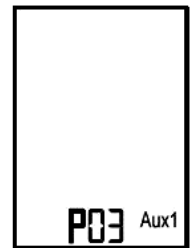
High temperature readings.

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.
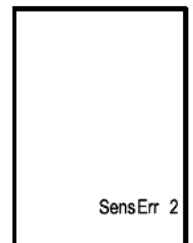

Communication error with snow sensors

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.
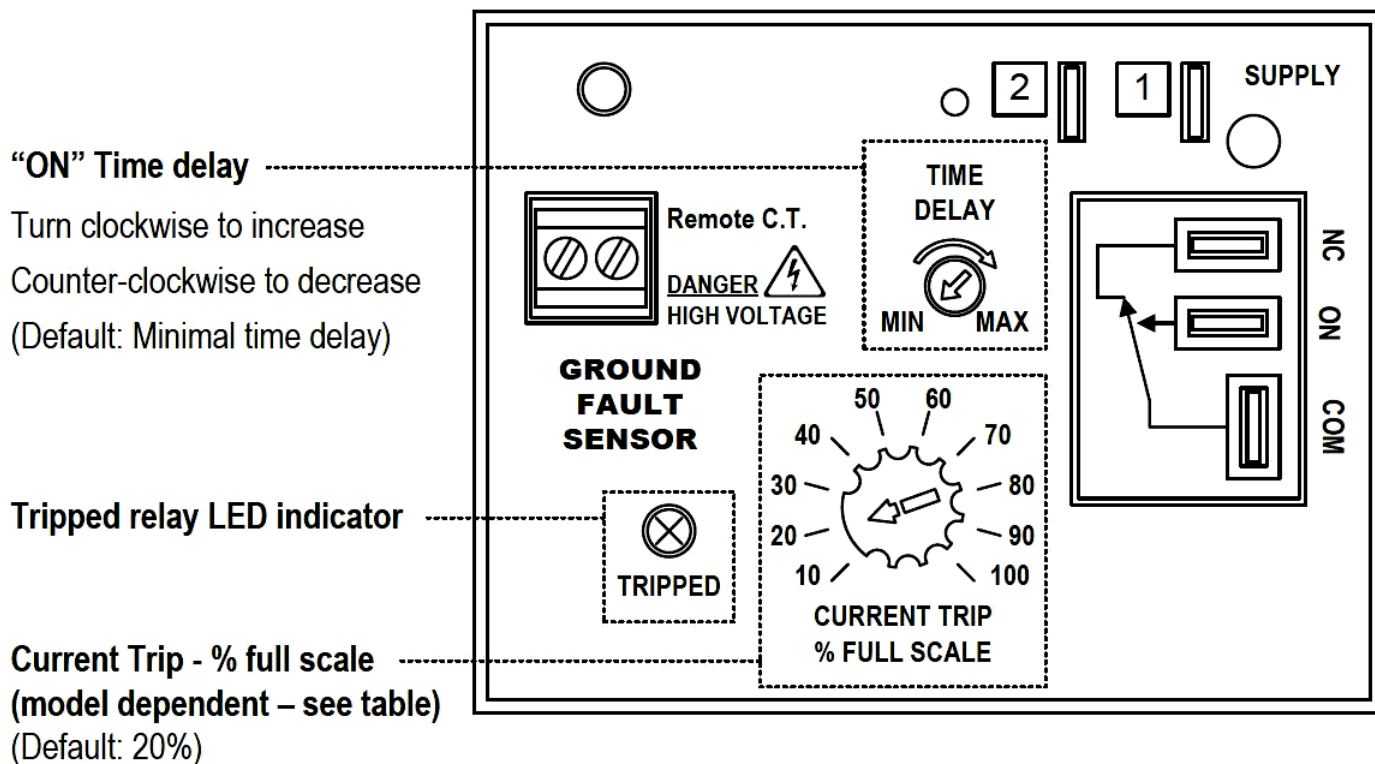
3. Replace the sensor.

Upper limit temperature Sensor error

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Appendix 1—Calibrating the internal GFS

The GFS (Ground Fault Senor) is designed to provide protection for electrical equipment.

The "ON" Time delay and current trip should be configured to match application requirements.

"ON" Time delay

Turn clockwise to increase

Counter-clockwise to decrease

(Default: Minimal time delay)

Tripped relay LED indicator

Current Trip - % full scale
(model dependent – see table)
(Default: 20%)

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

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Notes:

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