SECTION 26 51 13

INTERIOR LIGHTING FIXTURES, LAMPS, AND BALLASTS

Equipment Specified in this section:

GLD-LV-LED-L-1X50W

GLD-LV-LED-S-1X50W

GLD-LV-LED-L-1X100W

GLD-LV-LED-S-1X100W

GLD-DALI-LED-L-1X50W

GLD-DALI-LED-S-1X50W

GLD-DALI-LED-L-1X100W

GLD-DALI-LED-S-1X100W

GLD-DALI-LED-L-2X50W

GLD-DALI-LED-S-2X50W

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SECTION 26 51 13

INTERIOR LIGHTING FIXTURES, LAMPS, AND BALLASTS

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1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Dimmable LED drivers:
				1. 0-10V Control
			2. Dimmable LED drivers:
				1. DALI Control
		2. Related Information:
			1. Section 12 24 13 Roller Window Shades
			2. Section 25 08 00 Commissioning of Integrated Automation
			3. Section 25 10 00 Integrated Automation Network Equipment
			4. Section 25 11 13 Integrated Automation Network Servers
			5. Section 25 13 13 Integrated Automation Control and Monitoring Network Supervisory Control
			6. Section 25 13 19 Integrated Automation Control and Monitoring Network Interoperability
			7. Section 25 15 16 Integrated Automation Software for Control and Monitoring Networks
			8. Section 26 05 00 Common Work Results For Electrical
			9. Section 26 27 26 Wiring Devices
			10. Section 26 51 00 Interior Lighting
			11. Section 27 15 00 Communications Horizontal Cabling
			12. Section 27 41 00 Audio-Video Systems
	2. REFERENCES
		1. Underwriters Laboratories, Inc. (UL):
			1. UL1310 and 8750, Class 2 output
		2. Federal Communications Commission (FCC):
			1. FCC Title 47 Telecommunications CFR Part 15 Class B
	3. DEFINITIONS
		1. Daylight Harvesting: The dimming of electric lighting sources when natural daylight is available.
		2. DALI: Digital addressable lighting interface.
		3. Load Shedding: Intentional reduction of power consumption to avoid total power disruption due to overloading the circuits or reduction of power consumption to avoid crossing an agreed on threshold of power usage. Load shedding lighting ballasts reduce the light level in response to a signal on the power line.
		4. Monitor: Acquisition and presentation of status or operating condition of microprocessors or electrical devices in the network of the monitoring device or program.
		5. Scene: Predetermined position of shades and light levels.
		6. Scene Selection: Grouping of lighting and window shade controls into groups that will respond to a single scene command.
		7. Transmission Control Protocol/Internet Protocol (TCP/IP): Networking protocols for exchanging data over the World Wide Web and Local Area Networks.
		8. MTBF: Mean time between failures.
	4. ACTION SUBMITTALS
		1. Product Data: For each type of product required for complete electronic dimmable ballast system, demonstrating compliance with requirements.
		2. Shop Drawings: Indicate the following:
			1. Schematic diagram showing complete LED unit with dimmable driver system and integrated control equipment and accessories.
			2. Describe Circuits and emergency circuits with capacity and phase, control zones, load type and voltage per circuit.
	5. CLOSEOUT SUBMITTALS
		1. Operating and maintenance instructions.
		2. Record drawings of electronic dimmable ballast system.
		3. Provide copy of warranty.
	6. QUALITY ASSURANCE
		1. Manufacturer Qualification: Manufacturer of LED lighting components with minimum 10 years record of satisfactory manufacturing and support of lighting and control components.
		2. Source Requirements: Provide LED drivers [and DALI-compliant drivers] through a single source from same manufacturer as lighting control equipment.
	7. COORDINATION
		1. Coordinate dimmable LED driver outfitted luminaire system with systems and components specified in the following sections:
			1. Division 26 Section “Network Lighting Controls”.
			2. Division 11 Section "Audio-Visual Equipment".
			3. Division 12 Section "Window Treatments".
			4. Division 23 Section "Instrumentation and Control for HVAC".
			5. Division 25 Section "Integrated Automation Control of Electrical Systems".
			6. Division 26 Section “Network Lighting Controls”.
			7. Division 26 Section "Panelboards".
			8. Division 26 Section "Wiring Devices".
			9. Division 26 Section "Lighting Devices".
			10. Division 26 Section "Interior Lighting".
			11. Division 27 Section "Communications Horizontal Cabling".
			12. Division 28 Section "Electronic Access Control and Intrusion Detection".
	8. PROJECT CONDITIONS
		1. Environmental Conditions Range:
			1. Temperature: 32 to 104 degrees F (0 to 40 degrees C).
			2. Relative Humidity: 10 – 90 percent, noncondensing.
2. PRODUCTS
	1. MANUFACTURERS
		1. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of **Crestron Electronics, Inc., Rockleigh, NJ 07647**, Phone (800)237-2041, Fax: (201)767‑1903, [www.crestron.com](http://www.crestron.com) with the following components and characteristics.
	2. LED DRIVER TYPE 1
		1. Single channel dimming driver:
			1. Basis of design Product:
				1. Crestron GLD-LV-LED-L-1X50W (long case)
				2. Crestron GLD-LV-LED-S-1X50W (short case)
			2. Control interface: 0-10V
				1. Driver shall communicate with control processor through a 0-10V control interface by same manufacturer.
			3. Input:
				1. Line Voltage: 120-277VAC
				2. Frequency: 50/60Hz
				3. Current: 0.7 Amp Maximum
			4. Output:
				1. Dimmed LED channels: 1
				2. Dimmed LED groups: 2
				3. Power: 50W
				4. Maximum Voltage: 55V
				5. Compatible LED controllers: current sink and current source
				6. Current Range: 200mA to 1,050mA per output
			5. Dimming:
				1. Range: 100% to 0%
				2. Curve: linear or Logarithmic
			6. Driver shall include an interface for programming configurable parameters including:
				1. Output current (per LED group)
				2. Dimming curve
				3. Minimum dimming level
				4. NTC Temperature
			7. Dimensions:
				1. Long Case: H: 1.18” (30mm); W: 17.48” (444mm); D: 8.83” (21mm)
				2. Short Case: H: 2.99” (76mm); W: 5.12” (130mm); D: 1.18” (30mm)
		2. General:
			1. Driver housing shall be constructed of painted metal with no sharp edges.
			2. Wiring termination: push button terminal block.
			3. Drivers shall be configured and installed in fixture by the fixture manufacturer.
			4. Environmental Rating: -40 to 122 degrees F (-40 to 50 degrees C).
			5. MTBF: 480,000 hours
		3. Driver Certifications:
			1. CE; UL: Recognized Component for US and Canada according to UL1310 and UL8750; US: Class 2 output; Canada: Non-Class 2 output; IEC 61347-1, IEC 61347-2-13, IEC 62384 + A1, EN 55015 + A1, EN 55022 + A1, IEC 61000-3-2, IE 61547 + A1, IEC 62386-101/102/207; FCC: Title 47CFR Part 15 Class B
	3. LED DRIVER TYPE 2
		1. Single channel dimming driver:
			1. Basis of design Product:
				1. Crestron GLD-LV-LED-L-1X100W (long case)
				2. Crestron GLD-LV-LED-S-1X100W (short case)
			2. Control interface: 0-10V
				1. Driver shall communicate with control processor through a 0-10V control interface by same manufacturer.
			3. Input:
				1. Line Voltage: 120-277VAC
				2. Frequency: 50/60Hz
				3. Current: 1.5 Amp Maximum @ 120VAC/60Hz; 0.5 Amp Maximum @ 230VAC/50Hz; 0.45 Amp Maximum @277 60Hz
			4. Output:
				1. Dimmed LED channels: 1
				2. Dimmed LED groups: 4
				3. Power: 100W
				4. Maximum Voltage: 60V
				5. Compatible LED controllers: current sink and current source
				6. Current Range: 200mA to 1,050mA per output
			5. Dimming:
				1. Range: 100% to 0%
				2. Curve: linear or Logarithmic
			6. Driver shall include an interface for programming configurable parameters including:
				1. Output current (per LED group)
				2. Dimming curve
				3. Minimum dimming level
				4. NTC Temperature
			7. Dimensions:
				1. Long Case: H: 1.61” (41mm); W: 14.57” (370mm); D: 1.18” (30mm)
				2. Short Case: H: 3.15” (80m); W: 9.06” (230mm); D: 1.18” (30mm)
		2. General:
			1. Driver housing shall be constructed of painted metal with no sharp edges.
			2. Wiring termination: push button terminal block.
			3. Drivers shall be configured and installed in fixture by the fixture manufacturer.
			4. 0-10V Control
				1. Driver shall communicate with control processor through a 0-10V control interface by same manufacturer.
			5. Environmental Rating: -40 to 122 degrees F (-40 to 50 degrees C).
			6. MTBF: 480,000 hours
		3. Driver Certifications:
			1. CE; UL: Recognized Component for US and Canada according to UL1310 and UL8750; US: Class 2 output; Canada: Non-Class 2 output; IEC 61347-1, IEC 61347-2-13, IEC 62384 + A1, EN 55015 + A1, EN 55022 + A1, IEC 61000-3-2, IE 61547 + A1, IEC 62386-101/102/207; FCC: Title 47CFR Part 15 Class B
	4. LED DRIVER TYPE 3
		1. Single channel dimming driver:
			1. Basis of design Product:
				1. Crestron GLD-DALI-LED-L-1X50W (long case)
				2. Crestron GLD-DALI-LED-S-1X50W (short case)
			2. Control interface: DALI
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			3. Input:
				1. Line Voltage: 120-277VAC
				2. Frequency: 50/60Hz
				3. Current: 7.7 Amp
			4. Output:
				1. Dimmed LED channels: 1
				2. Dimmed LED groups: 2
				3. Power: 50W
				4. Maximum Voltage: 55V
				5. Compatible LED controllers: current sink and current source
				6. Current Range: 200mA to 1,050mA per output
			5. Dimming:
				1. Range: 100% to 0%
				2. Curve: linear or Logarithmic
			6. Driver shall include an interface for programming configurable parameters including:
				1. Output current (per LED group)
				2. Dimming curve
				3. Minimum dimming level
				4. NTC Temperature
			7. Dimensions:
				1. Long Case: H: 1.18” (30mm); W: 17.48” (444mm); D: 8.83” (21mm)
				2. Short Case: H: 2.99” (76mm); W: 5.12” (130mm); D: 1.18” (30mm)
		2. General:
			1. Driver housing shall be constructed of painted metal with no sharp edges.
			2. Wiring termination: push button terminal block.
			3. Drivers shall be configured and installed in fixture by the fixture manufacturer.
			4. Environmental Rating: -40 to 122 degrees F (-40 to 50 degrees C).
			5. MTBF: 480,000 hours
		3. Driver Certifications:
			1. CE; UL: Recognized Component for US and Canada according to UL1310 and UL8750; US: Class 2 output; Canada: Non-Class 2 output; IEC 61347-1, IEC 61347-2-13, IEC 62384 + A1, EN 55015 + A1, EN 55022 + A1, IEC 61000-3-2, IE 61547 + A1, IEC 62386-101/102/207; FCC: Title 47CFR Part 15 Class B
	5. LED DRIVER TYPE 4
		1. Single channel dimming driver:
			1. Basis of design Product:
				1. Crestron GLD-DALI-LED-L-1X100W (long case)
				2. Crestron GLD-DALI-LED-S-1X100W (short case)
			2. Control interface: DALI
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			3. Input:
				1. Line Voltage: 120-277VAC
				2. Frequency: 50/60Hz
				3. Current: 1.5 Amp Maximum @ 120VAC/60Hz; 0.5 Amp Maximum @ 230VAC/50Hz; 0.45 Amp Maximum @277 60Hz
			4. Output:
				1. Dimmed LED channels: 1
				2. Dimmed LED groups: 4
				3. Power: 100W
				4. Maximum Voltage: 60V
				5. Compatible LED controllers: current sink and current source
				6. Current: 1.5 Amp Maximum @ 120VAC/60Hz; 0.5 Amp Maximum @ 230VAC/50Hz; 0.45 Amp Maximum @277 60Hz
			5. Dimming:
				1. Range: 100% to 0%
				2. Curve: linear or Logarithmic
			6. Driver shall include an interface for programming configurable parameters including:
				1. Output current (per LED group)
				2. Dimming curve
				3. Minimum dimming level
				4. NTC Temperature
			7. Dimensions:
				1. Long Case: H: 1.61” (41mm); W: 14.57” (370mm); D: 1.18” (30mm)
				2. Short Case: H: 3.15” (80m); W: 9.06” (230mm); D: 1.18” (30mm)
		2. General:
			1. Driver housing shall be constructed of painted metal with no sharp edges.
			2. Wiring termination: push button terminal block.
			3. Drivers shall be configured and installed in fixture by the fixture manufacturer.
			4. DALI Control
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			5. Environmental Rating: -40 to 122 degrees F (-40 to 50 degrees C).
			6. MTBF: 480,000 hours
		3. Driver Certifications:
			1. CE; UL: Recognized Component for US and Canada according to UL1310 and UL8750; US: Class 2 output; Canada: Non-Class 2 output; IEC 61347-1, IEC 61347-2-13, IEC 62384 + A1, EN 55015 + A1, EN 55022 + A1, IEC 61000-3-2, IE 61547 + A1, IEC 62386-101/102/207; FCC: Title 47CFR Part 15 Class B
	6. LED DRIVER TYPE 5
		1. Single channel dimming driver:
			1. Basis of design Product:
				1. Crestron GLD-DALI-LED-L-2X50W (long case)
				2. Crestron GLD-DALI-LED-S-2X50W (short case)
			2. Control interface: DALI
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			3. Input:
				1. Line Voltage: 120-277VAC
				2. Frequency: 50/60Hz
				3. Current: 7.7 Amp
			4. Output:
				1. Dimmed LED channels: 2
				2. Dimmed LED groups: 1 per channel
				3. Power: 50W
				4. Maximum Voltage: 55V
				5. Compatible LED controllers: current sink and current source
				6. Current Range: 200mA to 1,050mA per output
			5. Dimming:
				1. Range: 100% to 0%
				2. Curve: linear or Logarithmic
			6. Driver shall include an interface for programming configurable parameters including:
				1. Output current (per LED group)
				2. Dimming curve
				3. Minimum dimming level
				4. NTC Temperature
			7. Dimensions:
				1. Long Case: H: 1.18” (30mm); W: 17.48” (444mm); D: 8.83” (21mm)
				2. Short Case: H: 2.99” (76mm); W: 5.12” (130mm); D: 1.18” (30mm)
		2. General:
			1. Driver housing shall be constructed of painted metal with no sharp edges.
			2. Wiring termination: push button terminal block.
			3. Drivers shall be configured and installed in fixture by the fixture manufacturer.
			4. DALI Control
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			5. Environmental Rating: -40 to 122 degrees F (-40 to 50 degrees C).
			6. MTBF: 480,000 hours
		3. Driver Certifications:
			1. CE; UL: Recognized Component for US and Canada according to UL1310 and UL8750; US: Class 2 output; Canada: Non-Class 2 output; IEC 61347-1, IEC 61347-2-13, IEC 62384 + A1, EN 55015 + A1, EN 55022 + A1, IEC 61000-3-2, IE 61547 + A1, IEC 62386-101/102/207; FCC: Title 47CFR Part 15 Class B
	7. LED DRIVER TYPE 6
		1. Single channel dimming driver:
			1. Basis of design Product:
				1. Crestron GLD-DALI-LED-L-2X100W (long case)
				2. Crestron GLD-DALI-LED-S-2X100W (short case)
			2. Control interface: DALI
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			3. Input:
				1. Line Voltage: 120-277VAC
				2. Frequency: 50/60Hz
				3. Current: 1.5 Amp Maximum @ 120VAC/60Hz; 0.5 Amp Maximum @ 230VAC/50Hz; 0.45 Amp Maximum @277 60Hz
			4. Output:
				1. Dimmed LED channels: 2
				2. Dimmed LED groups: 2 per channel
				3. Power: 100W
				4. Maximum Voltage: 60V
				5. Compatible LED controllers: current sink and current source
				6. Current: 1.5 Amp Maximum @ 120VAC/60Hz; 0.5 Amp Maximum @ 230VAC/50Hz; 0.45 Amp Maximum @277 60Hz
			5. Dimming:
				1. Range: 100% to 0%
				2. Curve: linear or Logarithmic
			6. Driver shall include an interface for programming configurable parameters including:
				1. Output current (per LED group)
				2. Dimming curve
				3. Minimum dimming level
				4. NTC Temperature
			7. Dimensions:
				1. Long Case: H: 1.61” (41mm); W: 14.57” (370mm); D: 1.18” (30mm)
				2. Short Case: H: 3.15” (80m); W: 9.06” (230mm); D: 1.18” (30mm)
		2. General:
			1. Driver housing shall be constructed of painted metal with no sharp edges.
			2. Wiring termination: push button terminal block.
			3. Drivers shall be configured and installed in fixture by the fixture manufacturer.
			4. DALI Control
				1. Driver shall communicate with DALI compatible devices.
				2. Driver shall support standard DALI protocol.
				3. Driver shall communicate with control processor through DALI to IP control network interface by same manufacturer.
			5. Environmental Rating: -40 to 122 degrees F (-40 to 50 degrees C).
			6. MTBF: 480,000 hours
		3. Driver Certifications:
			1. CE; UL: Recognized Component for US and Canada according to UL1310 and UL8750; US: Class 2 output; Canada: Non-Class 2 output; IEC 61347-1, IEC 61347-2-13, IEC 62384 + A1, EN 55015 + A1, EN 55022 + A1, IEC 61000-3-2, IE 61547 + A1, IEC 62386-101/102/207; FCC: Title 47CFR Part 15 Class B
3. EXECUTION
	1. EXAMINATION
		1. Prior to installation, examine work area to verify measurements, and that commencing installation complies with manufacturer's requirements.
	2. PREINSTALLATION MEETING
		1. Installer of Electronic Ballast Lighting System to coordinate a meeting of the mechanical and electrical engineer, mechanical and electrical contractor, lighting, window shade and HVAC equipment manufacturers. Include any designers and contractors for any other direct digital control system designed to interact with product of this Section.
			1. Discuss interconnection and interoperability of other equipment with Electronic Ballast Lighting System.
	3. INSTALLATION
		1. Comply with requirements of Division 26 Sections "Common Work Results for Electrical."
		2. Install Electronic Ballast in accordance with manufacturer's instructions.
		3. Grounding: Provide electrical grounding in accordance with NFPA 70.
	4. SYSTEM STARTUP
		1. Provide manufacturer's system startup and adjustment.
		2. Switch each load on and off. Test dimming features. Test system integration to the satisfaction of engineer. Provide a written report of test and outcomes.
		3. Perform operational testing to verify compliance with Specifications. Adjust as required.
	5. ADJUSTING
		1. Within 12 months of the date of Substantial Completion provide onsite service to adjust the system to account for actual occupied conditions.
	6. DEMONSTRATION
		1. Factory authorized service representative to instruct owner's staff to adjust, operate and maintain electronic dimmable ballast systems; and provide instruction using the system software.
	7. FIELD QUALITY CONTROL
		1. Manufacturer's Field Services: Qualified manufacturer's field representative to perform on-site system inspection, startup, and owner demonstration and training.
			1. Participation in Preinstallation Conference and pre-wire inspection.
			2. Owner programming conference.
			3. Owner demonstration and training.
	8. CLOSEOUT ACTIVITIES
		1. Demonstration: Schedule demonstration with Owner.
		2. Training:
			1. Furnish set of approved submittals and record drawings of actual installation for Owner's personnel in attendance at training session.

END OF SECTION 26 51 13