

Thank you for purchasing the RTU - ProPack. This booklet will help you install your devices properly.

Included in this box:

- PL-M2000-RTU Rooftop Unit Controller
- PL-LPT-LCD Low Pressure Transmitter with LCD
- PL-LPT-SPT Barbed Static Pressure Tip
- (2) PL-DT-T8 Duct Temperature Sensor (Supply + Return)
- PL-OA-T Outside Air Temperature Sensor
- PL-APS Air Differential Pressure Switch
- Instructions

Not included in the box:

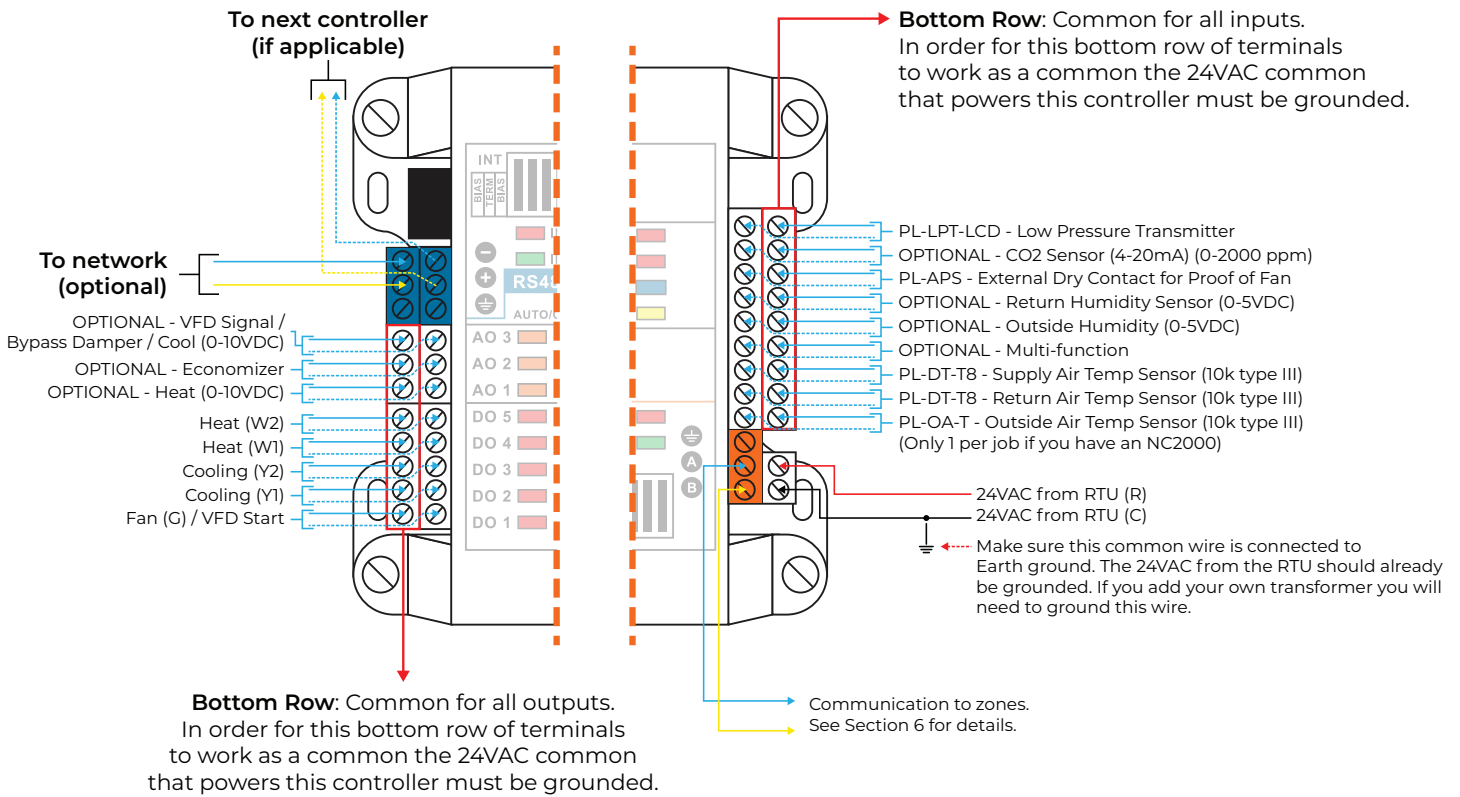
- 24VAC Transformer
- #18/2 AWG stranded, shielded wire for inputs and 24V
- #22/2 AWG stranded, shielded for data
- PL-485-BT Connection Tool

SECTION 1 - QUICK INSTALLATION INSTRUCTIONS

[PROPACK-RTU]

The PL-M2000-v functions as a standalone Rooftop Unit controller. It is preconfigured to control standard packaged RTU's via its terminal strip (G, Y1, Y2, W1, W2). Other control options include economizer and VFD control. It can be set up using the smartphone app or Focus software in combination with the PL-485-BT Prolon Connection tool (not included in ProPack).

- 1) Power Down the RTU: Turn off power to the RTU unit and lock out the switch.
- 2) Set Controller Address: Assign a unique address to your controller on the dipswitches (see Section 4 Addressing). Each controller needs a unique address between 1 and 127. Avoid using addresses 99 and 101, as these are reserved for other Prolon devices.
- 3) Install the PL-M2000-RTU: Mount the controller in the RTU near the control board. Choose a location where conditioned air will maintain an approximate temperature range between -4°F and 122°F.
- 4) Install the Outside Air Sensor: Mount the PL-OA-T Outside Air Temperature sensor on the unit, away from direct sunlight, ideally on the north side of the RTU and above potential snow accumulation. Connect the sensor to Input 1.
- 5) Install the Return Air Sensor: Mount the PL-DT-T8 Duct Temperature Sensor on the return duct. Connect the sensor to Input 2.
- 6) Install the Supply Air Sensor: Mount the PL-DT-T8 Duct Temperature Sensor on the supply duct. Connect the sensor to Input 3.
- 7) Install Fan Proof Sensor: Mount the PL-APS Differential Pressure Switch on the supply duct. Consider placing it close to the Supply Air Temperature Sensor. Attach the high side tube near the supply air temperature sensor and leave the low side disconnected. Connect the Normally Open contact on Input 7.
- 8) Install a Duct Static Pressure Sensor PL-LPT-LCD on input 9. Install this sensor 2/3 of the way down the length of the duct. **This will require a single 3-conductor cable (#18/3 AWG), with one wire for power, one for pressure signal and one for neutral.**
- 9) Connect Fan Start/Stop: Wire DO1 to the RTU/AHU control board's "G" terminal, or to the relay for VFD Start/Stop.
- 10) Connect Cooling Stage 1 + Stage 2: Wire DO2 + DO3 to the RTU/AHU control board's "Y1" and "Y2" terminal.
- 11) Connect Heating Stage 1 + Stage 2: Wire DO4 + DO5 to the RTU/AHU control board's "W1" and "W2" terminal.
- 12) Economizer Setup (if applicable): If controlling the economizer/fresh air damper, wire AO2 to the damper actuator 0-10Vdc input. Use Focus software/Focus App to enable and configure the economizer settings.
- 13A) VFD Setup (if applicable): If controlling a variable frequency drive (VFD), wire AO3 to the speed control 0-10Vdc input. Use Focus software/Focus App to enable and configure fan speed settings.
- 13B) Bypass damper Setup (if applicable): If controlling a bypass damper, wire AO3 to the damper signal 0-10Vdc input. Use Focus software/Focus App to enable and configure damper settings.
- 14) RS485 NET Termination: turn ON the "Term" jumper on the RS485 NET port and leave both "BIAS" jumpers OFF.
- 15) Power Connections: Connect 24VAC from the control board terminals "R" and "C" to the PL-M2000-RTU (refer to wiring diagram).
- 16) Power Up the RTU: Restore power to the RTU unit.
- 17) Verify Fan/VFD Functionality: Toggle DO1 HOA switch to HAND to verify that the fan (or VFD) turns on.
- 18) Verify Cooling Stages: Toggle DO2 and DO3 HOA switches to HAND to verify that cooling stages 1 and 2 turn on.
- 19) Verify Heating Stages Toggle DO4 and DO5 HOA switches to HAND to verify that heating stages 1 and 2 turn on.
- 20) Verify Economizer (if applicable): Toggle AO2 HOA switch to HAND to verify the economizer damper actuator opens. (NOTE: Switch in Hand mode will give 10Vdc, thus 100% damper opening)
- 21) Verify VFD or Bypass Damper (if applicable): Toggle AO3 HOA switch to HAND to verify VFD speed increase or Bypass Damper opening/closing. (NOTE: Switch in Hand mode will give 10Vdc, thus full VFD speed or damper opening/closing)
- 22) Set Schedule: Use Focus software/Focus App to set a schedule (default schedule is Occupied 24/7).
- 23) Connect Zone Controllers for communication:
 - Daisy-chain zone controllers using 22AWG (shielded, low capacitance) wire on the RS485 NET port. Ground the drain wire at the PL-M2000-RTU, tie the drain wire at each controller junction, and tape it off at the last with no connection to metal or ground.
 - Set the RS485 NET BIAS and Term jumpers to ON on the PL-M2000-RTU. At the last zone controller, set only the Term jumper to ON (leave BIAS off if applicable). Devices in between should have both BIAS (if applicable) and Term jumpers OFF.



SECTION 3 - SEQUENCE OF OPERATION

Occupied Mode (Default):

- The supply fan (DO1) starts and runs continuously. Once fan proof is confirmed (AI7), all other sequences are enabled.
- The low pressure transmitter (PL-LPT-LCD) reads the static pressure and the RTU Controller
 - a) modulates the bypass damper
 - b) modulates the VFD to maintain the system's static pressure in the supply duct (adjustable).
- The zone controllers send their demand (weighted average) to the RTU controller, to drive either the cooling stages (DO2, DO3) or heating stages (DO4, DO5) in sequence.
- Cooling stages will observe a minimum ON time of 2 minutes (adjustable) and a minimum OFF time of 5 minutes (adjustable) to avoid short cycling.
- If the outside temperature rises above 86°F (adjustable), heating is disabled.
- If the outside temperature falls below -40°F (adjustable), cooling is disabled.

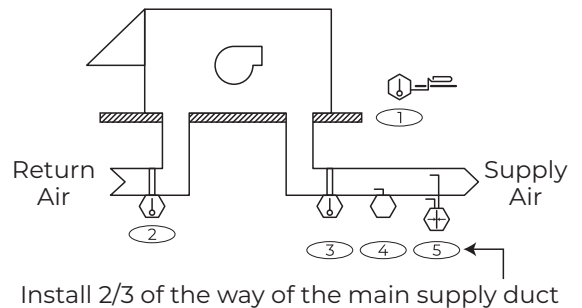
For Economizer (Free Cooling) options, refer to the Proton Rooftop Unit Focus Guide for more details.

Unoccupied Mode:

- The supply fan (DO1) stops.
- Cooling and heating setpoints are adjusted (cooling raised, heating lowered).
- If the space temperature exceeds the unoccupied cooling setpoint or drops below the unoccupied heating setpoint, the supply fan will start, and the system will engage cooling or heating as needed.

PERIPHERALS ID AND PLACEMENT

Designation	Description	Part Number
①	Outside Temperature Sensor	PL-OA-T
②	Return Duct Temperature Sensor	PL-DT-T8
③	Supply Duct Temperature Sensor	PL-DT-T8
④	Differential Pressure Switch (Fan Status)	PL-APS
⑤	Low Pressure Transmitter	PL-LPT-LCD



Full Instruction can be downloaded from these QR Codes.



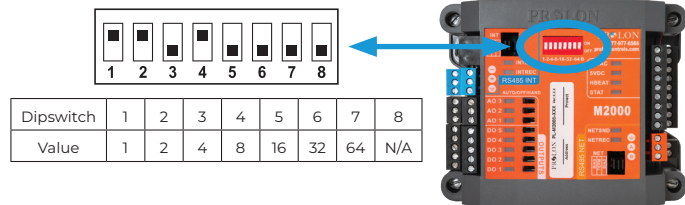
Rooftop Controller - M2000 Series
 Hardware Guide



Rooftop Controller
 Focus Guide

SECTION 4 - ADDRESSING

A controller address must be configured for communication with the wall sensor. Configure the first 7 switches on the addressing dipswitch to the desired value. Without a valid address, the controller will not be able to communicate with the wall sensor. If multiple controllers are on the same network, each must have a unique address.



Example 1:

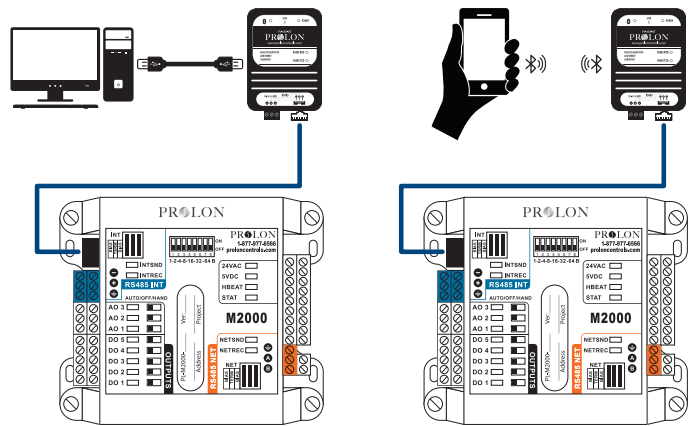
Dipswitches in UP position: #1, #2, #4
Address = 1 + 2 + 8 = 11

Example 2:

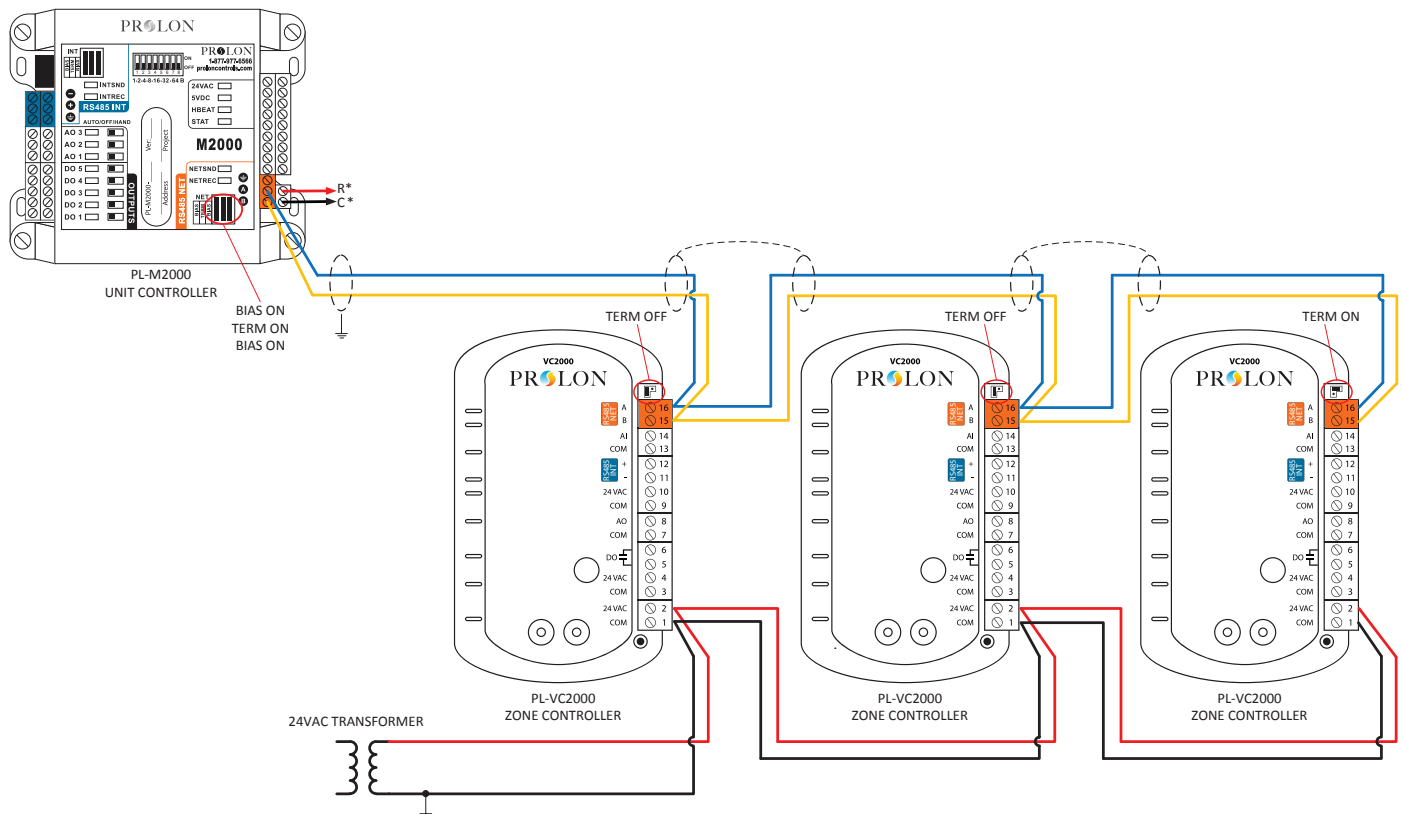
Dipswitches in UP position: #1, #3, #6
Address = 1 + 4 + 32 = 37

SECTION 5 - CONNECTION TOOLS

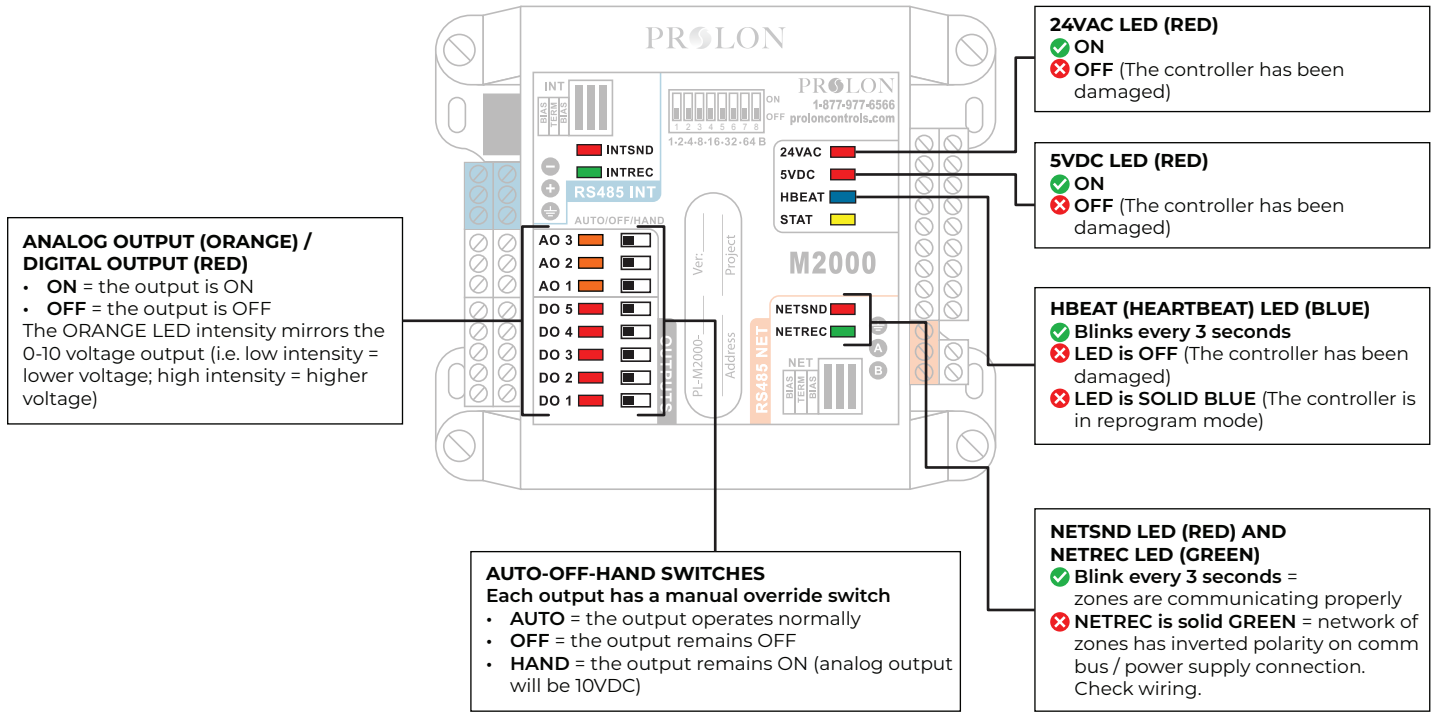
All PL-M2000-RTU settings can only be accessed ONLY through software on a computer or smartphone app. A PL-485-BT connection tool is required for setup (not included in the ProPack).



SECTION 6 - NETWORKING PL-M2000-RTU WITH MULTIPLE ZONE CONTROLLERS



To network multiple controllers together, please visit ProLon Controls website for more information.



SECTION 8 - FAQ (FREQUENTLY ASKED QUESTIONS)

- 1) What power is needed?**
ProLon controllers need 24VAC to run. Use the R (24VAC – Hot) and C (24VAC – Common) terminals at the unit control board to power up the PL-M2000-RTU controller.
- 2) What wiring is needed to for this controller?**
 - 24VAC Supply: #18/2 AWG
 - Zone controllers communication bus: #22/2 AWG low capacitance twisted & shielded for data.
 - Sensors #18/2 AWG
- 3) Can this controller be connected to the internet?**
Yes, this controller may be connected to the internet. To do so, a PL-NC2000 Network Controller is required (not included in ProPack)
- 4) Can this controller be connected/networked to other ProLon devices?**
Yes it can. To connect a controller to another controller you will need #22/2 AWG (stranded, shielded, low capacitance), and will connect to terminals RS485 INT “+” and “-“ terminals in a daisy chain pattern.
- 5) Can this controller connect wirelessly to the zone controllers?**
Yes it can. Simply add QTY 1 PL-TREE-COM wireless adapter to the PL-M2000-RTU controller and QTY 1 PL-TREE-Com for each zone controller (NOTE: all devices need Power Supply 24VAC even if wireless)
- 6) Is a CO2 transmitter required?**
No, it is not required. A PL-DT-CO2 (not included in ProPack) may be added.
- 7) Does every controller need an address?**
Yes, a unique address is required for each controller. This will allow it to communicate to its zone controllers.
- 8) Can I change the controller address?**
Yes, the address can be changed via the dipswitches on the controller.
- 9) What kind of economizer options are available?**
The PL-M2000-RTU offer 3 economizer strategies: Dry bulb, Single Enthalpy, Differential Enthalpy. For enthalpy economizer strategies, relative humidity transmitters (duct and/or outside air) are required (not included in ProPack).

