

Model: PEM-VDC

Installation Guide

DANGER

HAZARD OF ELECTRIC SHOCK

Disconnect electrical power to the power source and/or the HVAC equipment before installing and wiring the Pelican Expansion Module. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller(s).

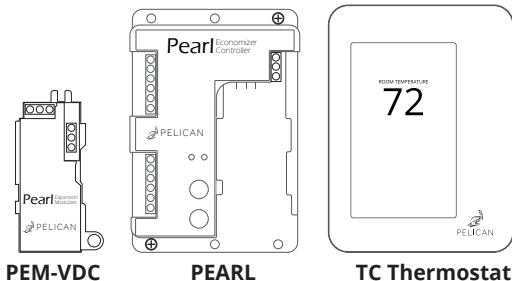


Before you start

The PEARL Expansion Module is designed to work with the Pelican PEARL and a Pelican TC Thermostat ONLY.

To configure Pelican devices, a Pelican Gateway must be installed and connected to an active Ethernet port. The Pelican devices will communicate with the Pelican Gateway over a wireless mesh network.

Configurations are accomplished through the Pelican Connect™ web-app.



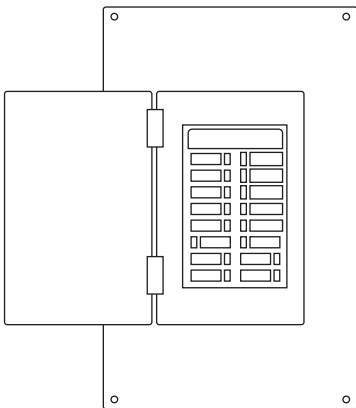
Disconnect Power

This device is designed to be installed on 24 VAC systems only. Turn power Off to the equipment either at the circuit breaker panel or by turning off the master power.

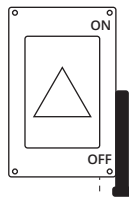
Installation to be by a licensed professional only.

IMPORTANT

AVOID CONNECTING POWER TO ANY INPUTS OR OUTPUTS NOT SPECIFICALLY DESIGNED FOR POWER. WIRING POWER TO THE (T1), (T2), (T3), (A1), (A2), (A3), (A4), (S1), or (S2) INPUTS CAN DAMAGE THE CONTROLLERS. TAKE EXTREME CAUTION WHEN WIRING POWER TO THE PEARL AND THE PEARL EXPANSION MODULE.



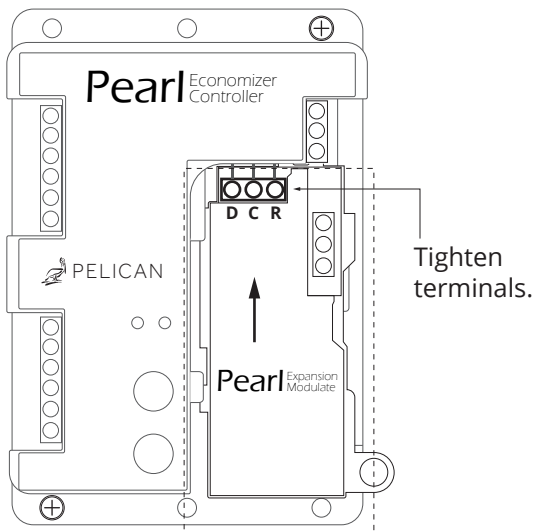
Power off your equipment either at the circuit breaker panel or by turning off the master power.



Install the Pearl Expansion Modulate

Align the expansion module with the opening in the PEARL. Gently slide the module upwards towards the PEARL's three pin connector.

Confirm all the pins are inserted into each of the expansion module's terminals and then tighten the (R), (C), and (D) terminals on the expansion module.



Installing the PEARL

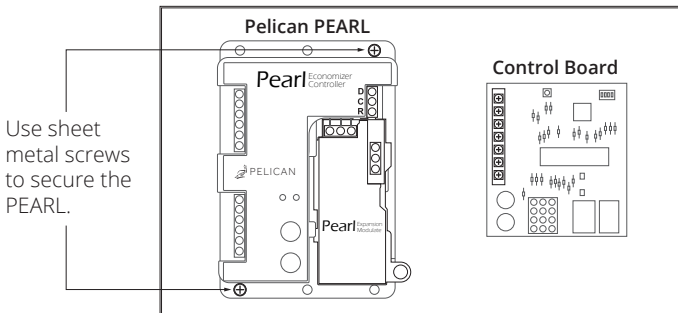
When installing the PEARL these items should be considered:

- 1) Mount in a location where it can easily control the equipment it will be wired to. This is traditionally a low voltage control cavity at the HVAC equipment.
- 2) Make sure all the required temperature probes and modulating signals can easily be wired to where the PEARL is mounted.
- 3) Verify that at least three (3) wires can be used between where the PEARL is installed and where its Pelican thermostat is mounted.
- 4) There is available 24 VAC power.

IMPORTANT

THE PEARL IS **NOT** WATER-PROOF. MOUNT THE PEARL IN A LOCATION WHERE MOISTURE WILL NOT CONTACT OR BUILD-UP ON THE PEARL.

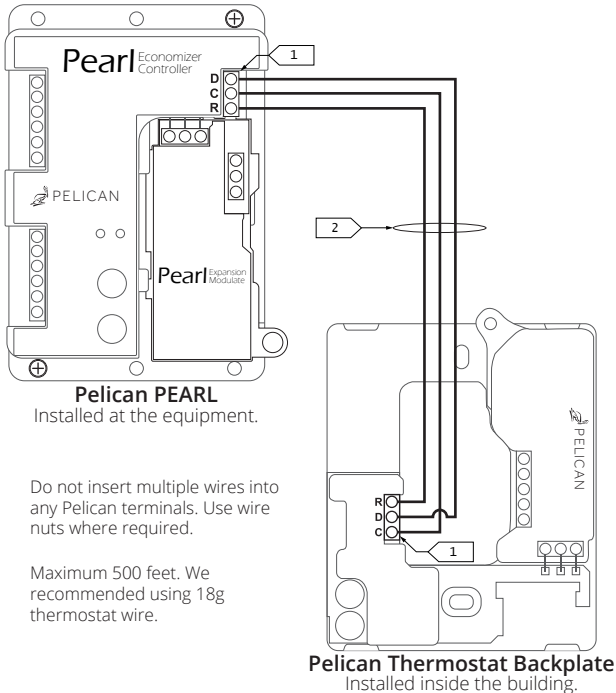
Use the best two of the six mounting holes on the PEARL's sub-base to mount it to a flat surface. Use the included 3/16" sheet metal screws.



Wire the PEARL to its Thermostat

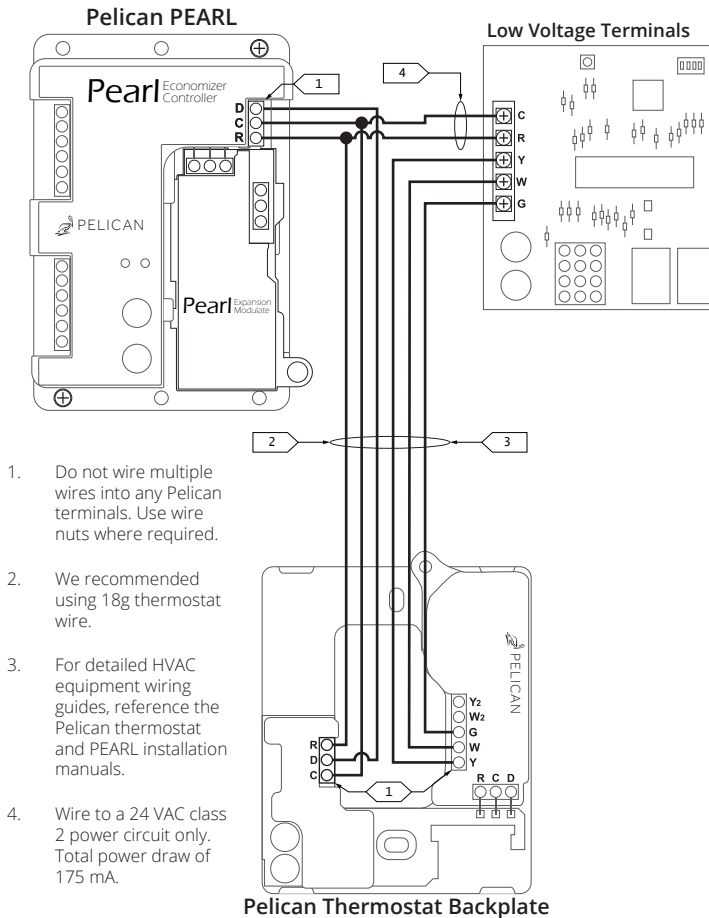
Connecting a PEARL to its Pelican thermostat requires at least three (3) wires between the two devices. This accommodates a maximum wire distance of 500 feet between the PEARL and the thermostat.

Use existing or a new three (3) wire run from the PEARL to where the thermostat is installed. Connect the (R), (C), and (D) terminals from the PEARL to the matching (R), (C), and (D) terminals at the thermostat's back plate.



Wire to Low Voltage Terminals

Locate the HVAC equipment's control board. Using new wire, connect the device terminals to the corresponding low-voltage input terminals at the HVAC unit's control board.



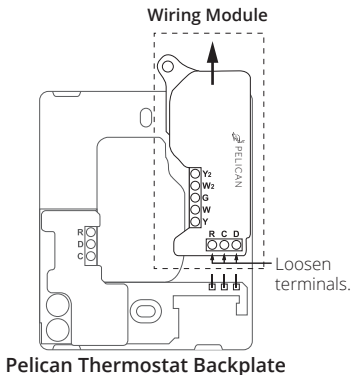
1. Do not wire multiple wires into any Pelican terminals. Use wire nuts where required.
2. We recommended using 18g thermostat wire.
3. For detailed HVAC equipment wiring guides, reference the Pelican thermostat and PEARL installation manuals.
4. Wire to a 24 VAC class 2 power circuit only. Total power draw of 175 mA.

Optional: Limited Wiring Installation

For installations with limited wires between the PEARL and its Pelican thermostat. You can use the thermostat's included Limited Wiring Module to achieve a three (3) wire installation.

Step 1: Remove the Wiring Module from the Pelican thermostat's back plate.

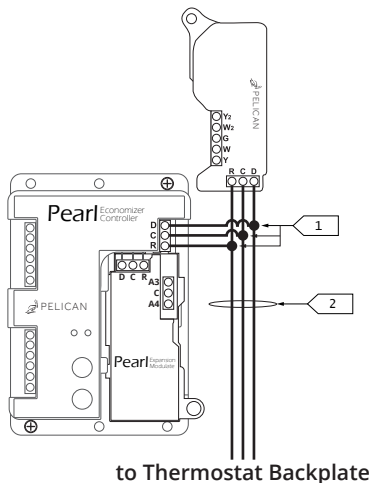
Loosen the (R), (C), and (D) terminals on the Limited Wiring Module. Gently slide the module upwards (away from the three pin connector) to remove.



Step 2: Install the Wiring Module next to the PEARL.

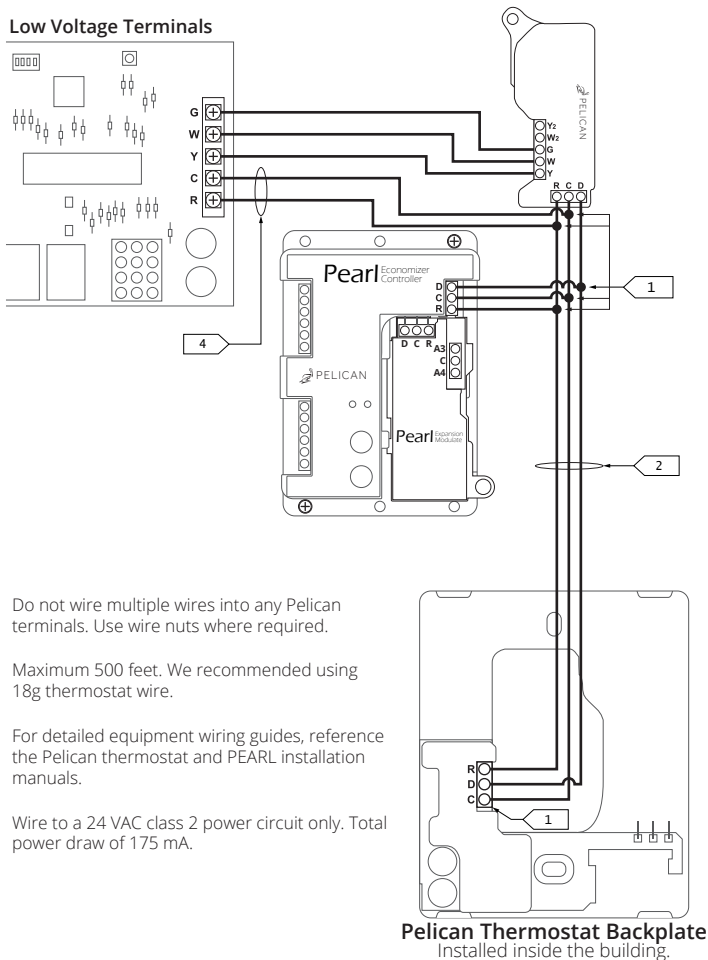
Install the Wiring Module on a flat surface near the PEARL. Use 18g thermostat wire and wire nuts to connect the (R), (C), and (D) terminals between the wiring module and the PEARL. Tighten the (R), (C), and (D) terminals on the wiring module and PEARL.

1. Do not wire multiple wires into any Pelican terminals. Use wire nuts where required.
2. We recommended using 18g thermostat wire.



Step 3: Wire PEARL to its thermostat

Use the three (3) 18G thermostat wires to connect the (R), (C), and (D) terminals from the PEARL to the matching (R), (C), and (D) terminals at the thermostat's backplate.



Wire to Power

The PEARL, expansion module, wiring module and the Pelican thermostat must be powered by a common 24 VAC Class 2 power source. Disconnect electrical power to the power source before wiring anything to the PEARL or its thermostat. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

If you use a separate control power transformer, it is essential that either the auxiliary transformer and the terminal at each control point are in-phase OR isolation relays must be installed between the PEARL and thermostat's 24 VAC outputs and any inputs at the equipment/device being controlled. You must verify this prior to connecting the auxiliary transformer to the PEARL and Pelican thermostat.

IMPORTANT

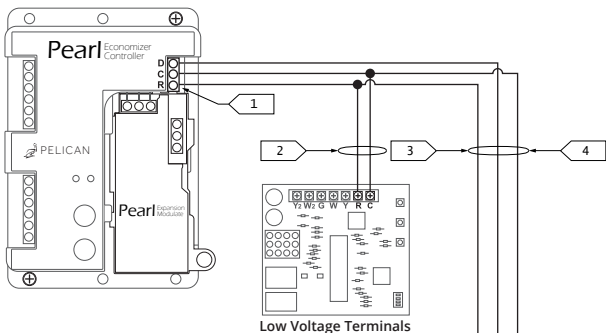
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Power Diagrams - Table of Contents

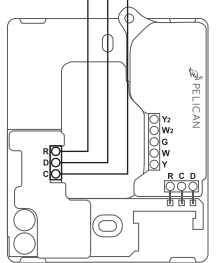
Page 10 Diagram 1	HVAC Equipment Transformer Common Power Source
Page 11 Diagram 2	Auxiliary 24 VAC Transformer Isolated Power Source

Power Diagram 1: Using the rooftop equipment's 24 VAC transformer:

- 1) Before wiring the to the rooftop equipment's power source, turn power ON to the rooftop equipment and verified the voltage measured from the transformer is within the PEARL/thermostat's operating range of 23 - 30 VAC.
- 2) Turn power back OFF to the rooftop equipment.
- 3) Wire the Pelican device's (R) to 24 VAC and (C) to Common at the rooftop equipment.
- 4) Turn PELICAN power back ON to the equipment and verify that the PEARL and thermostat's powers ON.



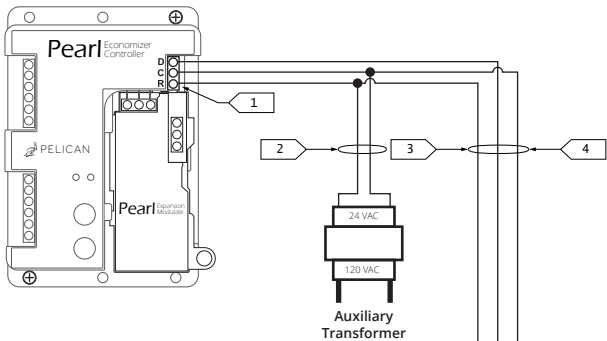
1. Do not wire multiple wires into any Pelican terminals. Use wire nuts where required.
2. Wire to a 24 VAC class 2 power circuit only. Total power draw of 175 mA.
3. We recommended using 18g thermostat wire.
4. Max wire distance between PEARL and Thermostat is 500 feet.



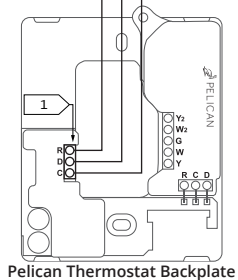
Pelican Thermostat Backplate
Installed inside the building.

Power Diagram 2: Using an auxiliary 24 VAC transformer:

- 1) Follow the transformer installation manual for directions on how to install the transformer.
- 2) Before wiring to the transformer, turn power ON to the transformer and verify the voltage measured is within the thermostat's operating range of 23 - 30 VAC.
- 3) Turn power back OFF to the transformer.
- 4) Wire the Pelican device's (R) to 24 VAC and (C) to Common at the transformer.
- 5) Turn power back ON to the equipment and verify that the PEARL and thermostat's powers ON.



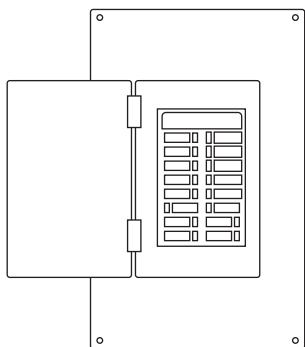
1. Do not wire multiple wires into any Pelican terminals. Use wire nuts where required.
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3. We recommend using 18g thermostat wire.
4. Max wire distance between PEARL and Thermostat is 500 feet.



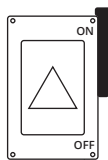
Turn On Power

Do not turn power back On until installation is complete.

Before turning power back On, confirm all wires are properly connected and that no wires are loose, spliced, or might create a bad or shorted connection. If any wire connections are not correct, damage might occur.

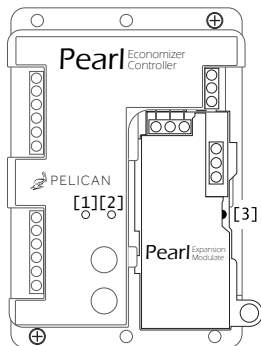


Power on your equipment either at the circuit breaker panel or by turning on the master power.



Confirm Power & Communication Status:

- The PEARL's left status light [1] will slowly blink green to indicate power & synchronization with the thermostat.
- Once synchronized, PEARL's left status light [1] will go to solid green.
- The Pearl Expansion Modulate light [3] will slowly blink green to indicate power & synchronization with the thermostat.
- Once synchronornized the Pelican Expansion light [3] will go solid green.



Application - Detailed Wiring Diagrams

The Pelican PEARL Expansion Module can be used for a variety of different modulating control applications. This section goes through detailed wiring diagrams for the most common applicaitons.

For PEARL related outputs and wiring diagrams, reference the Pelican PEARL Installation Manual.

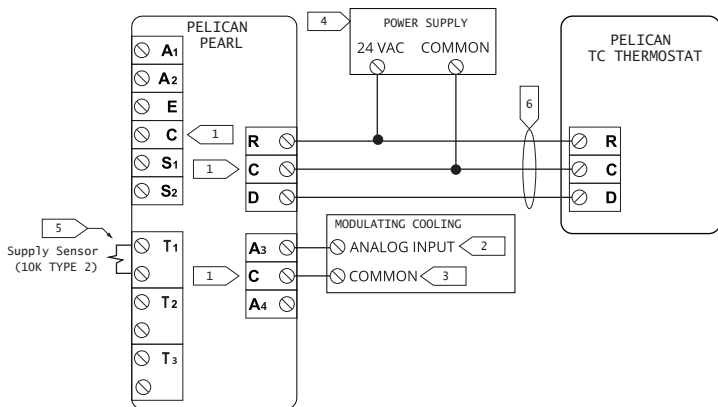
For Thermostat related outputs and wiring diagrams, reference the Pelican Thermostat Installation Manual

For any applications outside of this installation manual, contact Pelican techincal support for pre and post sales engineering support 888-512-0490 or email: support@pelicanwireless.com.

Application Diagram - Table of Contents

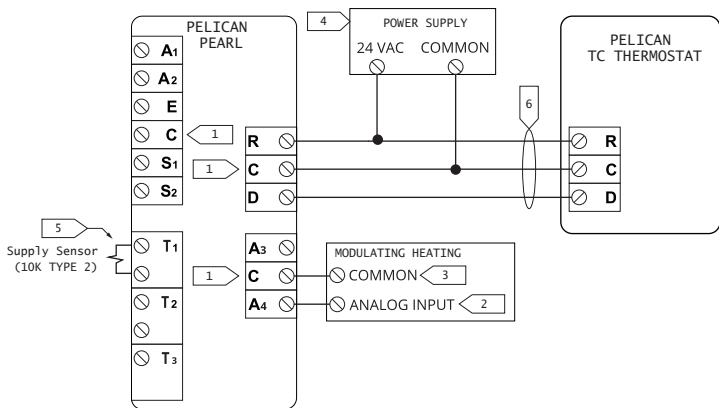
Page 10 Diagram 1	Modulating Cooling Discharge Tempature Control
Page 11 Diagram 2	Modulating Heating Discharge Tempature Control
Page 12 Diagram 3	Modulating Cooling & Heating Discharge Tempature Control

Diagram 1: Modulating Cooling



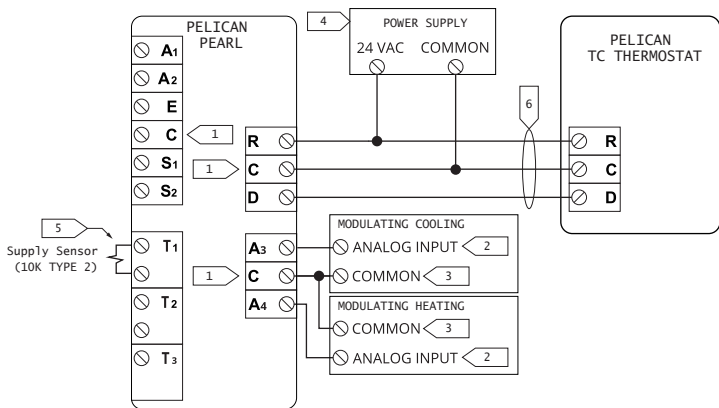
1. All commons are internally connected.
2. Modulating input must accept a VDC signal. The PEARL output is a configurable range from 0 - 10 VDC.
3. Common from the modulating equipment must be wired to the PEARL common.
4. Wire all devices to a common 24 VAC class 2 power circuit only. Total power draw is 175 mA.
5. Supply temperature sensor required to be installed where the PEARL can detected the discharge output of the equipment. The PEARL will modulate the cooling and/or heating equipment to maintain a discharge air temperature target.
6. The [R] [C] [D] power & communication terminals must be wired between the PEARL and its thermostat with a max distance of 500 feet.

Diagram 2: Modulating Heating



1. All commons are internally connected.
2. Modulating input must accept a VDC signal. The PEARL output is a configurable range from 0 - 10 VDC.
3. Common from the modulating equipment must be wired to the PEARL common.
4. Wire all devices to a common 24 VAC class 2 power circuit only. Total power draw is 175 mA.
5. Supply temperature sensor required to be installed where the PEARL can detected the discharge output of the equipment. The PEARL will modulate the cooling and/or heating equipment to maintain a discharge air temperature target.
6. The [R] [C] [D] power & communication terminals must be wired between the PEARL and its thermostat with a max distance of 500 feet.

Diagram 3: Modulating Cooling & Heating



1. All commons are internally connected.
2. Modulating input must accept a VDC signal. The PEARL output is a configurable range from 0 - 10 VDC.
3. Common from the modulating equipment must be wired to the PEARL common.
4. Wire all devices to a common 24 VAC class 2 power circuit only. Total power draw is 175 mA.
5. Supply temperature sensor required to be installed where the PEARL can detect the discharge output of the equipment. The PEARL will modulate the cooling and/or heating equipment to maintain a discharge air temperature target.
6. The [R] [C] [D] power & communication terminals must be wired between the PEARL and its thermostat with a max distance of 500 feet.

Configuration

Pelican Technical Support will request the below information and then configure the outputs to match your application and the sequences required for your installation.

The thermostat and its associated devices must be accessible through the Pelican Pelican Connect™ web-app for configuration to be pushed to the devices.

Thermostat Serial Number

Modulating Cooling: **Yes** **No**

Voltage Range: Max Cooling VDC

Min Cooling VDC

Cool Signal Output: A3 A4

Supply Targets: Moderate Cooling °F

Aggressive Cooling °F

Modulating Heating: **Yes** **No**

Voltage Range: Max Heating VDC

Min Heating VDC

Cool Signal Output: A3 A4

Supply Targets: Moderate Heating °F

Aggressive Heating °F

