

Lighting Control Protocols

0-10V

The simplest analog lighting systems control protocol. The variance in DC voltage sets the corresponding intensity levels. At 0 VDC the fixture/system is dimmed to a minimum level or OFF (depending on the driver) and at 10 VDC intensity is set to Full. Two polarity dependent wires connected to a dimmer are used for control making it easy for the Electrical Contractor to install but still leaves a little room for miswiring errors.

Pros: Cost efficient.

Cons: Limited control.

DALI

Digital Addressable Lighting Interface is a bidirectional lighting system control protocol that allows the controller and the controlled devices to communicate between each other. This allows the end-user to monitor conditions such as temperature, occupancy/vacancy events, device failure and most importantly power usage. The control commands are being sent over two wires which are polarity independent, making it easy to wire.

Pros: Digital system. Bi-directional communication.

Cons: Needs commissioning.

DMX

DMX512 is a digital protocol that allows control of advanced lighting fixtures such as RGBW LED (allowing to create virtually any color of the spectrum) and Tunable White LED (allowing modification of the Correlated Color Temperature or CCT). Starting out as the theatrical fixture control option more than 30 years ago, DMX512 is currently amongst a few most widely used protocols for the architectural lighting controls. The control signal is sent over 3-wire cable which requires very specific electrical characteristics and terminations.

Pros: Highly customizable and dynamic

Cons: Complex wiring. Commissioning required.

POE

Power over Ethernet has been quickly becoming one of the preferred methods of power and data distribution. It creates a smart lighting system which allows for real time system feedback status and power saving. A sophisticated control system sends data to a central distribution point (a network switch) which in turn send out data to POE drivers which power the luminaries. The system can be made up of a closed or open network(s) depending on the system requirements.

Pros: Energy Efficient

Cons: Proprietary control and equipment. Commissioning required. Not familiar to most contractors.

Lutron EcoSystem

EcoSystem technology is a control method for LEDs that provides addressing of individual fixtures and status feedback from the LED drivers. This makes it easy to digitally assign occupancy sensors, daylight sensors, time clocks, manual controls, and other controls to one or many fixtures without complicated wiring. This opens an entire suite of energy-saving, system-monitoring, and system-control schemes where the design, setup and rezoning are all done within software, making the electrical and control design simple.

Pros: Polarity free control wire. Simplifies wiring and minimizes room for wiring errors.

Cons: Compatible only with Lutron Controls. Proprietary system.

Phase-Cut Dimming

These types of dimmers work by modulating the input power to the load. By alternating the signal (the electrical sine wave) the load receives less voltage which results in a lower light output. There are two main approaches to this type of control, the Forward Phase and Reverse Phase. Both methods transform electrical energy into heat and therefore are not the most sufficient ways of dimming.

Pros: Best for retrofit installation. Installing contractor friendly

Cons: Oldest dimming technology, poor low-end dimming

Lighting Control Protocols

Phase-Cut Dimming

These types of dimmers work by modulating the input power to the load. By alternating the signal (the electrical sine wave) the load receives less voltage which results in a lower light output. There are two main approaches to this type of control, the Forward Phase and Reverse Phase. Both methods transform electrical energy into heat and therefore are not the most sufficient ways of dimming.

Pros: Best for retrofit installation. Installing contractor friendly

Cons: Oldest dimming technology, poor low-end dimming

Forward Phase (TRIAC)

The input power is modulated by turning it ON in the middle of the cycle and OFF at the end of the cycle. If the power is turned ON earlier in the cycle, the light output is increased. If the power is turned ON later in the cycle, the light output is decreased. This is also known as TRIAC based dimming,

Reverse Phase (ELV)

The input power is modulated by turning it ON in the beginning of the cycle and OFF in the middle of the cycle. If the power is turned OFF earlier the light output is decreased. If the power is turned OFF later in the cycle, the output is increased. This is also known as ELV (Electronic Low Voltage) dimming.

TW

Tunable White light technology allows to adjust the CCT (Correlated Color Temperature) of a light source in real time. The control is achieved via a dual analog signal (0-10V) or a single digital signal such as DALI. Coronet provides Tunable White LEDs in the spectrum range of 2700K-6500K. Custom ranges are available upon request.

Pros: Ability to adjust Color Temperature as needed

Cons: More wiring. Need for a special controller

WD

Warm Dim light technology allows to lower the CCT as the light source is dimmed. This resembles a replication of a natural lighting during the sunset and it appears warmer in color as it gets darker. The control is achieved via a single analog 0-10V signal. Coronet provides Warm Dim White LEDs in the spectrum range of 2200K-3000K. Custom ranges are available upon request.

Pros: Mimics the natural low-level lighting

Cons: Not suitable for everybody

Emergency options:

There are 2 Emergency Lighting options that are offered by coronet and could be virtually integrated into any fixture making it UL 924 compliant.

Option 1: Emergency battery pack

The UL 924 compliant, emergency battery pack, provides illumination for at least 90 minutes in the event of power failure due to an emergency or other situation. The battery is hardwired to a power source and is constantly receiving a charge. Once the battery senses the power loss, it switches from its charging state to the operation state and illuminates the fixture or the fixture's section(s)

Option 2: Emergency circuit

Either the entire fixture or a section(s) could be powered by an external emergency power source that would still be operational in case of normal power outage. The EM fixture or a section(s) would not be affected and would remain ON as long as the emergency power source is properly operating.