

Precision Lighting Systems, Inc.

The Performer™ MR4 2400w Digital Dimming System

Users Manual

For Model #

PLS MR4 2400 PTC

**Automatic Current Limiting
Detects Short Circuits**

Installing and Operating Instructions

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Attention

Warnings, and Cautions:

Electricity is dangerous. Make sure the installer is qualified to work with electrical equipment, has a solid understanding of damage electricity can do to equipment, animals, and people. Improper understanding can lead to damage, injury, or death. Ensure that your installer can and will follow installation instructions. **Improper installation will damage your dimmer and void the warranty.** If you have questions regarding installation, contact your equipment distributor, or call the manufacture for **Tech Support at 800-737-1837.**

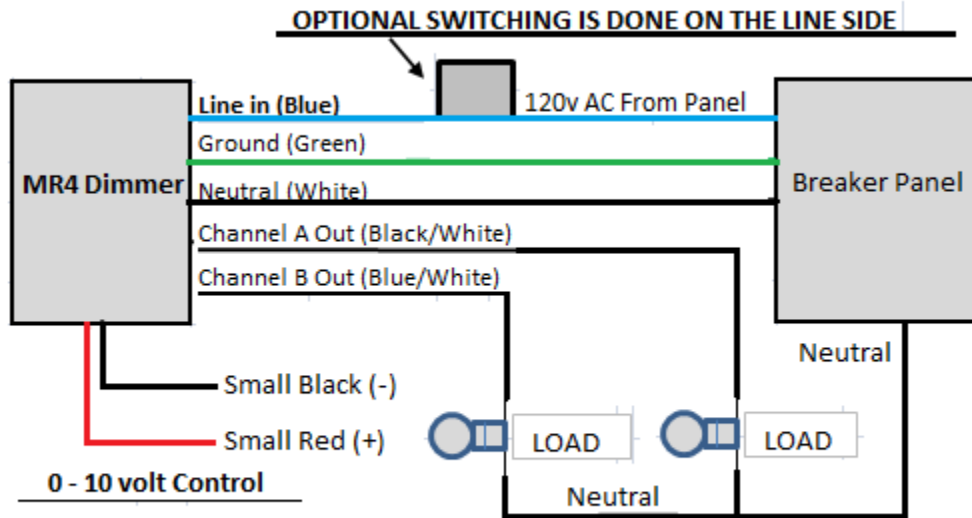
Warranty:

The Performer™ MR4 series of dimmers carry a one-year limited warranty against defects in materials and workmanship. Acts of God, improper installation, damage from direct hits of water, lightning strikes, power surges, direct shorts, damage or interference from other equipment, and all other **non-material and non-workmanship issues are not included.** Precision Lighting determines warranty circumstances and repairs legitimate warranty issues. **Non-warranty repairs will be invoiced.** Do not replace disabled units with new units, as disabled units will be repaired, not replaced. Before shipping a disabled unit to Precision Lighting, call for Return Authorization. Units received without a Return Authorization Number may be greatly delayed in repair and return turnaround time.

Installation Wiring

PLS MR4 2400 PTC or STD

The MR4 hard wires differently than ALL previous PLS models. Follow diagram to prevent internal damage and risk voiding warranty.



Dimmer and lights must be powered by the same 120v phase of your Breaker Panel.

For Technical Support
800-737-1837

NEUTRAL WIRES SHOULD BE RUN DIRECTLY TO BREAKER BOX BUS BAR

0-10v low voltage wires connect to the computer/controller

Attention: If you are NOT using the two low voltage wires, they must be capped off, individually.

1200w (10a) Load A

2400w (20 amp) Max

Load B 1200w (10a)

The Performer™ PLS MR4 series dimmer is designed to power from a 20 amp breaker, via the solid blue wire.

Operating Dimmer With or Without Controller/Computer

With “0-10v/Manual/Enter” button engaged and red status light **on**, the dimmer is controlled remotely by 0-10v signal from Controller/Computer. Zero is two dashes (--), which is OFF. In this “automatic 0-10v mode,” the light level display becomes a volt meter display, showing output from the Controller, to one tenth of a volt: 3.2v is 32% output, and can be approximately 32% light level. 5.2v is 52%, etc. This continues to a maximum Controller output of 10v, which is 0.0 on the display and 100% light output.

3-Phase Operation – Use only ONE of 3 phases to power lights and dimmer. It must measure 120v to earth ground. The solid blue dimmer line wire then connects to one 20 amp breaker.

Quick Trouble Shooting Checklist

- 1 If inoperable, first confirm breaker is turned on, and then go back through the above Wiring Diagram.
- 2 Be sure dimmer switches A & B are in proper mode and responding correctly to the red status lights (On, Off, or Flashing). Check to ensure the bottom 0-10v/Manual button is in the correct mode.
- 3 If lamps are burning unsuitably:
 - a. Be certain you have a ground rod at the breaker box
 - b. Make sure you have a dedicated neutral and that it is not tied to the ground at the breaker box.
 - c. Measure for voltage between the neutral and ground. Any positive reading must be corrected
 - d. If operating through a controller, be certain DC voltage is transmitting from the controller to the dimmer’s small red and black 0-10v input wires.

GENERAL OPERATION SET-UP

For The Performer™ MR4 LED Digital Dimmer Models:

PLS **2400** MR4 PTC

PLS **2400** MR4 STD

The **INSTALLATION** of the MR4 series is NOT the same as the previous model.

If you need further instructions, please call Technical Support (800-737-1837).

After installing the unit, following the new installation instructions, set the dimmer Tier (dimming curve) you are using. The choices are:

"L1" = Mid Phase

"L2" = Reverse Phase, Specialized Curve

"L3" = Forward Phase

"L4" = Reverse Phase

Press **BOTH** the up and down arrows, at the same time, for 4 seconds, then release. You will see the L1, L2, L3, or L4 flash in the **Light Level** display. Use **EITHER** the UP **OR** DOWN button to scroll to the Tier you want. Press the **ENTER** key, located in the lower left corner.

Set "A Side" and "B Side" to the correct lighting mode: OFF, DIM, or HIGH (100% on).

Press "A" and "B" to cycle through the three choices

Off = Off

Flashing light = Dim mode

Solid light = 100% on, non dim

The first **red status light** shows what lighting mode "A Side" is set on and the second **red status light** shows lighting what mode "B Side" is set on.

Next, select the correct operating mode. If operating manually, press the bottom **"0-10v Manual/Enter"** button to turn **off** the bottom **red status light**. If operating through an appropriate environmental controller, press the button to turn **on** the **red status light**. If the dimmer will operate by its programmable time controller (only for PTC model), the "0-10v/Manual/Enter" **red status light** should be **off**. [See "Set Internal Time Clock", and "PLS GUI" instructions page 5, 7-10.]



OPTIONS:

ONE-SHOT™

L4 and L3 Kicker

- Make sure the dimmer has been properly installed and is powered.

ONE-SHOT™

Enter One-Shot™ Level and Duration (see below, Activating the One-Shot™)

While performing a daily walk through in the barn, many users turn the lights up to see well. Unfortunately, many also forget to turn them back down. The ONE-SHOT™ solves this by allowing the user to predetermine the length of time and light level needed for the walk through.

- Press and hold **both** the “UP” and “DOWN” arrows together for 4 seconds.

This puts the dimmer in a programming mode, including the TIER selection mode. At this time, you may use the “UP” or “DOWN” arrow to select the TIER you want [L1, L2, L3, L4]. However, the TIER selection mode does not affect any of the further Options.

Press and Release “A”. [NOTE: You must PRESS and RELEASE the “A” button]

You are now in the Options Menu.

You will see “OP” in the display window, for a second, followed by a random number.

Press and Hold “A.” [NOTE: Now, you PRESS and HOLD the “A” button.]

“01” appears in the display.

While HOLDING DOWN “A”, Press the “Up” arrow until the number reads 6. This is Option 6.

Release both buttons. The dimmer display will read, most likely, “00,” but, as long as you are in Option 6, it does not matter what the number currently is.

Option 6: With the “UP” arrow, only, enter your One-Shot™ light #. (Example: I want my One-Shot to run at # 50 light level).

Press and Hold “A.”

“06” appears in the display.

While HOLDING DOWN “A”, Press the “Up” arrow until the number reads 7. This is Option 7.

Release both buttons. The dimmer display will read, most likely, “00,” but, as long as you are in Option 7, it does not matter what the number currently is.

Option 7: With the “UP” arrow, only, enter your One-Shot™ light increase duration. (Example: I want my One-Shot to run for 20 minutes).

Press the “Enter” button once. Your tier number will display. **Press the “Enter” button a second time** and your dimmer will reboot with the new ONE-SHOT™ option.

Activating the ONE-SHOT™ Mode

The ONE-SHOT™ is ideal for times when increased light levels for short periods are needed (maintenance or discarding carcasses, for example). With the ONE-SHOT™ there is no need to go back to the dimmer to return the lights to DIM Mode, as the timer will count down to zero, and the lights will automatically go back to the proper setting. **In Option 6, you entered the increase in light level. In option 7 you entered how long that increase lasts, in minutes.**

Simply press and hold “A” or “B”, or “A” and “B” for 4 seconds. Release. A number will appear in the display window (the duration minutes entered in Option 7). The light level changes to the # you entered in Option 6. The dimmer display window will show a circling of the readout as the ONE-SHOT™ timer counts down to zero. **To end the ONE-SHOT™ early, press the “Enter” button to return to the previous operating mode.**

L3 and L4 KICKER

Understanding the L4 and L3 Kicker

“My lights won’t come back on in the morning.”

When dimmed very low and then turned off, most brands of LEDs are unable to restart at that low level. Those LEDs have a higher voltage requirement to restart than they do to stay on at a dim level. If you are dimming on the L4 or L3 tiers, the MR4 Dimmer overcomes this flaw in LED engineering.

Tiers L3 and L4 are both preset to restart your LED lamps any time the lamps are turned off below 25 on the display. Upon restart, the dimmer will raise the LED level to 25 for 2 seconds and then drop it back to the low level you were using. No programming changes are needed in your controller to make this happen. **Example: Dimmer is on L4 and lights are set to 16 on the display. Lights are turned off at 16. Lights are then turned on at 16. The dimmer will bring your lights to 25 for 2 seconds and then drop them back to 16.**

If your lamps do not restart, you may be using a brand that needs a higher ‘kick.’ This is easy to solve. Find the number on the display which sees all lamps relit. That is your new restart number. That light level # is **Option 8 (if you are using L4) or Option 10 (if you are using L3).**

Some brands of LEDs with this flaw require a longer voltage ‘kick’ to restart. Most fall into the 1 to 2 second range (the range is .01 to 10 seconds). You can increase this “kick” time on **Option 9 (for L4) or Option 11 (for L3).** Enter tenths of a second as a whole number (example: .8 seconds = 8, 1.2 seconds = 12, etc.). Using 20 (2 seconds) is the preset duration.

After the “Kicker” duration is over, the lamps will drop back down to the original setting.

Enter L4 and L3 Kicker

- **Press and hold both the “UP” and “DOWN” arrows together for 4 seconds.**

This puts the dimmer in a programming mode, including the TIER selection mode. At this time, you may use the “UP” or “DOWN” arrow to select the TIER you want [L1, L2, L3, L4]. However, the TIER selection mode does not affect any of the further Options.

Press and Release “A”. [NOTE: You must PRESS and RELEASE the “A” button]

You are now in the Options Menu.

You will see “OP” in the display window, for a second, followed by a random number.

Press and Hold “A.” [NOTE: Now, you PRESS and HOLD the “A” button.]

“01” appears in the display.

If you are using L4:

While HOLDING DOWN “A”, Press the “Up” arrow until the number reads 8. This is Option 8.
Release both buttons. The dimmer display will read, most likely, “00.”

Option 8: With the “UP” button, only, enter the light level # required to restart your LED. (Example: When my LEDs are off and then turned back on, the LEDs have to go to 28 to restart). It is always a good idea to give an additional 5 to 10 cushion to allow for any electric provider voltage drop. So, in this example, you would enter 33 to 38.

Press and Hold “A.”

“08” appears in the display.

While HOLDING DOWN “A”, Press the “Up” arrow until the number reads 9. This is Option 9.
Release both buttons. The dimmer display will read, most likely, “00.”

Option 9: With the “UP” button, only, enter the length of time (in tenths of a second) your LEDs require the “KICKER” to last. (Example: It takes 1.5 seconds (enter 15) to restart my LEDs).

If you are using L3:

While HOLDING DOWN “A”, Press the “Up” arrow until the number reads 10. This is Option 10.
Release both buttons. The dimmer display will read, most likely, “00.”

Option 10: With the “UP” button, only, enter the light level # required to restart your LED. (Example: When my LEDs are off and then turned back on, the LEDs have to go to 28 to restart). It is always a good idea to give an additional 5 to 10 cushion to allow for any electric provider voltage drop. So, in this example, you would enter 33 to 38.

Press and Hold “A.”

“10” appears in the display.

While HOLDING DOWN “A”, Press the “Up” arrow until the number reads 11. This is Option 11.
Release both buttons. The dimmer display will read, most likely, “00.”

Option 11: With the “UP” button, only, enter the length of time (in tenths of a second) your LEDs require the “KICKER” to last. (Example: It takes 1.5 seconds (enter 15) to restart my LEDs).

Press “Enter” once to exit the Options editing mode and return to the Tier mode, then press “Enter” a second time to exit the Tier mode and reboot the dimmer with the new ‘kicker’ option and to return to normal dimmer operations.

To exit the programming mode, Press and Release the “Enter” button at the bottom of the dimmer face. The tier your dimmer is operating on will display (example: “L4”). When the tier appears in the display, Press and Release the “Enter” button, again. The dimmer will now reboot with the new data.

Understanding the New Technology

Automatic Current Limiting

Your Precision Lighting Systems, Inc. Performer™ MR4 2400 LED dimmer is now designed to help overcome two of the biggest LED lighting electrical issues facing today's modern poultry barn.

Most LED brands are engineered to operate alongside a handful of LED lamps in your personal home. They are not engineered to operate alongside 50 or 100 other LED lamps, to dim 95%, or more, or to dim for 18+ hours a day. Quite simply, they are not designed for poultry, despite how they are presented by many lamp sellers. Due to this, clusters of LED lamps that operate at 5 or 6 amps, will initiate at 800 or more amps. Some brands register over 1300 initial amps with only 52 lamps operating. These massive inrush currents can overcome and damage electrical components.

The second big electrical issue is short circuits. While large starting amps can damage like a short circuit, there are additional precautions to take to help reduce actual short circuits. Most load side short circuits will occur due to damaged or worn lamp sockets or the failure of the LED electronics.

Precautions:

- 1 Never install or uninstall a lamp into a socket while the power to that socket is live.**
- 2 Inspect sockets between flocks. Sockets that have loose screw shells, lose or damaged contact tabs, or broken housing are all short circuits waiting to happen.**

Your new MR4 has been engineered to help alleviate problems of inrush current and short circuits. .

“My dimmer has “SH” in the display window and one side of the lights are off.”

Your new MR4 is engineered to take large inrush of amperage and spread it out while slowing it down. This is the Automatic Current Limiting ability of the dimmer. By spreading out the amps and slowing them down, the dimmer protects itself from being overpowered by the massive inrush issue. Occasionally, the inrush amps may be so great that even the Automatic Current Limiting may not be able to slow it down enough. In these cases, the dimmer will react to protect itself. It will shut down the side of the dimmer being affected and give an “SH” code in the display.

Your new MR4 will also detect short circuits from the load side. If a socket is broken or a lamp blows, instead of being damaged by the short circuit, the dimmer will protect itself by turning that side of the dimmer off and will display “SH” in the window.

When you see “SH,” power down the dimmer (cut the power, do not just turn the lights off). Wait 10 seconds and power back up. The dimmer will reboot and normal operation should be restored. If, however, the “SH” shows back up upon reboot, it means you have an active direct short occurring on that side of the barn. This direct short should be corrected immediately. The dimmer will not allow you to operate it under a short circuit condition, as doing so would permanently damage the dimmer.

If your new MR4 displays “SH” occasionally, but reboots and operates normally, it means you have at least one lamp that has failing electronics. Keep your eye out for that expected lamp failure.

SHORTCUT to Current Day in Flock:

To do a quick check or “quick edit” of the current day in flock, Press and Hold “Enter,” for 4 seconds. You will see in the display window, “dd,” followed by either two dashes or a number between 1-99. Two dashes equals Day Zero. The numbers 1-99 equal Day 1 through Day 99.

Use the “UP” or “DOWN” arrow to select the day # you want, then press “Enter.”

If using the PTC model as a stand-alone controller, use the Day Zero “--” setting when you want to temporarily run the dimmer manually.

- In-between flocks
- Any time you need to ‘pause’ the program
- Any time you want to control the dimmer hands-on manually
- Any time the dimmer is to be operated through an environmental controller

Make sure and “quick edit” the Current Day in Flock back to its correct setting when you are ready to go back to the stand-alone controller feature. Don’t forget to press “Enter” when you are done.

Precision Lighting Systems Graphical User Interface (PLS GUI) program

To use the PLS MR4 2400 PTC model to its fullest, you will need the free PLS GUI program.

You will need to create a folder in your computer to save the PLS GUI software. You cannot run the software from our dropbox.com location, for example, but **MUST** save it to a folder on your computer. After downloading and saving the PLS GUI program to your computer, continue with the following instructions.

- 1 Connect your powered up dimmer (powered up at your desk, or installed in the poultry barn) to your Desktop PC or Laptop, through a USB connector cable (USB 2.0 B Male to USB 2.0 A Male). The bottom of the PTC model has a dust/moisture resistant protector box covering the communication port. Plug one end of your communication cable to this port, and the other to a USB port on your Laptop or Desktop.

IMPORTANT: Although the following scenario would be unusual, this is important. If your dimmer is installed in the barn, and connected to an environmental controller, and you are connecting it to your Desktop PC for programming – all at the same time – you must do the following. Disconnect the **small red and small black 0-10v** dimmer wires from the controller while the dimmer is connected by USB to your Desktop PC. You do not have to do this if you are connecting through a Laptop. Since you are using the Programmable Time Control feature, you should not need to be connected to your environmental controller, anyway. Just cap off the small red and small black wires, separately.

- 2 Open the PLS GUI program that you saved to your computer. An additional box may open that alerts “Unable to find dimmer on last used serial port.” If so, click “OK.” (If there is no alert, you may skip down to “You may now begin entering basic flock management information”).
- 3 On the upper right side of the program, you will see a “Smiley Face.” This means your dimmer, laptop, and GUI Program are all connected. If you have a “Frowny Face,” it means the laptop or GUI Program are unable to communicate with the dimmer. In this case, disconnect the USB cord and try to reconnect, using a different USB Port, on your laptop. Once your Smiley Face appears, you are connected.

You may now begin entering basic flock management information.

Your program should have automatically opened to the “Options” tab. If not, click the “Options” tab.

Next, enter the below information. If one area does not apply to your flock, enter the number, zero (“0”).

The below Options are fully explained in the Options section on pages 5-7. Please refer there for details.

- A. **Current Day in Flock** – Day Zero (--) will always stay at Zero until you change it. It is the only Day Option that will not roll over to the next day. Day 1 is the first day in your flock. If you install the dimmer in mid-flock, on day 26, for example, enter “26.”
- B. **Total Days in the Flock** – If you are growing a 63 Day Bird, enter “63,” or whatever number of Days the actual flock length is (even if you start the dimmer in mid-flock).
- C. **One Shot Light Level** – Enter a light level #, 50, for example.
- D. **One Shot Duration (Min.)** – Enter the number of minutes duration you want the ONE-SHOT™ feature to operate, 20 minutes, for example.
- E. **L4 and L3 Light Level and Kicker Durations** are for LED lamp brands that are unable to restart at a low level and need an additional “kick” jumpstart. Enter a restart light level #. Then enter the duration of the kick, in tenths of a second. Leave these blank, if you are not going to use them.

The above Options are fully explained in the Options section on pages 5-7. Please refer there for details.

You may now begin entering your lighting program.

Click on the “Transitions” tab. Each Transition will define what day and time the lights come on, off, dim, light level #, and how long they stay that way.

This “Transition” section is where you enter the data for your stand-alone lighting control program. The term, transition, in this program, indicates you are moving from one light level to another at different times of the day. You transition from one to the next.

Please use Military Time. Midnight is “00.” There is a Military Time Chart on page 10, for reference.

Here is a simple light program example:

- Day 1 through Day 7, at 5:30, lights are turned on and brought to 100%, over 10 minutes.
- Day 1 through Day 7, at 23:00 (11:00PM), lights are turned off, over 10 minutes.
- Day 8 through Day 15, at 5:30, lights are turned on and brought to 80%, over 5 minutes.
- Day 8 through Day 15, at 22:30 (10:30PM), lights are turned off, over 5 minutes.
- Day 16 through Day 28, at 5:30, lights are turned on and brought to 30%, over 5 minutes.
- Day 16 through Day 28, at 8:00, lights are spiked to 80%, over 3 minutes.
- Day 16 through Day 28, at 8:25, lights are dimmed to 30%, over 3 minutes.
- Day 16 through Day 28, at 13:00 (1:00PM), lights are spiked to 80%, over 3 minutes.
- Day 16 through Day 28, at 13:25, lights are dimmed to 30%, over 3 minutes.
- Day 16 through Day 28, at 22:00 (10:00PM), lights are turned off, over 5 minutes.
- Day 29 through Day 62, at 5:00, lights are turned on and brought to 25%, over 5 minutes.
- Day 29 through Day 62, at 9:00, lights are brightened to 45%, over 5 minutes.
- Day 29 through Day 62, at 11:00, lights are dimmed to 25%, over 5 minutes.
- Day 29 through Day 62, at 18:00 (6:00PM), lights are brightened to 45%, over 5 minutes.
- Day 29 through Day 62, at 20:00 (8:00PM), lights are dimmed to 25%, over 5 minutes.
- Day 29 through Day 62, at 23:00 (11:00PM), lights are turned off, over 10 minutes.
- Day 63, at 3:00, lights are turned on and brightened to 15%, over 15 minutes.
- Day 63, at 7:00, lights are turned off over 1 minute.

The above lighting program example will, when entered into the PLS GUI program, will look like this:

	Start Day	End Day	Hour	Minute	Light Level	Ramp Minutes
1	1	7	5	30	100	10
2	1	7	23	00	0	10
3	8	15	5	30	80	5
4	8	15	22	30	0	5
5	16	28	5	30	30	5
6	16	28	8	00	80	3
7	16	28	8	25	30	3
8	16	28	13	00	80	3
9	16	28	13	25	30	3
10	16	28	22	00	0	5
11	29	62	5	00	25	5
12	29	62	9	00	45	5
13	29	62	11	00	25	5
14	29	62	18	00	45	5
15	29	62	20	00	25	5
16	29	62	23	00	0	10
17	63	63	3	00	15	15
18	63	63	7	00	0	1

Now you must save your Options and Transitions data. Click on the “Save To File” button, located above the tabs. Save this file in the same folder you created to keep the PLS GUI file in. It must be in the same folder. Name your new file something that makes sense to you. Just make sure the extension remains “.pls” when you save it.

After saving the file, send it to the dimmer. Click on the “Send Set up to Dimmer” button. The program will automatically begin sending the file to your dimmer. When the top “Progress” line is fully blue, wait 10 to 15 seconds. The dimmer is now programmed. You may disconnect the USB cord and close the PLS GUI Program. If you would like to verify the new information uploaded to the dimmer, before you disconnect, simply click on the “Read From Dimmer” button, located above the PLS logo. It will then begin to display the data currently on the dimmer. You can open the Options tab and the Transitions tab to review.

+Using Military Time:

1:00AM	= 1:00	1:00PM	= 13:00
2:00AM	= 2:00	2:00PM	= 14:00
3:00AM	= 3:00	3:00PM	= 15:00
4:00AM	= 4:00	4:00PM	= 16:00
5:00AM	= 5:00	5:00PM	= 17:00
6:00AM	= 6:00	6:00PM	= 18:00
7:00AM	= 7:00	7:00PM	= 19:00
8:00AM	= 8:00	8:00PM	= 20:00
9:00AM	= 9:00	9:00PM	= 21:00
10:00AM	= 10:00	10:00PM	= 22:00
11:00AM	= 11:00	11:00PM	= 23:00
12:00 Noon	= 12:00	12:00 Midnight	= 00:00

