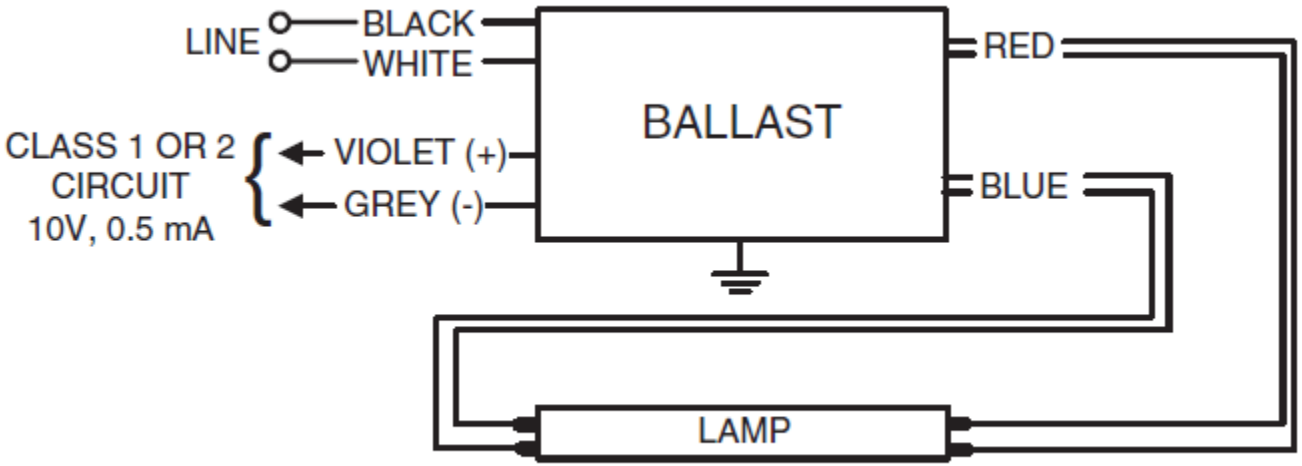
NEMA / DoE
Dimming Ballast Discussion
Dimming Control Methods

Dec 6, 2016

Dimming Ballast / Control Overview

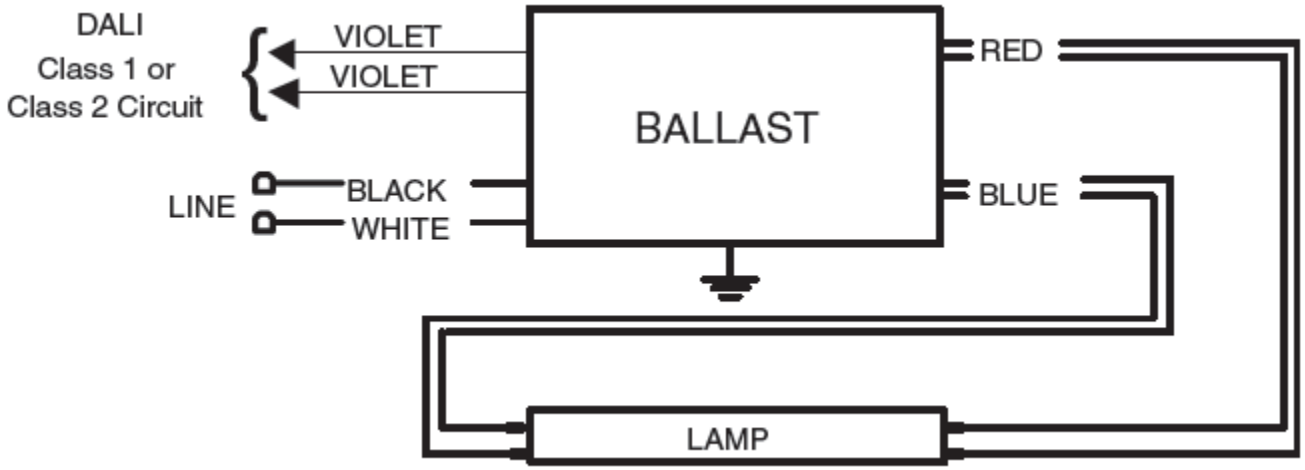
- Types of dimming control systems
  - 0-10VDC
  - DALI
  - Phase Cut
  - Switch Dimming
  - Power Line Carrier
- Each control strategy has advantages for specific applications
- Dimming action can be stepped or continuous, with active or passive controls
- In all cases, the ballast must maintain cathode heating during dimming to assure long lamp life

0-10VDC Analog Control



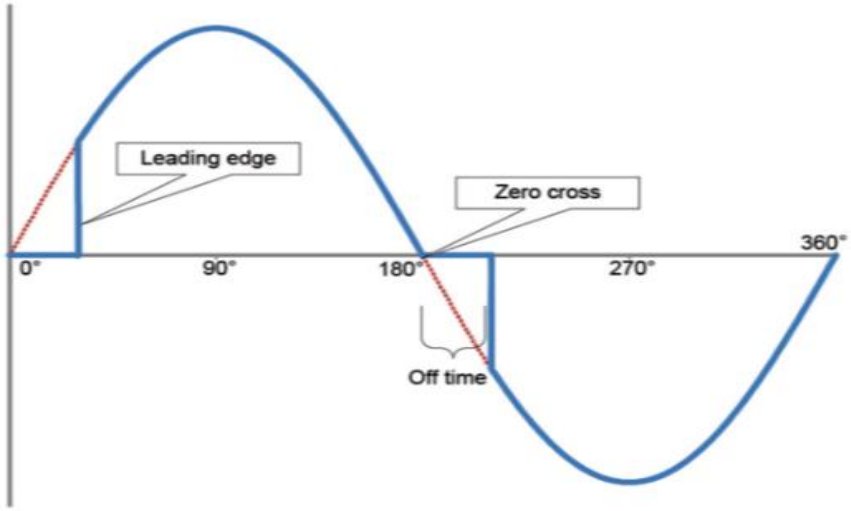
- 0-10VDC is most popular control scheme, ANSI Standard.
- No Standby state, Min light at 0 volts, Max light at 10 volts
- Ballast typically Sources 0.5 mA for control, 20mW max
- Widely used in Big Box Retail, Office, and Institutional sites
- Easily interfaced with Daylight Harvesting and BAC systems

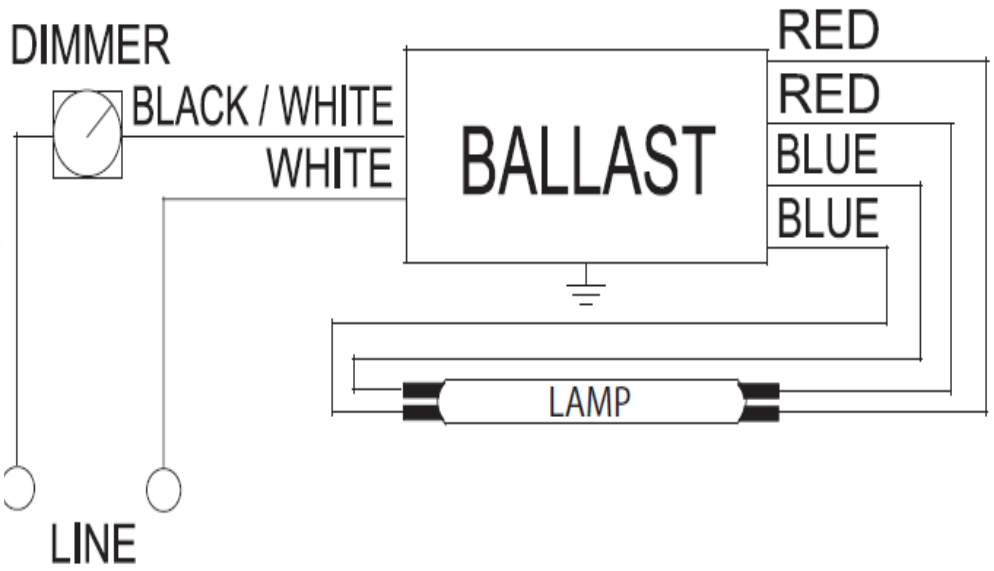
DALI or Digital Control



- Most flexible control scheme, easily re-configurable and scalable to large installations
- Precise digital control, addressable to a single fixture
- Some standby power is required to maintain comms
- Comm bus power comes from DALI driver, not ballast
- High level interface with Daylighting and BAC systems

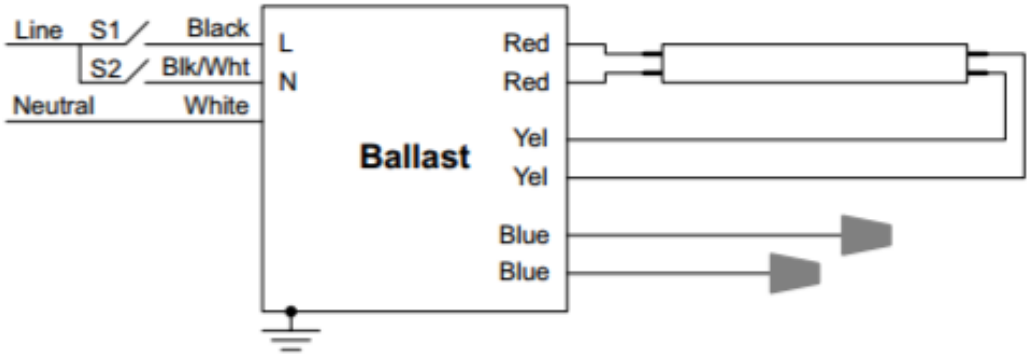
Powerline Phase Control





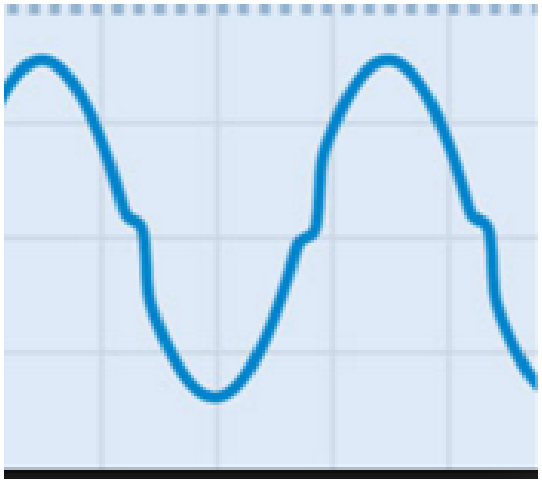
- Phase control requires specialized ballast dimmer
- AC Line into ballast is chopped, effecting dimming control
- Suitable for smaller Office/Conference Room applications
- Number of luminaires is limited by Dimmer capabilities
- Possibility of EMI generation due to chopped AC waveform

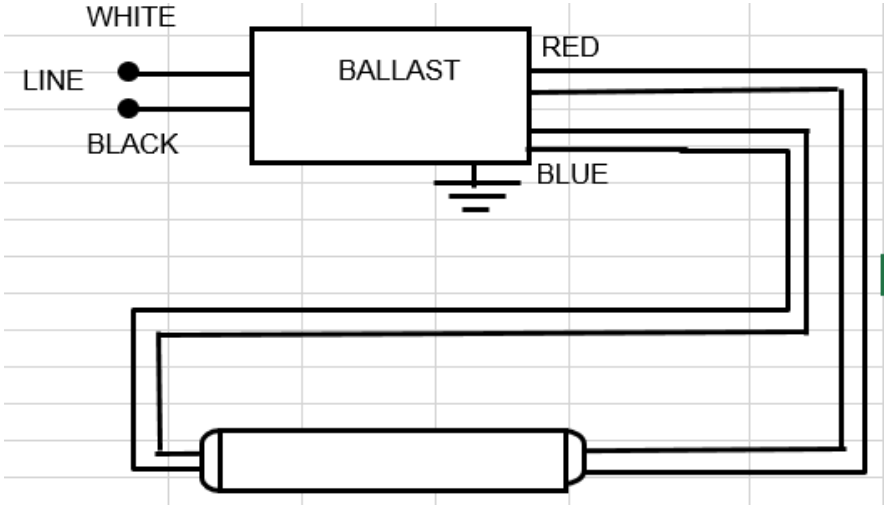
Switched Control



- Controlled by sensor relay or wall switches, simple, inexpensive control scheme uses existing wiring.
- Typically can provide 3 light levels based on S1 and S2
- No Standby state, no power consumed when switches OFF
- Useful for conversion of dual switched luminaires in classrooms, lecture halls and in stairwells with sensor
- Other ballast configurations turn off one or more lamps of a multi lamp ballast rather than dim all tubes

Power Line Carrier Control





- Power Line Carrier (PLC) good for Load Shed or Demand Management, controlled by Facility Manager or Utility
- Able to cover wide application area w/o additional wires, good for Whse, Big Box, or Institutional, limited granularity
- Requires transmitter on branch circuit or in lighting panel, control data transmitted during zero cross time
- Some have limited dim range, could be Instant Start designs

QUESTIONS?