SECTION 16580-Fluorescent Electronic Dimming Ballast

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fluorescent Electronic dimming ballast.

B. Related Sections:
   1. Section [16150 - Wiring Devices/Lighting Controls.]
   2. Section [16580 - Ballasts:] Fluorescent lighting ballasts controlled by central dimming control system.
   3. Section [16950 - Occupancy Sensors:] Occupancy sensors used in conjunction with central dimming control system.

1.2 REFERENCES

A. American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE)
   1. C62.41-1991 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

B. Canadian Standards Association (CSA) .
   1. C22.2 No. 74 – Electronic Ballast Standard

C. International Electrotechnical Commission .
   1. (IEC) 801-2 Electrostatic Discharge Testing Standard.
   2. IEC/EN 60669-2-1 Switches for household and similar fixed electrical installations - electronic switches.

D. International Organization for Standardization (ISO)
   1. 9001 (2000) – Quality Management Systems.

E. National Electrical Manufacturers Association (NEMA)
   1. WD1 (R2005) - General Color Requirements for Wiring Devices.
   2. Ballast standards

F. Norma Official Mexicana (NOM).
   1. NOM-003-SCFI Productos eléctricos - Especificaciones de seguridad (Electrical products - Safety Specifications)

G. Underwriters Laboratories, Inc. (UL):
   1. 935 (2005) - Fluorescent Ballasts

1.3 DESCRIPTION

A. 3-Wire (Line Voltage Controlled) Dimming Ballasts

B. 2-Wire (Line Voltage Controlled) Dimming Ballasts

C. 0-10 V (Low Voltage Controlled) Dimming Ballasts

D. Digital (Low Voltage Controlled) Dimming Ballasts

1.4 SUBMITTALS

A. Submit under provisions of Section [01330.]

B. Specification Conformance Document: Indicate whether the submitted equipment:
   1. Meets specification exactly as stated.
   2. Meets specification via an alternate means and indicate the specific methodology used.

C. Product Data: Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer: Minimum [10] years experience in manufacture of electronic dimming ballasts.

B. Manufacturer’s Quality System: Registered to ISO 9001:2000 Quality Standard, including in-house engineering for product design activities.

C. Listed by [CE] [CSA] [NOM] [UL]. Provide evidence of compliance upon request.

1.6 PROJECT CONDITIONS

A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:
   1. Ambient temperature: 10° to 60° C (50° to 140° F).

2. Relative humidity: Maximum 90 percent, non-condensing.
3. Protected from dust and excess moisture during installation.

1.7 WARRANTY

A. Provide manufacturer's warranty covering [3 years] [5 years with factory commissioning] on ballasts from date of purchase.

1.8 COMMISSIONING

A. Provide factory-certified field service engineer to a site visit to ensure proper installation and operation under following parameters:
   1. Qualifications for factory-certified field service engineer:
      a. Minimum experience of 2 years training in the electrical/electronic field.
      b. Certified by the equipment manufacturer on the system installed.
   2. Make a visit upon completion of installation to:
      a. Verify connection of power feeds control circuits
      b. Check performance.
      c. User to be trained on ballast operation.

1.9 MAINTENANCE

A. Make ordering of new equipment for expansions, replacements, and spare parts available to end user twenty-four hours a day, seven days a week.
B. Make replacements available for minimum of ten years from date of manufacture.
C. Provide factory direct technical support hotline 24 hours per day, 7 days per week.
D. Provide on-site service support within 24 hours anywhere in continental United States and within 72 hours worldwide except where special visas are required.
E. Offer renewable service contract on yearly basis, to include parts, factory labor, and annual training visits. Make service contracts available up to ten years after date of commissioning.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Lutron Electronics Co., Inc.
B. [Basis of design product: Lutron or subject to compliance and prior approval with specified requirements of this section, one of the following:]
   1. Lutron
C. Substitutions: [Not permitted.] [Under provisions of Division 1.]
   1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
   2. Any substitutions provided by the contractor shall be reviewed at the contractor's expense by the electrical engineer at a rate of [$200.00] per hour.
   3. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring. The contractor shall provide complete engineered shop drawings (including power wiring) with deviations for the original design highlighted in an alternate color to the engineer for review and approval prior to rough-in.

2.2 GENERAL

Ten-year operational life while operating with a case temperature range of 10° C (50°F) to 75° C (167°F) and 90 percent non-condensing relative humidity.

B. Designed and tested to withstand electrostatic discharges up to 15,000 V without impairmentper IEC 801-2.
C. Electrolytic capacitors to operate at least 20° C below the capacitor's maximum temperature rating when the ballast is under fully-loaded conditions and case temperature is 75° C (167° F).
D. Programmed Rapid Start Type.
E. Maximum inrush current of 7 amperes for 120V ballasts and 3 amperes for 277V ballasts.
F. Current crest factor (CCF) less than 1.7.

G. Meet ANSI C82.11 High frequency ballast standard.
H. Will not interfere with infrared devices operating at frequencies between 38 kHz and 42 kHz.
I. Withstand up to a [4,000] [6,000] volt surge without impairment of performance as defined by ANSI C62.41 Category A.
J. Manufactured in a facility that employ ESD reduction practices in compliance with ANSI/ESD S20.20.
K. Inaudible in a 27 dBA ambient.
L. No visible change in light output with a variation of +/- 10% line voltage input.
M. Total Harmonic Distortion less than [10%] [20%] and meet ANSI C82.11 maximum allowable THD requirements
N. Actively prevent overheating in T5-HO linear fluorescent lamp applications.
O. Ballasts to track evenly across:
1. Multiple lamp lengths.
2. All light levels.

2.3 3-Wire Control
A. Continuous dimming from 100% to [10%: Lutron EcoSystem] [10%: Lutron Eco-10] [5%: Lutron Compact SE][1%: Lutron Hi-lume] relative light output.
B. Provide integral fault protection to prevent ballast failure in the event of a mis-wire.

2.4 Lutron Tu-wire: 2-Wire control continuous dimming from 100% to 5% relative light output.

2.5 Lutron TVE: 0-10V Control continuous dimming from 100% to 10% relative light output.

Lutron EcoSystem: Digital Control

A. Continuous dimming from 100% to 10% relative light output for T8 U-bend and linear fluorescent lamps, T5 and T5-HO linear fluorescent lamps.
B. Connect without interface to:
1. Occupant sensor (motion detector).
2. Daylight sensor.
3. Personal control input (keypad or infrared receiver).
C. Provide a 20VDC source to power connected sensors.
D. Generate digital communication commands to distribute ballast and sensor data on the digital bus.
E. Monitor and report lamp and ballast status.
F. Lights automatically return to the setting prior to power interruption.
G. Each ballast responds independently to:
1. Up to 64 occupant sensors.
2. Up to 64 personal control inputs.
3. 2 daylight sensors.
H. Unique internal reference number visibly displayed on ballast cover.
I. Averages 2 independent daylight harvesting inputs internally.
J. Responds to digital load shed command.
1. Sets high end trim.
2. Automatically scales light output proportional to load shed command.
a. Example: If light output is at 30% and a load shed command of 10% is received, the ballast automatically sets the maximum light output at 90% and lowers current light output by 3% to 27%.

2.7 SOURCE QUALITY CONTROL
A. Perform full-function testing on all completed assemblies at end of line. Statistical sampling is not acceptable.

PART 3- EXECUTION

3.1 INSTALLATION
A. Install equipment in accordance with manufacturer’s installation instructions.
B. Provide complete installation of system in accordance with Contract Documents.
C. Season lamps at full intensity according to lamp manufacturer’s recommendation.
D. Lead lengths to lamp sockets not to exceed three feet (.9m) for T4 4-pin compact lamps and T5 BIAX and

seven feet (2.1 m) for T5, T5-HO, T8 U-bend, and T8 linear fluorescent lamps.
Rapid starts sockets must meet IEC 60400:

END OF SECTION