

## Positive and Negative Control of the Dimming Module



### Overview

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### Key Takeaways

In a 0-10V dimming system, the positive (+DIM) and negative (-DIM) wires carry the analog control voltage that regulates LED brightness, with the positive wire providing the variable voltage signal and the negative wire serving as the reference or return path.

Wiring and Signal Polarity

0-10V dimming modules use two dedicated low-voltage DC wires to control LED drivers:

- Positive wire (+DIM, typically violet): Carries the variable voltage signal from 0 to 10 volts. The voltage level determines the brightness of the connected LED fixture, with 10V corresponding to full brightness and 0V corresponding to minimum brightness or off, depending on the driver type .



- Negative wire (-DIM, typically gray): Serves as the reference or return path for the dimming signal, completing the circuit between the dimming module and the LED driver . The dimming module acts as a current sink or source, depending on the driver design. In some systems, the LED driver provides a small current through a pull-up resistor to the +DIM line, and the dimmer modulates this current to adjust brightness .

#### Functional Role

- The positive control determines the voltage level applied to the LED driver input, directly controlling the output intensity.
- The negative control ensures a stable reference for the voltage signal, preventing flicker or erratic dimming behavior.
- Both wires must be kept separate from AC power lines and properly shielded to avoid interference .

#### Practical Considerations

- Ensure the total signal current drawn by all LED drivers on a single dimming loop does not exceed the dimmer's output capacity (typically  $\leq 2\text{mA}$  per driver), .
- For 1-10V dimming systems, some drivers may not dim fully to off; in such cases, a relay may be required to cut AC power to achieve complete dim-off .
- Proper polarity must be maintained: reversing +DIM and -DIM can prevent the dimming module from functioning correctly .

#### Troubleshooting Tips

- If dimming is erratic, verify that the positive and negative wires are correctly connected to the corresponding terminals on both the dimming module and the LED driver .
- Use the module's test button or UI interface to confirm that the output voltage varies correctly from 0 to 10V .
- Check that the driver type (constant current vs. constant voltage) matches the fixture requirements, as mismatched drivers can cause improper dimming . By correctly wiring and maintaining the positive and negative control lines, a 0-10V dimming module can reliably regulate LED brightness across multiple fixtures.

## Article Content

### Simple DC Dimmer Circuit

The Power Driver You can use the PWM output signal (OUT) from the module to control the brightness of common DC lamps and

### Related Video Reference

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