QuickStart Guide - CircuitTree Motor Controller

Model # CT-ND-MC-480W (rev. 3)

For complete documentation, consult the User Manual: https://www.circuittree.net/manual

This guide describes how to use the Motor Controller in "stand-alone" mode – the internal timer controls 2 light deprivation shades, the thermostat controls 2 sidewall vents. This unit is also "**smart-ready**" – it can be controlled wirelessly by the CircuitTree smart system, accessible through any smartphone, tablet, or computer.

Installation:

→ **Make sure the Motor Controller is not powered during installation.**
→ The long bundled cable on the bottom is the temperature sensor – place in a convenient location, ideally not in direct sunlight.

1) Mount the unit on a flat vertical surface using the included mounting hardware (taped to side.)
2) Thread your 4 motor wires through the 4 cable glands on the bottom of the Motor Controller. (Twist cable gland to open it, then twist it to close after cable is through. Close it snug.)
3) The **light deprivation** shade motors get wired to the 2 relays on the **left** side. For each motor, connect the motor's wires to a white wire and a blue wire (the one with a fuse). It doesn't matter which blue and white wire pair is chosen for each motor, as they are the same.
4) The **sidewall** vent motors get wired to the 2 relays on the **right** side.
(If you are only using light deprivation and not sidewall vents, it is fine to only wire up the 2 light dep motors, using only the timer & light dep feature. Disable the thermostat in this case.)

* If motors don't roll in the direction you're expecting, flip the wires to reverse the direction.

5) Plug in the unit and set the Timer for light dep shades and Thermostat for sidewalls. (Details below.)

How It Works: The Motor Controller unit contains a "stop timer" which is independent of the timing threshold set directly on the motors. This defines the amount of time that each set of motors will receive power. When you press the manual UP/DOWN buttons or a command is sent from the timer or thermostat to move motors up or down, the controller provides power supply to the motors for this specified period of time. The motor knows to stop moving once it reaches the threshold set on the motor itself, even if it is still being provided power from the controller. The default stop timer values in the Motor Controller are 20 minutes for light deprivation shades and 10 minutes for sidewall vents, which should cover most standard greenhouse configurations and would not need to be adjusted. This amount of time is adjustable if you know your motors need more or less time.

⚠️ **IMPORTANT:** You must set the maximum thresholds on the motors themselves, to limit how far the motors can move. These are adjustable by knobs on the motor, indicating the maximum number of rotations it will run before stopping. If you have not already set these thresholds, you must do so prior to automating the shades with this Motor Controller. Consult your greenhouse/motor documentation or support for more details. Essentially you need to watch the shade the first time it rolls up, observe when it has reached the point where you want it to stop, then manually stop the rolling – then set that as the motor threshold.
** *Failure to set the motor thresholds can result in damage to your greenhouse shades from over-rolling!* **

• Only 1 pair of motors can be used at a time – light dep or sidewall. (Not simultaneously.)
• The sidewall vent motors cannot be operated while light deprivation shades are closed.
• If a request is sent to close light dep shades, the sidewall vents will be closed first (if they're open) before light dep shades close. If a request is made to open sidewalls while light dep shades are closed, sidewalls will be locked out and request will be ignored.

Basic Usage:

• When the unit is plugged in, all of the LEDs next to the buttons flash 1 time, then will resume indicating their current state. (Controller will remember and indicate if motors are up or down, if AUTO is on, etc.)
• Set the programming for the Timer and the Thermostat before turning on AUTO mode.
• Automation is not running until you activate it by pressing the "AUTO" button for the light dep or sidewall channels. The LED lights next to the AUTO button will be lit if automation is active. In AUTO mode the internal timer and thermostat are controlling the light dep and sidewall motors.
• If AUTO is not active, the controller is in Manual mode. The UP ⇧ and DOWN ⇩ buttons move the light dep or sidewall motors. If you manually move the light dep or sidewall motors, AUTO will turn off since the motors have been moved separately from the automation settings. (Be sure to put the unit back into AUTO mode if you want to resume the automation after a manual movement.)
• You can flip the circuit-breaker as a full stop switch if needed – this cuts power to the motors and everything except the power supply.

Automation:

The internal timer and thermostat work as toggle devices for stand-alone automation. The timer automates the light dep motors, the thermostat automates the sidewall motors. Each device toggles a relay ON or OFF. When the relay turns ON, the motors automated by that device move UP to the open position. When the relay turns OFF, the motors automated by that device move DOWN to the closed position.

Buttons → Manual Control & Programming:

The 3 buttons on the outside of the unit can be used for manually moving the light dep shades or sidewall vents up/down, and for programming internal timing parameters of the Motor Controller.

Buttons respond to a normal **short press**, or have a different function if you hold the button down (**long press**).

There are LEDs on each side of the buttons – the left side (green) is for the light dep shades, the right side (red) is for the sidewall vents. The left channel (light dep) is considered "master" because the status of the light dep shades being up or down determines whether the sidewall vents are in lockdown or allowed to be opened.

The unit starts up with the buttons in manual operation with the left channel selected. In manual mode, when all motors are stopped, all LEDs are off. In automation mode, the LED is illuminated next to the "AUTO" button. AUTO mode means that the motors are controlled by the timer and thermostat.

Pressing the UP (⇧) button will activate motors to move up. Pressing the DOWN (⇩) button activates motors to move down. The light blinks while motors are moving or waiting to move, and remains lit (solid) when complete. To stop a motor from moving in a direction, press that same direction button again.

Long-pressing any button will switch the manual motor control between the left channel (green/light dep) and the right channel (red/vent). All 3 of the LEDs on the activated side will light up before you release the button from long press, as a visual confirmation of which side is active.

> Example usage: Long-press the UP button to select which side you are controlling,
> then regular short-press the UP button again to activate that motor to go up.
> To stop motor from moving up while it is in progress, press the UP button again.

If you attempt to move the sidewalls while the light dep shades are closed or moving, the available LED lights will all flash once to indicate the sidewalls are in "lockout" mode and cannot be operated with light dep closed.

Configuration mode is used to set the stop-timers for each channel and change internal settings. See the complete user guide for info on using Configuration mode.
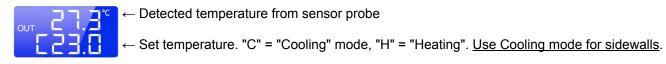

Timer → Light Deprivation Shades:

Flip open the front cover of the timer to access its buttons. "Manual" button toggles between AUTO, ON, and OFF. AUTO means automation is on, relays will activate at programmed times. OFF means the timer is disabled and not controlling light dep. ON means the relay is active and stays active until changed. (We recommend not using the "ON" or "OFF" setting – just use the button controls to manually move shades.)

To set the current time and date, hold the Clock button and use the Day (D+), Hour (H+) and Minute (M+) buttons to adjust.

Press the "P" button to program timer. The timer is capable of holding many different on/off times, but you only need to use one timer to open & close light dep shades. Each time you press "P" it will switch between the available timer slots – each one has an ON time and an OFF time, as shown on the display. Using the Day (D+) button will allow setting timer for specific days – for daily light dep purposes you'd want all days to be activated, with the whole week shown across the top of display. Pressing the clock button exits out of programming.

Thermostat → Sidewall Vents:
The thermostat in this unit operates in °C. See the chart inside the lid for easy conversion to °F.

27.3 °C OUT   ← Detected temperature from sensor probe
C 23.0   ← Set temperature. "C" = "Cooling" mode, "H" = "Heating". Use Cooling mode for sidewalls.

Sidewall motors open if the detected temperature exceeds the set temperature **+ range** (hysteresis).
Sidewall motors close when the detected temperature drops below the set temperature.
Press STOP to toggle thermostat between AUTO or OFF. "OUT" blinks when thermo automation is disabled.

The SET button toggles between different settings which can be adjusted using the UP or DOWN buttons. The selected setting will flash and you can then edit it. In Settings mode, the top value in the LCD display changes from the current temperature to the range (hysteresis). After 3 seconds of no button presses, settings are saved.

The "temperature range" is set so the sidewall vents aren't constantly triggering open and closed when the temperature is hovering right around the set temperature. The range provides a slight difference between the opening temp and the closing temp. The range is set to 2°C by default – you can change this by pressing SET until the range is selected (press 3 times), then use UP or DOWN to set the range – wait a few seconds without pressing buttons to exit setup mode.

Long-pressing the SET button enters a different type of settings. "ALA" is an optional audio alarm for when a high temperature setting is reached. "OPH" is a timer delay of minutes that must pass after an open/close action before another action is taken by the thermostat. "OFE" is sensor probe calibratiot. (0.7 is the default calibration setting for the long sensor probe built-in to the unit.)