Technical solution guide

CHOOSING A DIMMING SOLUTION FOR LOW VOLTAGE (12V OR 24V) SINGLE COLOUR NEON FLEX AND FLEXIBLE STRIPS

This solution guide will assist you in deciding on the best solution to dim low voltage (12V or 24V) single colour LUMUL neon flex or LUMUL flexible strips using either a dimming driver or a dimming controller.

You can not effectively dim LEDs by reducing the voltage, and whilst it may appear to work at initial levels:
- you can not achieve linear dimming
- you will usually experience voltage drop
- you quite quickly can't provide the minimum forward voltage to the LEDs and they shut off

Low voltage LUMUL neon flex and LUMUL flexible strips can only be properly dimmed through PWM dimming, where the constant current duty cycle is varied to change the average current: the current is turned on and off rapidly. The more time the current is left on the brighter the LED will appear.

A dimming solution needs to be instructed on the dimming level required. This is usually a user setting the dimming level on a wall control, a remote control, through Siri / Alexa, a mobile / tablet or through a more complex system where the dimming level is determined by the time of day or the weather outside.

Some of these dimming controls are hard-wired to a control system (e.g. a wall-mounted dimmer) whilst others are wireless (e.g. a remote control, mobile, Alexa).

Dimming drivers (power supplies)

Dimming drivers act as both a power supply and a dimming controller. They accept an input dimming signal and output a PWM signal.

Dimming controllers

Dimming controllers are not drivers and have no driver circuitry in them. They output a PWM signal, and take two inputs : a DC power input from a driver which is used to power the controller and to pass power to the LEDs, and a second input being a dimming input.

Both of the above options have their merits and are suitable for different situations.

	Dimming drivers	Dimming controllers
Controlled by wired dimming control	Yes	Yes
Controlled by remote control	Yes	Yes
Controlled by smartphone / tablet application	No	Yes
DMX input	No	Yes
DALI input	Yes	Yes
PWM input	Yes	Yes
Zigbee input	Yes	Yes
0-10V / 1-10V input	Yes	Yes
DMX output	No	Yes
DALI output	No	Yes
PWM output	Yes	Yes
Master / slave orchestration	No	Yes
Components required	Only the driver	Driver + controller

Dimming controllers offer a wide range of features and are far more versatile than dimming drivers, however they always require a separate driver for power (otherwise they would be known as dimming drivers).

1-10V, 10V PWM and resistance input dimming restrictions

1-10V, 10V PWM and resistance input signals cannot dim an LED to absolute 0%. At their lowest levels they will generally dim an LED to around 10% of the maximum current. For some LEDs this might mean there is a small amount of brightness when the dimmer is at its' lowest. There are ways to resolve this such as using a relay and some fancy wiring, however if it is required to have the LED dimmed to absolute 0% then it is suggested to use DALI input or 0-10V input can dim an LED to absolute 0%.

0-10V dimming is considered as a second-generation dimming signal whereas 1-10V, PWM input and resistance dimming signals are considered first generation.

DALI dimming systems are expensive and generally suited for large commercial installations, such as hotels and office buildings where centralised control of lighting is required.

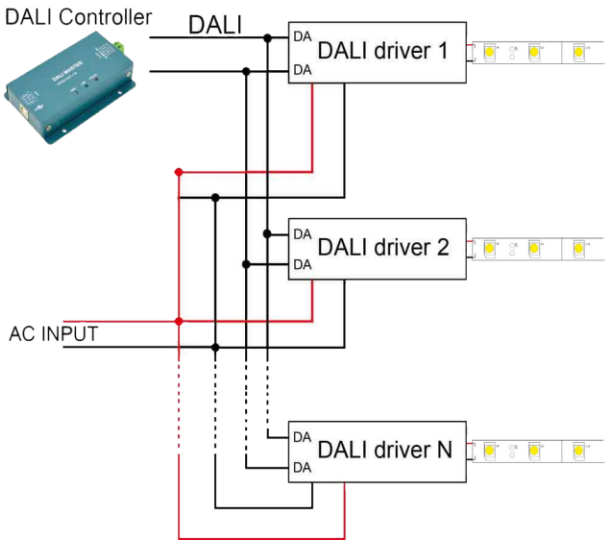
	Brightness at 10V	Lowest brightness voltage	Brightness at lowest level
1-10V	100%	1V	10%
0-10V	100%	0.57V	0%

Dimming driver wired to a dimming control

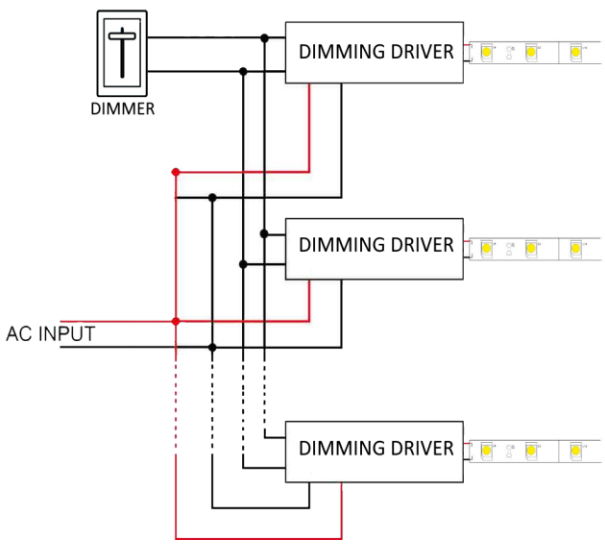
Mean Well offer a range of 12V and 24V drivers with dimming capabilities. These drivers accept a wired input signal which depending on the driver model could be either DALI, 0-10V, 10V PWM or Resistance.

Range	Output	Dimming signal				IP	Voltage	Wattage available
	PWM	DALI	1-10V	0-10V	Resistance			
ELG–B	No	No	No	Yes	Yes	65 / 67	12V	75, 150, 200
							24V	75, 100, 150, 200, 240
ELG–DA	No	Yes	No	No	No	65 / 67	12V	75, 150, 200
							24V	75, 100, 150, 200, 240
HLN-A	No	No	Yes	No	Yes	64	12V	40, 80
							24V	40, 60, 80
PWM	Yes	No	No	Yes	Yes	65	12V	40, 60, 90, 120
							24V	40, 60, 90, 120
PWM–DA	Yes	No	No	Yes	Yes	65	12V	40, 60, 90, 120
							24V	40, 60, 90, 120
HLG–B	No	No	Yes	No	Yes	65 / 67	12V	40, 80, 120, 150, 185, 240, 320, 600
							24V	40, 60, 80, 100, 120, 150, 185, 240, 320, 480, 600

Dimming drivers



DALI dimming driver



PWM, 0/1-10V, resistance dimming driver

A dimming driver is the better choice when ···

- ··· you are dimming via a DALI control system
- ··· you have a 0-10V, 1-10V, 10V PWM or resistance wired controller and you only want to control one short length of neon flex or flexible strips and don't require this dimming signal to be extended to other LED sections

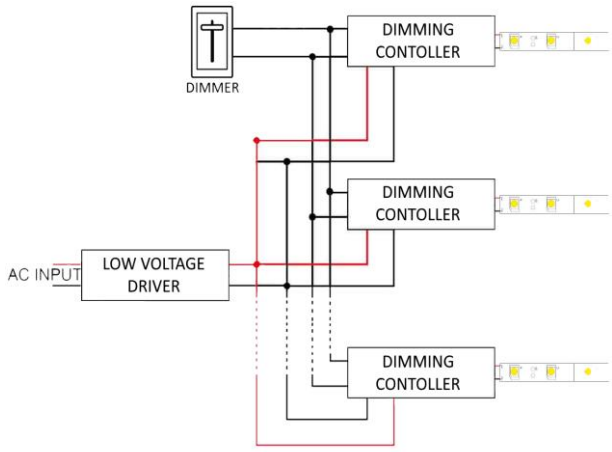
Dimming controller wired to a dimming control

Whilst dimming LED lights with a dimming driver is convenient and suitable in some instances, it can not solve all dimming requirements. There are situations where a dimming controller will be required as dimming controllers and receivers offer a wider range of features than dimming drivers do.

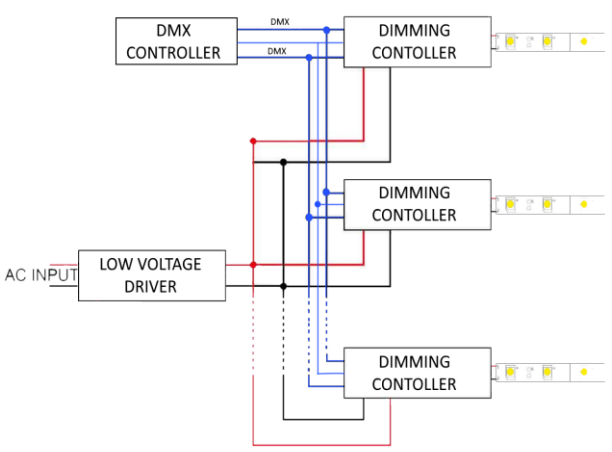
LUMUL offers a wide range of dimming controllers, dimming remote controls, dimming receivers, dimming hubs and repeaters. Dimming controllers are small in comparison to drivers and don't generate much heat, nor do they consume much power. It is possible to get waterproof (IP67) as well as non-waterproof controllers / receivers

Most of the LUMUL dimming controllers / receivers draw their power from an external low voltage power supply, which they use to not only power the electronics of the controller / receiver but also to power the connected LUMUL neon flex or LUMUL flexible strips.

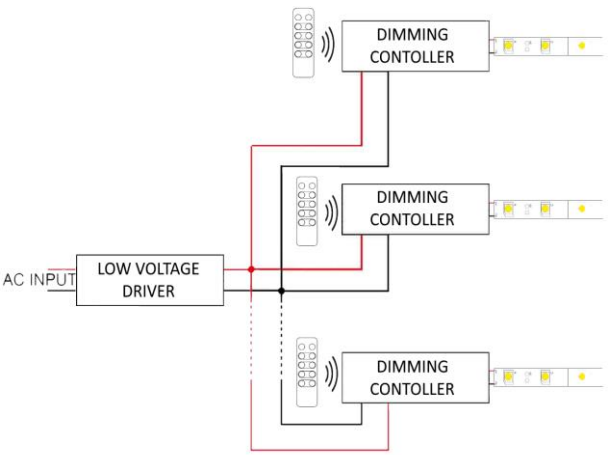
Dimming controllers



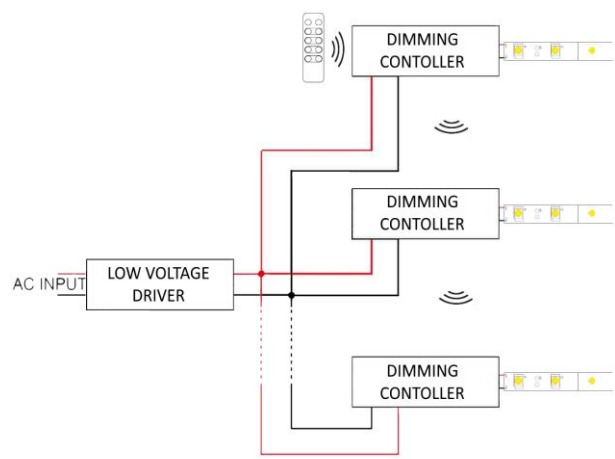
Wired dimming controller



DMX-controlled dimming controller



Individually-remote-controlled dimming controllers



Single remote controlled dimming controllers, master / slave configuration

A dimming controller is the better choice when ···

- ··· you want to dim via an application on your smartphone or tablet (iOS or Android)
- ··· you want to dim via a remote control
- ··· you want to control multiple LED strips or lengths of neon flex in an orchestrated fashion
- ··· you are not dimming via a DALI control system
- ··· you require DMX controlled dimming