

Suggested Engineering Specifications

ESD Series Lighting Dimmers

16570: DIMMING CONTROL

I. General

A. Scope

1. Furnish and install as indicated on the drawings and plans, digital electronic sinewave lighting dimmers capable of dimming HID, Fluorescent, or incandescent lamps.
2. Furnish owner's manuals covering installation, start-up, maintenance and operating instructions, complete in every way to permit efficient operation and maintenance of the dimmers.
3. Manufacturer shall warrant the dimmers to be free from defects in materials and workmanship for a period of 2 years after the sale.

II. Product

A. Lighting Dimmers

1. The lighting dimmers shall be of the digital sinewave type using an ultra-high speed PWM system to create an accurate and infinitely variable sinewave output. Each lighting dimmer shall check and adjust the power output a minimum of 20,000 times per second. Preprogrammed PWM schemes are unacceptable as they cannot adjust automatically to power fluctuations.
2. SSR and SCR type dimmers are unacceptable, as they cannot work with HID and Fluorescent lighting. Variac or auto-transformer type dimmers are unacceptable. Step type dimming schemes are unacceptable as they provide no flexibility for lighting requirements.
3. Each lighting dimmer shall use a PIC controller with pin connectors to allow the resident software to be upgraded in the field if required, with future changes to the lighting system or dimmer.
4. Each lighting dimmer shall have a series of LEDs on the dimmer that show the power output of the dimmer in binary terms for accuracy.
5. Each lighting dimmer shall have board mounted terminals for connection of the line and output power and control signal inputs. Each dimmer shall accept a standard 0-10 Vdc control signal input, or a 4-20 mAdc signal with a load resistor.
6. Each lighting dimmer shall have field changeable jumpers to permit hard setting of minimum power output to 0%, 30% (for fluorescent lighting) or 50% (for HID lighting). The lighting dimmer shall then modulate from the hard minimum power setting to the maximum power setting linearly with the control input signal. There shall also be field changeable jumpers to permit a hard setting of maximum power output at 85% so that it will qualify for energy savings tax credits and utility rebates.
7. Each lighting dimmer shall have a minimum 10 ms power override so that high-speed switching UPS systems can be used without interruption of lighting.
8. Lighting dimmers shall be UL and cUL compliant, and shall meet FCC and CE standards for control of EMI and RF emissions and harmonic distortion.

B. System Controls [Options]

1. Connect to the existing lighting control system. Lighting control contractor to provide 0-10 Vdc control signals to the lighting dimmers.
2. Supply a lighting control system providing a 0-10 Vdc control signal to the lighting dimmers, complete with sensors for:
 - a) daylight harvesting – to dim the lighting when sufficient daylight is available;

- b) lumen maintenance – to maintain a constant lumen output even as lamps age;
 - c) motion detection – to dim the lighting when there is no occupancy of the space;
 - d) door entry switches – to brighten the lighting when someone enters the area;
 - e) timers – to dim the lighting on a preset schedule;
3. Install and connect control system according to the specifications and drawing for this project.

C. Operating Sequence

- 1. On initial power-up, each lighting dimmer shall go to 100% power output for 15 minutes to permit the lamp ballasts to strike and warm up the lamps.
- 2. After the initial 15 minute power-up, each dimmer shall then modulate it's power output from minimum power output to maximum power output linearly with the 0 to 10 Vdc control signal.
- 3. On loss of the control signal, the dimmers will go to their programmed minimum power settings to maintain lighting, but warn of a control signal failure.
- 4. Dimmer software shall contain algorithms to control the proper ramp up and down times to stay within manufacturer's recommendations for proper dimming of the lighting loads.
- 5. Specific operating control schemes:

III. Installation

A. General

- 1. All lighting dimmers shall be mounted in appropriate UL listed enclosures properly sized and ventilated in accordance with the dimmer manufacturer's specifications.
- 2. Lamp ballasts on the circuit to be dimmed by the ESD sinewave dimmers shall be of the magnetic or electronic type having a "passive" front end. "Active" front end ballasts shall not be used.
- 3. All wiring shall be in accordance with local and national electrical codes and manufacturer's recommendations.
- 4. All installation and wiring must be done by a qualified, licensed electrical contractor.

IV. Execution

A. General

- 1. Install the lighting dimmers as detailed in the installation drawings and schedules and/or as recommended by the manufacturer.
- 2. Manufacturer to furnish complete operating manuals with the product.
- 3. Start up of the system shall be by a qualified, factory trained representative or qualified, licensed contractor, and shall include a training session for owner's maintenance personnel if requested.
- 4. Lighting dimmers shall be the ESD series sinewave dimmers as manufactured by:

Sinewave Energy Technologies, LLC
200 Barr Harbor Drive, Suite 400
Conshohocken, PA 19428
Ph: (610) 795-7436
Fax: (610) 646-0790
Email: info@sinewaveenergy.com

Form: SET-SPEC1-080107