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DATE: March 4, 2020

FROM: Wight & Company
2500 N. Frontage Road
Darien, IL 60561

SUBJECT: ADDENDUM #2 TO THE BIDDING DOCUMENTS FOR:
ISSUED FOR BID
COMMUNITY HIGH SCHOOL DISTRICT 99
LIFE SAFETY 2020 PROJECTS - NORTH
6301 SPRINGSIDE AVE.
DOWNERS GROVE, IL 60516

This addendum forms a part of the Bidding Contract Documents, dated February 12, 2020. Bidders must acknowledge receipt of this Addendum in the space provided on the Bid Form.

I. Specifications

1. Specification section 000110 – TABLE OF CONTENTS revised to include added sections noted below.
2. Specification section 260501 – THEATRICAL SYSTEMS ELECTRICAL INSTALLATION added.
3. Specification section 260961 – THEATRE STAGE LIGHTING SYSTEMS added.

II. BP#02 General Trades-Scope of Work

III. F-1 Fixture Cut Sheet

END OF ADDENDUM #2

SPECIFICATIONS

PROJECT: Life Safety 2020 Projects - North

Downers Grove South High School
4436 Main Street
Downers Grove, Illinois 60515

OWNER: Community High School District 99
6301 Springside Avenue
Downers Grove, IL 60516

ISSUED FOR BID

END OF TABLE OF CONTENTS

SECTION 26 05 01 – THEATRICAL SYSTEMS ELECTRICAL INSTALLATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, other General Requirement Sections, apply to work of this section.

B. Refer to Section 26 09 61 – Theatre Stage Lighting Systems and the “TE” Contract Drawings for plans, graphic representations, schedules, and notations showing Stage Lighting and Dimming System work.

C. Reference related specifications in Division 26.

1.2 SCOPE OF WORK

A. Work in this section includes but is not limited to:

1. General requirements for provision of electrical services and materials, raceway and outlet box systems, wire, wire pulling, and terminations suitable to accommodate installation of the following systems:

a. Section 26 09 61 – Theatre Stage Lighting Systems

B. Provide electrical materials and methods in accordance with all requirements and related sections of Division 26, and as detailed herein.

C. Provide all junction boxes, pull boxes, terminal cabinets, cable trays, conduit, enclosures, standard outlet and device back boxes, and other electrical materials and hardware for a complete theatrical systems electrical infrastructure as specified herein and in quantities and locations as shown on electrical drawings.

D. Provide all disconnects, panelboards, feeders to company switches, and feeders to emergency lighting transfer systems for theatrical Systems equipment as specified herein and in quantities as shown on electrical drawings.

E. Provide test reports and verification that wiring installations comply with applicable standards and the requirements set forth in the theatrical systems specifications sections listed above, in Division 01, and by the equipment manufacturers.

F. Theatrical Lighting System

1. Provide and Install equipment furnished under Section 26 09 61 – Theatre Stage Lighting Systems, including, but not limited to, dimmers and circuit distribution

devices per Manufacturers' recommendations and instructions in Locations shown on "TE" Drawings.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. Provide electrical metallic tubing (EMT) or other wireways as specified in the Contract Documents for all Theatrical Systems wiring. Note NEC 520.6 exception to conductor limitation.

B. Provide conductor pull lines in all EMT for low voltage cable provided by Division 11.

C. All wiring for Theatrical Systems shall be contained in raceways.

2.2 BOXES

A. Provide all required pull and junction boxes for the proper routing of cables.

B. All surface mount back boxes shall have faceplates of the same size.

C. All flush mount back boxes shall have faceplates that extend no less than 1/8" past the back box on all sides.

D. WIRING DEVICES

1. Provide dedicated Theatrical Lighting System power receptacles and other required wiring devices, complete with associated hardware and wall plates, as specified herein and shown on Electrical Drawings. Verify cover plate finish and color with the Architect.
2. Duplex receptacles shall be standard NEMA 5-20R configurations, unless otherwise noted.
3. Receptacles shall be connected to dedicated circuits as shown on the Drawings.
4. Label cover plates "LIGHTING SYSTEM POWER."

PART 3 - EXECUTION

3.01 FOLLOW STANDARD PRACTICES NOTED THROUGHOUT DIVISION 26 SPECIFICATIONS.

3.02 THEATRICAL LIGHTING SYSTEM LOAD WIRING

A. For all theatrical lighting branch load circuits, all splices and connections to wiring devices shall use compression-type connectors. Spring wire nuts shall not be used for these circuits.

B. All theatrical circuits shall include an individual neutral wire. No common neutrals. No exceptions.

C. All circuits shall be grounded to building electrical ground. No circuit grounds shall be made to conduit, boxes, or structure. Grounds may be shared for lighting circuits.

D. Where parallel circuits are identified, individual circuit wires shall be homerun to dimmer terminals.

E. Branch wiring device ground wires as shown in Drawings shall be terminated at the dimmer rack(s) and relay panels.

END OF SECTION

SECTION 26 09 61 – THEATRE STAGE LIGHTING SYSTEMS

PART 1 – GENERAL

1.1 SCOPE

All materials, components, and services necessary to provide a complete system indicated in this Section, as specified herein and shown on related Drawings, including:

A. Preparation and submission of complete shop drawings and samples for review prior to fabrication.

B. Verification of dimensions and conditions at the job site.

C. Shipment of equipment to the job site and the secured storage of all non-fixed equipment.

D. Installation and completion in accordance with these Specifications, related Drawings, the Equipment Manufacturer's recommendations, established trade criteria, and all applicable code requirements.

E. The observation, demonstration, and necessary adjustment of the completed installation by the Manufacturer's engineering personnel.

F. Preparation and submission of complete record drawings and operational and maintenance data and certificates.

1.2 WORK INCLUDED

A. Architectural Lighting Control System.

B. Remote control panels and receptacles.

C. Network data system.

D. Dimmers.

E. Wiring devices.

F. Centralized DMX Data distribution.

The above is for reference only and is not intended to define the limits of the work for a complete installation.

1.3 RELATED WORK IN OTHER SECTIONS

A. General requirements for all electrical work.

B. Electrical service

C. General lighting system.

1.4 QUALIFICATIONS

A. All dimming and control system equipment shall be provided by qualified Stage Lighting Manufacturers.

B. The Manufacturers shall have at least ten (10) years experience in the fabrication of similar equipment.

C. If requested, the Manufacturers shall submit a representative list of installations during the above period.

D. Subject to the above requirements, the equipment indicated herein shall be by one of the following manufacturers:

1. Dimming and control
    a. Electronic Theatre Controls, Middleton, Wisconsin

2. Wiring devices
    a. Electronic Theatre Controls, Middleton, Wisconsin
    b. LEX Products, Stamford, Connecticut
    c. Performance Electric, Greer, South Carolina
    d. Rigging Innovators, San Antonio, Texas
    e. Southeast Stage Rigging & Curtains, Greenville, South Carolina
    f. TMB, New York, New York
    g. Union Connector, West Babylon, New York

E. Other manufacturers may be considered with the prior review of the Theatre Consultant. Manufacturers seeking review must contact the Theatre Consultant not later than fourteen (14) days prior to bid date.

F. The dimming and control system shall be provided by a qualified theatrical dealer, who shall have at least five (5) years experience in the sales and installation of similar systems and who shall be factory certified to provide warranty service for all of the equipment in this Section. Dealer shall be a Business member, accredited as a Dealer/Retailer, of the entertainment service organization Entertainment Services and Technology Association (ESTA).

G. Dealer shall be responsible for the integration, operation, and performance of all elements of the system described in this Section. Dealer shall provide all warranty

work and equipment upgrades as called for in this Section. The dealer shall be available for product service onsite within (24) hours of a call for service.

H. Subject to the above requirements, the equipment indicated herein shall be provided by one of the following dealers:

1. Barbizon Lighting Company, Chicago, Illinois, 773-276-8500
2. Grand Stage, Chicago, Illinois 312-332-5611
3. Intelligent Lighting Creations, Arlington Heights, Illinois 847.933.9792
4. Protolight, Des Plaines, 847-859-5000

Other dealers may be considered with the prior review of the Theatre Consultant. Dealers seeking review must contact the Theatre Consultant not later than fourteen (14) days prior to bid date.

1.5 SUBMITTALS

A. With bid.

1. Identification of qualified Theatrical Dealer providing system.
2. All deviations and exceptions from specification must be revealed with bid. Deviations and exceptions from specification submitted after this time shall not be accepted.
3. Manufacturer shall indicate any additional infrastructure that is not shown in the Drawings and is required to install Manufacturer's system.
4. Shop drawings. Within thirty (30) days of receipt of order, the Manufacturer shall submit drawings and equipment data sheets to the Architect for distribution to the Theatre Consultant for review and action prior to fabrication:
    a. Dimensions, components, and finishes of all equipment and accessories.
    b. All system assemblies and major sub-assemblies, cabinets, and enclosures, including notation of type and manufacture of switches, pilot lights, locks, hardware, and electrical and electronic connectors.
    c. Block schematics of system internal wiring and system element interconnection.
    d. Full size samples of labeling styles for all wiring device types.
    e. Quantities of each component and sub-assembly.
    f. Indication by boxed caption of any and all variations from contract Drawings and Specifications, whether or not these variations have been formally or informally accepted by the Theatre Consultant.

B. Samples. Within thirty (30) days of receipt of order, the Manufacturer shall submit to the Architect for review prior to fabrication samples of any equipment component requested by the Theatre Consultant. Samples shall not be included in quantities of equipment specified but shall be returned.

C. Final submittal. Within thirty (30) days of final tests, and as a condition for final review, the Manufacturer shall submit to the Architect:

1. Three (3) sets to the Architect and one (1) set on electronic media to the Theatre Consultant. Format of sets shall be compliant with Division One of this Specification.

a. Receipts for delivery of all non-installed items, i.e., all items designated, "deliver to Owner."
b. "As built and approved" drawings and equipment data sheets showing all systems and components as installed, including all field modifications.
c. Documentation of Data Network system, noting system layout, all panel locations, and all wire lengths. Documents shall indicate the device IP address, MAC/NIC address, Hub Number, and Port number, where applicable. Subnet Masks and Subnet documentation shall be provided where applicable. Provide cable analyzer printouts of all tests performed as required in this Section, labeled by cable number.
d. Operating and maintenance manuals.
e. Parts lists.
f. Training videos as noted below.
g. Certificates of warranty, as set forth below.

1.6 TESTING AND INSTRUCTION

A. Upon completion of all installation work, the Contractor and Dealer shall certify in writing to the Architect that the work is complete and ready for final observation. Final observation shall be scheduled by the Owner, the Architect, and the Theatre Consultant within fourteen (14) days following the Contractor's notice of completion.

B. System testing shall include testing of control data network, documenting traffic utilization within the Network Data System requirements noted below in this Section. Testing shall also include verification of Wireless Handheld Remotes operational range as required in Part 2 of this Section.

C. After system checkout and adjustment, the Dealer’s factory certified technician shall operate the system for the review of the Owner, the Architect, and the Theatre Consultant.

D. Necessary adjustments or modifications shall be made as required.

E. As a condition of final completion, the Dealer’s factory certified technician shall instruct the Owner's staff or representatives, under the observation of the Architect and Theatre Consultant, in the operation and maintenance of the system.

1. Initial Instruction: This instruction session shall be scheduled for a minimum duration of six (6) hours. While it may be possible to schedule this instruction session to coincide with the system checkout, such coincidence shall not be assumed. Instruction shall be scheduled by the Owner, the Architect, and the

Theatre Consultant to occur within fourteen (14) days following the Contractor's written notice.

a. Provide to Users at time of training a copy of the circuit termination schedule that has been revised by the Dealer and Electrical Contractor to reflect the installed circuit terminations for the Owner’s use and reference. This document shall not supplant any other requirements contained in this Specification.

F. The Dealer shall provide to the Owner video instructions on the operation and maintenance of the system. Information contained in video will cover all points of operation and maintenance covered in the instruction session with Owner's staff. A videotaped recording of the actual instruction session is acceptable. Provide four (4) full copies of video instruction. Video format shall be DVD.

1.7 GENERAL REQUIREMENTS

A. General Conditions of the project contract, work schedules, and site regulations apply to this work.

B. This work shall comply with local codes and applicable standards as established by NEC and approved testing agencies, and all components shall carry pertinent labels by approved testing agencies.

C. The Contractor shall provide full insurance against loss or damage during shipment, storage, installation, and testing. Certification of such coverage shall be furnished to the Architect within thirty (30) days of award of contract.

D. Warranty

1. The Dealer shall unconditionally warrant all equipment and systems provided under this Section to be free from defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance of all work of this Section. Lamps and normal wear and tear are exempted.
2. Appropriate additional equipment to replace equipment removed for service shall be provided at the job site at no expense to the Owner to replace any and all equipment which must be removed for service. Replacement control console(s) must of the same model as those removed for service.
3. All warranty service shall be performed by technicians factory certified for the installed equipment.
4. For a period of two (2) years following acceptance, the Dealer shall provide and install, at no cost to the Owner, software upgrades to all control system components of all control systems including consoles and architectural lighting controllers. Thereafter the Dealer shall notify the Owner of all software upgrades for the life of the control system(s). The Dealer shall keep Owner’s name and address in a database for this purpose. All upgrades shall include a full written description of operational modifications. Software upgrades shall be designed so as to allow existing data, configurations and show files to be maintained, accessed and edited in the future.

E. State-of-the-art assurance: All products specified shall be the Manufacturer's most recent iteration and most recent product. No products shall be accepted if they have been discontinued or superceded at the time of shipment. Should the Manufacturer develop products of comparable function above and beyond the specification of the listed product, the Dealer shall make the newly developed product available to the project at no additional cost. The Dealer shall notify the Architect and the Theatre Consultant of any developments to the specified products, and shall note any change in the requirements of building infrastructure(s) to support the developments. The Architect and Theatre Consultant shall then determine whether upgraded products shall be accepted.

PART 2 – PRODUCTS

2.1 GENERAL

A. All components shall be new, in good condition, and under warranty.

B. All components shall bear labels from approved testing agencies and labels identifying the manufacturer, model number, and serial number. All such labels shall be permanently attached in a conspicuous location.

C. All control and receptacle faceplates not otherwise described in this Specification shall be black anodized aluminum or black painted steel, and all labels and legends shall be permanently engraved directly into the faceplate. Engravings shall be filled with white paint. Minimum text height if not specified elsewhere: 1/4" inch. Micarta, lamicoid, and other types of engraved plastic labels shall not be used. Dry transfer, decals, plastic "dymo," or other types of adhesive labels shall not be used. Silk-screened legends shall not be used except where specifically noted. All faceplates shall have beveled edges and rounded corners.

D. Control signal protocols and connector types

1. All control signal protocol and connector types shall comply with the following Standards:
    a. ANSI E1.11 – 2008 (R2013) - Entertainment Technology USITT DMX-512-A Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories.
    b. ANSI E1.17 – 2015 Entertainment Technology – Architecture for Control Networks.
    c. ANSI E1.20 – 2010 Entertainment Technology – RDM Remote Device Management over DMX512 Networks.
    d. ANSI E1.27-1 - 2006 (R2016) Entertainment Technology-Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A) Products
    e. ANSI E1.27-2 - 2009 – Entertainment Technology - Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products

f. ANSI E1.30 Series of Documents level equipment interoperability for control of commonly encountered entertainment technology devices using E1.17.
g. ANSI E1.31 - 2016 - Entertainment Technology – Lightweight streaming protocol for transport of DMX512 using ACN

2. All components shall be compatible within the Stage Lighting Manufacturer's network data system.
3. All control, signal, and video connectors shall be of substantial construction and shall be of the locking or latching type. All plate-mounted connectors shall be bolted to faceplates. Rivets shall not be acceptable.

E. Provide a total of (2) keys for each keyed device.

F. Where specification allows for "approved equal," substitutions shall be proposed to the Theatre Consultant at least ten (10) days prior to bid date.

2.2 NETWORK DATA SYSTEM

A. The Network Data System shall provide for the interconnection of devices used solely for stage lighting and special effects.

B. A dedicated network is required for each performance space in the project. The network shall consist of receptacle panels, connecting wiring, patch bay(s), patch cables, hub devices, routers, switches, and receptacle panels for portable node devices.

C. Provide all materials, components, and services necessary to provide a complete network data system indicated in this Section. Dealer shall be responsible for performance of the complete system.

D. The network shall provide for the connection of the following devices:

1. Control consoles.
   a. DMX outputs.
   b. Dimmer feedback information.
2. Remote video displays.
3. Designer's remote control consoles.
4. Hand-held remote controls.
   a. Dedicated lines to console locations if required.
5. Automated lighting fixtures.
6. Moving yoke devices.
7. Color changers.
8. LED lighting fixtures.
9. DMX-controlled special effects.
10. Architectural lighting control system.

E. Network capacity shall be determined by the following simultaneous usage criteria. System shall allow all the data below to be sent simultaneously, within the traffic and collision maximums noted in Item J below.

1. Control Consoles – quantity one (1)
    a. Control signal to dimmers
    b. Dimmer feedback information
2. Remote video displays – quantity two (2) in use, in two separate locations
3. Designer's remote control consoles – quantity one (1)
4. Wireless Handheld remote controls
    a. Network signal for one (1) unit
5. Distributed DMX signal – eight (8) 512-dimmer universes for automated lighting, color changers and special effects. System shall be designed for the quantity of DMX nodes specified herein and a 50% future expansion of DMX node devices.

F. The system shall utilize unshielded twisted pair (UTP) wiring. UTP wiring shall be 4 pair #24 AWG unshielded twisted pair wiring. Fiber optic wiring is permissible for "backbone" wiring runs. Fiber optic wiring shall be 62.5/125/900 Micron Fiber Optic wiring. All elements of the system shall meet the following requirements:

1. Institute of Electrical & Electronic Engineers Standard 802.3: 1996 (E), ANSI/IEEE Standard 802.3, 1993 Edition
2. Electronic Industries Association/Telecommunications Industries Association Standard 568-1995
3. TIA/EIA Bulletin TSB67 for field-testing of unshielded twisted-pair cabling systems

G. All system elements shall be provided from a qualified network hardware manufacturer. The manufacturer shall have at least five (5) years experience in the fabrication of network hardware. Subject to the above requirements, the equipment indicated herein shall be by one of the following manufacturers:

1. Allied Telesyn
2. Bay Networks
3. Cisco Systems
4. 3Com Corporation
5. Hubbell Premise
6. Panduit

H. Panels

1. Network terminations shall be provided at the following panels as shown in the Drawings and Schedules:
    a. Control Receptacle Panel(s) (CRP-xx)
    b. Entry Panel(s) (EP-XX)
    c. Dimmer Rack(s) (DR-xx)
    d. Signal Processing Rack(s) (SPR-XX)

I. Wiring methods

1. All permanent network wiring shall terminate in receptacles in panels. All equipment shall be connected to receptacles via "patch cables" with RJ45 plugs. No installed wire shall terminate directly to network equipment. The use of male RJ45 pigtails shall not be permitted.
2. Cable shall be pulled in conduits, meeting the minimum-bending radius permitted by the cable manufacturer. All cable shall be pulled with no more than the maximum pulling tension permitted by the cable manufacturer.
3. Riser rated or Plenum rated cable shall be used where required under local codes.

J. Electrical requirements

1. All UTP wiring segments shall be of continuous runs of not more than 250 feet. The Contractor shall coordinate and submit all conduit runs for review, verifying the maximum length of each wiring run. If a wiring run exceeds the noted maximum footage, Contractor shall notify the Architect of all issues and coordinate with Manufacturer to bring the segment wiring to the stated maximum run. Manufacturer shall provide required repeaters and system elements as necessary. Contractor shall provide and install such elements as part of the work of this Section. All elements shall be provided with uninterruptible power supplies. Such equipment shall be located in a location mutually agreed upon by the Theatre Consultant and Architect.
2. All cable shall meet the standards for TIA/EIA-568-B Category 5e, or highest rated category wiring in use for this project at the time of installation. The Contractor shall use a current generation 100Mhz or higher network/cable analyzer to perform testing on the cable plan and shall test all data pairs. All cable shall be tested for continuity, attenuation, near end crosstalk, mutual capacitance, cable impedance, cable resistance, cable length, structural return loss and pair mapping. All testing will be performed by certified cable technicians.
3. All wiring shall meet the TIA/EIA-586-B wiring standard.
4. All cable and installation shall accommodate 100Mbs transmission rate.
5. The system shall be designed for maximum 40% traffic utilization and maximum 10% collisions within the same collision domain. The use of switches is acceptable to manage network traffic.
6. All Layer 2 switches shall provide for IGMP Layer 3 snooping to accommodate IP multicast events.

K. Network cables

1. Cables shall have a Category rating to match wiring of installed wiring.
2. Cables shall include RJ45 plugs at each end, for proper mating to receptacle panels and node devices.
3. Cables shall be of type “ProPlex” as manufactured by TMB, Carlstadt, NJ or approved equal.
4. Connectors shall be Neutrik “Ethercon” type connectors or approved equal.
5. Quantities per schedule.
6. Deliver to Owner.

L. Patch cables

1. Cables shall have a Category rating to match wiring of installed wiring.
2. Cables shall include RJ45 plugs at each end, for proper mating to receptacle panels and node devices. Each cable shall be protected by a rubber boot of a diameter sufficient to extend beyond the plug connection tab.
3. Quantities as sufficient to fully patch the network.
4. Install at Signal Processing Rack.

M. Uninterruptable power supply.

1. Capable of sustaining operating voltage to supported devices for a minimum of ten (10) minutes in the event of a loss of power.
2. Capable of filtering spikes, surges, and noise from power source.
3. Conditioner shall provide continuity of earth ground from source to the console.
4. Shall include test switch to confirm battery charge.
5. Shall include battery end-of-life indicator.
6. Shall be rack mounted.
7. UPS shall be sized to provide rated power supply for supported devices.
8. Eaton Powerware Series 5 or approved equal.

2.3 SIGNAL PROCESSING RACK

A. The Signal Processing Rack shall be 19" equipment mounting rack(s) with a hinged front door.

B. The Rack shall be surface wall mounted and completely wired internally. Rack shall include hinged “swing-away” mounting for rear access. Design and configuration as shown in the Drawings.

C. Patch panel(s) shall include sufficient patching for all network receptacles, plus (12) spare receptacles.

1. The Panel(s) shall include wire management panel(s) as manufactured by Panduit or approved equal.
2. The Panel(s) shall include engraved labeling of each port. Port labeling shall refer to Control Receptacle Panel designation.

D. System to incorporate for Power over Ethernet. Provide one of the following systems:

1. IEEE 802.3af compliant Power over Ethernet 24-48VDC 10/100 Base T Switches as required

OR

1. IEEE 802.3af compliant Power Injector and 10/100 Base T network switches as required. Injector(s) must have sufficient ports to simultaneously service to all network taps.

E. All wires shall be identified at the jacket with separate numbers.

F. The rack shall contain the following elements as shown in the Drawings:

1. Network Patch Bay
2. Network Switch
3. Power Over Ethernet (POE) Power Injector.
4. Cable Management.
5. Signal Translation node, if required.
6. Uninterruptable Power Supply.
7. Architectural Lighting Processor.
8. Cue Light Processor.
9. Centralized DMX Distribution
10. Distributed DMX Driver

G. Install as shown in the Drawings.

2.4 CENTRALIZED DMX DISTRIBUTION

A. The system described below is based upon general performance criteria common to the products listed below. No other system shall be considered unless specifically approved by Theatre Consultant at least ten (10) days prior to the bid date:

1. Electronic Theatre Controls “Net3 Four Port Gateway.”
2. Pathway Connectivity “Pathport Quattro Node.”
3. Pathway Connectivity “Pathport Octo Node.”

B. The Centralized DMX Distribution system shall be located at the Signal Processing Rack and employ the above noted device(s). The system shall provide for the translation of network control data into discrete DMX512 data streams to the indicated receptacles on the Control Receptacle Panels, per the drawings and schedules. The system shall be designed with the following functionality:

1. The device(s) shall be capable of accepting the following lighting control network data: ACN; sACN; RDM; ETC Net3.
2. The device(s) shall use a dedicated multiplexed signal conforming to the ANSI E1.11 – 2008 (R2013) DMX512-A standard.
3. DMX512 data streams shall be optically isolated.
4. Each discrete DMX512 data stream shall be programmable to provide data within the specified DMX512 Universe(s).

C. Wiring between Centralized DMX Distribution system devices and indicated receptacles on the Control Receptacle Panels, per the drawings and schedules, shall:

1. Utilize Category 5E cable for transmission of DMX512 data.
2. Cable length shall be limited to 250 feet.
3. Follow all recommended practices, unless otherwise noted above, of ANSI E1.27-2 - 2009 (R2014) – Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products.

D. All wires shall be identified at the jacket with separate numbers.

E. The device(s) shall provide one discrete input or output for each DMX receptacle in the system plus four (4) spare inputs/outputs. Provide rear-mounted terminals for the connection of all DMX wiring.

F. Multiple DMX receptacles on a single input or output cable shall not be accepted.

G. Install in the Signal Processing Rack.

2.5 DISTRIBUTED DMX DRIVER

A. The Control Interface Rack shall include an optically isolated distribution device capable of providing discrete DMX512 signals. The device(s) shall be rack-mounted and provide discrete DMX control lines to the indicated Control Receptacle Panels and to the dimmer racks.

B. All wires shall be identified at the jacket with separate numbers.

C. The device(s) shall use a dedicated multiplexed signal conforming to the ANSI E1.11 – 2008 (R2013) DMX512-A standard.

D. The device(s) shall provide one discrete output for each DMX output receptacle in the system plus four (4) spare outputs. Provide terminals for the connection of all DMX wiring.

E. Manufacturer: Pathway Connectivity or approved equal.

F. Install in the Signal Processing Rack.

2.6 CONTROL RECEPTACLE PANELS

A. The Control Receptacle Panels shall be mounted as indicated in the Drawings, and completely wired internally, with terminal strips of the proper rating for all external connections.

B. The face of each panel shall contain receptacles as indicated in the Drawings. These receptacles shall be of the locking type and shall be sized for the proper number and capacity of conductors as indicated in the Drawings.

1. Receptacles for device connection.
    a. All Category connectors shall be RJ45. All female RJ45 connectors shall be individual connectors of matching catalog number.
    b. All fiber optic connectors shall be ST style connectors.
    c. Control connectors shall be equal to 4-pin or 5-pin XLR, Switchcraft.
    d. Smaller or less substantial connectors shall not be acceptable.

2. Engraved Lamicoid label(s) with the following information:
    a. Designation of wire destination
    b. Maximum length of patch cable permissible from the receptacle.

3. Faceplate engraving of device name and receptacles as shown in Drawings.

C. Initial programming of DMX Receptacles shall be as follows:

1. If one (1) DMX INPUT then: DMX INPUT shall be 1-512 and control house dimmers unless noted otherwise.
2. If two (2) DMX INPUT then: first DMX INPUT shall be 1-512 and control house dimmers unless noted otherwise; second DMX INPUT shall be 513-1024.
3. If one (1) DMX OUTPUT then: DMX OUTPUT shall be 513-1024.
4. If two (2) DMX INPUT then: first DMX OUTPUT shall be 1-512 and control house dimmers unless noted otherwise; second DMX OUTPUT shall be 513-1024.
5. If three (3) or more DMX INPUT or OUTPUT then DMX Receptacle shall be initially programmed for the next sequential DMX Universe.

D. Install as shown in the Drawings.

2.7 THEATRE LIGHTING CONTROL SYSTEM

A. The Theatre Lighting Control System shall be a comprehensive lighting control system designed to control all dimming and relay panels as shown in the Schedules.

B. The system shall be comprised of individual control panels as shown in the Drawings. Each panel shall contain one or more of the following control elements:

1. Master Lighting Control
    a. Controls, quantities and labeling as noted in the Drawings.
    b. Rear-illuminated liquid crystal display screen shall display available presets and programming information.
        i. It shall be possible to limit control and access to the screen through the use of password controls.
        ii. It shall be possible to program fade times for each preset
        iii. The panel shall be capable of addressing all dimmers in the system.
        iv. Control zone numbers and names as noted in the Drawings.
    c. Panic switch. Rear-illuminated pushbutton switch. Color: red. Operation: Push On / Lock. Panic switch shall bring designated architectural lighting circuits on to full power overriding all other dimmer controls. The dimmer racks shall be locked at this state until released by the Normal Switch. This switch shall function regardless of the operating status of other control system elements.
    d. Normal switch. Rear-illuminated pushbutton switch. Color: green. Operation: Push On / Lock. Normal Switch shall release the dimmer override and shall return the dimmers to the last state prior to the activation of the Panic Switch.

e. Night Light switch. Rear-illuminated pushbutton switch. Color: Blue. Operation: Push On / Push Off. Night Light switch shall activate a preset of house lights and work lights for use when the theatre is unoccupied. The Night Light preset shall only be activated and deactivated with this switch. All other houselight controls and worklight switches, including Entry Panels, will continue to operate while the Night Light preset is engaged, but their action shall not affect any channels being controlled by the Night Light preset.
f. Entry Panel Lockout Switch. Recessed rear-illuminated pushbutton switch. Color: White. Lockout switch shall address all designated Entry Panels. Switch shall be able to lock out local control.

2. Houselight Controls

a. One Master (1) linear slider for house light dimmers.
b. Linear sliders for individual control of house light dimmers. Quantity and Label per drawings.

3. Work light controls.

a. Manufacturer standard pushbuttons. Operation: Push On / Push Off. Each button shall incorporate or have associated with it a status indicating LED.
b. One (1) Kill/Restore switch. Switch shall be a double-throw momentary-contact toggle or rocker switch with indicator light. Switch shall be arranged vertically with the top position being ON (non-locking), the center position HELD, and the bottom position OFF (non-locking). Indicator light color: red.
Switch function shall be:
Switch Up - Restore (non-locking)
Switch – Center – HELD
Switch – Down – Kill (non-locking).
Kill position shall take all work light circuits to zero. Restore position shall restore last state of all circuits, including status indicators.
c. Controls, quantities and labeling as noted in the Drawings.

C. The following systems shall be acceptable:

1. ETC "Paradigm"

D. Auxiliary Control Console

1. The Auxiliary Control Console shall be a separate console, totally enclosed, portable, and completely wired internally.
2. The face of the panel shall contain the control Panels as shown in the Drawings
3. The console elements shall retain their memory regardless of connection status to system power.
4. Design and configuration as shown in the Drawings.
5. The Auxiliary Control Console shall include a vinyl dust cover or case lid as appropriate, and one (1) 25-foot multi-conductor cable terminating in a locking connector appropriate for mating with Control Receptacle Panels as required by the Drawings.

E. Entry Panels

1. All panels shall employ a multiplexed control signal.
2. Panels shall be mounted as shown in the Drawings and Schedules, and completely wired internally, with terminals of the proper rating for all external wiring.
3. The face of the panel shall contain momentary contact pushbutton switches or faders. Quantity, labeling, and circuits controlled per Drawings.
4. Enclosed entry panels.
    a. The face of the panel shall be recessed and covered by a hinged latching cover with a clear view panel.
    b. All entry panel enclosures mounted in audience areas shall be custom color per the Architect’s specifications. All faceplates to complement enclosure color with a color from manufacturer’s standard finish selections.
5. The panels shall retain their memory regardless of connection status to system power.
6. Install as shown in the Drawings.

F. All labels and legends shall be permanently engraved directly into the faceplate, or the surrounding faceplate of the panel's enclosure. Engravings shall be filled with paint of a contrasting color.

2.8 DIMMER RACKS

A. Physical requirements

1. The Dimmer Racks shall be floor supported, substantially framed, and enclosed with sheet metal panels. Access for installation and maintenance shall be provided through the front of the rack. All parts shall be properly cleaned prior to painting and then painted with a rust inhibiting primer. The finish paint shall be baked enamel. Each rack section shall not exceed 25" wide, 26" deep, and 86" high.
2. The racks shall be mounted using one of the vibration isolation methods noted below and as shown in the Drawings:
    a. Waffle type neoprene vibration padding, Mason Industries type WSW, with a hardness of 40-50 Duro, consisting of two (2) pads mounted on the sides of a metal shim. Each corner of each rack shall contain one (1) WSW pad mounted to the frame to distribute the load from the corner of the frame.
    b. Cone type neoprene vibration padding, Mason Industries type ND-B, with a hardness of 40-50 Duro. Each corner of each rack shall contain (1) pad bolted to the rack. The racks shall be braced laterally by a cone type neoprene deflection mounting, Mason Industries type BR, with a hardness of 40-50 Duro. Rack shall be bolted to deflection mounting. Deflection mount shall be bolted to a support at the dimmer room wall.

3. No portion of the dimmer rack shall contact any part of the building structure or walls except through resilient connections specifically approved by the theatre consultant.
4. Each dimmer space and control module space shall have guides for ease of insertion and withdrawal of the dimmer and control modules for maintenance.
5. Each dimmer space shall be clearly labeled with circuit/dimmer number and channel number such as “HL-xx.” For dimmer spaces that have channel numbers, such as worklight and house light circuits provide both the channel number and the dimmer number, e.g. “WL-XX/YYY”, where “YYY” is equal to the circuit/dimmer number of that space.
6. All connections and test points shall be accessible through the front of the rack.
7. The rack shall incorporate a front locking door to cover all user-operable portions of its components.
8. An engraved lamicoid label shall be bolted or riveted to the front of the rack, to read:

DIMMER RACK (Number)
DIMMERS (Beginning no.)—(End no.)/
CHANNEL NUMBER (Beginning no.)-(End no.)
Schuler Shook Theatre Planners, Chicago, IL
(Year of Commissioning)

B. Electrical requirements

1. The Dimmer Racks shall be designed to operate at a voltage of 120/208 volts, 60 Hz, 3-phase 4-wire, with the main busses of each rack sized for maximum full loading of all contained dimmers.
2. The Dimmer Racks shall be completely wired internally, and terminals of the proper rating shall be provided for all external connections. Each terminal shall be clearly and permanently marked and numbered.
3. Each dimmer space shall include factory wired, heavy duty, free floating female power and control jacks to ensure proper seating of the dimmer module male pins when the dimmer is inserted.
4. In order to protect control components from a catastrophic failure of voltage isolation at the dimmer module, the Dimmer rack shall incorporate isolation between control voltage of all control devices and line voltage of dimmers. Isolation shall be in excess of 2500 volts RMS. This isolation shall be in addition to any isolation provided in each dimmer.

C. Electronic requirements

1. Each rack shall include a solid-state interface system capable of translating the multiplexed information format from the Control Console, to a signal for driving the Dimmer Modules.
2. Each rack shall include control electronics to govern the output voltage of the dimmers. The Dealer shall adjust the output voltage to provide 115 volts at each stage circuit receptacle supplied by that rack.
3. Each rack shall include storage of a minimum of thirty-two (32) user-defined dimmer states for backup. Backup states shall be activated by user at the rack.

D. Thermal requirements

1. Forced air ventilation shall be provided by low-noise fans in each rack. These fans shall keep the dimmers within safe operating temperature.
2. Each rack shall contain an electronic system to monitor the temperature within the rack. This system shall shut down the rack and activate a warning light on or near the Control Console should the safe operating temperature of the rack be exceeded.

E. Install as shown in the Drawings.

F. Provide and deliver to Owner spare modules of each module type in the rack. See Schedule of Quantities.

G. To ensure proper air ventilation, provide and install blank filler modules in all unfilled dimmer module spaces. Provide placard on inner face of each dimmer rack door, reading, “CAUTION—FILL ALL EMPTY RACK SLOTS WITH BLANK MODULES. DO NOT OPERATE DIMMERS UNLESS ALL SLOTS ARE FILLED.”

2.9 RACK MOUNTED DIMMERS

A. Acoustical requirements

1. 500µs SCR DIMMERS
   a. Dimmers shall be equipped with firing circuitry and filtering designed to reduce "filament sing" attributable to rapid SCR switching of the AC waveform. Rise time shall not be less than 500 microseconds measured at 90-degree conduction angle, at the dimmer's full rated load.
   b. Acoustical performance criteria: accumulated filament noise levels measured at a distance of 10'-0” from any fixture shall not exceed 20 dBA with any loading and at any dimming level.

B. Physical requirements

1. Dimmer Modules shall be of the plug-in drawer type, designed for insertion into and removal from the Dimmer Rack without the use of tools. A substantial handle shall be provided in the face of each module.
2. Each Dimmer shall be plainly identified with the Manufacturer's name and address, dimmer rating in amperes and volts, and catalog identification. Dimmers shall each bear an individual serial number for identification.

C. Electrical requirements

1. The Dimmer Module shall be designed to operate at a nominal line voltage of 120 volts, 60 Hz.
2. The faceplate of each module shall include fully magnetic circuit breakers to serve as disconnecting devices and to provide branch circuit protection.
3. Each module shall be completely factory wired, with power and control connections between the Dimmer Module and the Dimmer Rack provided

through permanently installed, oversized, self-aligning connectors located at the rear of the module.

4. Each module shall meet or exceed the characteristics defined in NEMA-410-2015 Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts.

D. Electronic requirements

1. SCR Dimmers

a. Dimmers shall be solid state, utilizing two silicon-controlled rectifiers (SCR) in a back-to-back electrical configuration, which provides, at all times, a symmetrical alternating current output. The full load of the circuit shall be carried and controlled solely by the SCRs.
b. Each dimmer shall include an integral inductive toroidal filter to reduce the rate of current rise resulting from the SCR switching, to isolate the dimmer from the AC line to prevent interaction with other dimmers, and to limit conducted radio frequency interference.
c. Power efficiency shall exceed 90% at any voltage and at any load.

E. Thru-Power Modules

1. The module shall provide a single module which allows the choice between dimmed, non-dim or hot power on each circuit in the module.
2. Module, when in dimmer mode, shall provide 500μs rise time response subject to the requirements of this article.
3. Module shall provide two air gap relay switches outputs controlled by the control system
4. Module shall provide two manual bypass constant power circuits controlled manually.

2.10 EMERGENCY LIGHTING TRANSFER SWITCH

A. The Emergency Lighting Transfer Switch shall be designed to operate at a nominal voltage of 120/208 volts, 60 Hz., fed from the building emergency system.

B. The transfer system shall be UL 1008 listed for Emergency Use.

C. The operation of the Emergency Lighting Transfer Switch shall be as follows:

1. The transfer switch shall employ integral "break-before-make" relays to switch power to the emergency lighting circuits between the stage dimmer feed and emergency feed.
2. The transfer shall incorporate relays that transfer the emergency lighting circuits to the emergency power system if the normal power to the Dimmer Rack is interrupted. A power sensing circuit shall determine when normal power to the Dimmer Rack has been interrupted.
3. The transfer shall automatically transfer the emergency lighting circuits to the main Dimmer Rack when the normal power to the rack is restored.

4. Approved Systems:
    a. "UC700" by Union Connector Co., Inc., Roosevelt, New York
    b. “ELTS2” by Electronic Theatre Controls, Middleton, Wisconsin
    c. Or approved equal.

D. Install as shown on the Drawings.

2.11 EMERGENCY BYPASS DETECTION KIT

A. Where required to detect the loss of normal power and trigger special-purpose lighting presets, the detection means shall be the Emergency Bypass Detection Kit as manufactured by Electronic Theatre Controls, Inc., or equal.

B. Mechanical

1. The Kit Enclosure shall be a surface mounted, constructed of 16-gauge, formed steel panels with a removable front cover.
2. The Emergency Bypass Detection Kit shall include a 3-pole, 10 amp breaker for local over-current protection and simulation of normal power loss.
    a. The enclosure shall have a lockable door to allow limited access to the over-current protection breaker
3. All components shall be properly treated and finished.
    a. Exterior surfaces shall be finished in fine textured, scratch-resistant, powder coat paint
4. The EBDK enclosure shall provide discrete high and low voltage wiring compartments with voltage barrier.

C. Accessories

1. Emergency Bypass Detection Tap Kit (EBDK-TAP)
    a. The Emergency Bypass Detection Kit shall support an optional tap kit for normally power loss sensing within an ETC Unison DRd Enclosure
    b. The Tap Kit shall provide fused over-current protection for sense feed wiring without the need for an external circuit breaker
    c. The Tap Kit shall install within an ETC Unison DRd Enclosure

D. Electrical

1. Emergency Bypass Detection enclosures shall support 100 to 277 volt configurations
    a. EBDK enclosures shall be field configurable for single-phase, bi-phase, and three-phase operation without the need for additional components.
2. Phase Loss Detection circuitry shall provide 0.5 second delay to prevent nuisance tripping

3. The EBDK shall provide an integrated circuit breaker for over-current protection and simulation of normal power loss
4. The Emergency bypass detection Kit shall support isolated outputs for connection to multiple dimming products simultaneously
    a. Three isolated contacts shall be provided
    b. Each contact shall support connection of up to four dimming products.
5. The Emergency Bypass Detection Kit shall be completely pre-wired by the manufacturer. The contractor shall provide input feed and control wiring.
6. All control wire connections shall be terminated via factory provided connectors.
    a. Factory provided connector shall support 12 to 22-gauge wiring
    b. Emergency lighting input shall support load shedding
7. The Bypass Detection Kit shall prove a normally-closed input for interface with fire alarm systems
8. The Bypass Detection Kit shall be UL and cUL Section 924 Listed for interaction with similarly listed dimming and switching panels

E. Install as shown in the Drawings.

F. Quantities per Drawings & Schedules.

2.12 DMX EMERGENCY BYPASS CONTROLLER

A. Functional

1. The DMX Emergency Bypass Controller shall be capable of overriding a single universe of ANSI E1.11–2008, USITT DMX512-A control signals from “Normal” to “Bypass” when a trigger signal is detected via a contact closure trigger input
    a. The DMX Emergency Bypass Controller shall output to a single DMX output or up to six optically-isolated DMX outputs
    b. The DMX Emergency Bypass Controller shall poll the bypass trigger input after a power loss and react upon start up
    c. The default or recorded preset shall be recalled immediately on restart if the trigger is also applied at restart
2. The DMX Emergency Bypass Controller shall be capable of recording a single DMX preset (snapshot) of 512 channels for recall during “Bypass” mode
3. The DMX Emergency Bypass Controller (DEBC) shall have internally accessible, labeled DIP switches for configuration of:
    a. DMX Record Mode
        i. All 512 channels (default)
        ii. Selected channels, snapshot
    b. Contact input type
        i. Normally open (default)
        ii. Normally closed

c. Wait Time for Restore incoming DMX (bypass trigger removed)

i. 0 Seconds (default)
ii. 10 Second Wait
iii. 30 Second Wait
iv. 10 Minute Wait

4. The DMX Emergency Bypass Controller shall support a single bypass input using two input modes:

a. Bypass triggering shall be supported via a maintained contact input configurable for normally open (N.O.) or normally closed (N.C.) operation
b. The contact input shall support +12VDC wet input to provide interface with fire alarm or secondary trigging systems. Bypass controllers that do not support a fire alarm input shall not be acceptable.

B. Mechanical

1. The DMX Emergency Bypass Controller (DEBC) enclosure shall be a surface mounted enclosure with a removable cover, constructed of 16-gauge, formed steel with a removable front cover

a. All components shall be properly treated and finished in fine textured, scratch-resistant, powder coat paint
b. DEBC enclosure shall have a minimum of four keyed mounting holes for wall attachment
c. DEBC enclosure shall have a visible label stating the product name, manufacturer name, indicator functions, control functions, ratings and listings

2. The DMX Emergency Bypass Controller (DEBC) enclosure shall provide discrete high and low voltage wiring compartments with voltage barrier
3. The DMX Emergency Bypass Controller (DEBC) shall have a single bi-color LED indicator visible from the exterior of the enclosure

a. LED shall indicate Normal state with a “green” color light

i. Normal state illuminates steady green when Power and DMX are present
ii. LED Off indicates Power or DMX are not present

b. LED shall indicate Bypass state with a “red” color light

i. Bypass state includes bypass input contact trigger or ‘test’ active

4. The DMX Emergency Bypass Controller (DEBC) shall have a single test button accessible from the front of the enclosure without removing any panels

a. The test button shall immediately trigger bypass state for as long as it is held down, and release the bypass state immediately upon release of the button

i. The test button shall be momentary only
ii. The test button shall be recessed to prevent accidental triggering

5. The DMX Emergency Bypass Controller (DEBC) shall have a single, internally accessible button for DMX Record (snapshot) with an indicator LED for record action
    a. The record button shall be momentary only and held for at least 3 seconds before activation to prevent accidental recording
    b. The LED indicator will flash rapidly when record function is active
    c. The LED indicator will illuminate steady when record function is complete

C. Electrical

1. The DMX Emergency Bypass Controller shall be completely internally pre-wired by the manufacturer
2. The contractor shall provide input feed and control wiring to the provided terminals
    a. DMX Emergency Bypass Controllers (DEBC) shall support 100 to 277 volt input power, 50/60 Hz, 150mA maximum current
3. DEBC shall support labeled terminations for two 24 – 10 AWG solid or stranded power wires
4. DEBC shall support one Grounding Lug for 24-14 AWG solid or stranded ground wire
5. DEBC shall support labeled, socketed termination connections for DMX Input and DMX Output wiring
6. DEBC shall support labeled, socketed termination for the bypass contact input
    a. Termination shall support two, 30-12 AWG low-voltage wires
    b. The bypass input shall support a maintained normally open (N.O.) or normally closed (N.C.) dry contact input
    c. A +12VDC wet contact input shall also be available for interface to fire alarm systems.
    d. DEBC shall support socketed DMX transceiver chips
        i. A spare DMX transceiver chip shall be supplied in a labeled, inactive socket
7. The DMX Emergency Bypass Controller (DEBC) shall internally switch from the normal DMX input (pass through) to the bypass DMX output using electromechanical relays when triggered
    a. The DEBC shall have non-volatile memory for storage of a single recorded sequence of 512 channels
        i. The recorded sequence shall persist through power outages
        ii. The default sequence shall have all 512 channels at “full” if no sequence is recorded
    b. The DEBC shall have a DMX baud rate of “Slow” (20 packets per second) for increased compatibility during bypass DMX output
8. The DEBC shall be available in two versions capable of output to a single DMX line or up to six optically-isolated DMX lines

9. The DMX Emergency Bypass Controller shall be UL and cUL Section 924 LISTED for interaction with similarly listed products

D. Install as shown in the Drawings.

E. Quantities per Drawings & Schedules.

2.13 STAGE LIGHTING CONNECTORS

A. Two Pin and Ground

1. 20-Ampere devices.
   a. Connectors shall be 20-ampere slip pin, 2 wire plus ground, with integral strain relief.
   b. Unless otherwise noted provide transparent plastic covers
   c. The following manufacturer's devices shall be acceptable:
      i. Union Connector
      ii. Marinco Bates® Plug
      iii. LEX Products

B. TWIST-LOCK

1. 20-Ampere devices
   a. Connectors shall be 20 ampere, 2 wire plus ground, locking, with nylon bodies and casings, and integral cable clamp. Configuration shall be NEMA L5-20.
   b. The following manufacturer's devices shall be acceptable:
      i. Hubbell
      ii. Leviton

C. 20-ampere 6-circuit multi-pin

1. A threaded coupling 19-pin cylindrical connector for theatrical lighting applications
2. All multi-conductor connectors shall be wired in accordance with the recommended practice RP-1 as published by the U. S. Institute for Theatre Technology.
3. The following manufacturer's devices shall be acceptable:
   i. Veam
   ii. Socapex
   iii. LEX Products

4. All products shall be compatible with Socapex 419 Series connectors.

D. SINGLE POLE LOCKING CONNECTORS

1. Connectors shall be 400 ampere, single wire, locking with Thermoplastic Elastomer casing, with nylon retaining screw. Body shall be brass with double set screw termination. Configuration shall be compliant with UL 1691.
2. Connectors shall accept wire sizes from 4∅ to 2∅.
3. Acceptable Products:
   a. Hubbell Single Pole Devices
   b. Crouse-Hinds Cam-Lok
   c. Leviton Rhino-Hide

E. Quantities per Drawings & Schedules.

2.14 WIRING DEVICES

A. General Requirements

1. All device number and letter labeling shall be provided with matching character fonts.
2. 20-ampere pigtails shall be 12-3 type S cord, length per Drawings, secured by cushioned strain reliefs or nylon "Heyco" bushings.
3. Connectors for circuits other than standard 20-amp stage circuits shall have covers that correspond to the label color.
4. Device labeling
   a. Plug Strips circuit numbers shall be painted onto both sides of the wireway in letters not less than 1-1/2 inches high, using white epoxy paint for standard 20-amp stage circuit numbers and epoxy paint, color as noted, for all other numbers per the Drawings.
   b. Circuit numbers on all other devices shall be engraved into the face plate in letters not less than one inch high and filled with white epoxy paint for standard stage circuit numbers and epoxy paint, color as noted, for all other numbers per the Drawings.
5. All multi-pin receptacles shall include a removable threaded cover with retaining chain.
6. Receptacle configuration as shown in the Drawings.
7. Exterior finish shall be flat black baked enamel (for steel) or black anodized (for aluminum) unless noted otherwise.
8. Devices with multiple voltages shall provide continuous voltage barriers separating each voltage.
9. All components requiring external electrical connections of more than eight (8) conductors shall include barrier-type terminal strips properly sized and permanently labeled.
   a. For drop boxes the terminal strips shall be sized to accept a range of wire from #10 to 12.
   b. For all other devices the terminal strips shall be sized to accept a range of wire from #12 to #6

10. Units shall be UL listed and carry a UL label.

B. Plug boxes

1. Plug boxes shall be constructed of 16-gauge steel or extruded aluminum. Knockouts shall be provided on all sides of the back box.

C. Drop boxes

1. Drop boxes shall be portable, entirely enclosed, and constructed of 16 gauge steel or extruded aluminum. End plates shall be filleted to prevent any sharp edges. The bottom shall contain two C-clamps and one load rated eyebolt with 11/16” i.d. eye for attachment to pipe batten. The offstage side shall contain "Kellems" type mesh grips to support the entrance of the multi-conductor cable.

D. Gridiron junction boxes

1. Gridiron junction boxes shall be constructed of 20-gauge steel.
2. Exterior finish shall include safety yellow stripes.
3. Access shall be by means of a removable cover plate. Knockouts shall be provided in all sides for contractor wiring and multi-conductor cables.
4. Each flexible cable entry shall have a "Kellems" type mesh grip attached to the box.

E. Multi-conductor cables

1. Cables shall be rated at 600 volts, minimum 90 degrees Celsius, with two (2) conductors for each 20-ampere circuit required plus one grounding conductor for every three (3) circuits.
2. Permanently installed cables shall be cord type SC or SO.
3. Portable cables shall be cord type SC.
    a. Approved Manufacturers:
        i. “Pro Cable” as manufactured by TMB, Burbank, CA.
        ii. “PowerFlex” as manufactured by LEX Products, Stamford, CT.
        iii. Coast Entertainment, a division of Coast Wire & Plastic Tech, Inc., Carson, CA
        iv. or approved equal.
4. Wire size shall be minimum #12 AWG, or larger as code requirements dictate.
5. Sizes and lengths as indicated in the Drawings and schedules.

F. Locations, quantities, sizes and circuits as shown in the Drawings.

G. Install as shown in the Drawings.

2.15 SCHEDULE OF QUANTITIES

Section		Description	Quantity
2.2		Network Data system	as required
	L	Network patch cables	8 additional
2.3		Signal Processing Rack	per Drawings
2.4		Centralized DMX Distribution	per Drawings
2.5		Distributed DMX Driver	per Drawings
2.6		Control Receptacle Panels	per Drawings
2.7	D	Auxiliary Control Console, cable, and dust cover	1
	E	Stage Manager Panel	per Drawings
	F	Entry Panels	per Drawings
2.8		Dimmer Racks	as required
	F	Spare dimmer rack components:	
		Control Electronics Module	1 set
		Dual 2.4kW dimmer module	1 set
		Thru-Power Module	1 set
2.9		Dimmers	per Drawings
	E	Thru-Power module	per Drawings.
2.10		Emergency Lighting Transfer Switch	per Drawings
2.11		Emergency Bypass Detection Kit	per Drawings
2.12		DMX Emergency Bypass Controller	per Drawings
2.14		Wiring Devices	per Drawings

PART 3 – EXECUTION

3.1 FABRICATION

A. Racks and cabinets shall be welded assemblies of sheet steel or aluminum or bar size angles, channels, and tees or aluminum extrusions forming rigid enclosures to support internal components.

B. Operating elements shall be mechanically safe and electrically "dead."

C. All steel parts and panels shall be cleaned and primed with rust inhibiting primer. Exterior finishes shall be epoxy resin or baked enamel in matte black, or in Manufacturer's standard color where not specified.

D. All internal wiring shall be factory completed. All wiring shall be in harnesses and bound. No loose or randomly routed wires shall be permitted.

E. All wire sizes and insulations shall comply with NEC, UL, and local codes and meet or exceed electronics industry standards.

3.2 PACKING AND SHIPPING

A. Equipment shall be wrapped and sealed in polyethylene and substantially crated for shipment. Crates shall clearly indicate equipment contained, nature of components, and theatre site allocation.

B. Electronics shall be packages and shipped in dust and static proof packaging.

C. All materials shall be delivered to the site in clean, undamaged operational condition.

3.3 INSTALLATION

A. Install all items in conformity with Project Documents, standard trade practices and Manufacturer's recommendations.

B. Consult and coordinate work with trades doing adjoining work.

C. Position all items accurately as indicated in the Drawings, and true to plumb line and level. Maintain maximum headroom and clearance at all points.

D. Do not uncrate, unpack, unwrap, or install control console, video monitor(s), remote controls, or other auxiliary control components until construction is complete and environment is clean and dust-free.

3.4 SYSTEMS INTEGRATION AND PROGRAMMING

A. Stage Lighting Dealer shall provide addressing for all LED fixtures and any other DMX controlled fixture. Stage Lighting Dealer to provide Division 26 contractor a list of DMX address numbers prior to installation of fixtures. At time of commissioning Stage Lighting Dealer to patch all DMX controlled fixtures and test to ensure proper functionality.

B. Stage Lighting Dealer, at the direction of Theatrical Consultant and/or owner’s representative, will adjust all programmable components of the lighting and control system to meet the design intent of the project. Programmable devices include lighting controls (including the layout and design of all touchscreen control panels), addressable lighting fixtures, and user interfaces.

END OF SECTION 26 09 61

BG1 BP02 SCOPE OF WORK FOR GENERAL TRADES – 2020 SUMMER CAPITAL PROJECTS - SOUTH HIGH SCHOOL

Scope – This TRADE CONTRACTOR's scope shall include but not be limited to the scope listed below. Please see entirety of bid documents for all scope requirements.

1. This TRADE CONTRACTOR shall reference ALL General, Existing, Architectural Demolition, Architectural, Mechanical, Plumbing, Electrical, as they relate to **GENERAL TRADES**. This TRADE CONTRACTOR shall read all Notes and General Notes included in the drawings as they pertain to this scope of work. This TRADE CONTRACTOR shall review the project SCHEDULE included in this project manual and provide sufficient manpower to complete this TRADE CONTRACTOR's scope of work within the designated durations provided.

2. This TRADE CONTRACTOR shall be responsible for furnishing and installing all materials, skilled and/or licensed labor, equipment, tools, etc. to complete all aspects of this TRADE CONTRACTOR's work including All Architectural Demo, Rough Carpentry, Finish Carpentry, Joint Sealants, Caulking, Penetration Firestopping, Fire-Resistive Joint Systems, all required plywood backing (structural or non-structural) all blocking, Metal Studs and Drywall, Roller shades, all Flooring, all Ceilings and soffits, casework, etc. This Scope of work includes everything outside of the Mechanical, Electrical and Plumbing Scope of Work.

   NOTE: This TRADE CONTRACTOR is responsible for all Flooring.

   NOTE: This TRADE CONTRACTOR is responsible for all Casework.

   NOTE: This TRADE CONTRACTOR is responsible for all ACT.

   NOTE: This TRADE CONTRACTOR is responsible for all Roller Shades/Window Treatments.

   NOTE: This TRADE CONTRACTOR shall be responsible for a Painting.

   NOTE: This TRADE CONTACTOR is responsible for all Architectural Demolition per General and Key notes on AD2.01.d. Including all Dumpsters.

   NOTE: This TRADE CONTRACTOR is responsible for all Cold formed metal framing, light gauge metal framing, gypsum board sheathing and accessories, gypsum board reveals, casework & countertops.

   NOTE: This TRADE CONTRACTOR shall be responsible for any insulation U.N.O. in this document.

3. This TRADE CONTRACTOR is to furnish and install any blocking and/or backing mounted to walls or installed in stud walls needed to support casework, shelving, storefront, curtainwall system, windows, window sills, metal panels, IDF racks, AV racks, countertops, etc. as indicated on plans. Any blocking not indicated on plans required for support of casework/millwork, visual displays, roller shades, etc., is to be included in this TRADE CONTRACTOR's cost.

ALLOWANCES, BOND, & ALTERNATES

4. This TRADE CONTRACTOR **shall include an allowance of $10,000.00 in their base bid** to account for any Unforeseen Conditions, Additional Temporary / Safety Enclosures, Winter Conditions and General Labor. Contract amounts will be adjusted by change

Initials: _____ / _____

order for amounts greater or less than the allowance. Allowance to be utilized only at the direction of Construction Manager.

5. This TRADE CONTRACTOR will be required to provide a Performance and Payment Bond for their work in accordance with 002010 of the General Conditions.

ACCEPTANCE

Accepted as listed above in addition to terms and conditions of the original construction documents on which the bid was based.

Company: Wight Construction Services, Inc.
2500 North Frontage Road
Darien, IL 60561

Signed: _____

Printed Name: _____

Position: _____

Date: _____

END OF SECTION 00300 –Scope

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

EPANL LED

1'x4', 2'x2', and 2'x4'

FEATURES & SPECIFICATIONS

INTENDED USE — The EPANL Series LED Edge-Lit Flat Panel provides a fully luminous appearance across the face of the lens. This provides a soft, glare-free solution that is visually comfortable within the space. Suitable for many lighting applications including schools, offices and other commercial spaces, retail, convenience stores, hospitals and healthcare facilities. **Certain airborne contaminants can diminish the integrity of acrylic and/or polycarbonate.** **Click here for Acrylic-Polycarbonate Compatibility table for suitable uses.**

CONSTRUCTION — Built to last with an aluminum frame for strength and durability, the seamless frame prevents light leak in the corners. The satin white lens provides excellent shielding and fully luminous appearance. EPANL's low-profile design provides increased installation flexibility especially in restricted plenum spaces. The back plate includes integral T-bar clips for installation into 15/16" T-grid ceilings. Clips for 9/16" T grid installation are available. See Accessories section on bottom of page. This must be ordered as a separate item. Fixture may be mounted and wired in continuous rows.

CONTROLS — Optional integrated nLight®controls make each luminaire addressable - allowing it to digitally communicate with other nLight enabled controls such as dimmers, switches, occupancy sensors and photocontrols. Connection to nLight is simple. It can be accomplished with integrated nLight AIR wireless or through standard Cat-5 cabling. nLight offers unique plug-and-play convenience as devices and luminaires automatically discover each other and self-commission, while nLight AIR is commissioned easily through an intuitive mobile app.

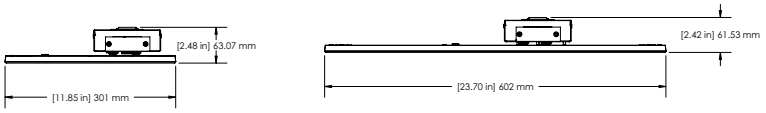
ELECTRICAL — Long-life LEDs, coupled with a high-efficiency driver, provide superior illumination for extended service life. 70% LED lumen maintenance at 60,000 hours (L70/60,000). 0-10V dimming driver, dims to 1% or 10%.

LISTINGS — CSA certified to meet US and Canadian standards. DesignLights Consortium® (DLC) Premium qualified product and DLC qualified product. Not all versions of this product may be DLC Premium qualified or DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified. Intended for indoor use only. Damp location listed. IC rated. IP5X rated.

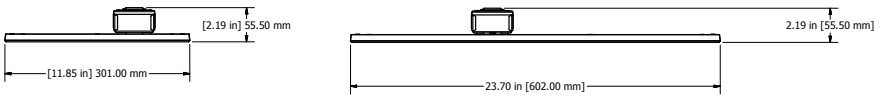
WARRANTY — 5-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

Configurable fixture dimension



Stock fixture dimension



ORDERING INFORMATION Lead times will vary depending on options selected.

Example: EPANL 2X4 4000LM 80CRI 35K MIN1 MVOLT E10WCP NLTAIR2 RIO

Series	Width and Length	Lumens		CRI	Color Temperature	Minimum Dimming Level[1]
		Standard Lumens:	High Efficiency Lumens:			
EPANL LED Flat Panel	1x4 1'x4'	1500LM 1500 Lumens 3000LM 3000 Lumens 4000LM 4000 Lumens 4800LM 4800 Lumens 6000LM 6000 Lumens	4000LMHE 4000 Lumens	80CRI 80 CRI	35K 3500K 40K 4000K 50K 5000K	MIN10 Dims to 10%[2] MIN1 Dims to 1%
	2x2 2'x2'	2000LM 2000 Lumens 3400LM 3400 Lumens 4000LM 4000 Lumens 4800LM 4800 Lumens	3400LMHE 3400 Lumens			
	2x4 2'x4'	3000LM 3000 Lumens 4000LM 4000 Lumens 4800LM 4800 Lumens 5400LM 5400 Lumens 6000LM 6000 Lumens 6800LM 6800 Lumens	4000LMHE 4000 Lumens			

Ordering continued on next page.

ORDERING (continued)

Control Input[3]		Voltage		Step Level Dimming		Emergency Option		nLight Interface		Control	
ZT	Generic 0-10V Dimming	MVOLT	120-277V	(Blank)	None	E10WCP	EM Self-Diagnostic battery pack, 10W Constant Power, Certified in CA Title 20 MAEDBS[7,8,9]	nLight Wired:[12]		nLight Wired:[12]	
EZT	eldoLED 0-10V Dimming	120	120V	SLD	Step Level Dimming[5,6]	BGTD	Bodine Generator Transfer Device[10]	(blank)	No constant lumen management	(blank)	no control
NLIGHT	nLight enabled (Wired)	277	277V			EMG	for use with nLight on generator supply EM power[11]	CL80	Constant lumen output 80%		
		347	347V[4]					nLight Wireless:		nLight Wireless:	
								NLTAIR2	nLight AIR Generation 2 enabled[13]	RIO	nLight AIR Radio module

Options			
GLR	Fast-blowing fuse[14]	PWS1856LV	6' pre-wire, 3/8" diameter, 18 gauge, 1 circuit w/low voltage purple and grey wires[14]
GMF	Slow-blowing fuse[14]	CP	Chicago plenum[16]
PWS1836	6' pre-wire, 3/8" diameter, 18 gauge, 1 circuit	RRL_	RELOC®-ready luminaire
PWS1846	6' pre-wire, 3/8" diameter, 18 gauge, 2 circuit	NPLT	Narrow Pallet
PWS1846 PWSLV	Two cables: one 6' pre-wire, 3/8" diameter, 18 gauge, 2 circuits; one 6' pre-wire, 3/8" diameter, 18 gauge, purple and gray[15]		

Notes:
1. If Step Level Dimming (SLD) is needed please leave this section blank.
2. Not available with EZT or NLIGHT.
3. If Step Level Dimming (SLD) or NLTAIR2 is needed please leave this section blank.
4. Not available with EZT, NLIGHT, SLD, Emergency options or Controls.
5. Not available with BGTD.
6. When using prewire option use PWS1846.
7. When using prewire option use PWS1846 or PWS1846 PWSLV.
8. Please refer to Emergency Battery Estimated Lumen section for lumen estimation. PS1055CP installed with lumen packages > 6000. PS1055LCP installed with lumen packages < 5400.
9. Not available with NLTAIR2 RIO in the 2X2 4800LM and 1X4 or 2X4 6000LM and 6800LM.
10. Requires BSE labeling, voltage must be specified (120, 277). Consult factory for options. Example: BGTD BSE10.
11. nLight EMG option requires a conection to existing nLight network. Power is provided from a separate nLight enabled fixture. Requires NLIGHT.
12. Requires NLIGHT control input.
13. Only available with MIN1 Minimum Dimming Level option.
14. Voltage must be specified (120, 277, 347).
15. Not available with nLight Wired / nLight Wireless
16. Not available with NLIGHT or NLTAIR2 RIO.

Stock Configurations available for shorter lead times:

ORDERING INFORMATION

Catalog Number	UPC	Description	Lumens	Color Temperature	CRI	Voltage	Wattage	Efficacy	Pallet Qty.	Standard Carton Qty.
EPANL 14 40L 35K	190887602739	1x4 Flat Panel	3905	3500K	>80	120-277V	38.6W	101	26	1
EPANL 14 40LHE 35K	190887602746	1x4 Flat Panel	3922	3500K	>80	120-277V	30.6W	128	26	1
EPANL 14 40L 40K	190887602753	1x4 Flat Panel	4397	4000K	>80	120-277V	38.5W	114	26	1
EPANL 14 40LHE 40K	190887602760	1x4 Flat Panel	3857	4000K	>80	120-277V	30.2W	128	26	1
EPANL 14 40L 50K	191723811605	1X4 Flat Panel	4225	5000K	>80	120-277V	38.6W	113	26	1
EPANL 22 34L 35K	190887602647	2x2 Flat Panel	3285	3500K	>80	120-277V	31.3W	105	52	1
EPANL 22 34LHE 35K	190887602661	2x2 Flat Panel	3357	3500K	>80	120-277V	26.0W	129	52	1
EPANL 22 34L 40K	190887602678	2x2 Flat Panel	3479	4000K	>80	120-277V	30.8W	113	52	1
EPANL 22 34LHE 40K	190887602685	2x2 Flat Panel	3361	4000K	>80	120-277V	25.9W	130	52	1
EPANL 22 34L 50K	191723811650	2x2 Flat Panel	3385	5000K	>80	120-277V	32.9W	102	52	1
EPANL 24 40L 35K	190887602692	2x4 Flat Panel	4039	3500K	>80	120-277V	38.8W	104	26	1
EPANL 24 40LHE 35K	190887602708	2x4 Flat Panel	3953	3500K	>80	120-277V	30.3W	130	26	1
EPANL 24 40L 40K	190887602715	2x4 Flat Panel	4351	4000K	>80	120-277V	38.9W	112	26	1
EPANL 24 40LHE 40K	190887602722	2x4 Flat Panel	4013	4000K	>80	120-277V	30.7W	131	26	1
EPANL 24 40L 50K	191723812312	2X4 Flat Panel	4108	5000K	>80	120-277V	39W	105	26	1

LED: One Lithonia Way Conyers, GA 30012 Phone: 800-858-7763 www.acuitybrands.com

Performance Data				
Configuration	**CCT**	**Lumens**	**Wattage**	**LPW**
EPANL 1X4 1500LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277] [ALL OPTIONS]	3500	1455	13.3	109.8
EPANL 1X4 1500LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	1455	12.2	118.9
EPANL 1X4 1500LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277] [ALL OPTIONS]	4000	1518	13.3	114.5
EPANL 1X4 1500LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	1518	12.2	124.0
EPANL 1X4 1500LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277] [ALL OPTIONS]	5000	1527	13.3	115.3
EPANL 1X4 1500LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	1527	12.2	124.8
EPANL 1X4 3000LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	2885	27.2	105.9
EPANL 1X4 3000LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	2885	25.8	111.6
EPANL 1X4 3000LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	3009	27.2	110.5
EPANL 1X4 3000LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	3009	25.8	116.5
EPANL 1X4 3000LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	3028	27.2	111.2
EPANL 1X4 3000LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	3028	25.8	117.2
EPANL 1X4 4000LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	4025	38.6	104.2
EPANL 1X4 4000LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	4025	38.0	105.9
EPANL 1X4 4000LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	4198	38.6	108.8
EPANL 1X4 4000LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	4198	38.0	110.5
EPANL 1X4 4000LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	4225	38.6	109.5
EPANL 1X4 4000LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	4225	38.0	111.2
EPANL 1X4 4800LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	4765	47.0	101.5
EPANL 1X4 4800LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	4765	46.3	103.0
EPANL 1X4 4800LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	4970	47.0	105.8
EPANL 1X4 4800LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	4970	46.3	107.4
EPANL 1X4 4800LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	5002	47.0	106.5
EPANL 1X4 4800LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	5002	46.3	108.1
EPANL 1X4 6000LM 80CRI 35K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	5804	49.9	116.4
EPANL 1X4 6000LM 80CRI 40K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	5976	49.9	119.9
EPANL 1X4 6000LM 80CRI 50K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	6028	49.9	120.9
EPANL 2X2 2000LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	1946	18.9	103.0
EPANL 2X2 2000LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	1946	17.3	112.2
EPANL 2X2 2000LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	2030	19.6	103.7
EPANL 2X2 2000LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	2030	17.3	117.1
EPANL 2X2 2000LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	2043	19.6	104.4
EPANL 2X2 2000LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	2043	17.3	117.8
EPANL 2X2 3400LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	3225	32.1	100.4
EPANL 2X2 3400LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	3225	31.2	103.4
EPANL 2X2 3400LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	3364	32.9	102.3
EPANL 2X2 3400LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	3364	31.2	107.9
EPANL 2X2 3400LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	3385	32.9	103.0
EPANL 2X2 3400LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	3385	31.2	108.6
EPANL 2X2 4000LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	4025	32.2	125.2
EPANL 2X2 4000LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	4025	31.7	127.1
EPANL 2X2 4000LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	4144	32.2	128.9
EPANL 2X2 4000LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	4144	31.7	130.8
EPANL 2X2 4000LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	4180	32.2	130.0
EPANL 2X2 4000LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	4180	31.7	132.0
EPANL 2X2 4800LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	4446	36.2	122.7
EPANL 2X2 4800LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	4446	35.7	124.6
EPANL 2X2 4800LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	4578	36.2	126.4
EPANL 2X2 4800LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	4578	35.7	128.3
EPANL 2X2 4800LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	4618	36.2	127.5
EPANL 2X2 4800LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	4618	35.7	129.4
EPANL 2X4 3000LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	2993	27.4	109.4
EPANL 2X4 3000LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	2993	26.0	115.3
EPANL 2X4 3000LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	3122	27.4	114.1
EPANL 2X4 3000LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	3122	26.0	120.3
EPANL 2X4 3000LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	3142	27.4	114.8
EPANL 2X4 3000LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	3142	26.0	121.1
EPANL 2X4 4000LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	3914	39.0	100.4
EPANL 2X4 4000LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	3914	38.4	101.9
EPANL 2X4 4000LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	4082	39.0	104.7
EPANL 2X4 4000LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	4082	38.4	106.3
EPANL 2X4 4000LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	4108	39.0	105.4
EPANL 2X4 4000LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	4108	38.4	106.9
EPANL 2X4 4800LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	4771	47.1	101.2
EPANL 2X4 4800LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	4771	46.4	102.7
EPANL 2X4 4800LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	4976	47.1	105.6
EPANL 2X4 4800LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	4976	46.4	107.2
EPANL 2X4 4800LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	5008	47.1	106.2
EPANL 2X4 4800LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	5008	46.4	107.8
EPANL 2X4 5400LM 80CRI 35K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	5143	51.4	100.1
EPANL 2X4 5400LM 80CRI 35K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	3500	5143	51.4	100.1
EPANL 2X4 5400LM 80CRI 40K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	5296	52.1	101.6
EPANL 2X4 5400LM 80CRI 40K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	4000	5296	51.4	103.1
EPANL 2X4 5400LM 80CRI 50K [MIN1, MIN10] [BLANK, ZT, EZT, NLIGHT] [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	5341	52.1	102.4
EPANL 2X4 5400LM 80CRI 50K [MVOLT, 120V, 277V] SLD [ALL OPTIONS]	5000	5341	51.4	104.0
EPANL 2X4 6000LM 80CRI 35K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	6369	54.0	118.0
EPANL 2X4 6000LM 80CRI 40K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	6558	54.0	121.5
EPANL 2X4 6000LM 80CRI 50K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	6615	54.0	122.6
EPANL 2X4 6800LM 80CRI 35K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	3500	6645	59.9	110.9
EPANL 2X4 6800LM 80CRI 40K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	4000	6842	59.9	114.2
EPANL 2X4 6800LM 80CRI 50K [MIN1, MIN10] ZT [MVOLT, 120, 277, 347] [ALL OPTIONS]	5000	6901	59.9	115.2

ACCESSORIES

Accessories: *Order as separate catalog number.*

DGA14	Drywall grid adapter for 1x4 recessed fixture.
DGA22	Drywall grid adapter for 2x2 recessed fixture.
DGA24	Drywall grid adapter for 2x4 recessed fixture.
PS1055CP FMC BRKT	Power Sentry emergency constant power battery pack field installation kit for Certified in CA Title 20 MAEDBS.[1]
2X2SMKSH	2'x2' Surface Mount Troffer Kit[1]
2X4SMKSH	2'x4' Surface Mount Troffer Kit[1]
1X4SMKSH	1'x4' Surface Mount Troffer Kit[1]
EPANL TGRID CLIP J4	Pack of 4 grid clips for 9/16" T grid compatibility.
EPANL TGRID CLIP J50	Pack of 50 grid clips for 9/16" T grid compatibility.
1X4PANLACG 36	Adjustable aircraft cable gripper suspension kit with 36" length cables for 1X4 fixture. Includes: suspension cables, mounting hardware, and 5 wire power feed cable (Ground, Hot, Neutral, and Low Voltage Leads).[2]
1X4PANLACG 72	Adjustable aircraft cable gripper suspension kit with 72" length cables for 1X4 fixture. Includes: suspension cables, mounting hardware, and 5 wire power feed cable (Ground, Hot, Neutral, and Low Voltage Leads).[2]
2X2PANLACG 36	Adjustable aircraft cable gripper suspension kit with 36" length cables for 2X2 fixture. Includes: suspension cables, mounting hardware, and 5 wire power feed cable (Ground, Hot, Neutral, and Low Voltage Leads).[2]
2X2PANLACG 72	Adjustable aircraft cable gripper suspension kit with 72" length cables for 2X2 fixture. Includes: suspension cables, mounting hardware, and 5 wire power feed cable (Ground, Hot, Neutral, and Low Voltage Leads).[2]
2X4PANLACG 36	Adjustable aircraft cable gripper suspension kit with 36" length cables for 2X4 fixture. Includes: suspension cables, mounting hardware, and 5 wire power feed cable (Ground, Hot, Neutral, and Low Voltage Leads).[2]
2X4PANLACG 72	Adjustable aircraft cable gripper suspension kit with 72" length cables for 2X4 fixture. Includes: suspension cables, mounting hardware, and 5 wire power feed cable (Ground, Hot, Neutral, and Low Voltage Leads).[2]

Emergency Battery Estimated Lumens

Use the formula below to estimate the delivered lumens in emergency mode

Estimated Lumens = 1.25 x P x LPW

P = Output power of emergency driver (10W for PS1055CP)

LPW = Lumen per watt rating of the luminaire.

SMKSH Accessory

Notes:
1. Cannot be installed with fixture with integrated NLTAIR2 RIO.
2. See Suspension Kits section on bottom of page 6 for additional detail.

nLight® Wired Control Accessories:
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight.

WallPod stations	**Model number**	**Occupancy sensors**	**Model number**
On/Off	nPODM [color]	Small motion 360°, ceiling (PIR / dual tech)	nCM 9 RJB / nCM PDT 9 RJB
On/Off & raise/lower	nPODM DX [color]	Large motion 360°, ceiling (PIR / dual tech)	nCM10 RJB / nCM PDT 10 RJB
Graphic touchscreen	nPOD GFX [color]	Wall switch with raise/lower	nWSX PDT LV DX [color]
Photocell controls	**Model number**	**Cat-5 cable (plenum rated)**	**Model number**
Full range dimming	nCM ADCX RJB	10' cable	CAT5 10FT J1
		30' cable	CAT5 30FT J1

nLight® AIR Control Accessories:
Order as separate catalog number.
Visit www.acuitybrands.com/products/controls/nlightair.

Wall switches	**Model number**
On/Off single pole	rPODB [color] G2
On/Off two pole	rPODB 2P [color] G2
On/Off & raise/lower single pole	rPODB DX [color] G2
On/Off & raise/lower two pole	rPODB 2P DX [color] G2
On/Off & raise/lower single pole	rPODBZ DX WH G2

rCMS[1] — **Example: RCMS PDT 10 AR G2**

Series / Detection	**Power Supply[1]**	**Occupancy Detection**	**Lens (Required)**	**Operating Mode**	**Generation**
RCMS nLight AIR occupancy and daylight sensor	[blank] Power Supply ordered separately	[blank] PIR Detection	10 Large Motion/ Extended Range 360°	[BLANK] None	G2 Generation 2 compatibility
	PS 150 Standard 150 mA Power Supply	PDT Dual Tech PIR/ Microphonics	9 Small Motion/ Extended Range 360°	AR Auxiliary Relay	
			6 High Bay 360° Lens		

Notes
1 RCMS requires low voltage power from either RPP20 DS 24V G2 or PS150.

nLight AIR Wireless

nLight AIR is the ideal solution for retrofit or new construction spaces where adding additional wiring can be labor intensive and costly. The integrated RIO module is part of each luminaire in the nLight AIR network, which can be grouped to control multiple luminaires.

Simple as 1,2,3

1. Install the nLight® AIR fixtures with integrated RIO module.
2. Install the wireless battery-powered wall switch.
3. With CL*AIR*ITY PRO app, pair the fixtures with the wall switch and if desired, add and customize the ceiling mount sensor settings.

EPANL LED Flat Panel

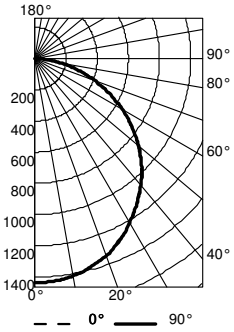
EPANL compatible with Sensor Switch™ WSX-D and SPOD wall switches.

WSX-D

SPOD

PHOTOMETRICS

EPANL 2x2 4000LM 80CRI 40K, 4144.5 delivered lumens.



CP Summary

	0°	90
0°	1433	1433
5°	1432	1431
15°	1385	1385
25°	1282	1285
35°	1136	1140
45°	964	968
55°	754	758
65°	529	528
75°	296	291
85°	85	80
90	4	3

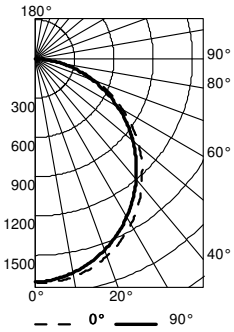
Coefficients of Utilization

	pf				20%							
	pc		80%			70%				50%		
	pw	70%	50%	30%		50%	30%	10%		50%	30%	10%
RCR	0	119	119	119		116	116	116		111	111	111
	1	108	104	99		101	97	94		97	94	91
	2	98	90	83		88	82	76		85	79	75
	3	90	79	71		77	70	63		74	68	62
	4	82	70	61		69	60	54		66	59	53
	5	75	62	53		61	53	46		59	52	46
	6	70	56	47		55	47	40		53	46	40
	7	65	51	42		50	42	36		48	41	35
	8	60	46	38		46	37	32		44	37	32
	9	56	43	34		42	34	29		41	34	28
	10	53	39	31		39	31	26		38	31	26

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1115	26.9	26.9
0° - 40°	1823	44.0	44.0
0° - 60°	3234	78.0	78.0
0° - 90°	4144	100.0	100.0
90° - 120°	1	0.0	0.0
90° - 130°	1	0.0	0.0
90° - 150°	1	0.0	0.0
90° - 180°	1	0.0	0.0
0° - 180°	4144	100.0	100.0

EPANL 2x4 4800LM 80CRI 40K, 4976.3 delivered lumens.



CP Summary

	0°	90
0°	1703	1703
5°	1707	1689
15°	1653	1610
25°	1535	1477
35°	1364	1300
45°	1154	1086
55°	903	851
65°	636	593
75°	354	335
85°	103	103
90	3	13

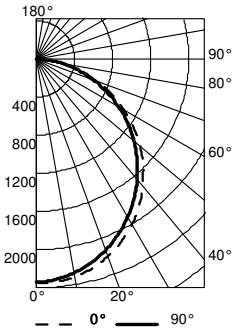
Coefficients of Utilization

	pf				20%							
	pc		80%			70%				50%		
	pw	70%	50%	30%		50%	30%	10%		50%	30%	10%
RCR	0	119	119	119		116	116	116		111	111	111
	1	108	103	99		101	97	93		97	94	91
	2	98	90	83		88	82	76		84	79	74
	3	90	79	70		77	69	63		74	68	62
	4	82	70	61		68	60	54		66	59	53
	5	75	62	53		61	52	46		59	51	46
	6	69	56	47		55	46	40		53	46	40
	7	64	51	42		50	41	35		48	41	35
	8	60	46	38		46	37	32		44	37	31
	9	56	42	34		42	34	28		41	33	28
	10	52	39	31		39	31	26		38	31	26

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1330	26.7	26.7
0° - 40°	2179	43.8	43.8
0° - 60°	3862	77.6	77.6
0° - 90°	4975	100.0	100.0
90° - 120°	1	0.0	0.0
90° - 130°	1	0.0	0.0
90° - 150°	1	0.0	0.0
90° - 180°	1	0.0	0.0
0° - 180°	4976	100.0	100.0

EPANL 2x4 6800LM 80CRI 40K, 6842.1 delivered lumens.



CP Summary

	0°	90
0°	2342	2342
5°	2347	2323
15°	2273	2214
25°	2111	2030
35°	1875	1788
45°	1586	1493
55°	1242	1170
65°	874	816
75°	487	461
85°	141	141
90	3	17

Coefficients of Utilization

	pf				20%							
	pc		80%			70%				50%		
	pw	70%	50%	30%		50%	30%	10%		50%	30%	10%
RCR	0	119	119	119		116	116	116		111	111	111
	1	108	103	99		101	97	93		97	94	91
	2	98	90	83		88	82	76		84	79	74
	3	90	79	70		77	69	63		74	68	62
	4	82	70	61		68	60	54		66	59	53
	5	75	62	53		61	52	46		59	51	46
	6	69	56	47		55	46	40		53	46	40
	7	64	51	42		50	41	35		48	41	35
	8	60	46	38		46	37	32		44	37	31
	9	56	42	34		42	34	28		41	33	28
	10	52	39	31		39	31	26		38	31	26

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1829	26.7	26.7
0° - 40°	2996	43.8	43.8
0° - 60°	5310	77.6	77.6
0° - 90°	6840	100.0	100.0
90° - 120°	1	0.0	0.0
90° - 130°	1	0.0	0.0
90° - 150°	1	0.0	0.0
90° - 180°	1	0.0	0.0
0° - 180°	6842	100.0	100.0

LED: One Lithonia Way Conyers, GA 30012 Phone: 800-858-7763 www.acuitybrands.com

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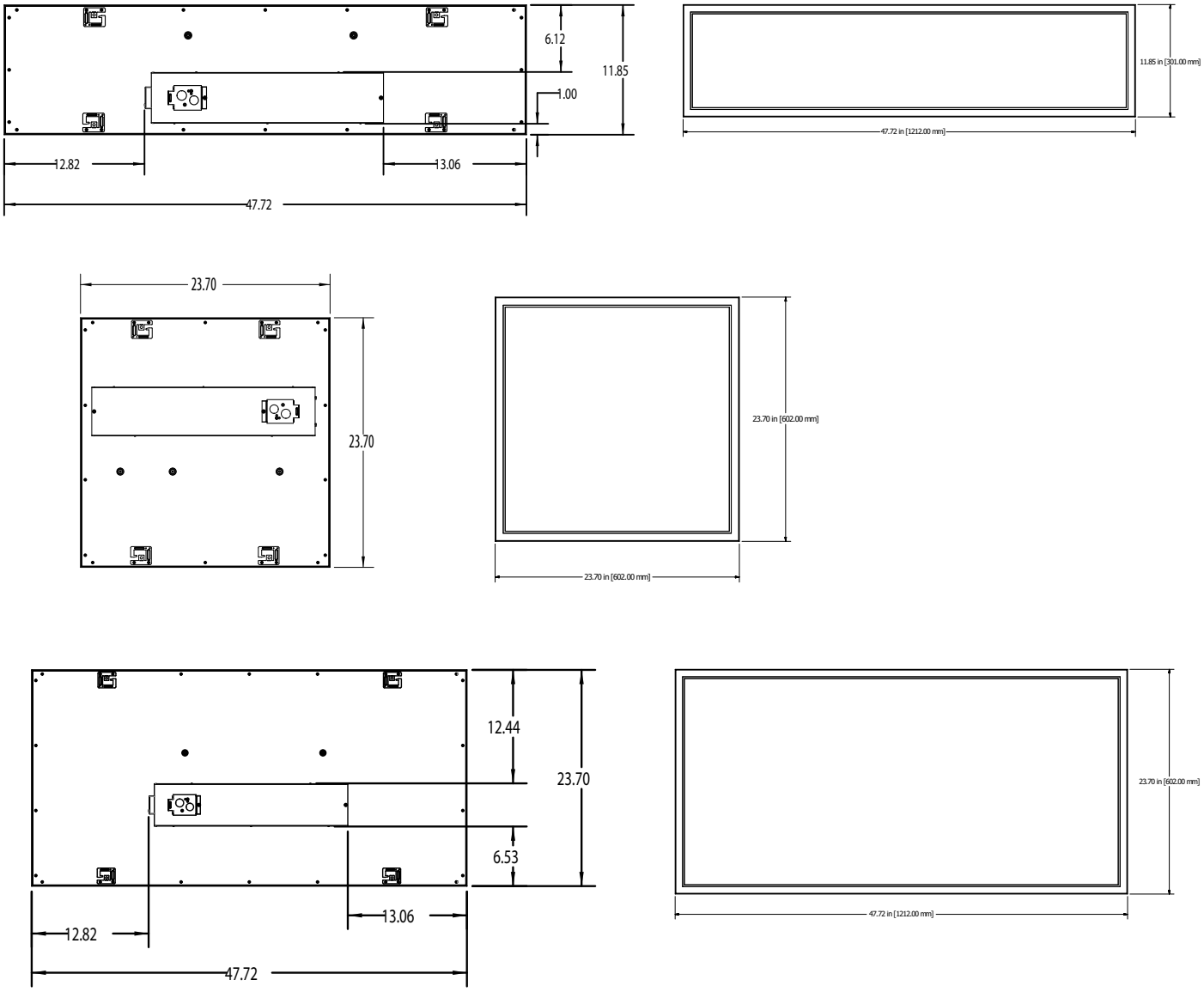
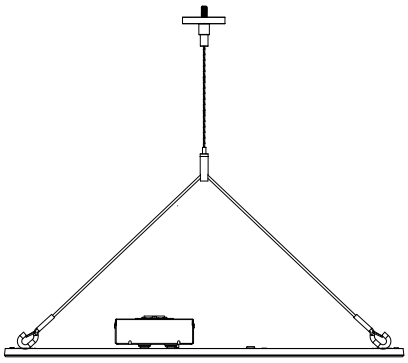
DIMENSIONS



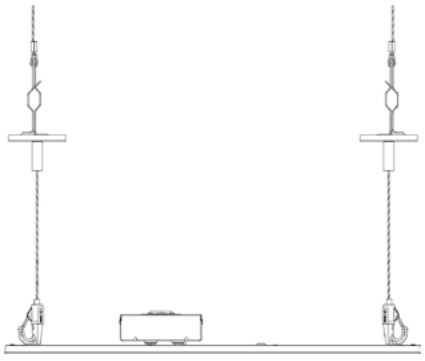
Suspension Kits

1X4PANLACG

2X2PANLACG



2X4PANLACG



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1X4SMKSH, 2X2SMKSH, 2X4SMKSH

SURFACE MOUNT KIT - MOUNTING DATA