Operation & Maintenance Manual ::

Project ID ::

LUTRON®

Complete LCP Series Manual

Warranty & Start-Up Information

Job Name:

Job Number:

Toll-Free 24/7 Technical Support Line: 1.800.523.9466

Field Service Scheduling 1.800.523.9466 ext.4439

02.17.09

Lutron Standard Limited Warranty

Applies to all Lutron Products that are not purchased with Lutron Services Co., Inc. start-up.

Limited Warranty

Lutron warrants each new unit to be free from defects in materials and workmanship and to perform under normal use and service.

Lutron will, at its option, repair or replace any unit that is defective in materials or manufacture within one year after purchase. For Lutron ballasts, Lutron will repair or replace any unit that is defective in materials or manufacture within three years after purchase.

THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES, AND THE IMPLIED WARRANTY OF MERCHANTABILITY IS LIMITED TO ONE YEAR FROM PURCHASE. THIS WARRANTY APPLIES ONLY TO LUTRON HARDWARE AND DOES NOT INCLUDE LUTRON SOFTWARE, LUTRON PROVIDED SYSTEM SERVERS, LAPTOPS, PDAS, OR COMPUTERS PURCHASED WITH LUTRON CONTROL SYSTEMS. THIS WARRANTY DOES NOT COVER THE COST OF INSTALLATION, REMOVAL, OR REINSTALLATION, OR DAMAGE RESULTING FROM MISUSE, ABUSE, OR IMPROPER OR INCORRECT REPAIR, OR DAMAGE FROM IMPROPER WIRING OR INSTALLATION. THIS WARRANTY DOES NOT COVER INCIDENTAL, OR SPECIAL DAMAGES. THE PURCHASER ASSUMES AND WILL HOLD HARMLESS LUTRON IN RESPECT OF ALL SUCH LOSS. LUTRON'S LIABILITY ON ANY CLAIM FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE MANUFACTURE, SALE, INSTALLATION, DELIVERY, OR USE OF THE UNIT SHALL NEVER EXCEED THE PURCHASE PRICE OF THE UNIT.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

For warranty service on returnable products (including Lutron ballasts), take the unit to the place of purchase or mail to:

Lutron
7200 Suter Rd.
Coopersburg, PA 18036-1299
(send postage pre-paid for proper handling)

For warranty service on non-returnable products, contact Lutron Technical Support Center at **1-800-523-9466**

Note - Although every attempt is made to ensure that catalog information is accurate and up-to-date, please check with Lutron before specifying or purchasing this equipment to confirm availability, exact specifications, and suitability for your application.

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Lutron Electronics Co., Inc. Commercial Systems Limited Warranty

SCOPE

This limited warranty ("Warranty") covers Lutron (a) commercial lighting control system panels, controls, processor panels, wall box products, and other Lutron components (collectively, "Hardware"), (b) ballasts supplied directly by Lutron ("Ballasts"), (c) provided computer ("Supplied Computer"), and (d) commercial systems eLumen software ("Software" and, with the Hardware, Ballasts and Supplied Computer, the "System"). Customer acknowledges and agrees that use of (i) the System, or any part thereof, constitutes acceptance of all terms and conditions of this Warranty and (ii) the Software is subject to the terms and conditions of Lutron's Software License. Any subsequent addition to the System provided by Lutron will be governed by a separate warranty issued at the time of the purchase of the additional equipment.

The provisions of this Warranty applicable to the Supplied Computer and Software will not apply to Systems that do not include these components.

LIMITED WARRANTY

Subject to the exclusions and restrictions and for the periods of time described in this Warranty, Lutron warrants that the System will be free from manufacturing defects. If any manufacturing defect exists in any Hardware or Ballast during the period of time identified below from the date of start-up completion by Lutron or a Lutron approved third party, or the date of shipment by Lutron if such component was not purchased with Lutron start-up, so long as Customer promptly notifies Lutron of the defect and, if requested by Lutron, upon the return of the defective part(s), Lutron will, at its option, either repair the defective part(s) or issue a credit to the Customer against the purchase price of comparable replacement part(s) purchased from Lutron as follows:

Number of Years from Date of Start-up or Shipment, as applicable	Percentage of Part Price Credited by Lutron			
	Hardware		Ballasts	
	With Start-up	No Start-up	With Start-up	No Start-up
Up to 1	100%	100%	100%	100%
More than 1 but not more than 2	100%	0%	100%	100%
More than 2 but not more than 3	50%	0%	100%	100%
More than 3 but not more than 5	50%	0%	100%	0%
More than 5 but not more than 8	25%	0%	0%	0%
More than 8	0%	0%	0%	0%

If any manufacturing defect exists in the Supplied Computer or Software during the one year period from the date of start-up by Lutron or a Lutron approved third party, or the date of shipment by Lutron if component was not purchased with Lutron start-up, so long as Customer promptly notifies Lutron of the defect, upon the return of the defective part(s) as to the Supplied Computer, if requested by Lutron, or Lutron determining that a defect exists as to the Software, Lutron will, at its option, either repair the defective part(s) or provide comparable replacement part(s).

Replacement parts for the System provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

CUSTOMER OBLIGATIONS TO MAINTAIN LIMITED WARRANTY

This Warranty will be void, and Lutron will have no obligations under it unless Customer complies with all of the following:

1. The Supplied Computer must be installed and maintained in a secure location, within the

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temperature and relative humidity ranges specified in the documentation accompanying the Supplied Computer, and away from where it may be bumped, abused, or subjected to large amounts of dust or dirt.

2. The Supplied Computer must be connected to a reliable (and preferably generator or battery backed-up) power supply.
3. The Supplied Computer must be properly shutdown in the event of power loss to prevent damage to it or its data, either of which could prevent it from operating properly. Customer has sole responsibility to take all reasonable measures to prevent this from occurring.
4. No modification, alteration, adjustment or repair can be made to the Software except by, or at the express instruction of, Lutron.
5. The Software may not be used on any hardware except the Supplied Computer.
6. No third party software may be installed on the Supplied Computer.

Lutron does not warrant that the Software will operate in combination with any other software except as specified in the applicable Lutron documentation. Customer acknowledges that its use of the Software may not be uninterrupted or error-free.

To ensure optimal operating conditions for the System, Lutron recommends that the Supplied Computer (1) not be connected to a power source that is also supplying power to a motor or other load that causes significant conducted emissions; (2) be located to permit easy access to it; and (3) be placed on a dedicated circuit.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the System pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; (g) failure to comply with the Customer Obligations listed above; (h) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control; (i) moving the Supplied Computer to another geographic location; (j) a virus or computer hacker; or (k) failure to maintain equipment under specified ambient temperature.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the System or any of its components.
3. Components and equipment external to the System, such as, lamps; non-Lutron ballasts; OEM supplied Lutron ballasts, sockets, and fixtures; fixture wiring between ballasts and lamps; building wiring between the dimmer panels and lamps and between the controls and the control or dimmer panels; audio-visual equipment; and non-Lutron time clocks and motion detectors.
4. The cost of repairing or replacing other property that is damaged when the System does not work properly, even if the damage was caused by the System.
5. Any loss of software, including the Software, or data. Customer has sole responsibility to properly back up all data on the Supplied Computer's hard disk drive and on any other storage device(s) in the System.
6. Repairs required due to malfunctions caused by non-Lutron supplied software.

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF ANY TYPE, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.

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LUTRON DOES NOT WARRANT THAT THE SYSTEM WILL OPERATE WITHOUT INTERRUPTION OR BE ERROR FREE.

NO LUTRON AGENT, EMPLOYEE OR REPRESENTATIVE HAS ANY AUTHORITY TO BIND LUTRON TO ANY AFFIRMATION, REPRESENTATION OR WARRANTY CONCERNING THE SYSTEM. UNLESS AN AFFIRMATION, REPRESENTATION OR WARRANTY MADE BY AN AGENT, EMPLOYEE OR REPRESENTATIVE IS SPECIFICALLY INCLUDED HEREIN, OR IN STANDARD PRINTED MATERIALS PROVIDED BY LUTRON, IT DOES NOT FORM A PART OF THE BASIS OF ANY BARGAIN BETWEEN LUTRON AND CUSTOMER AND WILL NOT IN ANY WAY BE ENFORCEABLE BY CUSTOMER.

IN NO EVENT WILL LUTRON OR ANY OTHER PARTY BE LIABLE FOR EXEMPLARY, CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFITS, CONFIDENTIAL OR OTHER INFORMATION, OR PRIVACY; BUSINESS INTERRUPTION; PERSONAL INJURY; FAILURE TO MEET ANY DUTY, INCLUDING OF GOOD FAITH OR OF REASONABLE CARE; NEGLIGENCE, OR ANY OTHER PECUNIARY OR OTHER LOSS WHATSOEVER), NOR FOR ANY REPAIR WORK UNDERTAKEN WITHOUT LUTRON'S WRITTEN CONSENT ARISING OUT OF OR IN ANY WAY RELATED TO THE INSTALLATION, DEINSTALLATION, USE OF OR INABILITY TO USE THE SYSTEM OR OTHERWISE UNDER OR IN CONNECTION WITH ANY PROVISION OF THIS WARRANTY, OR ANY AGREEMENT INCORPORATING THIS WARRANTY, EVEN IN THE EVENT OF THE FAULT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, BREACH OF CONTRACT OR BREACH OF WARRANTY OF LUTRON OR ANY SUPPLIER, AND EVEN IF LUTRON OR ANY OTHER PARTY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

NOTWITHSTANDING ANY DAMAGES THAT CUSTOMER MIGHT INCUR FOR ANY REASON WHATSOEVER (INCLUDING, WITHOUT LIMITATION, ALL DIRECT DAMAGES AND ALL DAMAGES LISTED ABOVE), THE ENTIRE LIABILITY OF LUTRON AND OF ALL OTHER PARTIES UNDER THIS WARRANTY ON ANY CLAIM FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE MANUFACTURE, SALE, INSTALLATION, DELIVERY, USE, REPAIR, OR REPLACEMENT OF THE SYSTEM, OR ANY AGREEMENT INCORPORATING THIS WARRANTY, AND CUSTOMER'S SOLE REMEDY FOR THE FOREGOING, WILL BE LIMITED TO THE AMOUNT PAID TO LUTRON BY CUSTOMER FOR THE SYSTEM. THE FOREGOING LIMITATIONS, EXCLUSIONS AND DISCLAIMERS WILL APPLY TO THE MAXIMUM EXTENT ALLOWED BY APPLICABLE LAW, EVEN IF ANY REMEDY FAILS ITS ESSENTIAL PURPOSE.

TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify Lutron within the warranty periods described above by calling the Lutron Technical Support Center at 1-800-523-9466. Lutron, in its sole discretion, will determine what action, if any, is required under this Warranty. Most System problems can be corrected over the phone through close cooperation between Customer and a technician. To better enable Lutron to address a warranty claim, have the System's serial and model numbers, its current operating system version, and the brand names and models of any peripheral devices (such as a modem) used with the System available when making the call. Let the technician know what error message you get; when it occurs; what you were doing when the error occurred; and what steps you have already taken to solve the problem. Listen carefully to the technician and follow the technician's directions.

If Lutron, in its sole discretion, determines that an on-site visit or other remedial action is necessary, Lutron may send a Lutron Services Co. representative or coordinate the dispatch of a representative from a Lutron approved vendor, to Customer's site, and/or coordinate a warranty service call between Customer and a Lutron approved vendor. All on-site labor costs incurred to diagnose any problems with

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the System and to repair, replace or adjust (at Lutron's option) the System to restore it to normal operation will be paid by customer at the then current service price unless covered by a Lutron Services Co. Support and Maintenance Plan.

REMOTE ACCESS

A dedicated analog phone line should be installed for the Supplied Computer to allow Lutron to remotely administer, troubleshoot, and support the System. Lutron does not recommended plugging the Supplied Computer into the analog phone line until asked to do so by Lutron support personnel. During such support calls, Customer should disconnect the Supplied Computer from Customer's local LAN. Lutron expressly disclaims all liability due to local LAN problems or if the phone line is connected to the Supplied Computer at any other time. Customer retains all responsibility for ensuring the security of the Supplied Computer from unauthorized access.

For more information, including preventative maintenance steps, see the Users Guide provided by the Lutron approved vendor of, and included with, the Supplied Computer.

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1-Visit Start-up

Description

The 1-Visit Start-up package includes one on-site start-up visit and extends the limited warranty for your integrated lighting system.

Field Start-up – A Lutron Services Company Engineer will perform an on-site system inspection, start-up the system, and train facilities personnel on system operation and maintenance. This includes the cost of travel.

Visit Summary:

- Installation verification
- Wiring verification – power and low voltage
- Energizing the low voltage and enabling dimming for the system
- Verification of lighting loads
- System programming
- Training

Additional Information

Replaces the Standard Limited Warranty with the Lutron Electronics Co., Inc. Commercial Systems Limited Warranty. Also includes two consecutive 1-year Support and Maintenance Plans. Up to eight additional years of coverage can be purchased.

Extends limited warranty for Lutron ballasts from 3 years to 5 years, if start-up is purchased for the ballasts.

24-hour/7-days a week toll-free telephone support (1-800-523-9466).

Refer to the Lutron Electronics Co., Inc. Commercial Systems Limited Warranty pages for limitations, exclusions, and any other details pertaining to what is covered by this warranty.

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Support and Maintenance Plan - Silver Level (INIT) (LSC-SILV-CS-IN-1, LSC-SILV-CS-IN-2)

Description

- Includes 1-year Support and Maintenance Plan with system purchase and start-up, and commences on date of start-up completion.
- Covers on-site parts and labor, telephone technical support, and remote diagnostics
- Remote Access Support - Diagnostics and programming for systems with that capability (analog telephone line connection required, must be provided by system owner).
- 24-hour/7-days a week toll-free telephone support (1-800-523-9466).

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Terms and Conditions of Lutron Services Co., Inc. Support and Maintenance Plans

This Agreement between Lutron Services Co., Inc. ("LSC") and Customer provides parts and labor coverage for the Lutron Electronics Co., Inc. ("Lutron") Integrated Lighting Control System ("ILCS") purchased on this Bill of Material. Parts and labor are covered at 100%, as further specified below.

1. The Silver Plan COVERS:
   - The diagnosis of problems with the Lutron ILCS and the repairs and adjustments necessary to restore the ILCS to normal operation are subject to the limitations described below. Visits will occur during normal business hours Monday through Friday.
   - Replacement parts, new or rebuilt, at LSC's option.
   - Four (4) hours of remote programming annually, for systems with that capability.
   - Remote diagnostics, for systems with that capability.
   - Unlimited Lutron Technical Support (1-800-523-9466).
2. Additionally, the Gold & Platinum Plans COVER:
   - An annual ILCS Checkup which can include:
     a) an evaluation to verify that the ILCS is working properly
     b) verification that panels have not been overloaded in the course of building relamping or renovation
     c) training of users on operation and maintenance of the ILCS
   - For Trouble Calls, LSC will use commercially reasonable efforts to be at the Customer's site within 24 hours (for Platinum customers) or 72 hours (for Gold customers) of receipt of the request.
3. Service Procedures
   - To schedule a visit, call 610-282-3800 and request to be connected to Field Service Scheduling.
   - LSC representatives will perform service in compliance with security and other instructions provided by the Customer.
   - LSC will respect the Customer's need for confidentiality and will utilize job-specific information only as needed to complete the service visit.
   - ILCS Checkups (for Gold and Platinum customers) will occur during normal business hours Monday through Friday. They must be scheduled at least two weeks in advance.
   - Customer agrees to allow LSC prompt and sufficient access to Customer's facility and to provide reasonable information and assistance to the LSC representatives to expedite the performance of service.
   - Customer agrees that all LSC service must be done in compliance with LSC's safety procedures, which may include temporarily disabling or de-energizing the ILCS and other equipment connected to the ILCS.
   - LSC will provide a certificate of insurance upon request of Customer.
4. This plan DOES NOT COVER:
   - Damage or malfunctions diagnosed by LSC as due to abuse, misuse, or accident, such as: use of incorrect line voltage, fuses or protection devices; failure to follow operating and maintenance instructions provided by Lutron or LSC; failure to comply with national or local electrical codes; unauthorized repairs/adjustments; vandalism or theft; fire, flood, "Acts of God", or other problems beyond LSC's control.
   - Non-Lutron components and equipment such as: lamps; non-Lutron ballasts, sockets, and fixtures; fixture wiring between ballasts and lamps; building wiring between ILCS elements; audio-visual

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equipment; non-Lutron timeclocks and motion detectors; and Local Area Networks.

- Labor costs to remove and reinstall fixtures and/or ballasts.
- Desktop, Laptop, or Server hardware and software.
- Repairs or adjustments to Lutron ILCS required as a result of (i) malfunctions caused by non-Lutron supplied equipment, (ii) software that is connected to or used with the ILCS, or (iii) programming changes made by anyone other than LSC.

5. Warranties

- LSC makes no warranty, either express or implied, including, but not limited to, any implied warranties of merchantability and fitness for a particular purpose
- For ILCS components that may be covered by product-specific warranties, LSC will coordinate the processing of any warranty claims.

6. Limitation of Remedy

- CUSTOMER'S EXCLUSIVE REMEDY AND LSC'S ENTIRE, COLLECTIVE LIABILITY IN CONTRACT, TORT OR OTHERWISE, UNDER THIS AGREEMENT IS THE REPAIR OF THE DEFECTIVE ILCS IN ACCORDANCE WITH THIS AGREEMENT. IF LSC IS UNABLE TO MAKE SUCH REPAIR, CUSTOMER'S EXCLUSIVE REMEDY AND LSC'S ENTIRE LIABILITY WILL BE THE PAYMENT OF ACTUAL DAMAGES NOT TO EXCEED THE CHARGE PAID BY CUSTOMER FOR ONE YEAR OF SERVICE UNDER THIS AGREEMENT. UNDER NO CIRCUMSTANCES WILL LSC BE LIABLE TO CUSTOMER OR ANY OTHER PERSON FOR ANY DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES, EXPENSES, COSTS, PROFITS, LOST SAVINGS OR EARNINGS, LOST OR CORRUPTED DATA, OR OTHER LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT, OR OUT OF THE INSTALLATION, DEINSTALLATION, USE OF OR INABILITY TO USE THE SYSTEM.
- THIS AGREEMENT GIVES CUSTOMER SPECIFIC LEGAL RIGHTS AND CUSTOMER MAY HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF (i) INCIDENTAL OR CONSEQUENTIAL DAMAGES OR (ii) IMPLIED WARRANTIES, SO THE ABOVE MAY NOT APPLY.
- Customer shall not bring legal action related to the services being provided hereunder more than two years after the cause of action arose unless otherwise provided by local law without the possibility of contractual waiver or limitation.
- LSC shall not be responsible for any delay or failure to perform its responsibilities under this Agreement that results from problems outside the control of LSC such as: permit or visa requirements; strikes or work stoppage; fires, floods, "Acts of God", wars, or force majeures; and transportation disruptions.
- With regard to any services that are not within the coverage of this Agreement, please contact LSC for service pricing and availability.

7. Taxes

- Customer agrees to pay all taxes (or reimburse LSC for all amounts paid or payable by LSC in discharge of these taxes) arising from this Agreement including state and local sales and use taxes, regardless of designation.

8. Term; Termination

- The term of this Agreement shall commence on the date of start-up completion and shall continue for the number of one-year terms purchased on the Bill of Material.
- Default: LSC may terminate this Agreement if Customer remains in default of any material term or condition of this Agreement ten days after LSC gives Customer written notice of the default.
- Unnecessary Service Calls: If Customer requests service on more than two (2) occasions in any one year for problems that are diagnosed by LSC as non-covered problems, LSC may terminate this Agreement by providing Customer with 30 days notice of termination.

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9. Miscellaneous

- Entire Agreement: This Agreement is the complete agreement between Customer and LSC regarding the services provided hereunder, and replaces any prior oral or written communications between Customer and LSC regarding such services. None of LSC's employees or agents may orally vary the terms and conditions of this Agreement. Any modification of this Agreement must be signed in writing by authorized representatives of Customer and LSC.
- Additional Remedies: This Agreement affords Customer specific legal rights. Customer may have additional legal rights that vary from state to state. This Agreement is not a warranty. The ILCS may come with a limited warranty from Lutron or third party manufacturers of products distributed by Lutron. Please consult those warranties for specific rights and remedies.
- Severability: If any part of this Agreement is held to be invalid or unenforceable, it will not affect the validity or enforceability of the rest of the Agreement. Without further action of the parties, that part will be reformed to the minimum extent necessary to make it valid and enforceable.
- Waiver of Rights: LSC's failure to exercise, delay in exercising, or single or partial exercise of any right, power, or privilege under this Agreement shall not operate to waive or preclude LSC's right to exercise such rights, power, or privileges.
- Send Notices to: Lutron Services Co., Inc., Attn: Director of Field Service, 7200 Suter Road, Coopersburg, PA 18036, cc: Legal Dept.

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Job Number:		

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Lutron Contacts for all Warranties and Support and Maintenance Plans

Internet: www.lutron.com
E-mail: lscwarranty@lutron.com

WORLD HEADQUARTERS
USA

Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299
TEL +1.610.282.3800
FAX +1.610.282.1243
Toll-Free 1.888.LUTRON1
Technical Support 1.800.523.9466

North and South America Technical Hotlines
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom

Lutron EA Ltd.
6 Sovereign Close, London,
E1W 3JF United Kingdom
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
FREEPHONE (UK) 0800.282.107
Technical support +44.(0)20.7680.4481

ASIAN HEADQUARTERS
Singapore

Lutron GL Ltd.
15 Hoe Chiang Road,
#07-03 Euro Asia Centre,
Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

Asia Technical Hotlines

Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Indonesia: 001.803.011.3994
Japan: +81.3.5575.8411
Macau: 0800.401
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other countries: +65.6220.4666

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LCP/XPS System On-Site System Start-up

What Standard GRAFIK LCP/XPS Start-up includes:

- One visit to the job site during normal business hours. This is one visit between the hours of 7 AM and 5 PM on a Monday through Friday that is not a Lutron Holiday.
- This visit may require multiple days depending on the size of the system.
- Phased construction projects (requiring multiple visits) should verify this was included with the system provider.
- Visits can be made outside these hours for an additional charge.
- Lutron requires Ten (10) business days notice to schedule a start-up date. Shorter notices may incur expedite fees.
- All terminations will be done by the installing agency. A person from the installing agency needs to be present for the startup. This person should be familiar with the installation of the system.
- A Lutron factory certified technician performs all system start-up items.

System start up includes:

- Verification that the XPS/LCP is installed according to Lutron specifications.
- Panels should be energized in by-pass fully lamped and tested prior to our arrival.
- Load circuits are checked for shorts and overloads and bypass jumpers are removed.
- Programming the dimming/switching panels to include:
    - Panel addressing
    - Proper load types as installed in field or as per approved submittal drawings. As installed conditions take precedence. This system may have modular components and if loads differ from design additional/different equipment may be required.
    - Circuit to zone assignment as per approved submittal drawings. If no zoning information exists prior to start-up, programming will be done according to written instructions from end user or end users representative, contractor, or will be set up based on the field engineers past experience in that order of priority.
    - Set light levels and fade times on controls as per approved submittal drawings. If no information is provided, test scenes will be set to 100%, 75%, 50% and 25% and default fade times will be set to 3 seconds.
    - Program emergency function per the installation guide for the system. This may not be applicable for every system.

Programming the wall controls/interfaces to include:

- Control addressing
- Verify proper wiring and operation of control link
- Set up controls to function as per approved submittal drawings. If no control functionality is included, controls will be programmed according to written instructions from end user or end users representative, contractor, or will be set up based on the field engineers past experience in that order of priority.
- Test all buttons to assure proper operation
- Occupancy sensor
    - Verification of proper installation and operation.

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Job Number:	Field Service Scheduling 1.800.523.9466 ext. 4439

  - Unless otherwise noted, a rough calibration will be performed at system start-up. Final calibration is the responsibility of the end user since it is very dependent on furniture placement, HVAC operation, and space usage.
- Photocell
  - Verification of proper installation and operation.
  - Unless otherwise noted a rough calibration will be performed at system start-up. Final calibration is the responsibility of the end user since it is very dependent on furniture placement, window treatments, outside weather conditions and space usage.
- Time clock set up
  - Lutron will set up the system location, daylight savings, and time of day preparation for event programming.
  - Lutron will set up time clock events as per the approved submittal drawings or written instructions from end user or end users representative, contractor in that order of priority.
  - In lieu of instructions, the time clock will not be programmed.

Items not included in standard on-site startup:

- Lutron service technicians will not perform work on non-Lutron equipment. Lutron will work with other manufacturers on integration of equipment by others.
- Programming or any other changes that are requested to be performed counter to the approved submittal drawings must be approved in writing via the proper channels.
- Field wiring changes or corrections that delay the startup process such that additional time is required for Lutron to complete the startup will result in additional charges.
- Replacement of controls damaged due to miss-wires or incorrect installation or any other related issue not covered under the Lutron warranty is the responsibility of the installer.
- Reprogramming of any functions after initial programming and sign-off.

End user training on overall system operation. Typical training agenda listed below:

- This system is not typically sold with a separate visit for the training of the end user. Check with purchasing agent if this is required.
- It is the responsibility of the person scheduling the startup to ensure the appropriate end users are present for system training. Lutron typically does not have these contacts.
- Additional charges will apply if a separate visit is required for training the end user.
- Video media is not provided by Lutron for training sessions. This may be provided by “others” for turnover to the end user or job site documentation.
- System demonstration and sign-off by the end user.

Additional items that are not included with standard startup, but may be purchased – check your quote to verify an item has been included with your quote. The quantity of the items listed below on the BOM will determine how many days are included with this item.

  - LSC-AF-VISIT. Aim and focus visit with design team or end user. This visit is typically coordinated by the construction team, that includes designers, Lutron, and end user to set up light levels and adjust fixtures.

  - LSC-SYSOPT. System optimization visit with end user. This visit is coordinated by the EC or end user to optimize the system performance to specific project details.

- LSC-WALK. Start-up agent or design team walk-through visit. The construction team and the agent requiring the walk-through coordinate this visit. This visit is for any type of additional walk-through that is required for job completion.

- LSC-SILV/GOLD/PLAT-IW. These are extended warranty part numbers for the system per the specification. Warranty information is supplied within the submittal documentation.

- LSC-TRAINING. This visit is for additional time on the job for training the end user. The EC or the end user typically coordinates this visit.

- LSC-AH-SU. After hours start-up. If normal business hours are not acceptable for start-up, after hours start-up can be purchased.

Additional items listed below may be charged for jobsites that are scheduled for start-up, but not ready when field service engineer arrives.

- LSC-NS-TRAVEL. Non standard travel arrangements
- LSC-SITE-RDY-CHG. Site ready charge. Jobsite not ready.

XPS/LCP system description

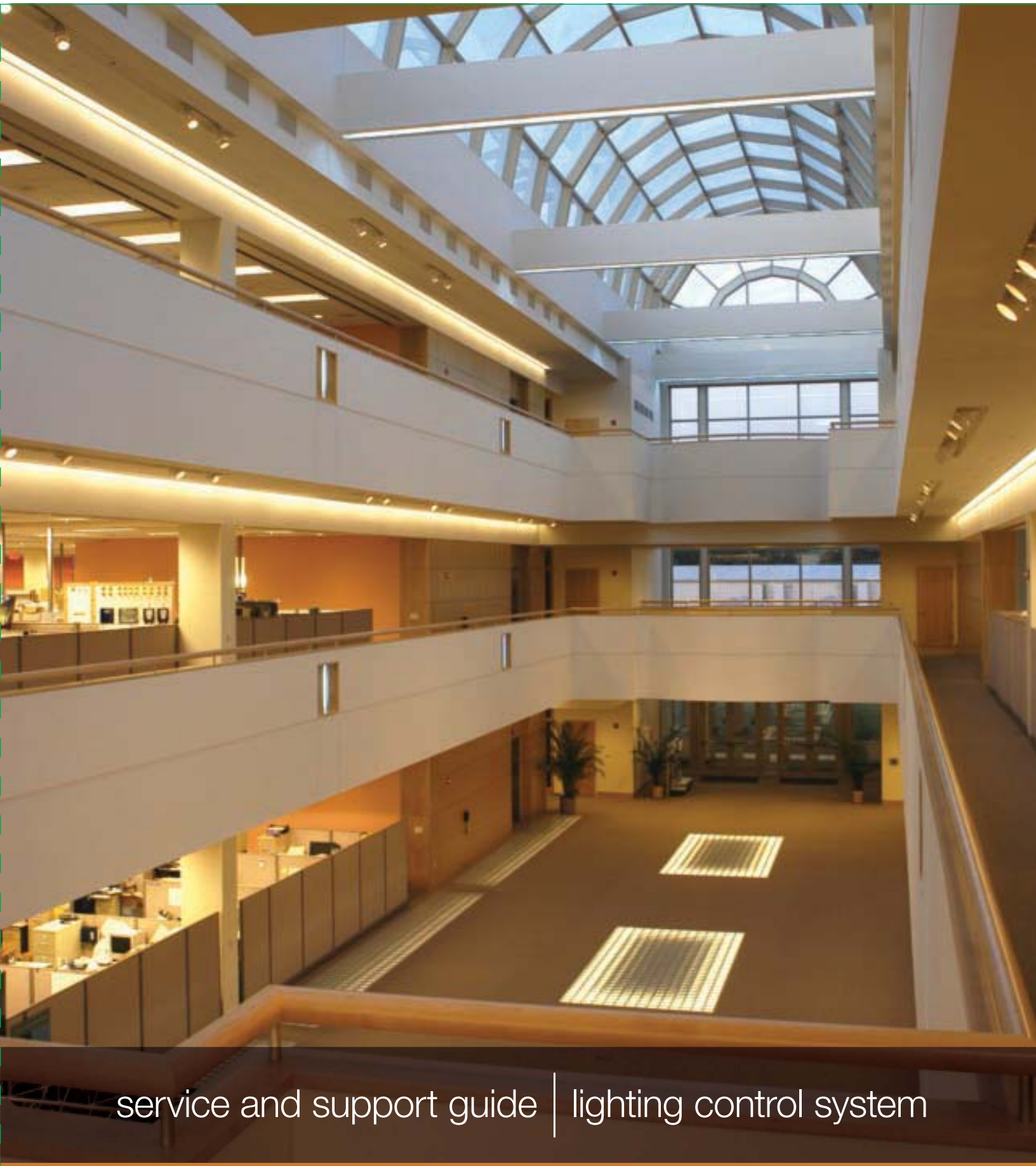
XPS is a Lutron Switching System that is designed to provide exceptional value and reliability to our customers. It utilizes Lutron's patented arcless Softswitch circuit that dramatically increases the lifetime of the system over conventional switching relay systems. Even when fully loaded, the arc elimination extends a relay's average rated life to more than 1,000,000 on/off cycles. Digital wall controls may be purchased for simple control in the space. The product also features an integrated time clock for automated system control.

LCP is a Lutron Dimming/Switching System that is designed to provide exceptional value and reliability to our customers. It allows the end used to use dimming and switching in the same panel for all of the space requirements. Digital wall controls may be purchased for simple control in the space. The product also features an integrated time clock for automated system control.

Both systems are similar in appearance, programming, and maintenance, however the XPS is solely a switching system and LCP can have dimming and switching capability in the same panel.

XPS/LCP Training Visit – Typical Agenda (duration – approximately 1 hour):

- Review of XPS/LCP system with end-user (control location and function).
- Discuss system model numbers
- Discuss Lutron lexicon - what is a zone, scene, fade rate, delay rate
- Review all system components
- Panel(s) and XPS/LCP Controller
    - o Bypassing outputs
    - o Spare dimmer cards/modules, switching modules
    - o Load schedule
    - o Programming of timeclock
- Wall controls
    - o Addressing
    - o Reprogramming
- Troubleshooting system. Panels, processor, controls, interfaces
- System integration (if applicable)
- Warranty information
- Tech support
- Preventive maintenance



service and support guide | lighting control system

LUTRON® SERVICES CO., INC.

service record

This information will help us assist you when you contact Lutron:

Job Number (typically on the front cover of the panels)

Approximate date of initial installation

Job Name at time of installation

This pocket is provided for storage of service visit sign-off sheets and other important system documentation.

Lutron controls the light at the following locations featured in this brochure:

Cover:	Lutron Electronics Headquarters, Coopersburg, Pennsylvania, U.S.A.
Page 1:	New York Times Building, New York, New York, U.S.A.
Page 2:	Bank of China Headquarters, Beijing, China
Pages 4–5:	Getty Museum, Los Angeles, California, U.S.A.
	JW Marriott Hotel Shanghai at Tomorrow Square, Shanghai, China
	Mandarin Oriental, Tokyo, Japan
	Louis Vuitton, Cannes, France
	Orange County Convention Center, Orlando, Florida, U.S.A.
Page 7:	Mandarin Oriental, New York, New York, U.S.A.
Page 8:	TAQA, Ann Arbor, Michigan, U.S.A.
Page 10:	The Westbury Mayfair Hotel, London, UK
Page 11:	Wynn Las Vegas, Las Vegas, Nevada, U.S.A.
	Mandarin Oriental, New York, New York, U.S.A.
	Georgian College, Ontario, Canada

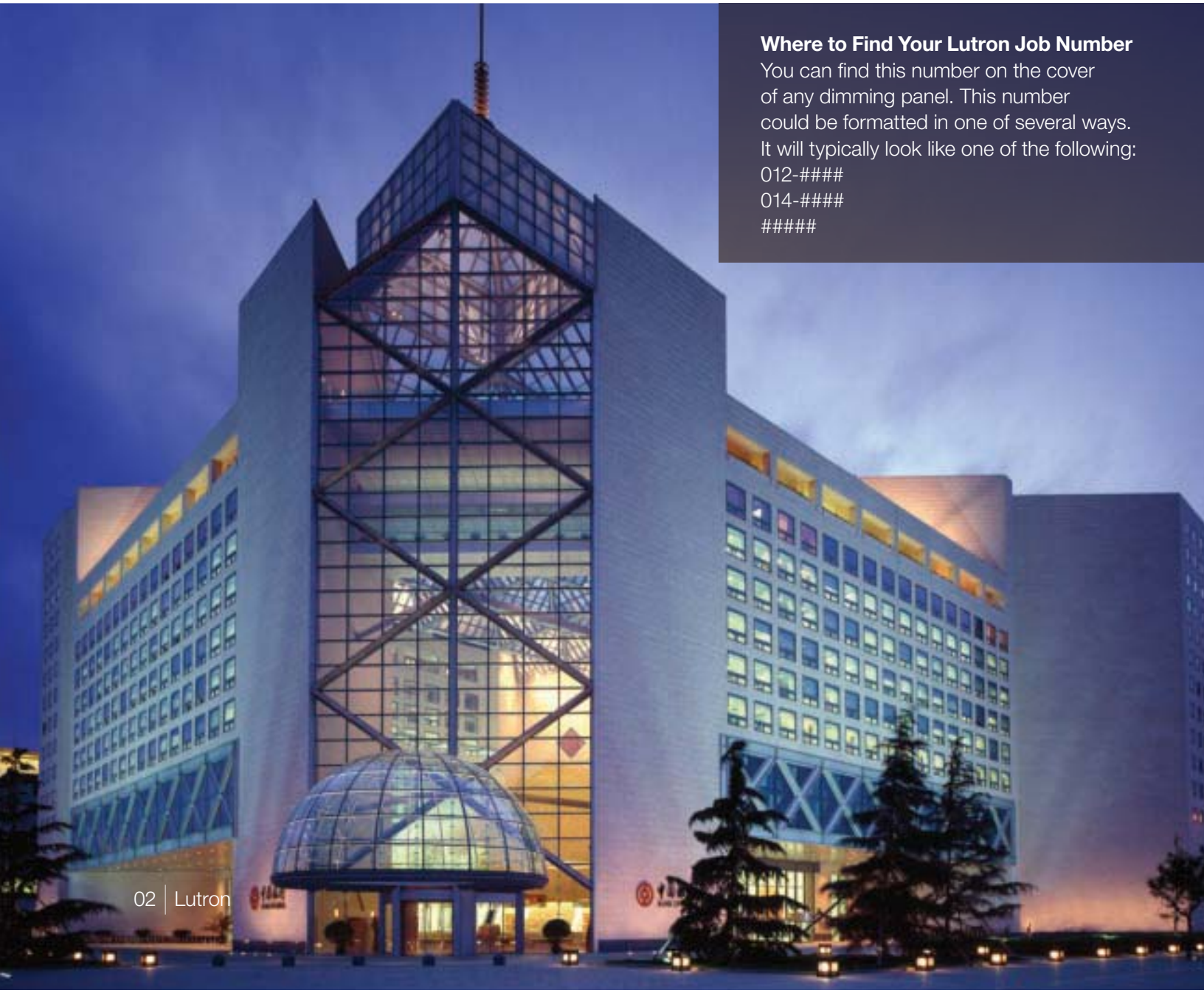
Thank you for purchasing a Lutron lighting control system.

This guide contains the information you will need to ensure your ownership experience is a good one. Please retain it for future reference. It contains important information on warranties, service, upgrades and more.

who to call if you have problems: 1.800.523.9466

24-hour Technical Support at No Charge
If you have questions about the operation of your system, or if you are not sure it is functioning properly, Lutron provides around-the-clock technical support. A knowledgeable support staff is ready to answer questions about the operation, programming, and maintenance of your system. They can also direct you to the technical information on our website that is specific to your Lutron products.

From the U.S., call 1.800.523.9466. International customers can dial 1.610.282.3800 or visit www.lutron.com to get more information on our international offices.



Where to Find Your Lutron Job Number
You can find this number on the cover of any dimming panel. This number could be formatted in one of several ways. It will typically look like one of the following:
012-####
014-####
#####

what to do if your system needs service

If your staff is unable to solve a problem with the help of our Technical Support Representatives, do not worry. There are other ways to get your system up and running. Lutron also provides reprogramming and training services. Please read over the points listed below to ensure you get the best service for your situation.

Lutron Scheduling Representatives: 1.800.523.9466 and select option 4, then 1 or email LSCscheduling@lutron.com.

- Determine your system coverage (see below).
- If you do not have a Support & Maintenance Plan or labor coverage, we recommend working with a local electrical contractor.
- If the electrical contractor was unable to solve the problem for you, please contact our Scheduling Representatives to set-up a Lutron field service visit.

How to Determine Your System Coverage

Lutron systems that are purchased with start-up have an initial 2-year Support & Maintenance Plan and an 8-year Limited Parts Warranty. That initial plan provides full labor and parts coverage for two years for the majority of equipment. Details on labor and parts coverage can be found in the below charts. The documents from the installing contractor will indicate what coverage you have for your particular system. *If you are unable to find that information, call 1.800.523.9466 and select option 4, then 4 or email LSCwarranty@lutron.com.*

With Lutron Start-up

System Component	Part Coverage	Labor Coverage
Lighting Control Equipment (excluding parts listed below)	100%, first 2 years 50%, year 3 through 5 25%, year 6 through 8	100%, 2 years
Ballasts	100%, 5 years	None
Computer/Laptop/PDA	100%, 1 year	100%, 1 year

To supplement or extend the initial coverage that comes with Lutron start-up, we offer Support & Maintenance Plans that provide up to 10 years of full labor and parts coverage (see pages 6 and 7 for more information).

Without Lutron Start-up

System Component	Part Coverage	Labor Coverage
Lighting Control Equipment (excluding parts listed below)	100%, 1 year	None
Ballasts	100%, 3 years	None
Computer/Laptop/PDA	100%, 1 year	None

replacement parts

If you are experiencing a problem with your system and need to order replacement parts, you can call one of our Parts Specialists. If possible, please have the part number of the failed item as well as the Lutron Job Number for your system. In many cases, we will have the parts in stock and will send them to you in as little as two days.

For custom products and older generation systems, it may take longer for us to provide replacement parts. In those cases, the components that we need to make the products may no longer be available from our suppliers. As a result, we may ask you to send the failed part back to us so we can try to repair it rather than replace it.

To request more information, please call 1.800.523.9466 and select option 4, then 2 or email LSCparts@lutron.com.

spare parts packages

Having a stock of parts at your facility can ensure that small problems will be resolved rapidly. Some components can be installed in minutes, and Lutron's 24-hour Technical Support Representatives are available to walk your maintenance team or local contractor through the process.

We can prepare a recommended spare parts list based upon the specific configuration of your system and any unique requirements you have.

To request more information, please call 1.800.523.9466 and select option 4, then 2 or email LSCparts@lutron.com.

training sessions

On Our Site: The software used with our GRAFIK$_{T}$ 5000/6000/7000 and Quantum$_{TM}$ systems allows a facility manager to reprogram, control, and monitor the lighting control system. To maximize the benefits this software provides, Lutron offers Facility Manager Training at our headquarters in Coopersburg, PA. The cost of these classes is minimal, and the feedback from past attendees has indicated that the training is well worth the time investment.

Go to www.lutron.com/training to see course dates and registration details.

On Your Site: If staff turnover has left you without anyone who knows how to operate and maintain your system, you can purchase a day of personalized training. This could be an ideal time to make any timeclock or wall control programming changes.

System specific training agendas are available on our website at www.lutron.com/service.

optimize energy usage

Although your lights turn on and off, there are many features that go beyond those basic options. Lighting strategies that take advantage of those new features can lead to more productive environments, happier occupants, and reduced lighting electricity bills.

Studies show that office buildings expend 44% of electricity on lighting alone. You can reduce your lighting energy consumption with a Lutron System Optimization Visit. This type of visit will help you implement strategies that will result in better system performance and more efficient energy usage.

To request more information, please call 1.800.523.9466 and select option 4, then 5 or email rus@lutron.com.

support & maintenance plans

The initial 2-year Silver Support & Maintenance Plan included with most systems can be extended for up to 10 years to ensure the lighting system will continue to satisfy the needs of the facility. With a Support & Maintenance Plan in place, a repair visit is just a phone call away. Annual payments are typical, but quarterly or monthly payments can be arranged to accommodate your budgeting needs.

The table below highlights the features of our three standard plans. If these plans do not fit your needs, please contact us and we can create a custom plan just for your facility.

	benefits	typical applications
 platinum	• 24-hour response time for service visits • Annual Scheduled Maintenance Visit (see page 7 for details) • 100% parts, 100% labor and any travel costs Lutron incurs • Technical Support, toll-free, around the clock, 365 days per year • Remote diagnostics and programming (for systems with that configuration/capability)	• Casinos • Convention centers • Luxury hotels/Resorts • Research centers/Vivariums • Hospitals
 gold	• 72-hour response time for service visits • Annual Scheduled Maintenance Visit (see page 7 for details) • 100% parts, 100% labor and any travel costs Lutron incurs • Technical Support, toll-free, around the clock, 365 days per year • Remote diagnostics and programming (for systems with that configuration/capability)	• Hotels • Stadiums/Arenas • Museums • Office buildings • High-end restaurants • Boutique retail • Large universities • Estates
 silver	• 100% parts, 100% labor and any travel costs Lutron incurs • Technical Support, toll-free, around the clock, 365 days per year • Remote diagnostics and programming (for systems with that configuration/capability)	• Places of worship • Residences • Libraries • Small offices • Small schools

To request more information or a quotation, please call 1.800.523.9466 and select option 4, then 4 or email LSCwarranty@lutron.com.

annual scheduled maintenance visits

Our Gold and Platinum Support & Maintenance Plan customers automatically receive an Annual Scheduled Maintenance Visit, but any customer can purchase a day of this service. According to each site's requests and needs, the Lutron Field Service Engineer may complete the following tasks during this visit:

- Train facility staff
- Update staff on new features and capabilities
- Make minor programming changes
- Perform a system check and preventative maintenance
- Provide a system status report
- Compile a list of spare parts to consider for site

new and improved Lutron products

Add Engraving to Existing Controls
With proper labeling of the buttons on existing controls, your lighting system will be easier to use for you and anyone that enters the space. Nearly all Lutron wall controls can be engraved with labels for individual buttons or the entire control. Most engravings are custom to the project but standard options are also available. Engravings are available in a variety of colors and we can laser engrave in any language.

Engraving sheets are available at www.lutron.com/seeTouch.

Upgrade to seeTouch®
An engraved control is better than one that is not, but a control with engraving that can be read in the dark is the ultimate solution. Controls in Lutron's GRAFIK™ 3000/4000/5000/6000/7000 lighting control systems can be replaced to feature this intuitive and ergonomic wall control option.

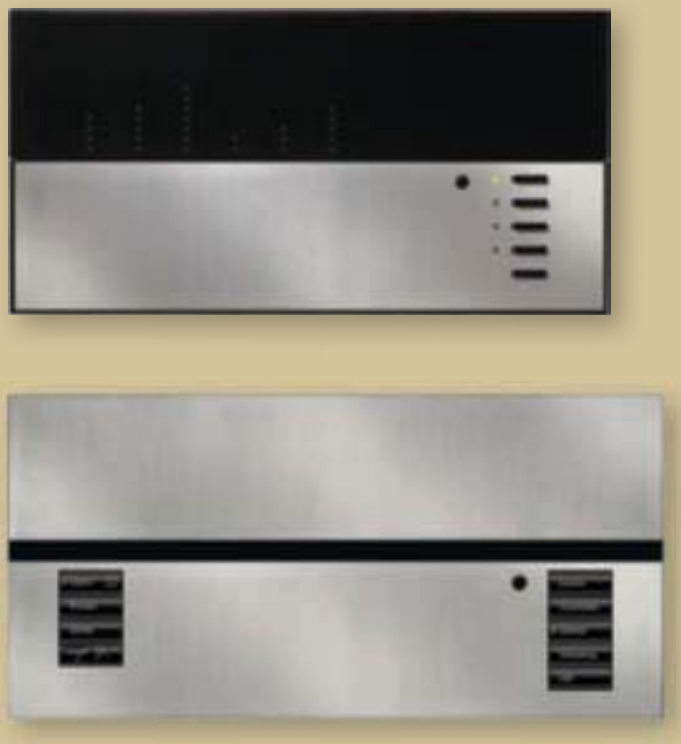
To upgrade your controls, please call 1.800.523.9466 and select option 4, then 5, or email rus@lutron.com.

Upgrade to GRAFIK Eye® QS
With the positive feedback from the experience our customers had with seeTouch controls, we updated our GRAFIK Eye product to include some of the same engraving and backlit features. An added bonus to the GRAFIK Eye QS is the opportunity to conveniently control shades and lighting from one control station.

To upgrade your controls, please call 1.800.523.9466 and select option 4, then 5, or email rus@lutron.com.

seeTouch®
Discover the intuitive simplicity of Lutron's seeTouch controls. As you can see above, our wall controls have continued to evolve into more beautiful and user-friendly additions to your facility. Engraved buttons make them easy to use for newcomers to the space and the backlit buttons remove the need to search for wall controls in the dark.

For more information, please visit www.lutron.com/seeTouch.



GRAFIK Eye® QS
Set your lights and shades just right for any task or activity in any room of your building. Easily recall these settings with the touch of a button. The new GRAFIK Eye QS provides convenient control and enhancement of the visual environment for the people inside the space.

For more information, please visit www.lutron.com/GRAFIKEyeQS.

modernize your lighting control system

You originally purchased a Lutron lighting control system because you wanted the ultimate in reliability and performance. The pace of innovation in Lutron's products has been rapid–the systems of today have features that were beyond reach just five years ago. These features may be just what you are looking for as you modernize your facilities.

In addition to improved serviceability, a new system brings advanced control features and energy saving capabilities that will take your lighting control experience to the next level.

Regardless of your reasons for wanting to upgrade or replace your system, Lutron will integrate the best products and services to give you a solution that meets your needs.

For more information on upgrading your system, please call 1.800.523.9466 and select option 4, then 5 or email rus@lutron.com.



system expansions

If you are expanding your building, or if existing areas of the building need to be incorporated into the system, we can provide a solution. Our systems are modular and expandable, allowing you to add capabilities or capacity as required.

Adding photo or occupancy sensors can help save energy. Using Lutron occupancy sensors can eliminate 20–30% of lighting energy costs.

Our Replacement Systems Specialists can review the equipment you have, work with you to determine what capabilities and features you want, and propose comprehensive solutions for your lighting needs.

For more information, please call 1.800.523.9466 and select option 4, then 5 or email rus@lutron.com.

Lutron in your home

When it comes to controlling electric and natural light, Lutron has the best products for any application, including your home.

The same world-class quality and engineering in the lighting controls in Buckingham Palace and the White House can be found in the dimmer that you can purchase for your home. After all, we feel that everyone deserves the benefits of dimming such as increased bulb life, improved energy savings, and enhanced room settings.

For assistance in locating Lutron products for your home, go to www.lutron.com.

Save energy beautifully

dimming the lights about	saves electricity	extends bulb life*
10%	10%	2 times longer
25%	20%	4 times longer
50%	40%	20 times longer
75%	60%	20 times longer +

* incandescent and halogen

www.lutron.com

LUTRON® SERVICES CO., INC.

www.lutron.com/service

Lutron Services Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299

World Headquarters 1.610.282.3800
Technical Support Center 1.800.523.9466

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Install & Setup Guides

Job Name:

Job Number:

Toll-Free 24/7 Technical Support Line: 1.800.523.9466

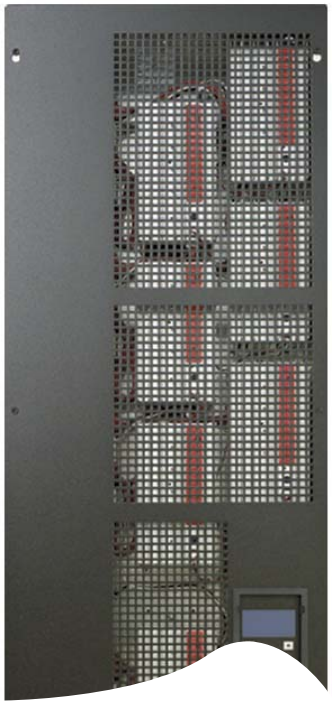
Field Service Scheduling 1.800.523.9466 ext.4439

Please Read

LUTRON®

Dimming and Switching **Panels**

Installation Guide
LCP128™ (LCP) and
GRAFIK Systems™ (LP and CCP)



LCP Panel shown

Contents

Overview

Use this guide to successfully install a dimming and switching panel. This guide describes panel installation, wiring, and load activation.

Panel Model Number Guide

LCP128™ (LCP) (120 V~ only)

See page 5 for 230/220-240 V~

Example

LCP-2X2D1A4T-1204ML-20

Prefix	Modules: Quantity and Type	Feed Voltage	Feed Type	Branch Circuit Breaker Rating
LCP	2X2D1A4T	120	ML	20

Prefix

LCP = LCP dimming panel

Module Types

_X _S _D _Q _A _M _F _T

List modules in the order shown above. Insert the quantity before each module code. Omit codes for modules not used in panel. See table below for limits on numbers of modules per panel.

X = Four-Circuit Switching (Relay) (XP)
S = One-Circuit Dimming (1U)
D = Two-Circuit Dimming (2U)
Q = Four-Circuit Dimming (4U)
A = Four-Circuit Adaptive Dimming (4A)
M = Four-Circuit Motor (4M)
F = Four-Circuit Quiet Fan Speed (4FSQ)
T = 0-10 V, DALI (broadcast), DSI, and PWM Ballast Control (TVM)

Feed Voltage

120 for 120 V~

Feed Type/Input Ratings

FT = Feed-through panel (circuit breakers not included) / 120 V~
3M or 3ML = 1 phase 3 wire feed (split phase) / 120/240 V~
4M or 4ML = 3 phase 4 wire feed / 120/208 V~

Branch Circuit Breaker Rating

Omit for feed-through panels
20 for 20 A branch circuit breakers

Frequency - All Model Numbers and Voltages

50/60 Hz

Output (Load) Ratings

Module Type	Rating
XP	16 A per circuit
1U, 2U, 4U	16 A per module
4A	16 A per module, 10 A per output
4M	16 A per module, 5 A per output (1/4 HP motor), 1 motor per output
4FSQ	2 A per output (single ceiling fan)
TVM	50 mA per channel, 750 mA per system

Module Quantity Limits

Panel Size	Feed type	TVM	4A 4U 4M	XP
Mini	Feed-through	NA	Any combination up to 3 modules	
Mini	Feed-through	0-4	Any combination up to 2 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	
Mini	Breakers	NA	Any combination up to 3 modules	0
Mini	Breakers	0-4	Any combination up to 2 modules; must have 1 4U module minimum; each 4U module can control only 2 TVM modules	0
Standard	Feed-through	NA	Any combination up to 9 modules	
Standard	Feed-through	0-12	Any combination up to 8 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	
Standard	Breakers (main lugs)	NA	Any combination up to 9 modules	0
Standard	Breakers (main lugs)	NA	Any combination up to 7 modules	
Standard	Breakers (main lugs)	0-12	Any combination up to 7 modules; must have 1 4U module minimum; each 4U module can control only 2 TVM modules	0
Standard	Breakers (main lugs)	0-12	Any combination up to 5 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	

Notes

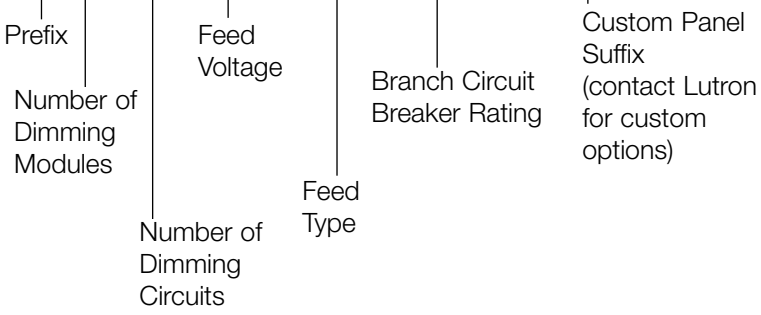
- Consult Lutron for panels with custom breaker needs.
- TVM = 0 is a TVM-ready panel; TVM modules can easily be installed in the future.
- TVM = NA is not TVM-ready

Panel Model Number Guide (continued)

GRAFIK Systems™ (LP) (all voltages)

Example

LP7/28-1204ML-20-CGP____



Prefix

LP = LP dimming panel

Number of Dimming Modules

Indicates number of 4-circuit (4U) dimming modules in the panel: 1 through 8; also indicates number of full load circuits

Number of Dimming Circuits

Indicates number of dimming circuits in the panel: 4, 8, 12, 16, 20, 24, 28, or 32; each module has four dimming circuits

Feed Voltage

120 = 120 V~
230 = 230 V~ (CE)
240 = 220-240 V~ (non-CE)

Feed Type

2M or 2ML = 1 phase 2 wire feed
3M or 3ML = 1 phase 3 wire feed (split phase)
4M or 4ML = 3 phase 4 wire feed
Mxx = Main Breaker;
xx = breaker size in amps (custom panel option)
IS = 3 phase 4 wire isolation switch (230/220-240 V~ only)

Input Ratings

120 V~
120/240 V~
120/208 V~

Branch Circuit Breaker Rating

20 for 20 A branch circuit breakers (120 V~ only)
20 A branch circuit breakers have a 16 A continuous load rating
15 for 15 A branch circuit breakers (120 V~ only)
15 A branch circuit breakers have a 12 A continuous load rating
13 for 13 A branch circuit breakers (230 V~ CE only)
16 for 16 A branch circuit breakers (220-240 V~ non-CE only)

Custom Panel Suffix (optional)

Indicates panel with special options

Panel Model Number Guide (continued)

GRAFIK Systems™ (CCP) (120 V~ only)

Example

CCP-2X2L 1A4T-1204ML-20-CGP___

- CCP: Prefix
- 2X2L 1A4T: Modules: Quantity and Type
- 1204: Feed Voltage
- ML: Feed Type
- 20: Branch Circuit Breaker Rating
- CGP___: Custom Panel Suffix (contact Lutron for custom options)

Prefix

CCP = Custom combination panel

Module Types

_X _L _A _M _F _T

List modules in the order shown above. Insert the quantity before each module code. Omit codes for modules not used in panel. See table below for limits on numbers of modules per panel.

X = Four-Circuit Switching (Relay) (XP)
L = Four-Circuit Dimming (4U)
A = Four-Circuit Adaptive Dimming (4A)
M = Four-Circuit Motor (4M)
F = Four-Circuit Quiet Fan Speed (4FSQ)
T = 0-10 V, DALI (broadcast), DSI, and PWM Ballast Control (TVM)

Feed Voltage

120 for 120 V~

Feed Type / Input Ratings

FT = feed-through panel (circuit breakers not included) / 120 V~
3M or 3ML = 1 phase 3 wire feed (split phase) / 120/240 V~
4M or 4ML = 3 phase 4 wire feed / 120/208 V~
2 = 1 phase 2 wire input breakers (mini only)
3 = 1 phase 3 wire input breakers (mini only)
4 = 3 phase 4 wire input breakers (mini only)

Branch Circuit Breaker Rating

20 = 20 A branch circuit breakers
15 = 15 A branch circuit breakers

Custom Panel Suffix (optional)

Indicates panel with special options

Frequency

(All Model Numbers and Voltages): 50/60 Hz

Output (Load) Ratings

Module Type	Rating
XP, 4U	16 A per circuit
4A	16 A per module, 10 A per output
4M	16 A per module, 5 A per output (1/4 HP motor)
4FSQ	2 A per output (single ceiling fan)
TVM	50 mA per channel, 750 mA per system

Module Quantity Limits

Panel Size	Feed type	TVM	4A 4U 4M	XP
Mini	Feed-through	NA	Any combination up to 3 modules	
Mini	Feed-through	0-4	Any combination up to 2 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	
Mini	Breakers	NA	Any combination up to 3 modules	0
Mini	Breakers	0-4	Any combination up to 2 modules; must have 1 4U module minimum; each 4U module can control only 2 TVM modules	0
Standard	Feed-through	NA	Any combination up to 9 modules	
Standard	Feed-through	0-12	Any combination up to 8 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	
Standard	Breakers (main lugs)	NA	Any combination up to 9 modules	0
Standard	Breakers (main lugs)	NA	Any combination up to 7 modules	
Standard	Breakers (main lugs)	0-12	Any combination up to 8 modules; must have 1 4U module minimum; each 4U module can control only 2 TVM modules	0
Standard	Breakers (main lugs)	0-12	Any combination up to 5 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	

Notes

- Consult Lutron for panels with custom breaker needs.
- TVM = 0 is a TVM-ready panel; TVM modules can easily be installed in the future.
- TVM = NA is not TVM-ready

Panel Model Number Guide (continued)

GRAFIK Systems™ (CCP/LCP) (230/220-240 V~ only)

Example

CCP-1X4L2T-2304IS-CE-LCP-CGP___

- Prefix
- Modules: Quantity and Type
- Feed Voltage
- Feed Type
- Region Suffix
- Controller Type
- Custom Panel Suffix (contact Lutron for custom options)

Prefix

CCP = Custom combination panel

Module Types

_X _L _E _A _M _T

List modules in the order shown above. Insert the quantity before each module code. Omit codes for modules not used in panel. See table below for limits on numbers of modules per panel.

X = Four-Circuit Switching (Relay) (XP)
L = Four-Circuit Dimming (4U)
E = Four-Circuit Electronic Low Voltage Dimming (4E)
A = Four-Circuit Adaptive Dimming (4A)
M = Four-Circuit Motor (4M)
T = 0-10 V, DALI (broadcast), DSI, and PWM Ballast Control (TVM)

Feed Voltage

230 = 230 V~ (CE)
240 = 220-240 V~ (non-CE)

Feed Type

FT = feed-through panel (circuit breakers not included)
4IS = 3 phase 4 wire isolation switch
2M = 1 phase 2 wire input breakers (mini only)
4M = 3 phase 4 wire input breakers (mini only)

Region Suffix

CE = 230 V~
AU = 220-240 V~
Note: Should match feed voltage

Controller Type

Omit for single-link circuit selector
2L = 2Link™ circuit selector
LCP = LCP128

Custom Panel Suffix (optional)

Indicates panel with special options

Frequency

(All Model Numbers and Voltages)

50/60 Hz

Output (Load) Ratings

Module Type	Rating
XP	16 A per circuit
4U (230 V~)	13 A per module, 10 A per output
4U (240 V~)	16 A per module
4A	13 A per module, 8 A per output
4E	16 A per module, 10 A per output
4M	16 A per module, 5 A per output (1/4 HP motor), 1 motor per output
TVM	50 mA per channel, 750 mA per system

Module Quantity Limits

Panel Size	Feed type	TVM	4A 4U 4E 4M	XP
Mini	Feed-through	NA	Any combination up to 3 modules	
Mini	Feed-through	0-4	Any combination up to 2 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	
Mini	Input breakers	NA	Any combination up to 3 modules	0
Mini	Input breakers	0-4	Any combination up to 2 modules; must have 1 4U module minimum; each 4U module can control only 2 TVM modules	0
Standard	Feed-through	0-12	Any combination up to 8 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	
Standard	Input breakers	0-12	Any combination up to 8 modules; must have 1 4U module minimum; each 4U module can control only 2 TVM modules	0
Standard	Input breakers	0-12	Any combination up to 6 modules; must have 1 4U or XP module minimum; each 4U or XP module can control only 2 TVM modules	

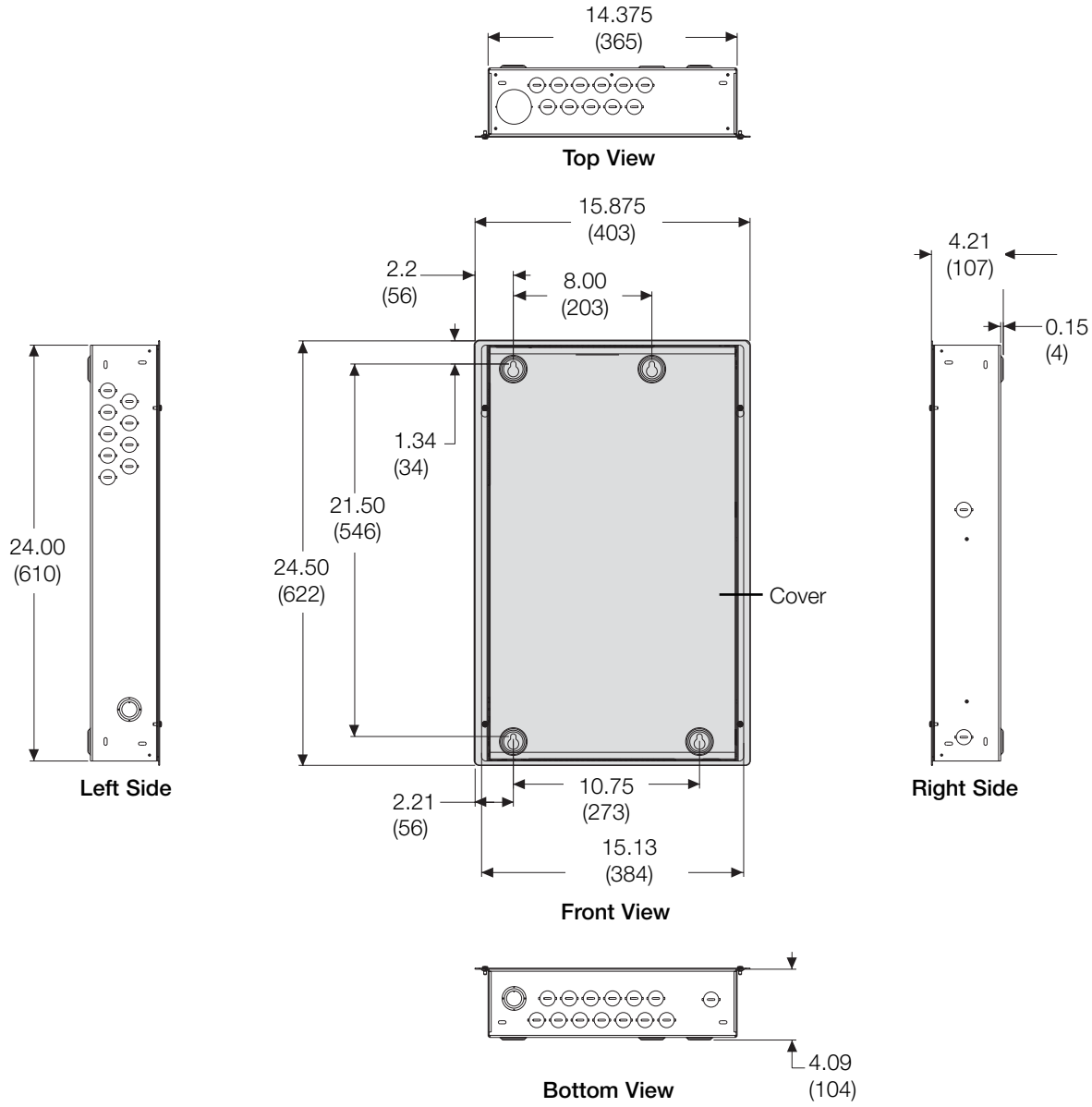
Notes

- Consult Lutron for panels with custom breaker needs.
- TVM = 0 is a TVM-ready panel; TVM modules can easily be installed in the future.
- TVM = NA is not TVM-ready

Panel Dimensions

Mini Panel

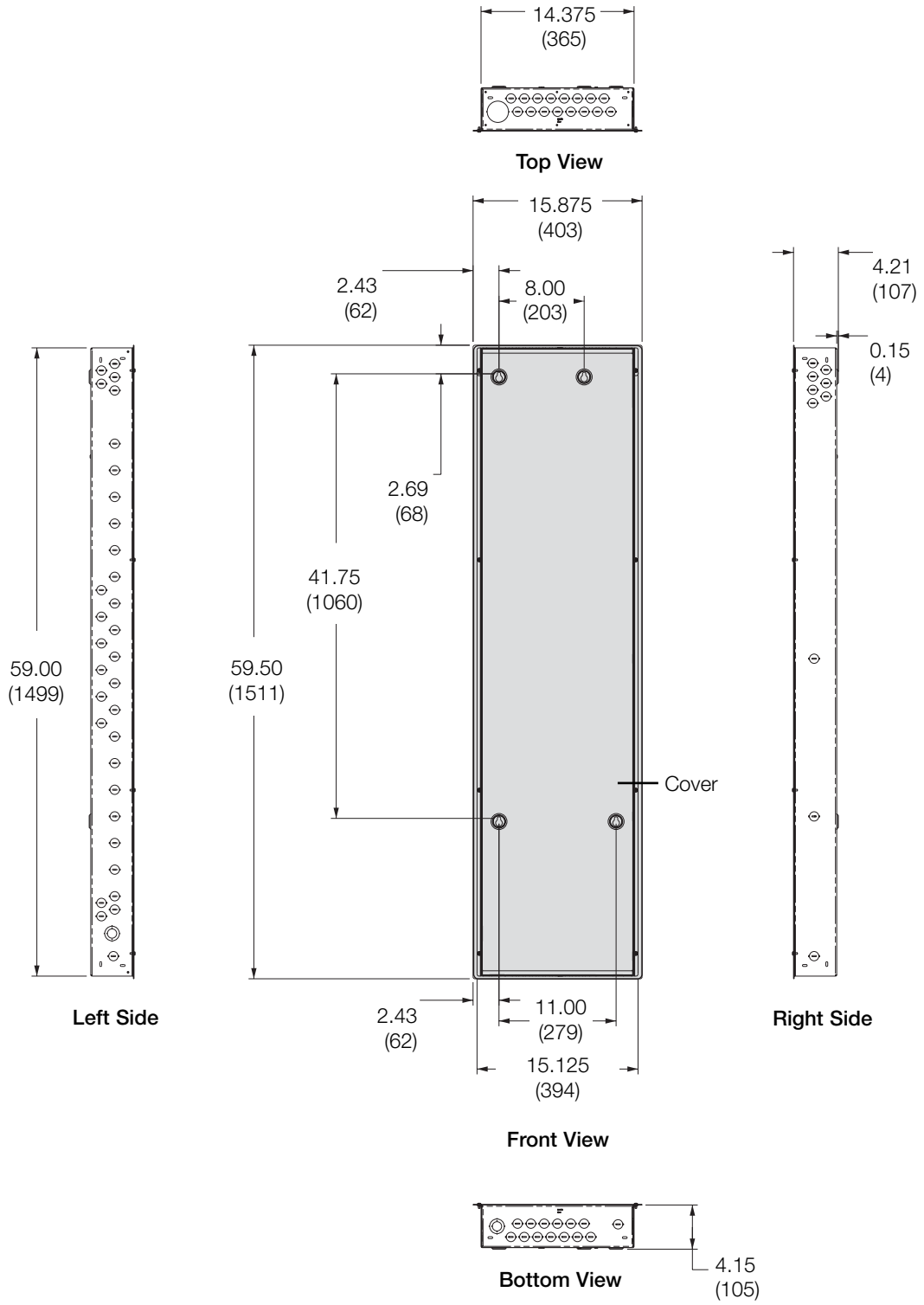
Dimensions are in inches (mm).



Panel Dimensions (continued)

Standard Panel

Dimensions are in inches (mm).



Panel Mounting

Mounting Guidelines

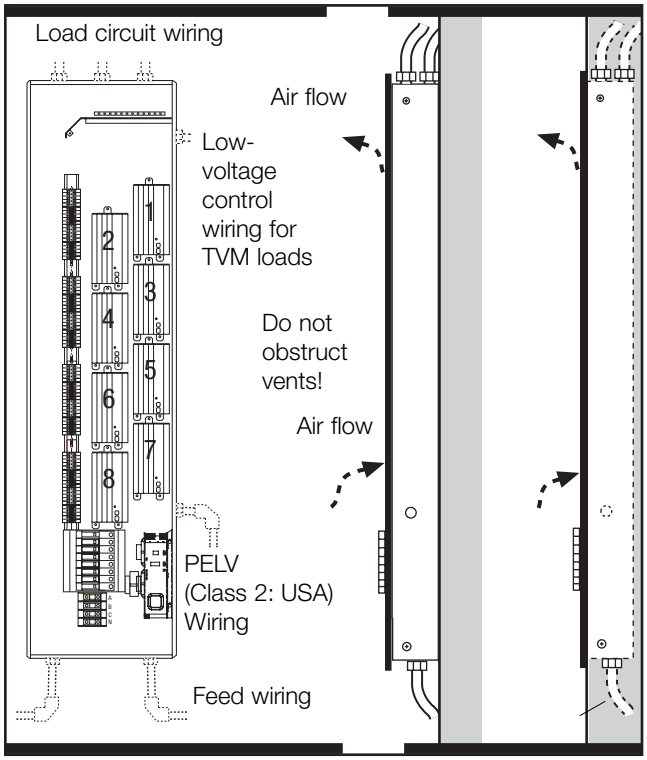
- For Indoor Use Only! NEMA, Type 1 enclosure, IP20.
- Panel generates heat. Mount only where ambient temperature is 32-104 °F (0-40 °C).
- Relative humidity must be < 90% non-condensing.
- Reinforce wall structure for panel weight and local codes; see table.
- Allow 12 in. (305 mm) clearance above and below panel.
- Mount within 7° of true vertical.
- Mount panel where audible noise is acceptable. (Internal relays click.)
- Mount panel so line (mains) voltage wiring is at least 6 ft. (1.8 m) from audio or electronic equipment and associated wiring.
- Install in accordance with all national and local electrical codes.

No. Modules	Max. Heat BTUs (Kcal)/Hr.	Max. Weight w/o Packaging Pounds (kg)
1	90 (22.68)	24 (11)
2	170 (42.84)	35 (16)
3	250 (63.00)	37 (17)
4	330 (83.16)	68 (25)
5	410 (103.32)	71 (26)
6	490 (123.48)	74 (27)
7	570 (143.64)	77 (28)
8	650 (163.80)	80 (29)
9	730 (183.96)	83 (30)

Caution! This equipment is air-cooled. Vents must not be blocked or you will void the warranty.

Caution! 230 V~ panels with 13 A circuit breakers are intended for industrial or commercial use only.

Front View **Side View: Surface Mount** **Side View: Recess Mount**



LP8/32-1204ML-20 shown

Surface Mounting

- Lutron recommends using 1/4 in. (6 mm) mounting bolts (maximum size accepted by keyholes).
- Reinforce wall structure as required for weight and local codes.
- Do not mount panel directly to wall board/drywall.

Recess Mounting

- Mount to wall stud by screwing through slots in corners of panel.
- Mount panel between flush and 1/8 in. (3 mm) below finished wall surface.

Recommended Mounting Heights*

(for LCP128 systems)

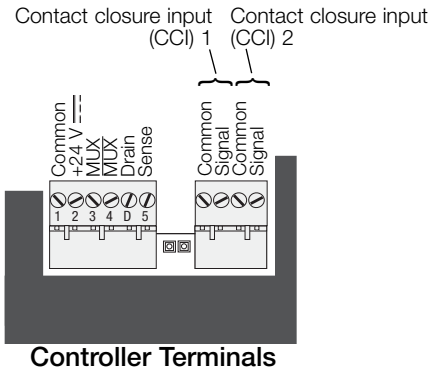
Mini	45 in. (1143 mm)
Standard	25 in. (635 mm)

* Measure from floor to bottom of panel; optimal viewing height for controller.

System Wiring Overview

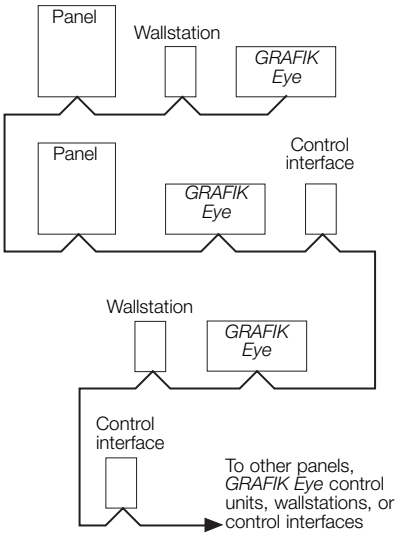
Review the options below for information on wiring your panel correctly into your specific system.

A. *LCP128* panel: Refer to the *LCP128 Setup and Operation Manual* for detailed wiring information.

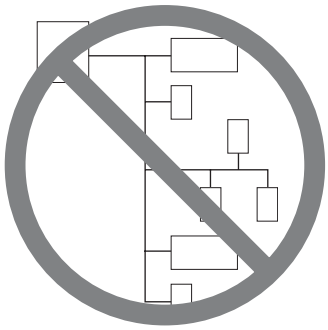


Controller Terminals

B. LP or CCP panel as a part of a *GRAFIK Eye* 4000 lighting system: Refer to the *GRAFIK Eye 4000 Installation, Setup, and Operation Manual* and the system overview pictured here for detailed wiring information.

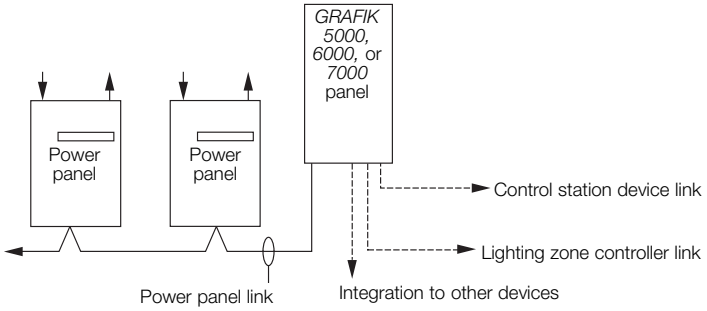


Correct: Daisychain OK

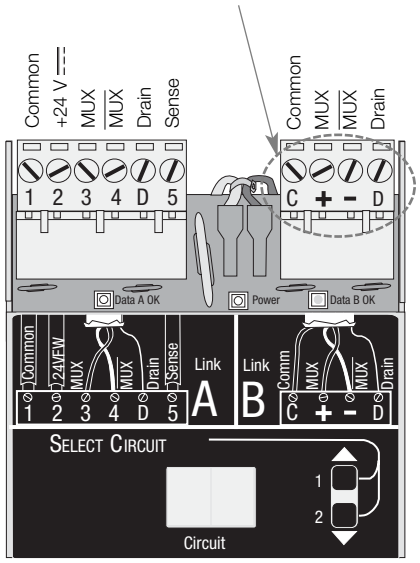


Incorrect: Branch, T-tap, or home run not acceptable

C. LP or CCP panel as a part of a *GRAFIK* 7000 lighting system: Refer to the *GRAFIK7000 Installation, and Maintenance Guide* and the system overview pictured here for detailed wiring information.



Note: Single-link circuit selectors will not have Link B connector.



Circuit Selector Terminals

Feed and Load Wiring Overview

Feed Wiring (Mains Voltage Wiring)

- Preferred feed wiring entry for panels with main lugs/isolation switch is from the bottom left of the panel.
- Preferred feed wiring entry for feed-through panels is from the top or bottom left of the panel, wired directly to module terminal blocks.
- Run wiring so that line (mains) voltage wiring will be at least 6 ft. (1.83 m) from sound or electronic equipment and its wiring.
- Refer to Feed Wiring pages for more information.

Load Circuit Wiring

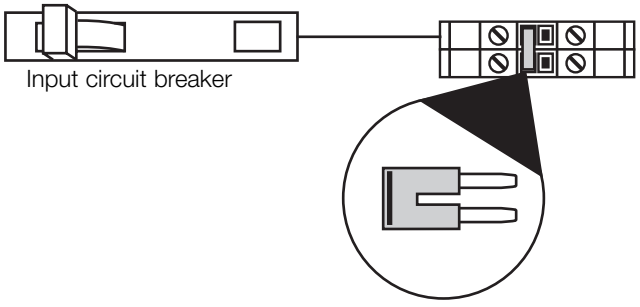
- Connect load wiring to the appropriate terminal block set for each module.
- For 230 V~ and 240 V~ panels, “Hot” is referred to as “Live”. Therefore, terminals will be labeled DL and L.
- The Dimmed Hot/Live (DH/DL) terminal block is grouped with a numbered Hot/Live (H/L) (H1, H2, etc./L1, L2, etc.). The number represents both the module and circuit breaker number.
- Output terminal blocks accept one #14-#10 AWG (2.5-4.0 mm^2) wires. Preferred entry is from the top left of the panel.
- Refer to Load Wiring pages for more information.

Caution! Common neutrals are not permitted. Run separate neutrals for each load circuit.

Caution! Panels require entry of wires as specified. Improper entry will block serviceable parts and impede air flow through the panel.

Temporary Lighting

You do not need to install a temporary distribution panel. Connect load wires into the appropriate terminal blocks. Each input breaker can supply power to a load while the bypass jumper protects the module from load faults.



Bypass jumper protects the module from load faults.

Caution! Verify that the panel is fed from the correct voltage. A feed miswire or loss of a feed neutral can cause over-voltage damage to the equipment. Do NOT remove bypass jumpers at this point--they protect the modules from load faults.

Ratings

LP/LCP/CCP Panels

Feed-Through Panels
(all voltages)

Number of Modules	Feed Type	Max. Feed
1 2 3 4 5 6 7 8 9	1Ø, 2W #14-#10 AWG (1.5-4.0 mm²)	120 V~: 20 A 230 V~: 13 A or 16 A 220-240 V~: 16 A

Panels with Breaker
(120 V~ only)

Number of Modules	Feed Type
1 2 3	1Ø, 2W 1Ø, 3W 3Ø, 4W #14-#10 AWG (1.5-4.0 mm²)

Panels with Main Lugs
(120 V~ only)

Number of Modules	Feed Type	Maximum Feed
4 5 6 7 8 9	1Ø, 3W or 3Ø, 4W #14-#2/0 AWG (25-70 mm²)	175 A

Panels with Breaker
(220-240 V~ and 230 V~ only)

Number of Modules	Feed Type
1 2 3	1Ø, 2W 1Ø, 2W 3Ø, 4W #14-#12 AWG (1.5-4.0 mm²)

Panels with Isolation Switch
(220-240 V~ and 230 V~ only)

Number of Modules	Feed Type	Maximum Feed 230 V~	Maximum Feed 220-240 V~
4 5 6 7 8	3Ø, 4W #14-#2/0 AWG (25-70 mm²)	125 A	125 A

Feed-Through Panel: Feed and Load Wiring (all voltages)

General Notes

- Typical dimming/switching legs shown.
- Do not remove bypass jumpers until after load wiring has been verified.

Wire sizes for power feed, to each input

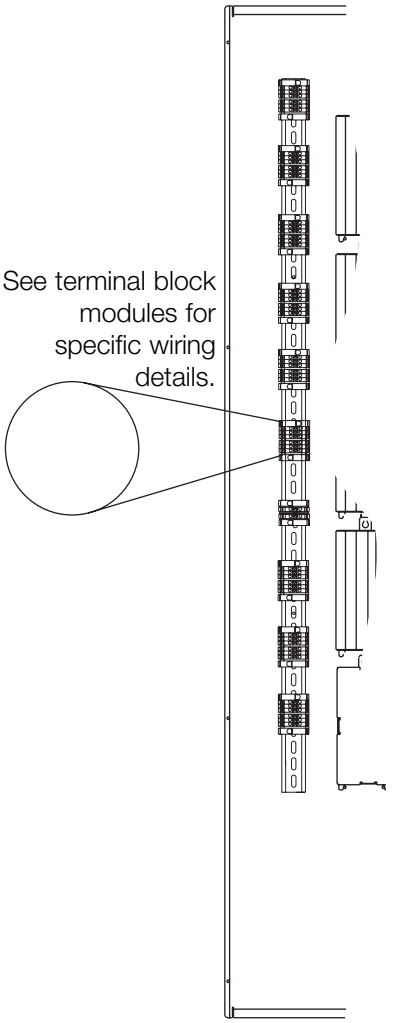
- Power feed: #14 AWG (2.5 mm^2) to #10 AWG (4.0 mm^2)
- Neutral feed: #14 AWG (2.5 mm^2) to #10 AWG (4.0 mm^2)

Wire sizes for load wiring, from each output

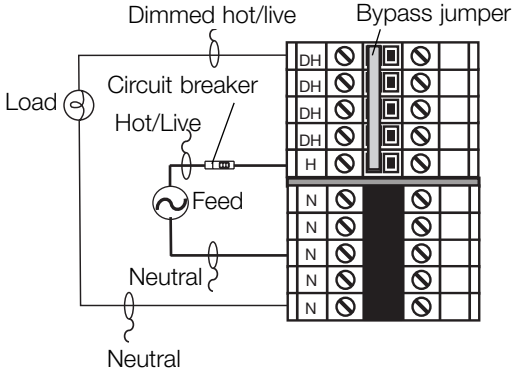
- Dimmed hot (live): #14 AWG (2.5 mm^2) to #10 AWG (4.0 mm^2)
- Load neutral: #14 AWG (2.5 mm^2) to #10 AWG (4.0 mm^2)

Control Circuit Power

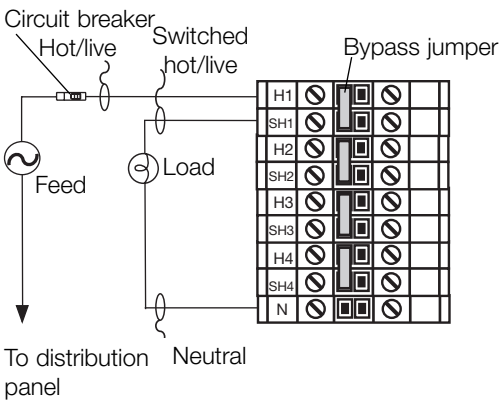
- Supplies power for internal operation.
- Requires dedicated feed with same voltage and phase as panel.
- Must be 1/4 in. (6 mm) away from PELV (Class 2: USA) control wiring harness.
- Panel voltage (see pages 2-3) indicates feed voltage.
- For 230 V~ and 240 V~ panels, "Hot" is referred to as "Live". Therefore, terminals will be labeled L and DL.



4-Circuit Dimming Module (4U)
4-Circuit Adaptive Dimming Module (4A)
4-Circuit ELV Dimming Module (4E: 230 V~ and 220-240 V~ only)
4-Circuit Quiet Fan Speed Module (4FSQ)

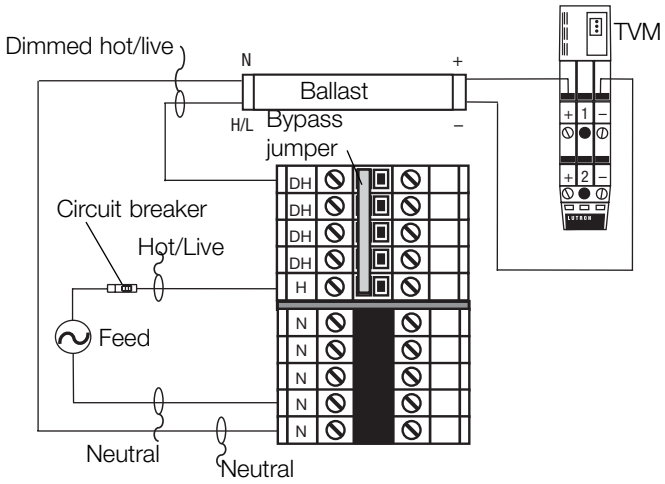


4-Circuit Switching (Relay) Module (XP)



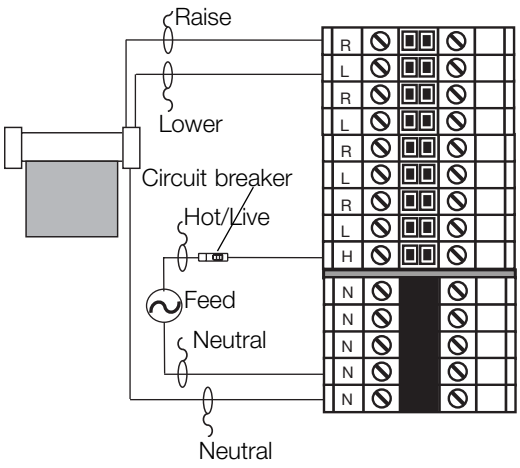
TVM Module

For 0-10 V, PWM, Tridonic® DSI, and DALI loads. Each TVM controls two consecutive circuits of lighting and are the first circuits in the panel. Maximum low-voltage ballast control current: 50 mA per zone, 750 mA per panel. Dimming or switching module is used to switch power to the ballast.

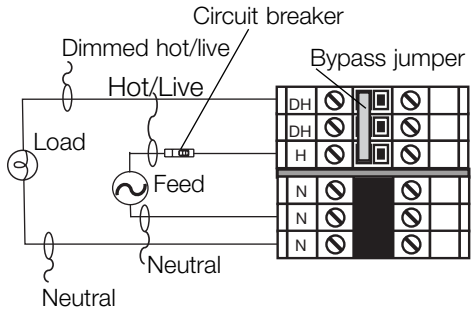


Feed-Through Panel: Feed and Load Wiring (continued)

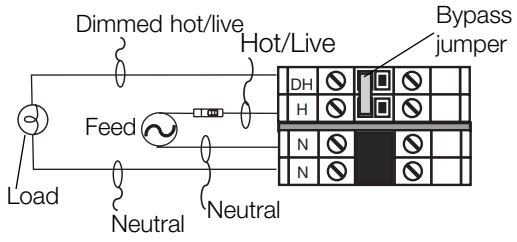
4-Circuit Motor Module (4M)



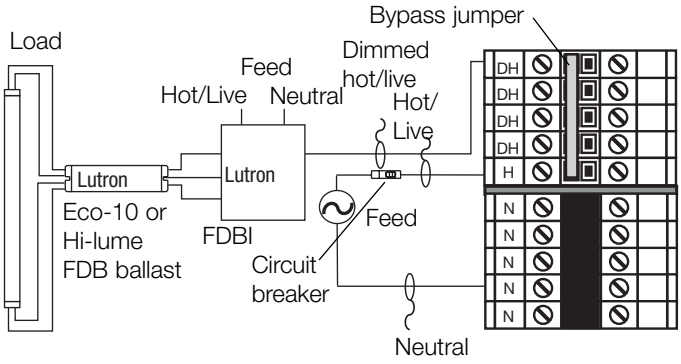
2-Circuit Dimming Module (2U)
(LCP and CCP only)



1-Circuit Dimming Module (1U)
(LCP only)



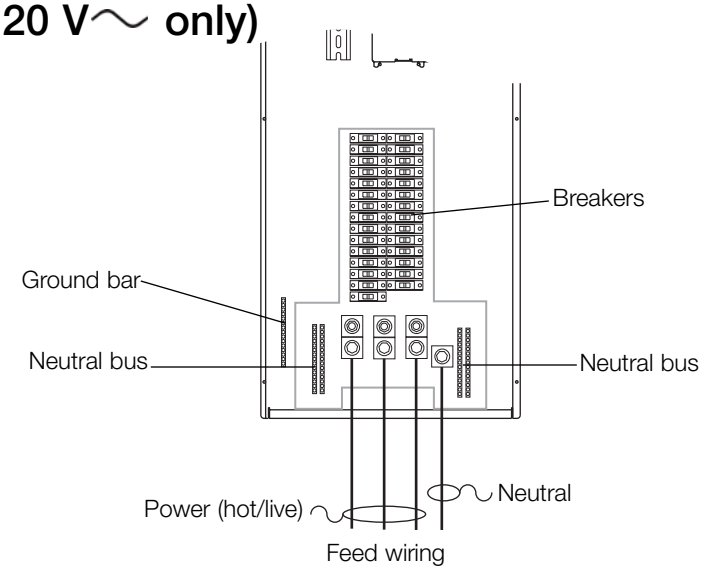
Connecting an NGRX-FDBI to a Panel



Refer to FDBI Installation Sheet for detailed wiring.

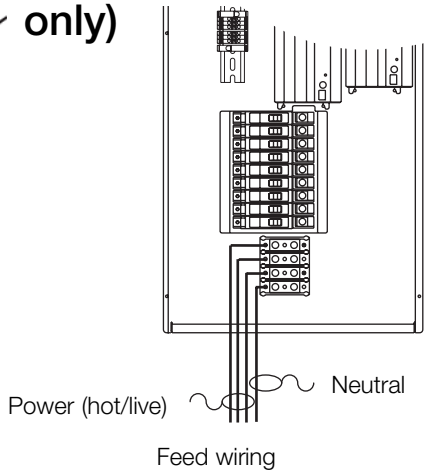
Panel with Main Lugs: Feed Wiring

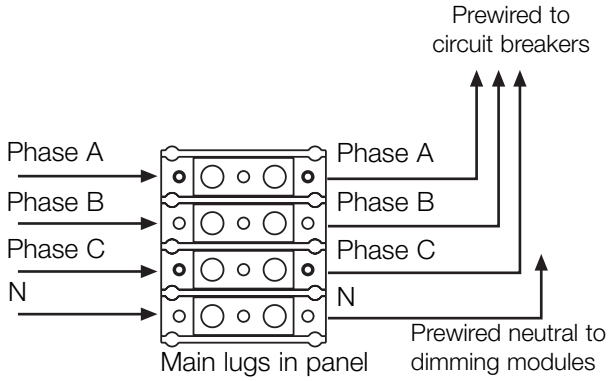
Dimming and Switching Panels (120 V~ only)



Notes
- See page 15 for load wiring details.
- On **dimming panels** only, the input breaker of Circuit 1 supplies current to Load Circuit 1 and to the Control Wiring (2 A draw max.). Panels with switching modules have a dedicated circuit breaker for the control circuit.

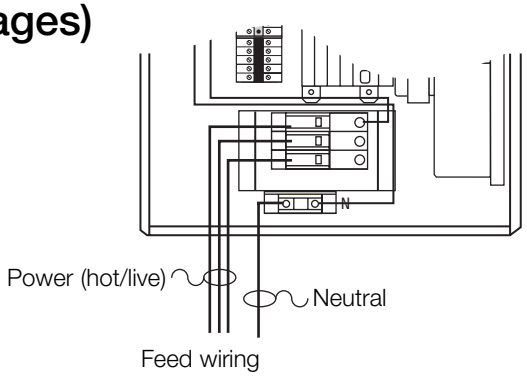
Dimming Panels (120 V~ only)



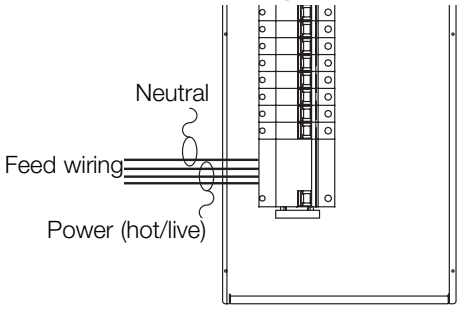


Main Lugs feed wiring gauge: #2/0 AWG (70 mm^2)

Mini Panel Breaker Wiring (all voltages)



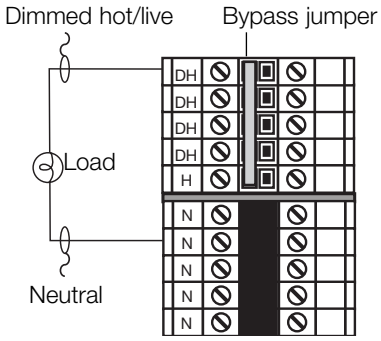
Dimming Panels Isolation Switch (230/220-240 V~)



Panel with Main Lugs: Load Wiring

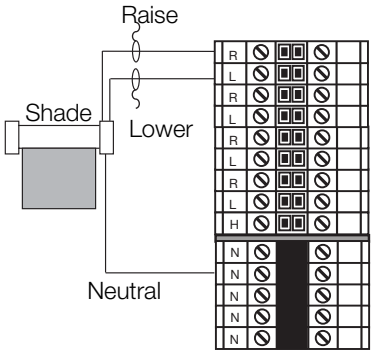
Typical Dimming/Switching Leg Shown

4-Circuit Dimming Module (4U)
4-Circuit Adaptive Dimming Module (4A)
4-Circuit ELV Dimming Module
(4E: 230 V~ and 220-240 V~ only)
4-Circuit Fan Speed Control Module (4FSQ)

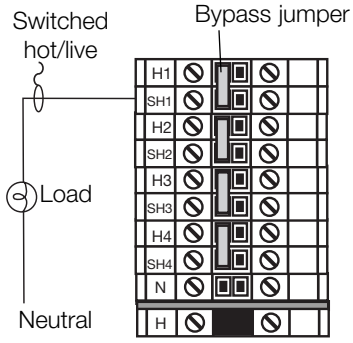


Caution! Do not remove bypass jumpers until after load wiring has been verified.

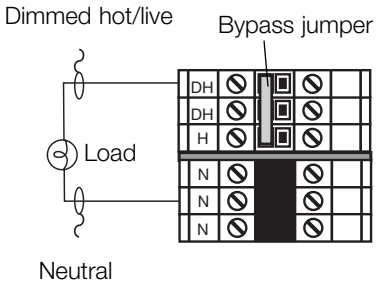
4-Circuit Motor Module
(4M)



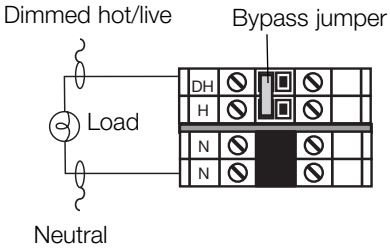
4-Circuit Switching Module
(XP)



2-Circuit Dimming Module (2U)
(LCP only)

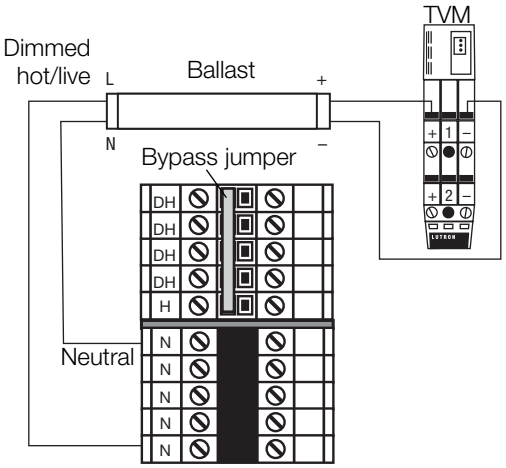


1-Circuit Dimming Module (1U)
(LCP only)



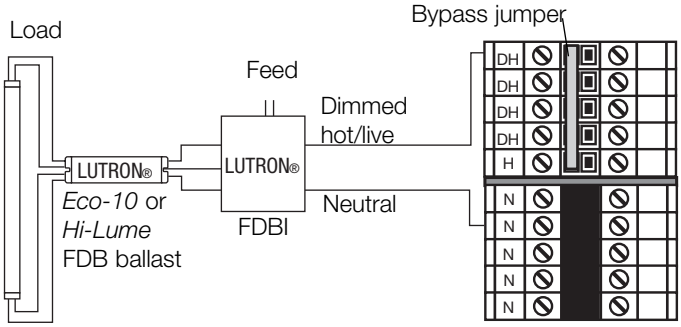
Load Wiring for TVM Module

For 0-10 V, PWM, and Tridonic® DSI loads. Each TVM controls two consecutive circuits of lighting and are the first circuits in the panel. Maximum low-voltage ballast control current:
50 mA per zone, 750 mA per panel.



Connecting an NGRX-FDBI to a Panel

For Hi-Lume® FDB or Eco-10™ Fluorescent Dimming Ballast



Activate Loads in Bypass

A. Complete load wiring.

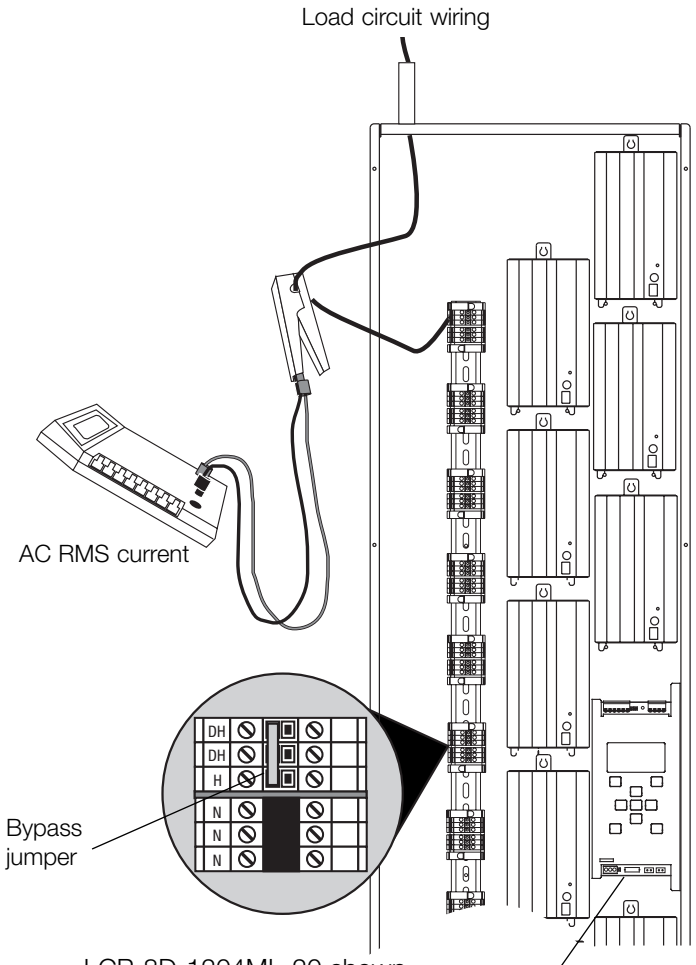
B. Check that the bypass jumpers are in place.
These jumpers protect from load faults and must be used to check load wiring when it is installed or modified.

Caution! Verify that the panel is fed from the correct voltage. A feed miswire or loss of a feed neutral can cause damage to the equipment.

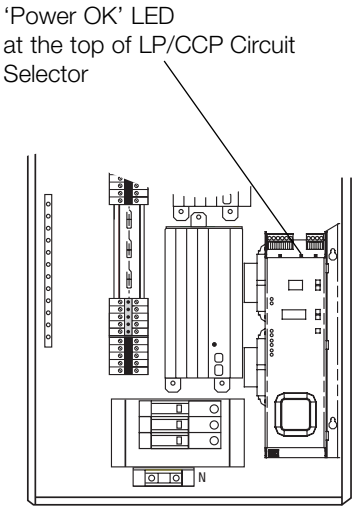
C. Turn circuit breaker 1 ON.
The load(s) should energize, the breaker should not trip, and total load current must be within the circuit breaker's limit and less than or equivalent to 16 A.
Circuit breaker 1 powers the control wiring as well as Circuit 1's dimmer and load(s). Check that the Power OK LED on the Controller (*LCP128*) or circuit selector (LP or CCP) is ON. If the Power OK LED is OFF, turn OFF the control circuit breaker (breaker 1) and check for a miswire on the low voltage link.

D. Turn next circuit breaker ON.
The load should energize, the breaker should not trip, and total load current must be within the circuit breaker's limit and less than or equal to 16 A.

E. Repeat step D for each circuit with completed load wiring.



LCP-8D-1204ML-20 shown



LP3/12-1204ML-20 shown

Complete Installation

You have completed your panel installation.

For Onsite Factory Commissioning, call Lutron Technical Support and select Startup to schedule a field service visit. Allow for 10 working days between day of call and scheduled visit.

If you purchased Telephone Startup (*LCP128* only), stop here and complete the Control Location, Panel, and Control Station Tables that are located in the back of the *Setup and Operation*. Once the tables are complete, call Lutron Technical Support and select Startup. Please call 24 hours prior to desired system startup.

In the U.S., Canada, and the Caribbean: 1.800.523.9466
In Mexico: +1.888.235.2910
In Europe: +44.207.702.0657
In Asia: +65.6220.4666
In Japan: +81.355.758.411
In all other countries: +1.610.282.6701

Remove Bypass Jumpers

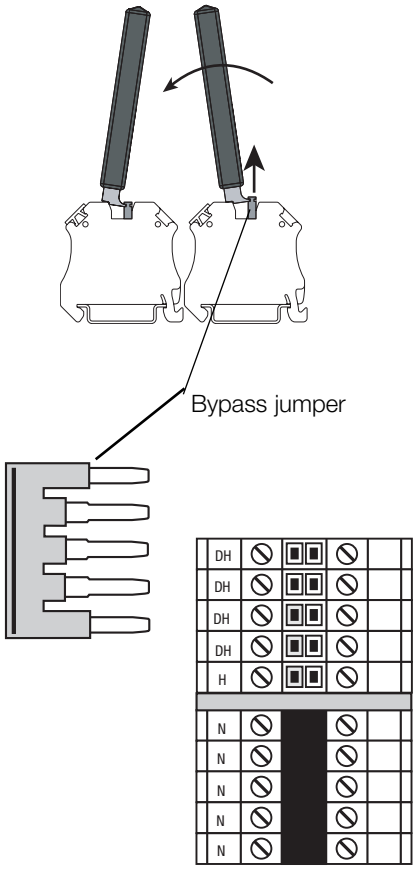
A. After all load wiring has been checked, turn circuit breakers OFF.

B. Remove and store the bypass jumpers for possible future use.

C. Turn circuit breakers ON.

Note. All circuits are now set to the default Non-Dim load type. Non-Dim load types will respond by immediately going to full ON in any lighting scene (except the OFF scene).

Caution! Reuse the bypass jumpers whenever work is being done on a load. Damage caused by short-circuits and miswiring is not covered by the product warranty.



Module with 4 outputs shown

Panel installation, control station wiring, and load activation are now complete.
Next Step: Refer to the *Setup and Operation Manual* to set up the functions and operation of the panel.

Notes

Warranty

Lutron Electronics Co., Inc.
One Year Limited Warranty

For a period of one year from the date of purchase, and subject to the exclusions and restrictions described below, Lutron warrants each new unit to be free from manufacturing defects. Lutron will, at its option, either repair the defective unit or issue a credit equal to the purchase price of the defective unit to the Customer against the purchase price of comparable replacement part purchased from Lutron. Replacements for the unit provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

If the unit is commissioned by Lutron or a Lutron approved third party as part of a Lutron commissioned lighting control system, the term of this warranty will be extended, and any credits against the cost of replacement parts will be prorated, in accordance with the warranty issued with the commissioned system, except that the term of the unit's warranty term will be measured from the date of its commissioning.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the unit pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; or (g) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the unit or any of its components.
3. Equipment and parts external to the unit, including those sold or supplied by Lutron (which may be covered by a separate warranty).
4. The cost of repairing or replacing other property that is damaged when the unit does not work properly, even if the damage was caused by the unit.

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF ANY TYPE, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. LUTRON DOES NOT WARRANT THAT THE UNIT WILL OPERATE WITHOUT INTERRUPTION OR BE ERROR FREE.

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Contact Information

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
USA
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299
TEL +1.610.282.3800
FAX +1.610.282.1243
Toll-Free 1.888.LUTRON1
Technical Support 1.800.523.9466

Brazil
Lutron BZ do Brasil Ltda.
AV, Brasil, 239, Jardim America
Sao Paulo-SP, CEP: 01431-000, Brazil
TEL +55.11.3885.5152
FAX +55.11.3887.7138

North and South America Technical Hotlines
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF United Kingdom
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
FREEPHONE (UK) 0800.282.107
Technical support +44.(0)20.7680.4481

France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33.(0)1.41.05.42.80
FAX +33.(0)1.41.05.01.80
FREEPHONE 0800.90.12.18

Germany
Lutron Electronics GmbH, Landsberger Allee 201, 13055 Berlin, Germany
TEL +49.(0)30.9710.4590
FAX +49.(0)30.9710.4591
FREEPHONE 00800.5887.6635

Italy
Lutron LDV, S.r.l.
FREEPHONE 800.979.208

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via del Carlos III, 84, planta 3a,
08028, Barcelona, Spain
TEL +34.93.496.57.42
FAX +34.93.496.57.01
FREEPHONE 0900.948.944

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34.91.567.84.79
FAX +34.91.567.84.78
FREEPHONE 0900.948.944

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
15 Hoe Chiang Road, #07-03 Euro Asia Centre, Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

China, Beijing
Lutron GL Ltd. Beijing Representative Office
5th Floor, China Life Tower
No. 16 Chaowai Street, Chaoyang District, Beijing 100020 China
TEL +86.10.5877.1817
FAX +86.10.5877.1816

China, Guangzhou
Lutron GL Ltd. Guangzhou Representative Office
Suite A09, 23/F Tower A, Centre Plaza
161 Lin He Xi Lu, Tian He District, Guangzhou 510620 China
TEL +86.20.2885.8266
FAX +86.20.2885.8366

China, Shanghai
Lutron GL Ltd., Shanghai Representative Office
Suite 07, 39th Floor, Plaza 66
1266 Nan Jing West Road, Shanghai, 200040 China
TEL +86.21.6288.1473
FAX +86.21.6288.1751

China, Hong Kong
Lutron GL Ltd.
Unit 2808, 28/F, 248 Queen's Road East
Wanchai, Hong Kong
TEL +852.2104.7733
FAX +852.2104.7633

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20
Akasaka, Minato-ku, Tokyo 107-0052 Japan
TEL +81.3.5575.8411
FAX +81.3.5575.8420
FREEPHONE 0120.083.417

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Japan: +81.3.5575.8411
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other countries: +800.120.4491

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LUTRON®

Please Read

LUTRON®
Dimming **Panels**

Installation Guide
GRAFIK Systems™ (GP) and LCP128™ (LCP SpecGrade)

GP24-1204ML-20 shown

Contents

Overview

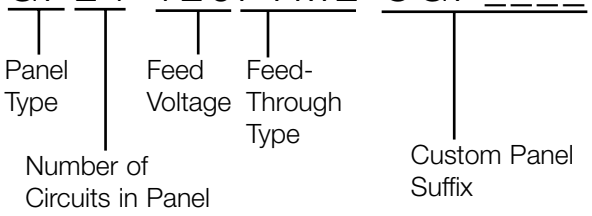
Use this guide to successfully install a dimming panel. This guide describes panel installation, wiring, and load activation.

Panel Model Number Guide: 120/277 V~

Feed-Through Model Numbers

Example

GP24-120FTML-CGP____



Panel Type

GP for GP panels
LCP for *LCP128* SpecGrade panels

Number of Circuits in Panel

Indicates number of circuits in the panel:

GP models: 3, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 60, 72, or 144

LCP (SpecGrade) models: 8, 12, 16, 20, or 24

Feed Voltage

120 for 120 V~
277 for 277 V~

Load Circuit Rating

16 A per circuit

Custom Panel Suffix

Contact Lutron for options

Frequency - All Model Numbers and Voltages

50/60 Hz

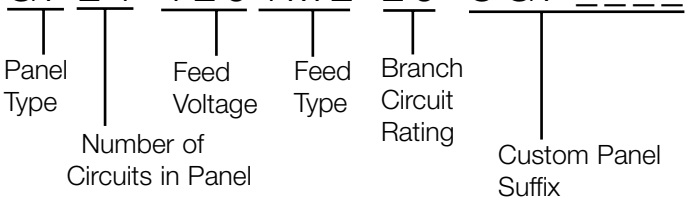
Output Voltages

120 V~ or 277 V~

Branch Circuit Breaker Model Numbers

Example

GP24-1204ML-20-CGP____



Panel Type

GP for GP panels
LCP for *LCP128* SpecGrade panels

Number of Circuits in Panel

Indicates number of circuits in the panel:

GP models: 3, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 60, 72, or 144

LCP (SpecGrade) models: 8, 12, 16, 20, or 24

Feed Voltage

120 for 120 V~
277 for 277 V~

Load Circuit Rating

16 A per circuit

Feed Type and Input Ratings

4M or 4ML for 3 phase 4 wire main lugs:
120/208 V~ or 277/480 V~
3M or 3ML for 1 phase 3 wire main lugs:
120/240 V~
2M or 2ML for 1 phase 2 wire main lugs:
120 V~ or 277 V~
DTML for dual tap main lugs
Mxxx for main breaker (xxx = breaker size in amps)

Branch Circuit Rating

15 for 15 A branch circuit breakers (GP only)
15 A branch circuit breakers have a 12 A continuous load rating
20 for 20 A branch circuit breakers
20 A branch circuit breakers have a 16 A continuous load rating

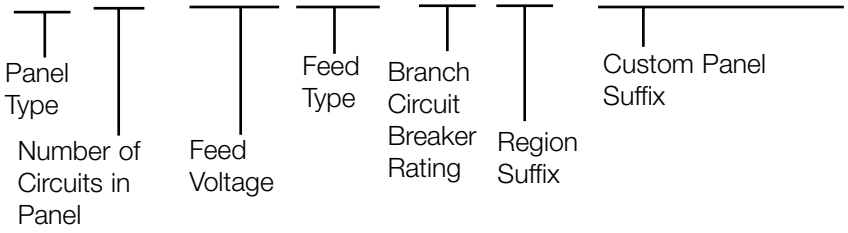
Custom Panel Suffix

Contact Lutron for options

Panel Model Number Guide: 230 V~ and 220-240 V~

Examples

GP12-2304IS-10CE-CGP____
GP12-2404IS-16AU-CGP____



Panel Type

GP for GP panels

Number of Circuits in Panel

Indicates number of circuits in the panel:
3, 4, 8, 12, 16, 20, 24

Feed Voltage

230 for 230 V~ (CE)
240 for 220-240 V~ (non-CE)

Feed Type

2IS for 1 phase 2 wire isolation switch
4IS for 3 phase 4 wire isolation switch

Input Ratings

230 V~ or 240 V~
220-240/380-415 V~

Branch Circuit Breaker Rating

10 for 10 A branch circuit breakers
10 A branch circuit breakers have a 10 A continuous load rating
16 for 16 A branch circuit breakers (240 V~ only)
16 A branch circuit breakers have a 16 A continuous load rating

Region Suffix

CE for 230 V~
AU for 220-240 V~

Custom Panel Suffix (optional)

Indicates panel with special options

Frequency - All Model Numbers and Voltages

50/60 Hz

Load Circuit Rating

16 A per circuit (non-CE)
10 A per circuit (CE)

Output Voltages

230 V~ or 220-240 V~

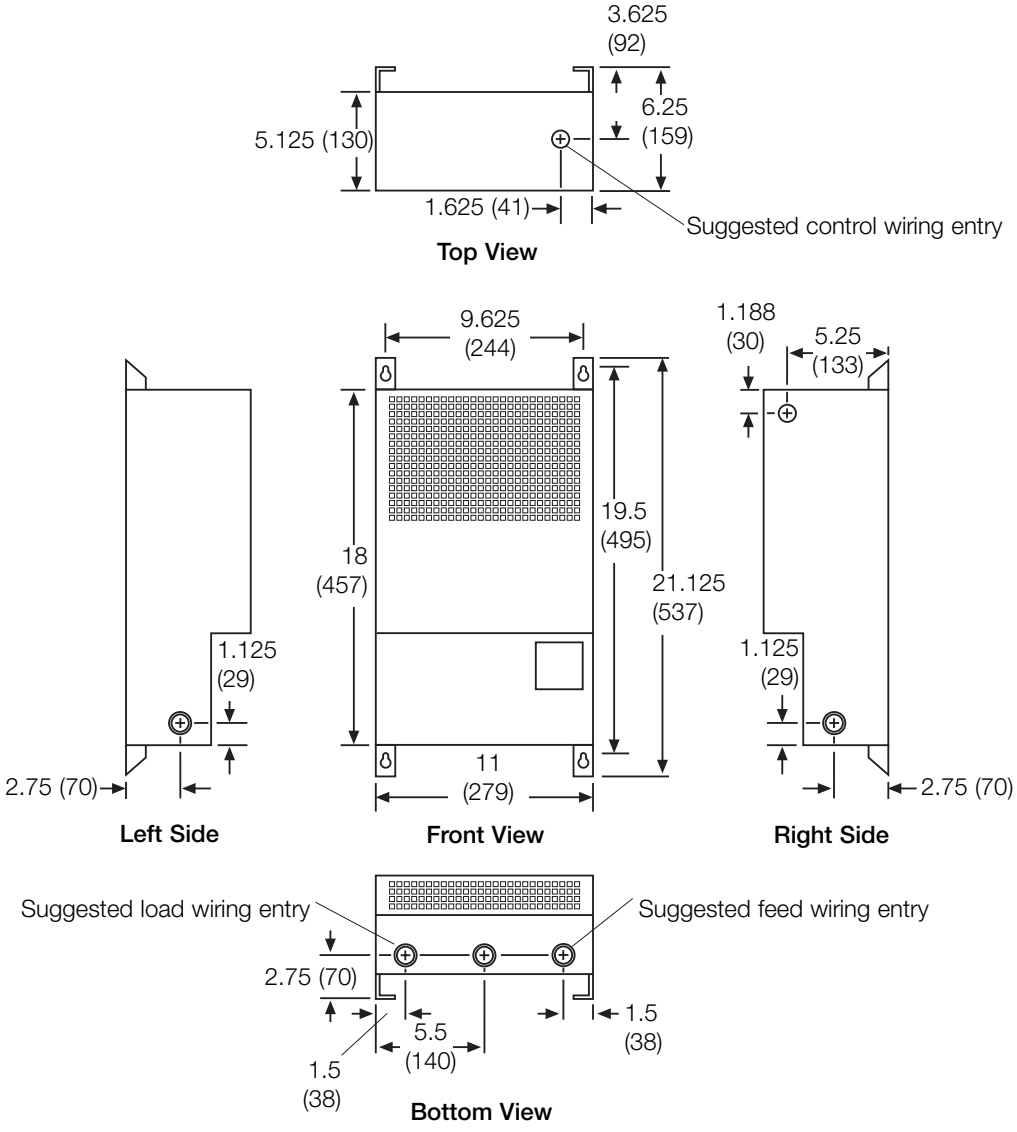
Custom Panel Suffix

Contact Lutron for options

Panel Dimensions

Mini Panel: GP3 and GP4

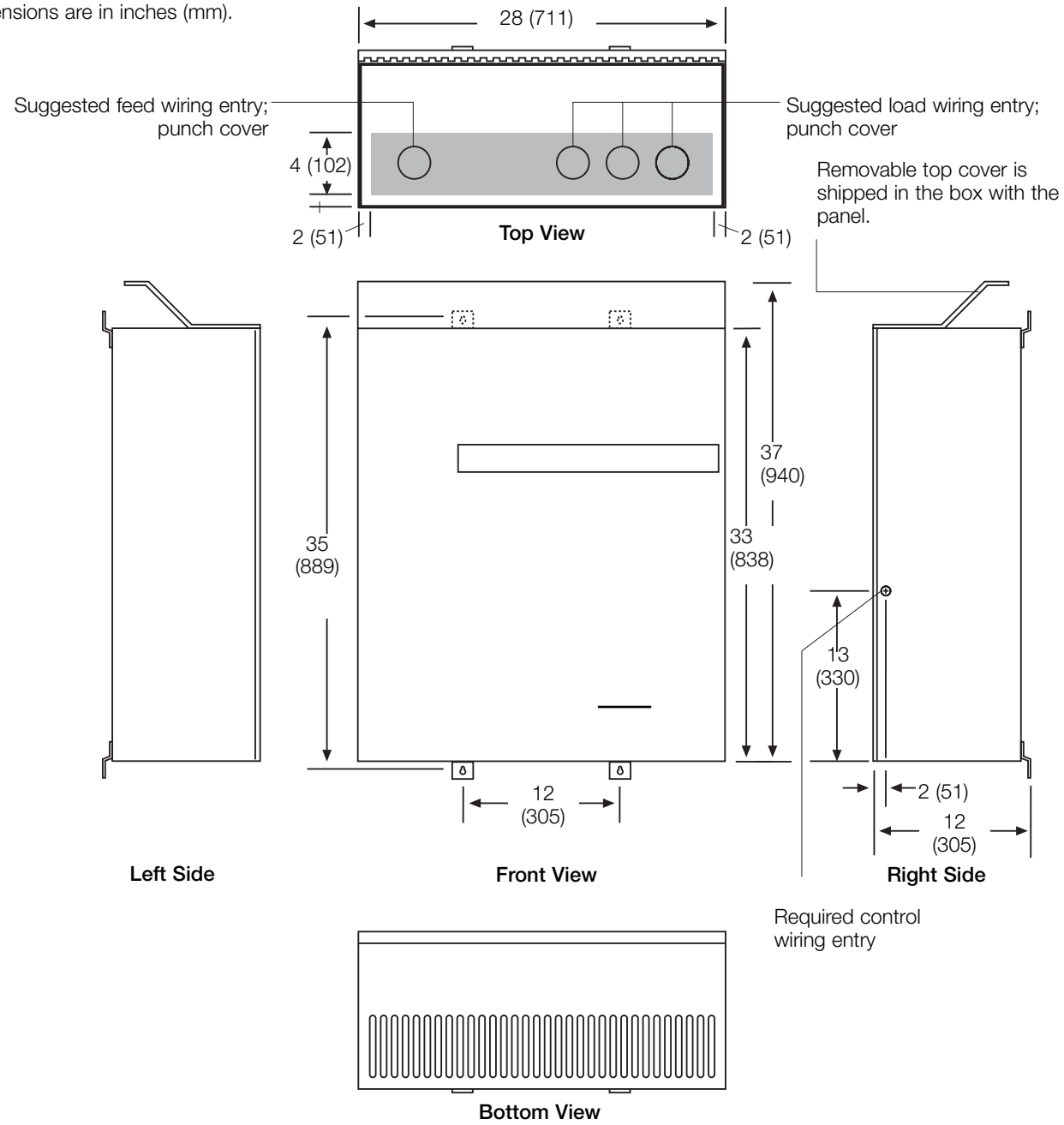
Dimensions are in inches (mm).



Panel Dimensions (continued)

Standard Panel: GP8-GP24, LCP8-LCP24

Dimensions are in inches (mm).



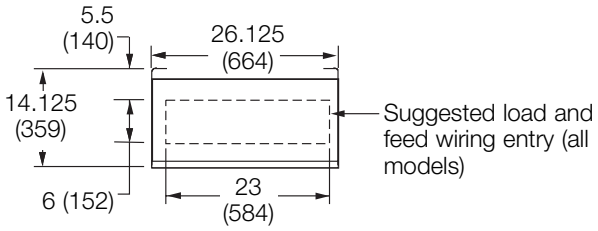
Notes

- Keyhole accepts a maximum 5/16 in. (8 mm) mounting bolt (1/4 in./m8 recommended).
- PELV (Class 2: USA) entry knockout is 7/8 in. dia. (22 mm).

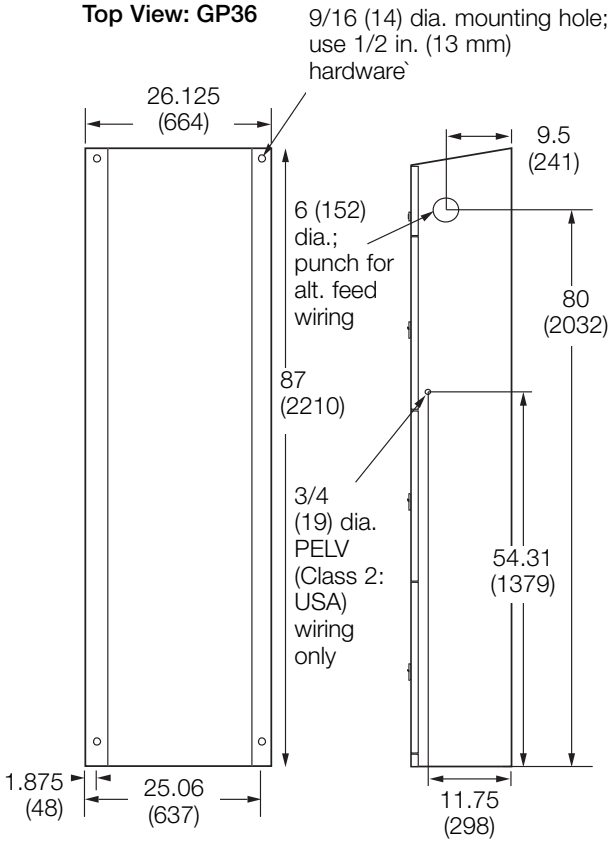
Caution! This equipment is air-cooled. Vents must not be blocked or you will void the warranty.

Panel Dimensions (continued)

Large Panel: GP36 (120/277 V~ only)

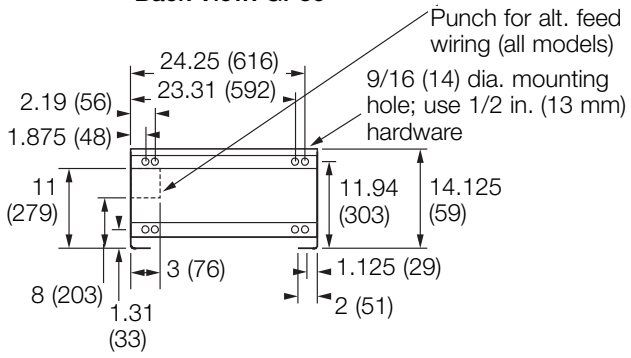


Top View: GP36



Back View: GP36

Right Side

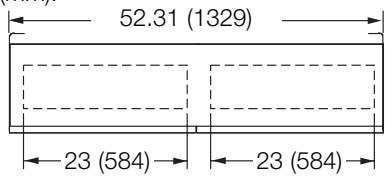


Bottom View: GP36

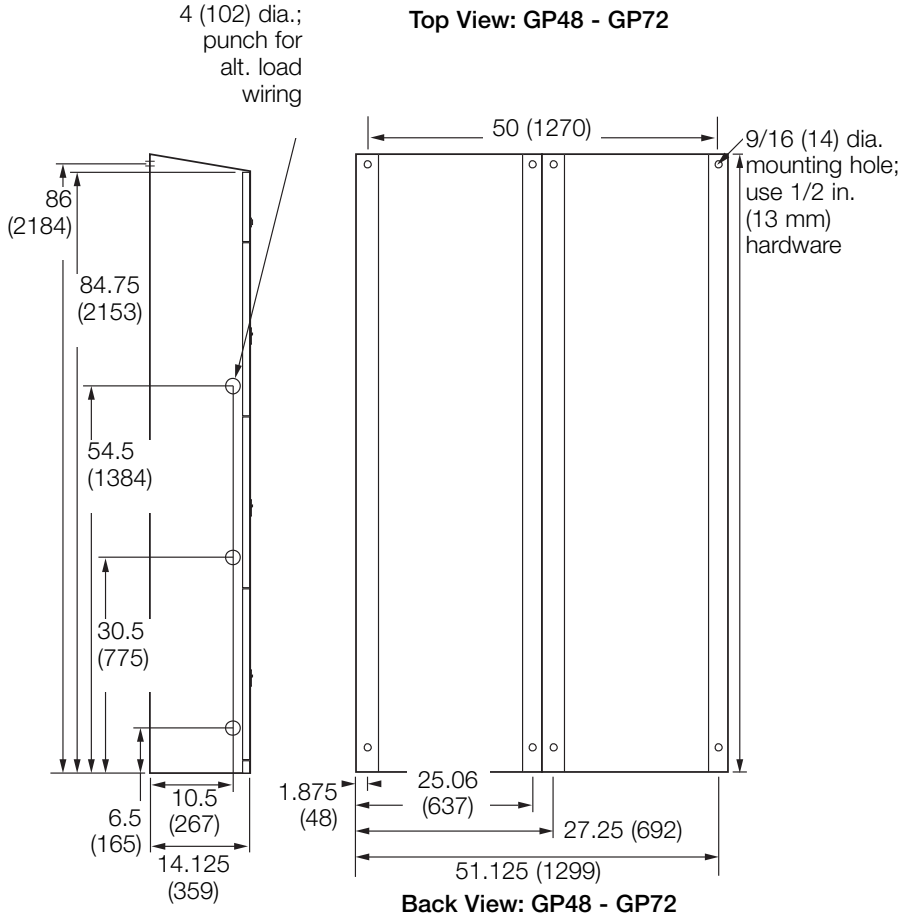
Panel Dimensions

Large Panel: GP48-GP72 (120/277 V~ only)

Dimensions are in inches (mm).

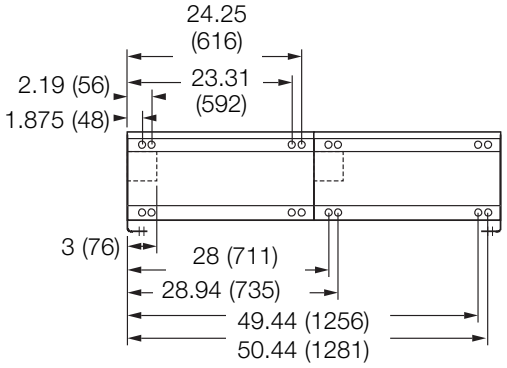


Top View: GP48 - GP72



Back View: GP48 - GP72

Left Side

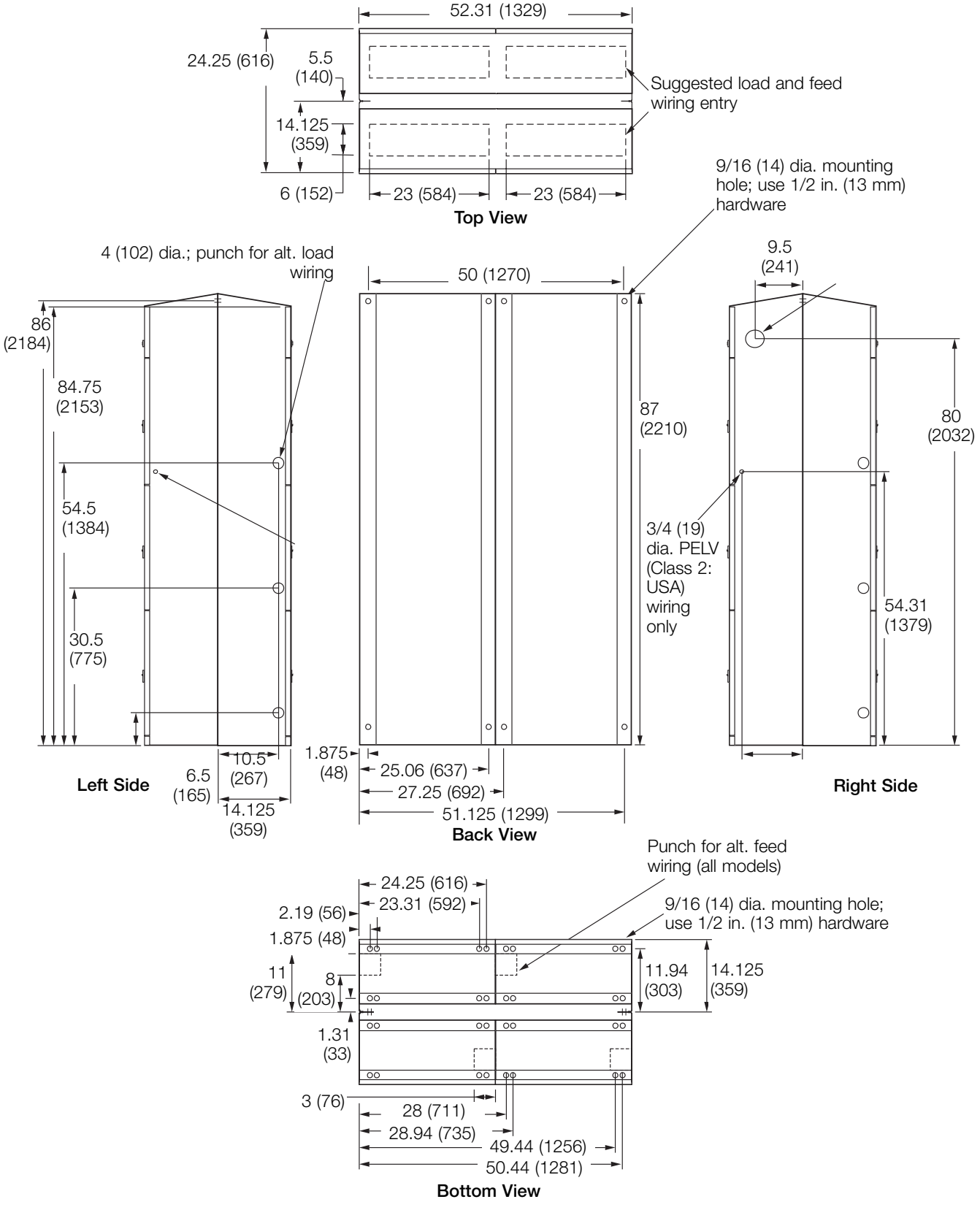


Bottom View: GP48 - GP72

Panel Dimensions (continued)

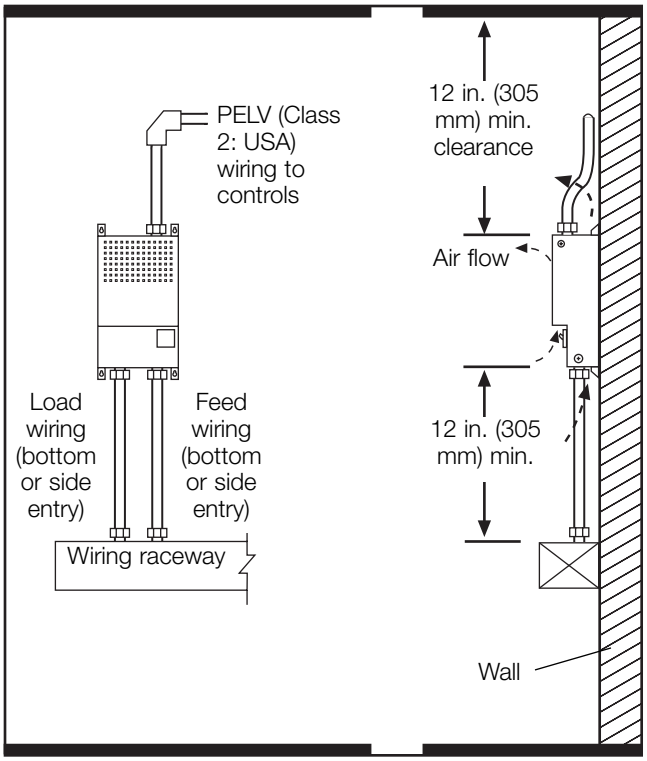
Large Panel: GP96-GP144 (120/277 V~ only)

Dimensions are in inches (cm).

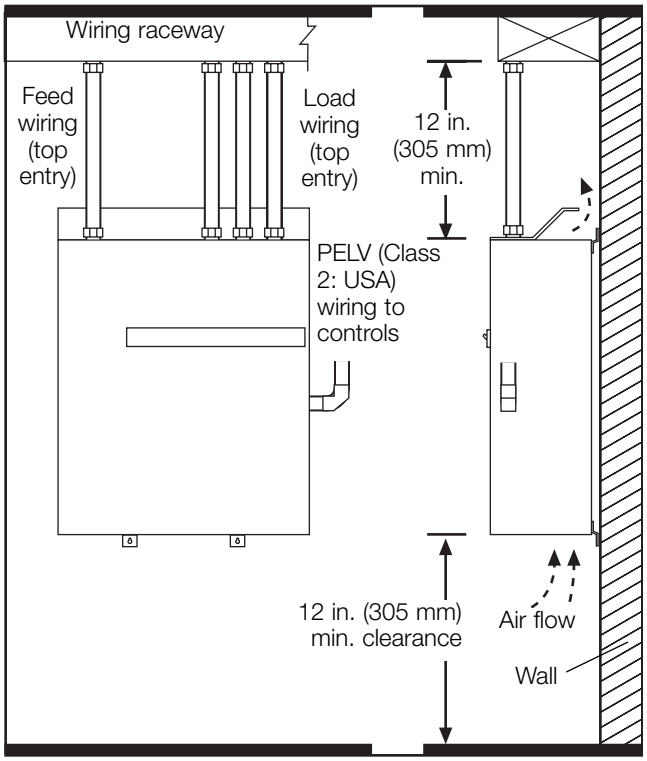


Panel Mounting

Mini Panel



Standard Panel



Mounting Guidelines

- For Indoor Use Only! NEMA, Type 1 enclosure, IP20.
- Panel generates heat. Mount where ambient temperature is 32-104 ºF (0-40 ºC).
- Relative humidity must be <90% non-condensing.
- Reinforce wall structure for panel weight and local codes; see table.
- Mount panel where audible noise is acceptable (internal relays click).
- Mount panel so line (mains) voltage wiring is at least 6 ft. (1.8 m) from audio or electronic equipment and associated wiring.
- Mount within 7º of true vertical.
- Panel clearances are 12 in. (305 mm) above and below and 0 in. to each side. Allow room for PELV (Class 2: USA) clearance.

Panel	Max. Heat BTUs (Kcal)/Hour	Max. Weight w/o Packaging* pounds (kg)
Mini		
GP3, GP4	685 (172.62)	30 (14)
Standard		
GP8, LCP8	1365 (343.98)	115 (52)
GP12, LCP12	2045 (515.34)	120 (54)
GP16, LCP16	2725 (686.70)	145 (66)
GP20, LCP20	3405 (858.06)	160 (73)
GP24, LCP24	4085 (1029.42)	175 (80)
Large		
GP36	4350 (1096.20)	325 (147)
GP48	5806 (1463.11)	550 (250)
GP60	7258 (1829.02)	600 (274)
GP72	8709 (2194.67)	650 (295)
GP144	17400 (4384.80)	1300 (590)

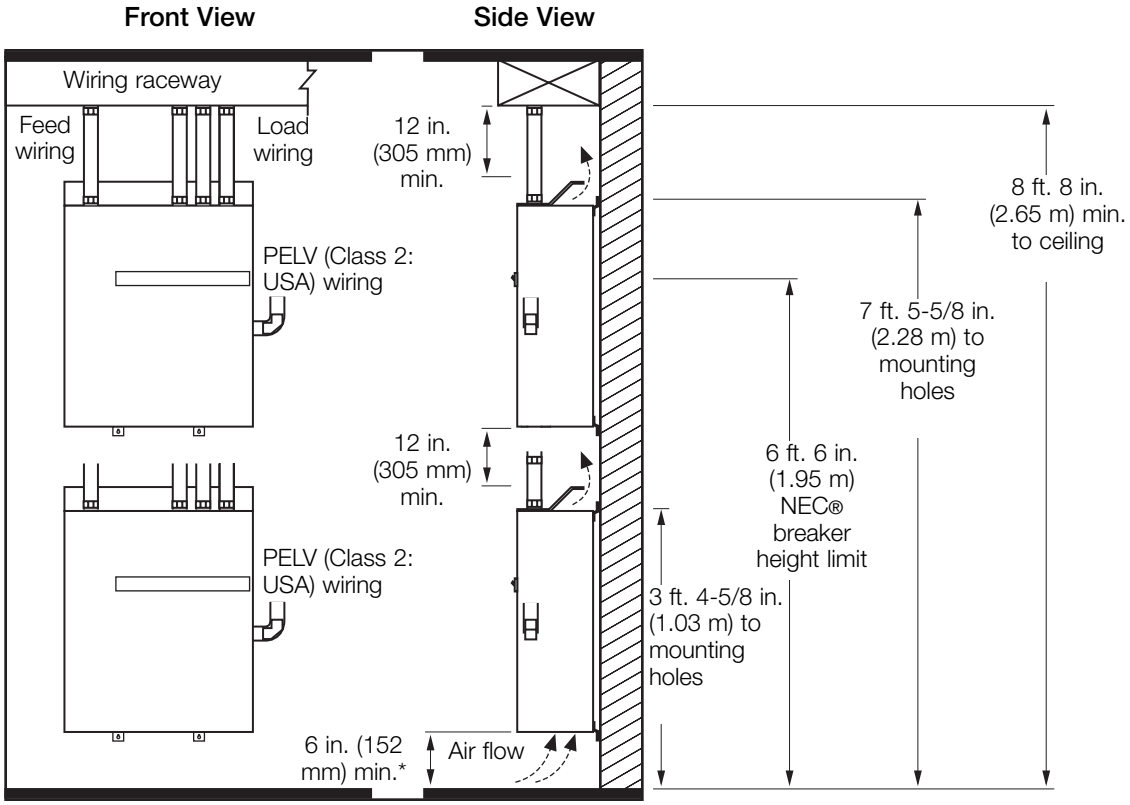
*Packaging weight adds 150 lbs (69 kg) for large panels, 50 lbs (23 kg) for medium panels, and 10 lbs (4.5 kg) for mini panels.

Warning! CE-marked panels with 10 A circuit breakers are intended for industrial or commercial use only.

Caution! This equipment is air-cooled. Vents must not be blocked or you will void the warranty.

Mounting One Panel above Another: GP8-GP24, LCP8-LCP24 only

At least 8 ft. 8 in. (2.74 m) between floor and suspended ceiling is required for this layout.



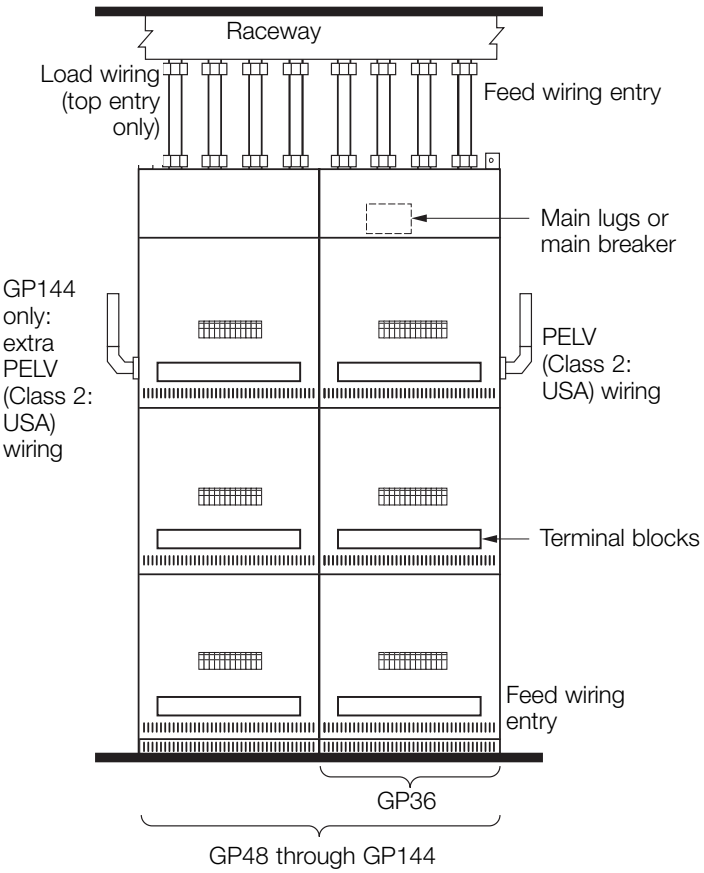
*6 in. (152 mm) approved for this layout only.

Warning! Water damages panels. Install where they will not get wet.

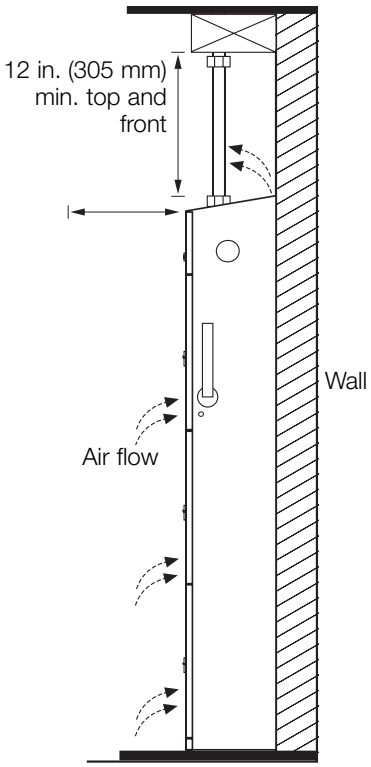
Panel Mounting

Large Panel (120/277 V~ only)

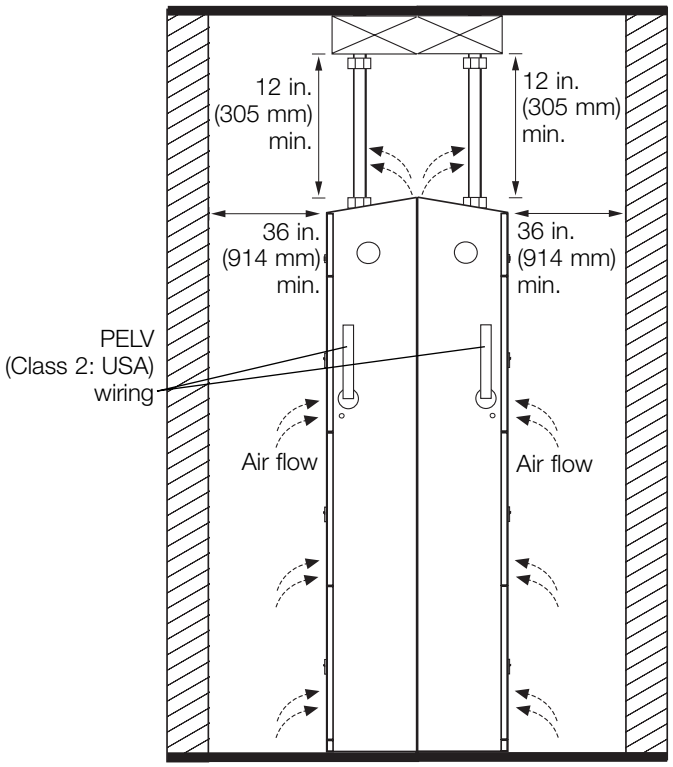
Front View



Side View: GP36 through GP72



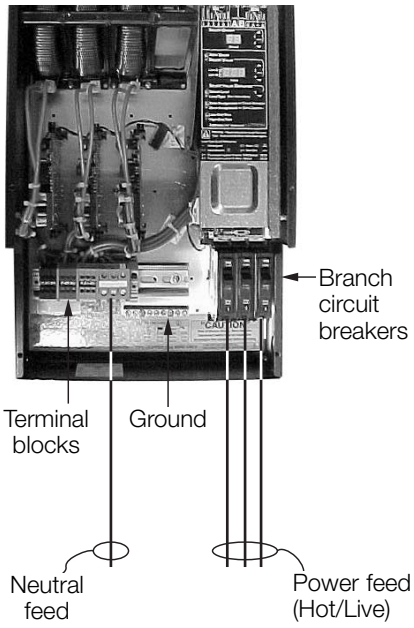
Side View: GP96-GP144



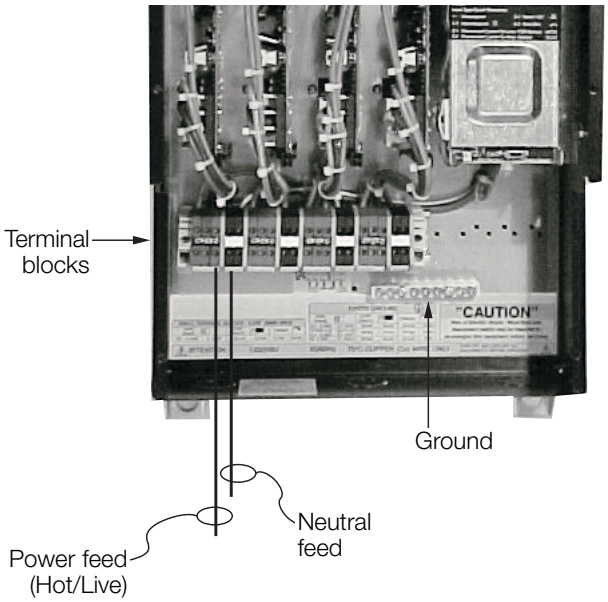
Note: Mount on the floor and against a wall. Reinforce wall structure as required for weight and local codes. See page 8.

Panel Feed: Wiring Overview

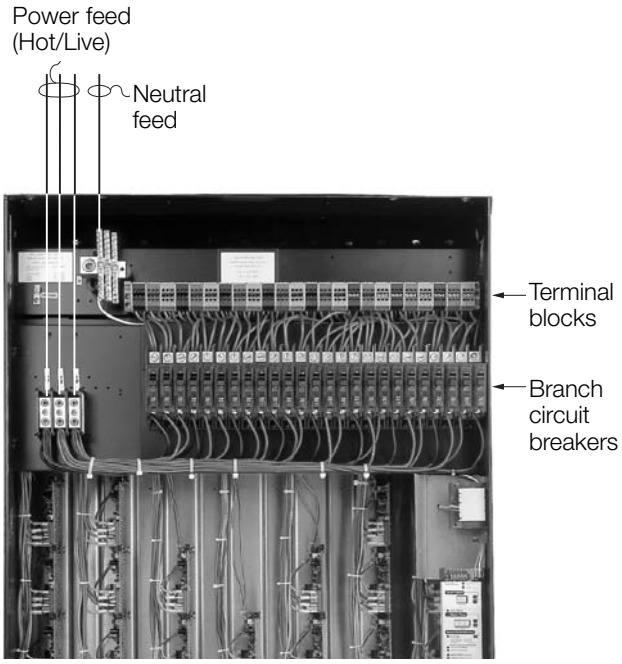
GP3



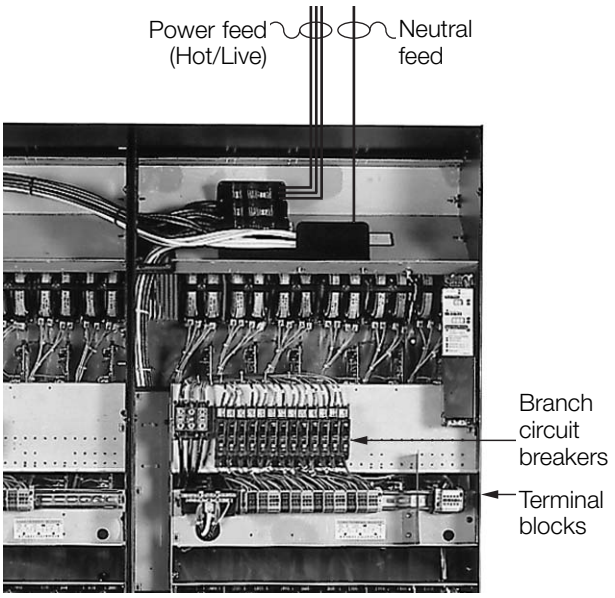
GP4



GP8-GP24



GP36-GP144



Panel Feed: Wiring Details

Notes

- Wire similar to a lighting distribution panel.
- Run feed and load wiring; no other wiring or assembly required.
- Common neutrals are not permitted; run separate neutrals for each load circuit.

To provide temporary lighting:

- Wire all loads.
- Do NOT remove the bypass jumpers that protect the dimming modules.
- Use branch circuit breakers to switch lights on and off.

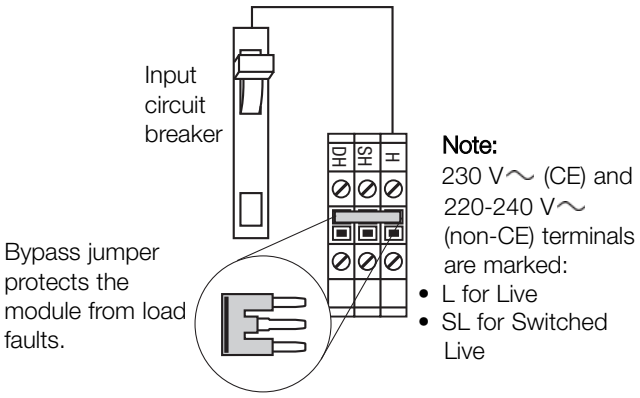
Wire Sizes

Panel/ Voltage	Power Feed	Neutral Feed	Dimmed Hot/ Dimmed Live	Load Neutral
GP3				
120 V~	#14-#8 AWG (2.5-10 mm^2)	#14-#6 AWG (2.5-10 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
230/240 V~	#18-#4 AWG (1.0-25 mm^2)	#14-#6 AWG (2.5-10 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
277 V~	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
GP4				
120 V~	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)
230/240 V~	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)
277 V~	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)
GP8-GP24, LCP8-LCP24				
120 V~	#14-#2/0 AWG (2.5-70 mm^2)	#6 AWG-350 MCM (10-185 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
230/240 V~ (GP only)	#14-#2 AWG (2.5-35 mm^2)	#14-#2 AWG (2.5-35 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
277 V~	#14-#2/0 AWG (2.5-70 mm^2)	#6 AWG-350 MCM (10-185 mm^2)	#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
GP36-GP144				
120 V~	(2) #4 AWG - 500 MCM ((2) 25-240 mm^2)		#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)
277 V~	(2) #4 AWG - 500 MCM ((2) 25-240 mm^2)		#14-#10 AWG (2.5-4.0 mm^2)	#14-#6 AWG (2.5-10 mm^2)

Temporary Lighting

You do not need to install a temporary distribution panel. Connect load wires into the appropriate terminal blocks. Each input breaker can supply power to a load while the bypass jumper protects the module from load faults.

Warning! Verify that the panel is fed from the correct voltage. A feed miswire or loss of a feed neutral can cause over-voltage damage to the equipment. Do NOT remove bypass jumpers at this point--they protect the modules from load faults.



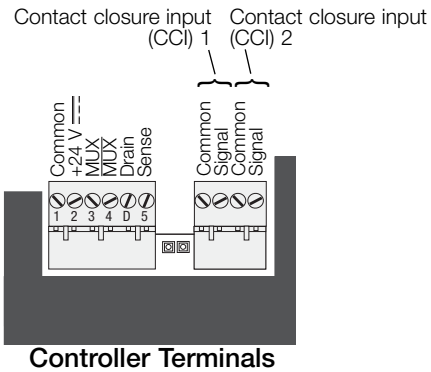
Note:
230 V~ (CE) and 220-240 V~ (non-CE) terminals are marked:

- L for Live
- SL for Switched Live

System Wiring Overview

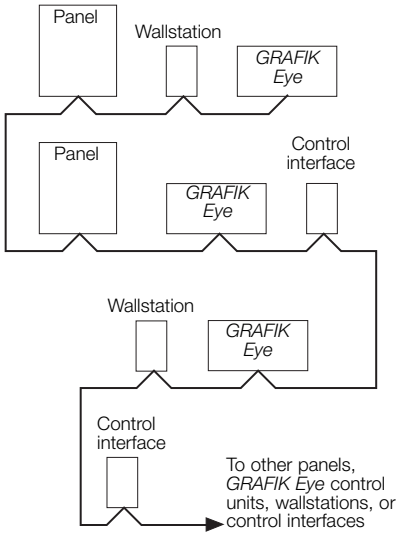
Review the options below for information on wiring your panel correctly into your specific system.

A. *LCP128* SpecGrade panel: Refer to the *LCP128 Setup and Operation Manual* for detailed wiring information.

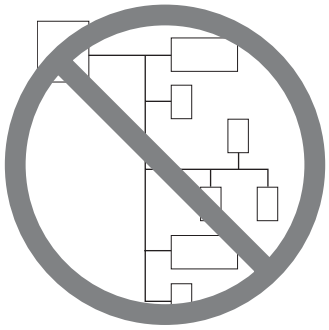


Controller Terminals

B. GP panel as a part of a *GRAFIK Eye* 4000 lighting system: Refer to the *GRAFIK Eye 4000 Installation, Setup, and Operation Manual* and the system overview pictured here for detailed wiring information.

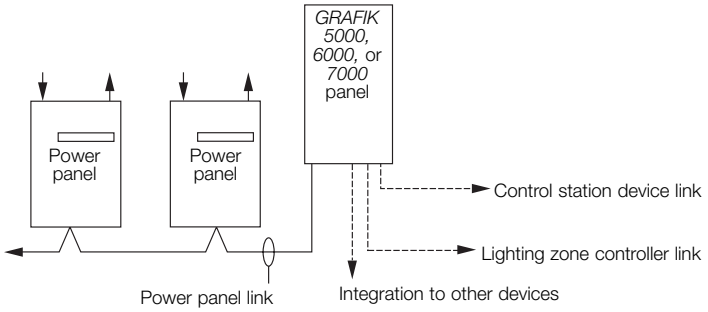


Correct: Daisychain OK

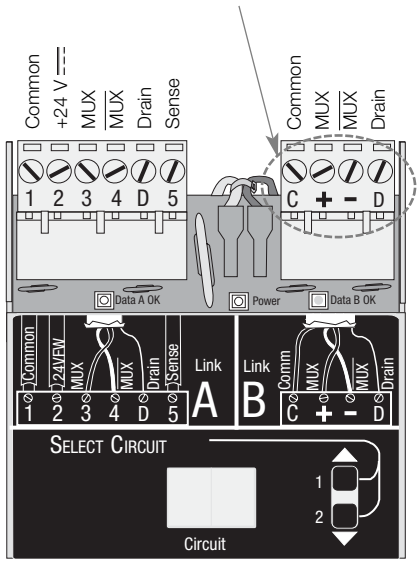


Incorrect: Branch, T-tap, or home run not acceptable

C. GP panel as a part of a *GRAFIK7000* lighting system: Refer to the *GRAFIK7000 Installation, and Maintenance Guide* and the system overview pictured here for detailed wiring information.



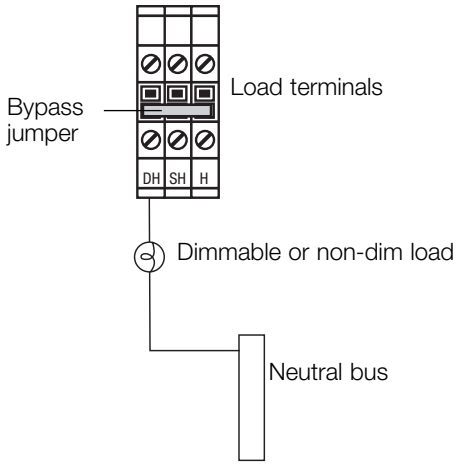
Note: Single-link circuit selectors will not have Link B connector.



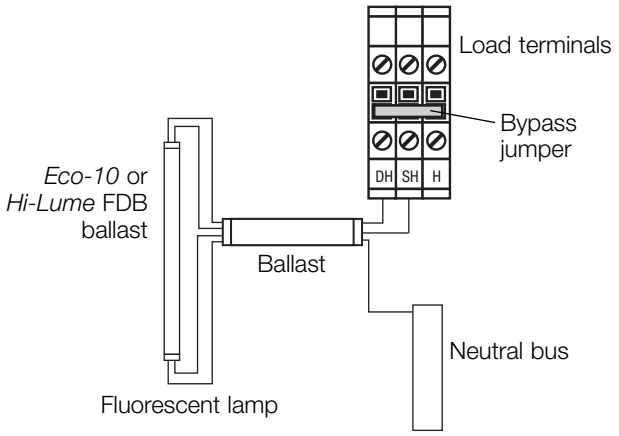
Circuit Selector Terminals

Load Wiring

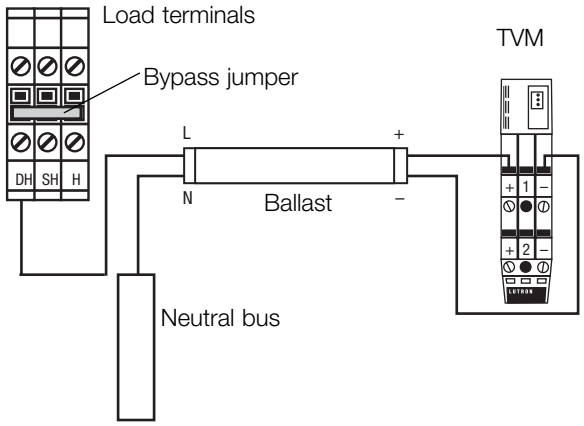
Incandescent Load Types
Dimmed Hot/Live (DH/DL) must be used for non-dim loads whether they will be dimmed or switched



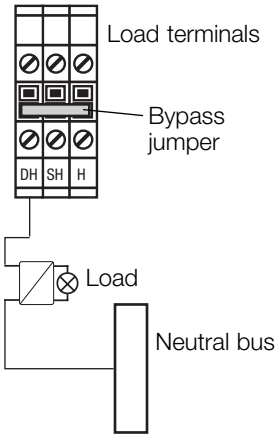
Hi-Lume® FDB or Eco-10™
fluorescent dimming ballasts



TVM Load Types



ELV Load Types
Dimmed Hot/Live (DH/DL) must be used for non-dim loads whether they will be dimmed or switched



Notes

- For 230 V~ and 240 V~ panels, "Hot" is referred to as "Live". Therefore, terminals will be labeled DL, SL, and L.
- Run wiring so that line (mains) voltage wiring will be at least 6 feet (1.8 m) from sound or electronic equipment and its wiring.
- Hot/Live (H/L) is used for bypass on all panels. It can also be used as a protected Hot/Live output on GP3, GP8, GP12, GP16, GP20, and GP24. (Added hot/live current plus load current must not exceed breaker limits.)

Caution! Verify with electronic low-voltage transformer or ballast manufacturer that product can be controlled with a phase control or leading edge dimmer before bypass jumpers are removed.

Caution! Switched Hot/Live (SH/SL) must be used for only *Hi-lume* FDB or *Eco-10* loads. Use Dimmed Hot/Live (DH/DL) for all non-dim loads.

Danger! Feed-through panels, such as GP4, may be fed by multiple circuits. Locate and lock each supply breaker in the OFF position before wiring feed or loads.

Warning! CE-marked panels are appliances. A distribution panel must provide a main circuit breaker that does not exceed the rating of the panel.

Activate Loads in Bypass

A. Complete load wiring.

B. Check that the bypass jumpers are in place.
These jumpers protect from load faults and must be used to check load wiring when it is installed or modified.

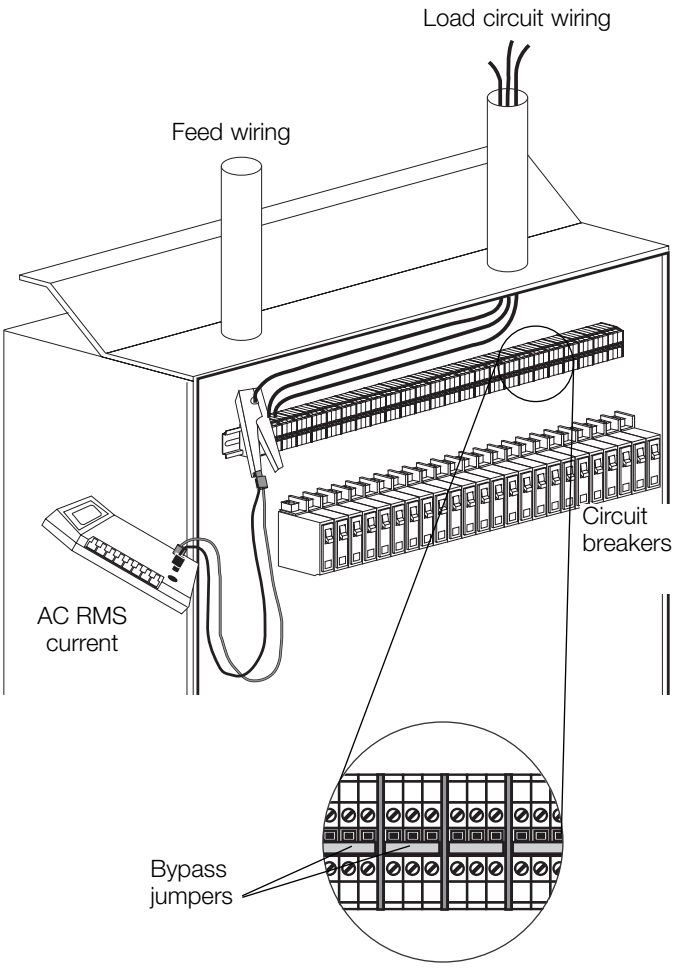
Warning! For GP3 and GP4, the input breaker of Circuit 1 powers the control wiring as well as Circuit 1's dimmer and load. Activate loads and remove loads from bypass concurrently for these models.

C. Turn circuit breaker 1 ON.
The load(s) should energize, the breaker should not trip, and total load current must be within the circuit breaker's limit and less than or equivalent to 16 A.

D. Repeat step C for each circuit with completed load wiring.

Warning! Do not remove bypass jumpers at this time.

Caution! For proper dimming performance, fluorescent lamps must be operated at full intensity for 100 hours prior to dimming.



Complete Installation

You have completed your panel installation.

For Onsite Factory Commissioning, call Lutron Technical Support and select Startup to schedule a field service visit. Allow for 10 working days between day of call and scheduled visit.

If you purchased Telephone Startup (*LCP128* only), stop here and complete the Control Location, Panel, and Control Station Tables that are located in the back of the *Setup and Operation Manual*. Once the tables are complete, call Lutron Technical Support and select Startup. Please call 24 hours prior to desired system startup.

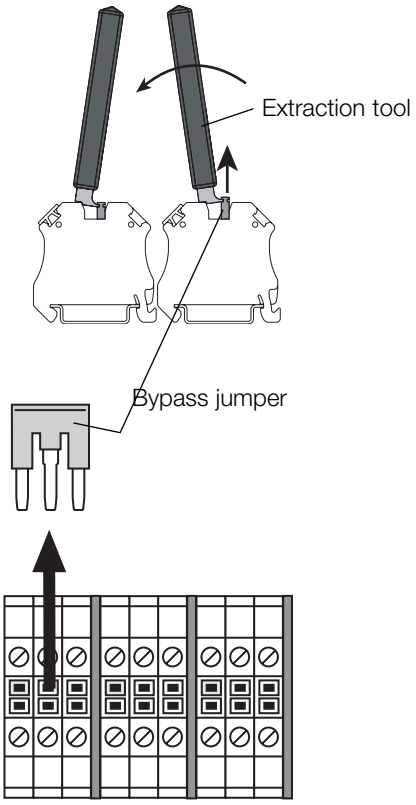
In the U.S., Canada, and the Caribbean: 1.800.523.9466
In Mexico: +1.888.235.2910
In Europe: +44.207.702.0657
In Asia: +65.6220.4666
In Japan: +81.355.758.411
In all other countries: +1.610.282.6701

Remove Bypass Jumpers

A. After all load wiring has been checked, turn circuit breakers OFF.

B. Remove and store the bypass jumpers for possible future use.

C. Turn circuit breakers ON.



Caution! Reuse the bypass jumpers whenever work is being done on a load. Damage caused by short-circuits and miswiring is not covered by the product warranty.

Danger! Feed-through panels, such as GP4, may be fed by multiple circuits. Locate and lock each supply breaker in the OFF position before removing the bypass jumper.

Warning! Confirm that load types were correctly assigned. Some loads may be damaged if dimmed, especially certain electronic transformers and electronic ballasts and motors.

Panel installation, control station wiring, and load activation are now complete.
Next Step: Refer to the *Setup and Operation Manual* to set up the functions and operation of the panel.

Warranty

Lutron Electronics Co., Inc.

One Year Limited Warranty

For a period of one year from the date of purchase, and subject to the exclusions and restrictions described below, Lutron warrants each new unit to be free from manufacturing defects. Lutron will, at its option, either repair the defective unit or issue a credit equal to the purchase price of the defective unit to the Customer against the purchase price of comparable replacement part purchased from Lutron. Replacements for the unit provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

If the unit is commissioned by Lutron or a Lutron approved third party as part of a Lutron commissioned lighting control system, the term of this warranty will be extended, and any credits against the cost of replacement parts will be prorated, in accordance with the warranty issued with the commissioned system, except that the term of the unit's warranty term will be measured from the date of its commissioning.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the unit pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; or (g) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the unit or any of its components.
3. Equipment and parts external to the unit, including those sold or supplied by Lutron (which may be covered by a separate warranty).
4. The cost of repairing or replacing other property that is damaged when the unit does not work properly, even if the damage was caused by the unit.

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TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify Lutron within the warranty period described above by calling the Lutron Technical Support Center at (800) 523-9466. Lutron, in its sole discretion, will determine what action, if any, is required under this warranty. To better enable Lutron to address a warranty claim, have the unit's serial and model numbers available when making the call. If Lutron, in its sole discretion, determines that an on-site visit or other remedial action is necessary, Lutron may send a Lutron Services Co. representative or coordinate the dispatch of a representative from a Lutron approved vendor to Customer's site, and/or coordinate a warranty service call between Customer and a Lutron approved vendor.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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Contact Information

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
USA
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299
TEL +1.610.282.3800
FAX +1.610.282.1243
Toll-Free 1.888.LUTRON1
Technical Support 1.800.523.9466

Brazil
Lutron BZ do Brasil Ltda.
AV, Brasil, 239, Jardim America
Sao Paulo-SP, CEP: 01431-000, Brazil
TEL +55.11.3885.5152
FAX +55.11.3887.7138

North and South America Technical Hotlines
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF United Kingdom
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
FREEPHONE (UK) 0800.282.107
Technical support +44.(0)20.7680.4481

France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33.(0)1.41.05.42.80
FAX +33.(0)1.41.05.01.80
FREEPHONE 0800.90.12.18

Germany
Lutron Electronics GmbH, Landsberger Allee 201, 13055 Berlin, Germany
TEL +49.(0)30.9710.4590
FAX +49.(0)30.9710.4591
FREEPHONE 00800.5887.6635

Italy
Lutron LDV, S.r.l.
FREEPHONE 800.979.208

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via del Carlos III, 84, planta 3ª,
08028, Barcelona, Spain
TEL +34.93.496.57.42
FAX +34.93.496.57.01
FREEPHONE 0900.948.944

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34.91.567.84.79
FAX +34.91.567.84.78
FREEPHONE 0900.948.944

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
15 Hoe Chiang Road, #07-03 Euro Asia Centre, Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

China, Beijing
Lutron GL Ltd. Beijing Representative Office
5th Floor, China Life Tower
No. 16 Chaowai Street, Chaoyang District, Beijing 100020 China
TEL +86.10.5877.1817
FAX +86.10.5877.1816

China, Guangzhou
Lutron GL Ltd. Guangzhou Representative Office
Suite A09, 23/F Tower A, Centre Plaza
161 Lin He Xi Lu, Tian He District, Guangzhou 510620 China
TEL +86.20.2885.8266
FAX +86.20.2885.8366

China, Shanghai
Lutron GL Ltd., Shanghai Representative Office
Suite 07, 39th Floor, Plaza 66
1266 Nan Jing West Road, Shanghai, 200040 China
TEL +86.21.6288.1473
FAX +86.21.6288.1751

China, Hong Kong
Lutron GL Ltd.
Unit 2808, 28/F, 248 Queen's Road East
Wanchai, Hong Kong
TEL +852.2104.7733
FAX +852.2104.7633

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20
Akasaka, Minato-ku, Tokyo 107-0052 Japan
TEL +81.3.5575.8411
FAX +81.3.5575.8420
FREEPHONE 0120.083.417

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Japan: +81.3.5575.8411
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other countries: +800.120.4491

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LUTRON®

LCP128™

Dimming and Switching System

LUTRON®

Setup and Operation Manual

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Introduction and System Startup

Step-by-Step Programming Instructions

Reference Information

Referenced Functions

Troubleshooting Guide

Maintenance

Glossary of Terms

Tables

How to Use this Guide

This programming guide contains three main sections:

- **Introduction** - Includes system specifications, electrical contractor Start-Up Checklist, and an overview of the controller and how to use it.
- **Step by Step Programming Instructions** - Walks you through each step needed to program your system.
- **Reference Information** - Includes additional procedures that you may need to perform after the system is programmed, including how to override system settings and lock/unlock the controller. This section also includes troubleshooting tips, system maintenance, a glossary of terms, and system planning tables.

When programming the *LCP128* system, you will need to know the following key information:

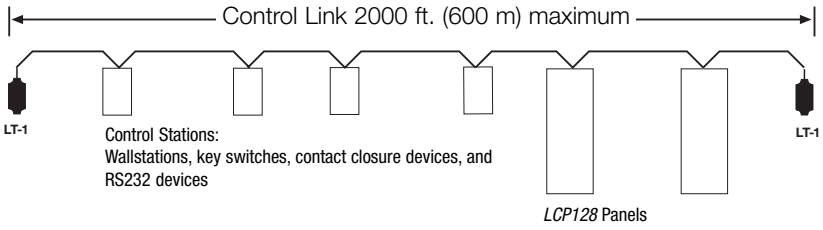
- How many panels are in this system and how many circuits are in each panel.
- How many modules are in the system and the module types.
- What the load schedule is.
- Where each wallstation and key switch is located and what each button or key turn should do.
- What each contact closure input and output should do.
- What the time clock should do.

Please read the guide completely before attempting to program the system.

Tables are provided at the back of this guide to record the above information. Photocopy the tables as needed, and leave them for the occupant after they are completed.

Note: *For mounting and wiring information, refer to the appropriate panel installation guide.*

System Overview Diagram



System Specifications

LCP128 is a lighting control system designed for commercial buildings. It consists of up to 8 dimming panels and up to 32 control stations. Control stations can be wallstations, key switches, contact closure input and output devices (OMX-AV), contact closure output devices (OMX-CCO-8), theatrical (ODMX-512) control interfaces, or building management system interfaces (OMX-RS232). All panels and control stations are connected by a digital communications link. Refer to the appropriate panel installation guide for wiring details. Other system specifications are described below.

Time Clock

- 7 weekly schedules.
- Up to 40 holiday schedules.
- Each holiday schedule can be 1-90 days.
- Up to 500 time clock events.
- Maximum of 25 time clock events per day.
- Up to 32 scenes and 1 Off scene.
- With each time clock event or control station input, you can select which circuits turn on or off and, for dimming circuits, set specific dimming levels.
- Time clock events can occur at a fixed time of day or at a time relative to sunrise or sunset (astronomical).
- Events can be placed on either a weekly schedule (for example, occurring every Monday) or a holiday schedule (for example, occurring only on January 1).
- Holiday schedules override weekly schedules.
- Time clock events can start and end afterhours mode. Afterhours is an energy saving mode where lights that are set to be off will automatically, after a period of time, turn themselves off. Afterhours mode can be temporarily overridden by any control station action. See STEP 5 for more information.
- Time clock events can enable and disable control stations.

Control Station - Wallstation

Wallstation buttons can be individually programmed to:

- Select a scene or custom scene. A scene is a combination of preset lighting levels used to automatically turn on, off, or dim a circuit or group of circuits. Each time the wallstation button is pressed, the circuits go to the programmed scene settings.
- Raise or lower circuits. Dimming circuits progressively raise or lower as long as the button is pressed. Circuits stay at this setting until another event or control station input occurs.
- Toggle circuits on and off. Each press of the button alternates between turning the circuits on and off. If the circuits are in a mixed state (some on and some off), the lights turn on.
- Turn off with a time delay. When the button is pressed, the circuits turn off after a preset amount of time.
- Enable or disable time clock.

Control Station - Key Switch

- The key switch (NTOMX-KS) can be programmed for clockwise and counterclockwise turns and with the same functions as a wallstation button.

Control Station - Contact Closure Inputs

Two contact closure inputs are available on each *LCP128* controller – more are available by purchasing a Lutron OMX-AV control station (five inputs per OMX-AV that can be added anywhere on the digital control station link). Also, an OMX-WCI can provide up to seven control inputs to the lighting control system.

- The contact closure inputs can be programmed on the open and/or closure of the contact to perform the same functions as a wallstation button.
- SeeTouch™ wallstations have two contact closure inputs (optional version of one input and one 24 V⎓ power for an occupant sensor).

Control Station - Contact Closure Outputs

Contact closure outputs can be added with either a Lutron OMX-AV control station (five outputs per OMX-AV) or with a Lutron OMX-CCO-8 (eight outputs per OMX-CCO-8). Either control station can be added anywhere on the digital control station link.

- Each contact closure may be momentary or maintained.
- Each contact closure output can be assigned to an action that is programmed to a wallstation button, key turn, contact closure input, time clock event, or emergency state.

Integration through RS232

The *LCP128* system can be integrated with a building management system through the Lutron RS232 interface (OMX-RS232, OMX-CI-NWK-E, or OMX-CI-RS232).

DMX Theatrical Integration

The *LCP128* system can take up to 32 DMX inputs from a theatrical lighting console/stageboard through the Lutron ODMX-512 interface.

Emergency Power Mode

When a *LCP128* panel is placed into emergency power mode (loss of normal power), circuits are changed to emergency settings and remain at those settings until the controller exits emergency power mode (return of normal power). All control station inputs and time clock events are ignored while in emergency power mode.

Emergency power mode can be activated using:

- Panel to panel emergency sense line. This method requires that the system have at least two panels. The system must have at least one normal (non-essential) feed panel and at least one emergency (essential) feed panel. When power to the normal panel is interrupted, the emergency panel(s) will go into emergency mode. Note that the normal / emergency switches at the bottom of the controllers need to be set correctly.
- The Lutron emergency lighting interface (LUT-ELI-3PH), a UL 924 listed device, senses the normal (non-essential) line voltage on all three phases (3PH) of normal power. When one or more phases of power are lost, the LUT-ELI-3PH sends a signal to the *LCP128* controller. If the *LCP128* controller's normal / emergency switch is set to emergency, the emergency lighting scene or programmed circuit levels are activated.

For more information on emergency lighting applications, refer to Application Note #106, available at www.lutron.com.

LCP128™ System Start-Up Checklist for Electrical Contractor

Important Note:

To ensure that the *LCP128* System is ready for Start-Up, please complete the following checklist.

- ❑ The *LCP128* panel(s) and control station(s) have been mounted in accordance with the installation instructions.
- ❑ Control stations have been wired to the panel in accordance with installation instructions.
- ❑ Feed and load wiring to panel have been installed in accordance with the installation instructions.
- ❑ All load circuits have been activated in bypass mode (bypass jumpers installed) and are correctly and permanently lamped.
- ❑ Bypass jumpers have been removed and all circuits activated as default Non-Dim load type.
- ❑ Load schedule for each panel has been completed.
- ❑ Correct load type for each circuit has been determined and recorded.

When the above checklist is completed, please fax this sheet along with the completed load schedule for each panel to Lutron Field Service Scheduling at (610) 282-0298.

Signature: _____ Job Name: _____

Today's Date: _____ Lutron Job Number: _____

Printed Name: _____ Scheduled Startup Date: _____

Phone Number: _____ Scheduled Startup Time: _____

Fax Number: _____ Job Site Number: _____

Bill of Material (panels, control stations, etc.):

_____ Qty. _____

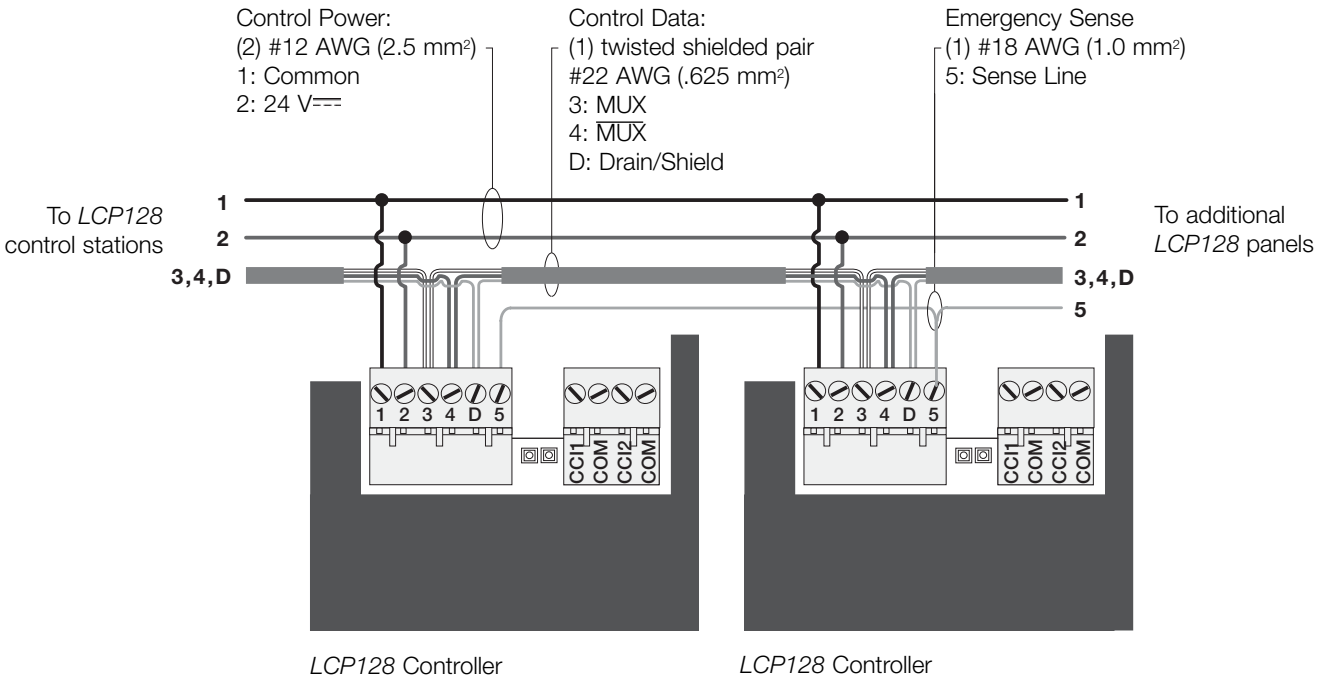
_____ Qty. _____

_____ Qty. _____

Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299
Telephone:
In the U.S., Canada, and the Caribbean: 1.800.523.9466
In Mexico: 888.235.2910
In Europe: +44.207.702.0657
In Asia: +65.6220.4666
In Japan: +81.355.758.411
In all other countries: +1.610.282.6701
(Listen to menu for scheduling)

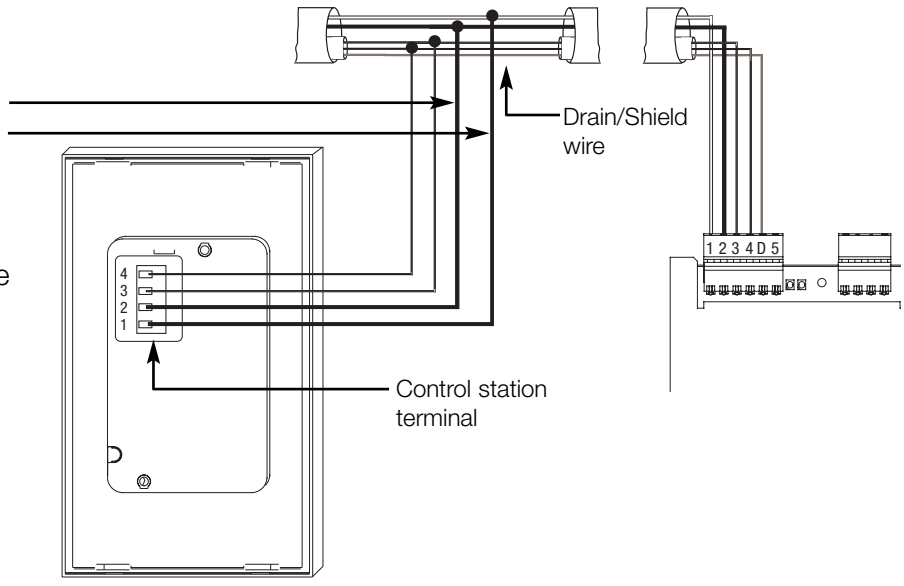
PELV (Class 2: USA) Wiring

Panel to Panel and Panel to Control Stations

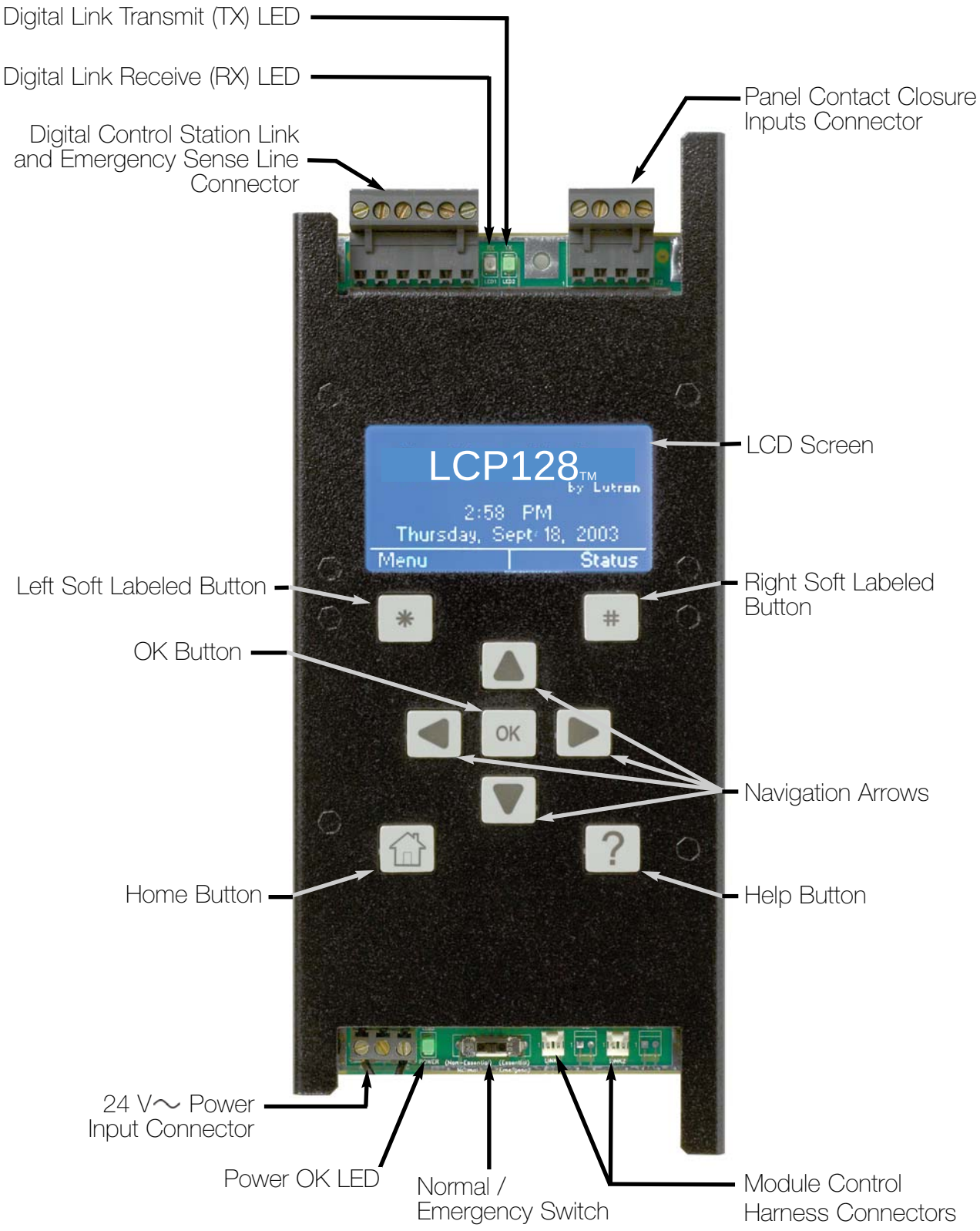


Notes

- Use a wire connector to attach one #18 AWG (1.0 mm²) wire for Common (terminal 1) and one #18 AWG (1.0 mm²) wire for 24 V⎓ (terminal 2) from the PELV (Class 2: USA) link to the control. Two #12 AWG (4.0 mm²) wires cannot both be terminated on the control station. Maximum wire length from link to control is 8 ft. (2.4 m).
- Only connect the Drain/Shield wire (bare copper) to terminal 'D' in *LCP128* panels. Maintain the shield throughout the link but do not allow it to touch ground (earth) or wallstation circuitry.



LCP128™ Controller Layout



Controller Overview (continued)

Navigation

The *LCP128* controller uses certain methods for navigating, selecting, setting values, etc. Please read this section carefully before using the controller to program your system.

The *LCP128* controller has nine buttons below the display. The table below explains their functions.

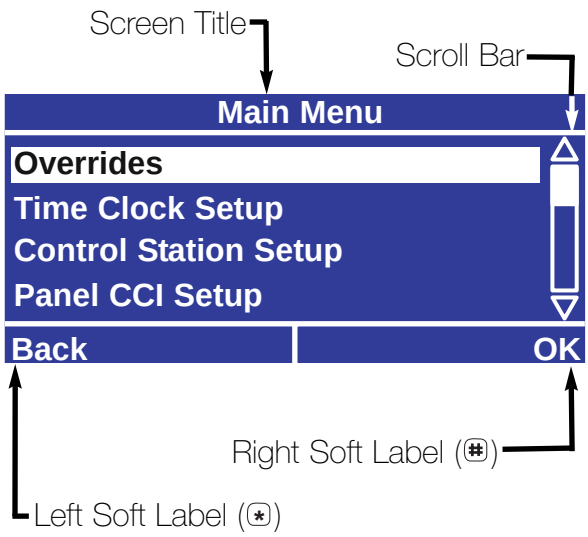
Button	Function
▲ ▼ ◀ ▶	Navigate the screen and change highlighted values
OK	Select an item
*	Left Soft-Labeled – Function defined on screen
#	Right Soft-Labeled – Function defined on screen
⌂	Go to the Home screen
?	On-Screen Help

The Screen

All screens on the *LCP128* controller have a similar look with some common elements. These are:

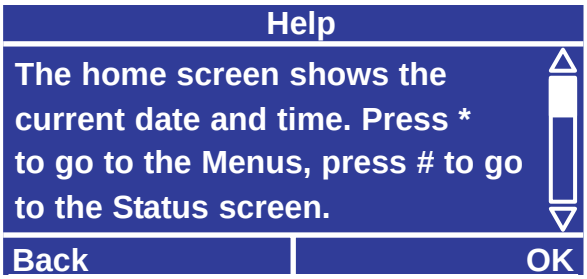
- A screen title
- Left and right soft button labels
- A scroll bar (only present if more information is available than will fit on the screen.)

The example shows the Main Menu. The scroll bar indicates that there is more information in the menu than fits on the screen. Pressing ▼ repeatedly (or press and hold) scrolls through the menu and shows other choices. The shaded slider on the scroll bar indicates what portion of the menu is being displayed.



Help

Help on the current screen is always available by pressing the ? button. If more information is available than fits on the screen, use ▲ and ▼ to scroll through the text. Pressing either OK, * or # returns you to the screen you were on.



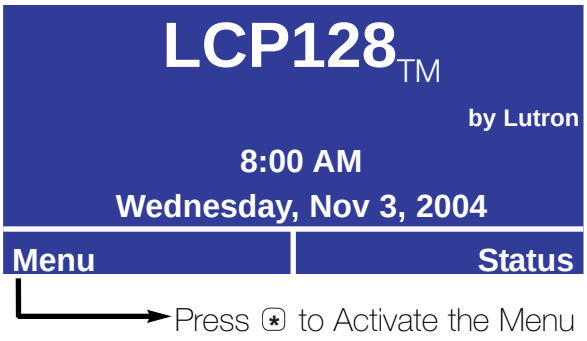
Controller Overview (continued)

Getting to the Home Screen

Press ⌂ from any screen to go back to the Home screen.

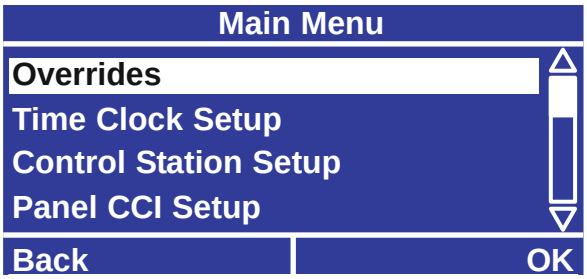
Accessing the Main Menu

From the Home screen, press ✱ to go to the Main Menu. If a password has been set, you need to enter it before continuing (see "Locking and Unlocking the Controller" in the reference section later in this guide).



Navigating the Menus

When in a menu, use ▲ and ▼ to change the highlighted item and press OK or # (OK) to select that item. Pressing ? provides help on that item. To go back to the previous screen, press ✱ (Back).



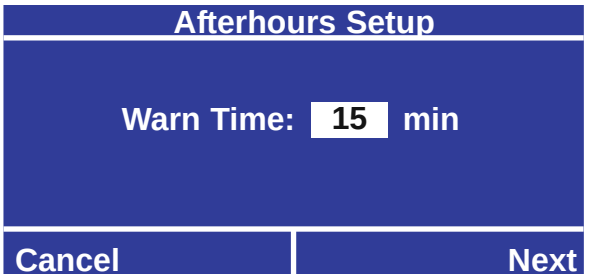
Entering Data

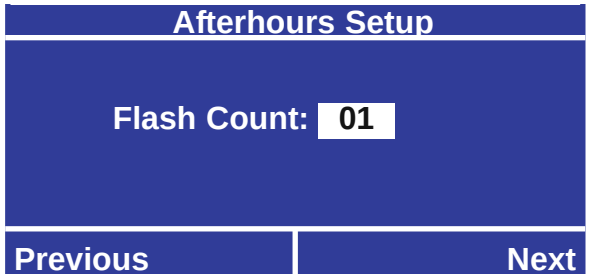
One or more screens are used to program the information required for each system feature.

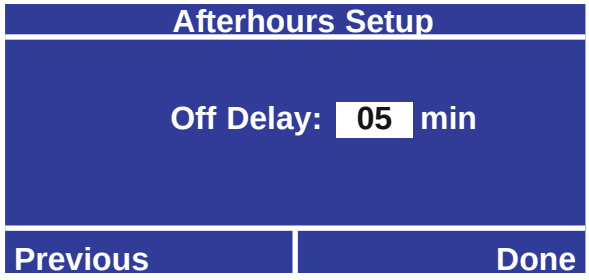
If only one screen is required, the screen has the soft labeled buttons "Cancel" and "Done".

If multiple screens are required, the first screen has the soft labeled buttons "Cancel" and "Next". Intermediate screens have the soft labeled buttons "Previous" and "Next", and the last screen has the soft Labeled buttons "Previous" and "Done".

Note: *Data is not stored in the LCP128 system database until "Done" is selected.*





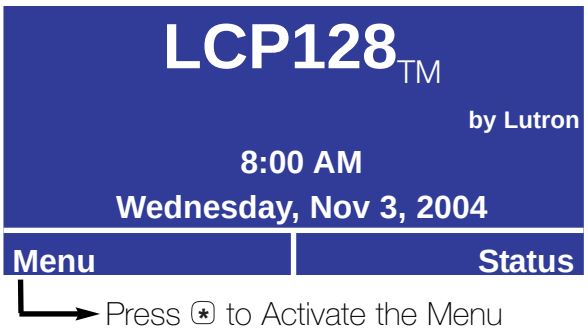


Language Select Screen

When the controller is first powered, you are prompted to choose a language for the screens. Use the navigation arrows to select a language, then press OK or # (Done).

Getting Started - The Home Screen

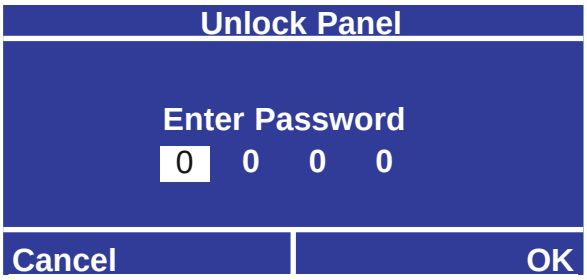
- When the controller is first powered or is not used for 20 minutes, the display shows the Home screen. Pressing ⌂ (the Home button) always takes you back to this screen. From the Home screen, pressing * displays the Main Menu and pressing # displays the Panel Status screen.
- The Home screen shows the current day, date and time set on the controller. If either of these are incorrect, refer to STEP 2 to set the date, time, and location.
- The backlight on the LCD turns off after 25 minutes of no activity. Pressing any button on the control turns the backlight on and displays the Home screen.



Unlocking the Controller

If the controller has been locked (see “Locking the Controller” in the referenced function section) you are prompted to enter the password before the Main Menu is activated. Press ◀ and ▶ to select the digit to change. Then press ▲ and ▼ to change each digit. When you have entered the password, press OK.

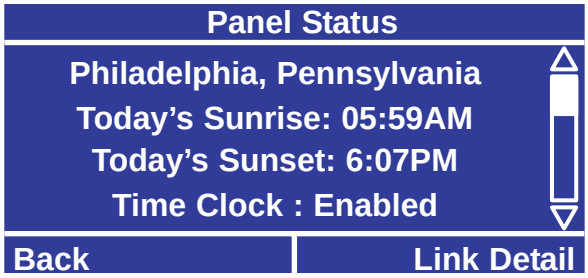
If you forget the password, contact Lutron technical support at (800) 523-9466 to unlock the controller.



The Panel Status Screen

Pressing # from the Home screen displays the Panel Status screen. The Panel Status screen shows:

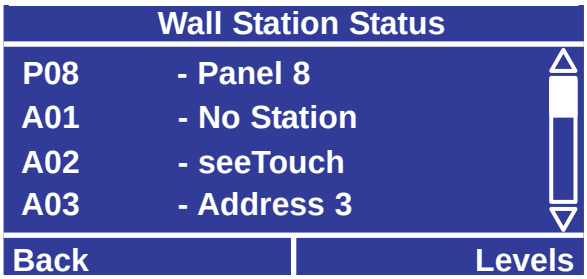
- Your location.
- Time clock status (Enabled/Disabled).
- Control station status (Enabled/Disabled).
- Today's sunrise time for the current system date (note that the time, date, and location must be configured correctly).
- Today's sunset time for the current system date (note that the time, date, and location must be configured correctly).
- Memory used.
- Build version.



The Wallstation Status Screen

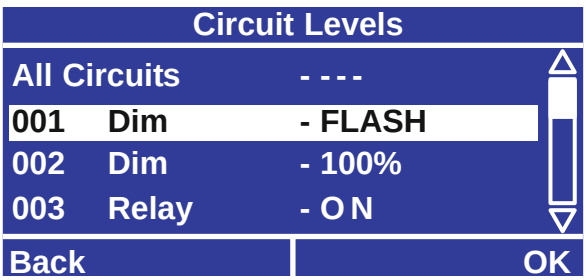
Pressing # from the Panel Status screen displays the Wallstation Status screen. The Wallstation Status screen shows:

- If the station is present and is recognized, the control is labeled by its type (for example, "seeTouch").
- If a station is not present, it is labeled as "No Station". This could also indicate a control station address conflict.
- If the unit is present and is not a control that is known to the system, the control is labeled as "???". This could also indicate a control station address conflict.



The Circuit Levels Screen

Pressing # from the Wallstation Status screen displays the Circuit Levels screen. The Circuit Levels screen shows the current circuit levels on the system.



Step by Step Programming Instructions

Overview

Programming your *LCP128* system is done in seven steps.

1. Panel Configuration

This step selects a language for the controller LCD and configures the load setup. For multiple panel systems, this step also assigns panel addresses and configures the number of circuits in each panel.

2. Time, Date, and Location

Required if the time clock will be used. This step shows how to set the clock.

3. Scene Modification

Required if changes to the default scene settings are needed.

4. Control Stations

Required if there is a remote wallstation, key switch, contact closure device, and/or RS232 device. This step is performed to configure their function.

5. Time Clock Events

Required if the time clock will be used. This step is used to automatically dim or turn circuits on/off at either a specific time of day or at a time relative to sunrise or sunset.

6. Panel Contact Closure Inputs

Required if the panel contact closure inputs are used. This step defines what each input will do.

7. Emergency Power Mode

Required if emergency lighting is needed when normal power is lost. Control station inputs and time clock events are ignored while in emergency power mode. This step defines if the panel has emergency circuits and how to configure the emergency lighting.

The following pages explain how to perform each of the programming steps.

Panel Configuration

To program a *LCP128* panel, you need to:

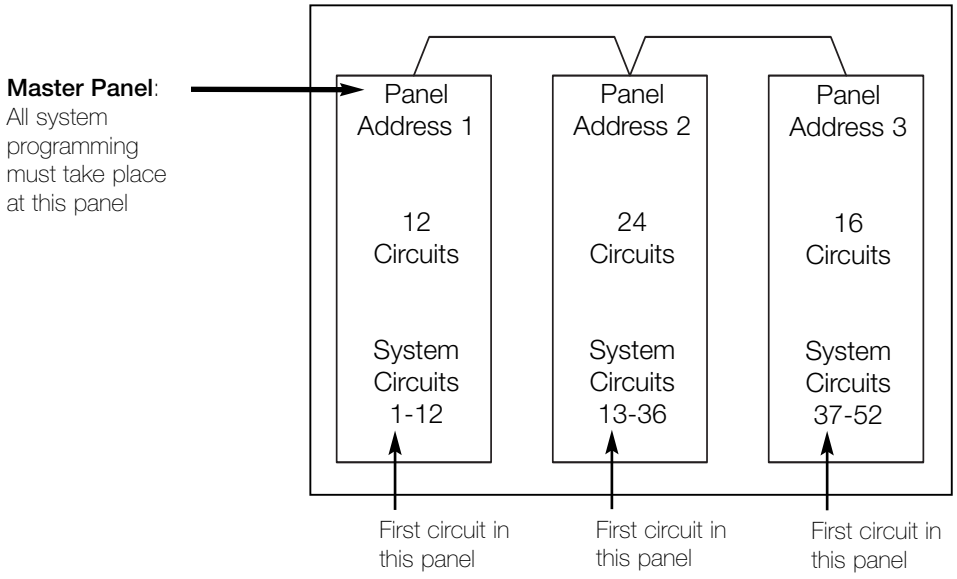
- **Choose a language** for the controller LCD.
- **Set the panel configuration,** including:
  - Panel address
  - First circuit number in the panel
  - Number of circuits in the panel

  Each circuit in the system is identified by a system circuit number. This number will be used to identify the circuit for programming purposes. For example, if Panel 1 has 12 circuits, the first circuit in Panel 2 will be circuit 13 on the *LCP128* controller. The figure below shows a sample system.

  ***Note:** If your system has only one panel, you do not need to set the panel configuration. The panel address, first system circuit number, and number of circuits are preprogrammed. However, for multi-panel systems, you must set the panel configuration from the master panel (address 1) and then from each remote panel.*
- **Configure the load setup,** including:
  - Module type setup
  - System size
  - Load type
  - High end trim
  - Low end trim

  All system programming (covered in programming STEPS 2-7) is performed at **panel address 1**. In a multi-panel system, panel address 1 becomes the master programming panel and all other panels are remote panels. Remote panels have limited menu options and functionality.

  Before proceeding with STEP 1, complete the Panel, Module Type, Load Type, and Control Station Tables located at the back of this guide.



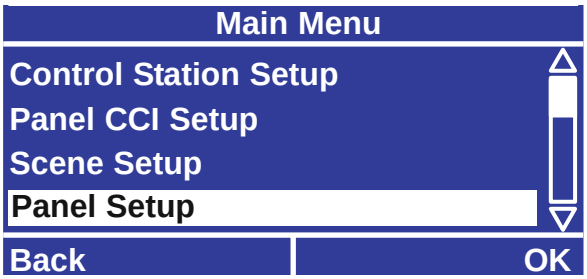
Choose a Language

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

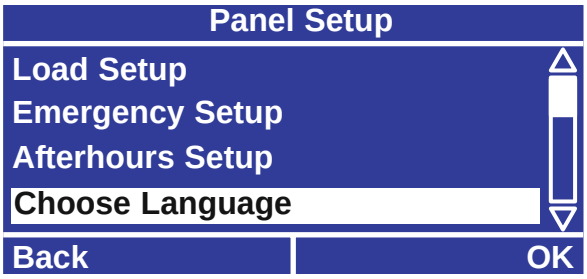
B. Use ▲ and ▼ to highlight **Choose Language** and press OK or # (OK).

C. Use ▲ and ▼ to set the **Language** and press OK or # (Done). The default is English.

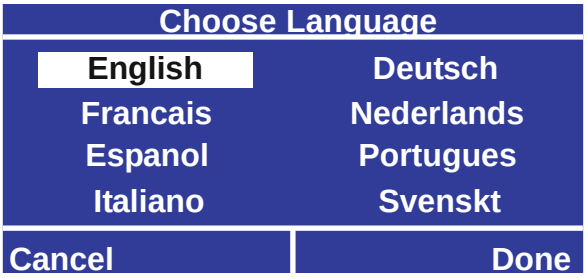
A.



B.



C.



Set System Size

You can set the system size so that controller screens display only the circuits used by your system. The default system size is 128 circuits.

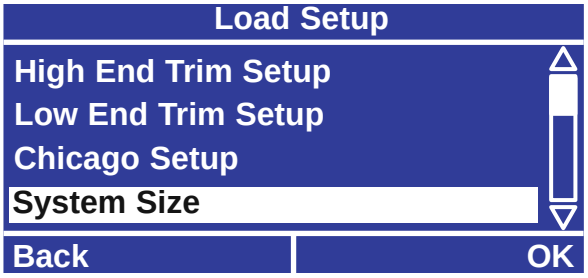
A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Load Setup** and press OK or # (OK).

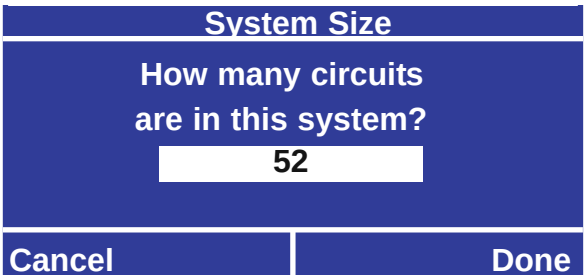
C. Use ▲ and ▼ to highlight **System Size** and press OK or # (OK).

D. Use ▲ and ▼ to set the total number of system circuits and press OK or # (Done).

C.



D.



Set Panel Configuration - Multi-Panel Systems Only

For multi-panel systems, you must set the address and number of circuits for each panel, beginning with the master panel.

A. From the **Main Menu** at the master panel controller, use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Panel Addressing** and press OK or # (OK).

C. Use ▲ and ▼ to set the **Panel Address** and press OK or # (Next).

Master panel address = 01

D. Use ▲ and ▼ to set the first system circuit number in the panel, and press OK or # (Next).

E. Use ▲ and ▼ to set the number of circuits in the panel and press OK or # (Done) to update the database.

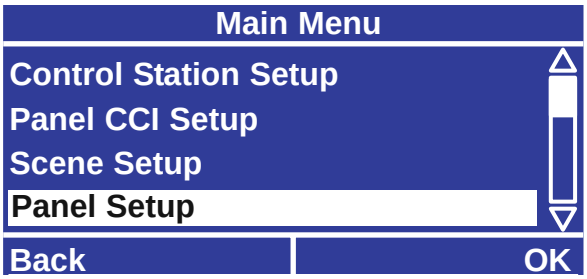
F. Repeat this procedure at each remote panel to set the panel address and number of circuits.

Panel 2 address = 02

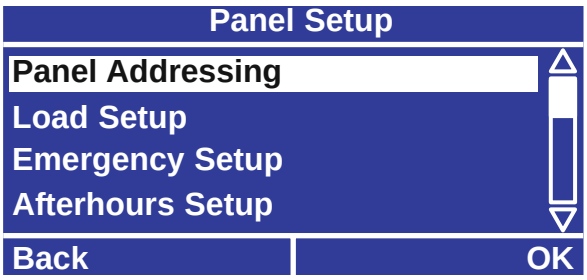
Panel 3 address = 03

Etc.

A.

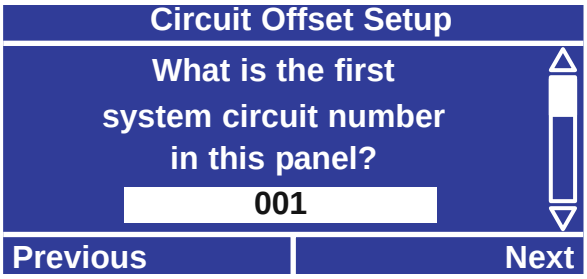


B.

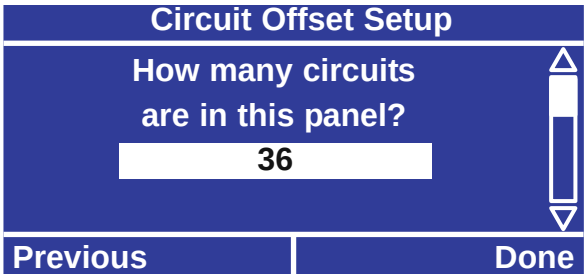


C.

D.



E.



Module Type Setup

Your *LCP128* system contains modules configured with one or more outputs (circuits). The module types are set by the model numbers of the panels in the system. Complete the Module Type Table at the back of this guide and then program the module types for your system. The factory default module type is X (4 Switches).

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Load Setup** and press OK or # (OK).

C. Use ▲ and ▼ to highlight **Module Type Setup** and press OK or # (OK).

D. The Module Type Setup screen lists all the circuits. To program a module, use ▲ and ▼ to select the first circuit number in the module and ◀ and ▶ to set the module type.

Module type options include:

X: Four-Circuit Switching (Relay) Module (XP)

S: One-output (circuit) Dimming Module (1U)

D: Two-output (circuit) Dimming Module (2U)

Q: Four-output (circuit) Dimming Module (4U)

E: Four-output (circuit) Electronic Low Voltage Dimming Module (4E)

A: Four-output (circuit) Adaptive Dimming Module (4A)

M: Four-output (circuit) Motor Module (4M)

F: Four-output (circuit) Quiet Fan Speed Module (4FSQ)

G: GP panel dimmer card (G4) - assigned in groups of four

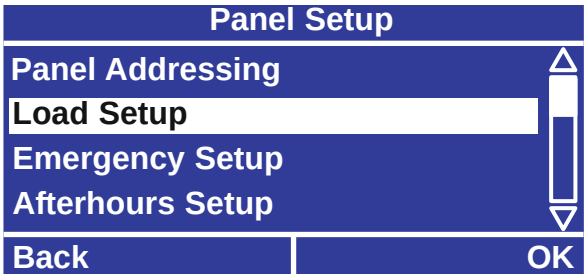
Notes:

As you set each module type, the appropriate circuit numbers are automatically assigned to the module.

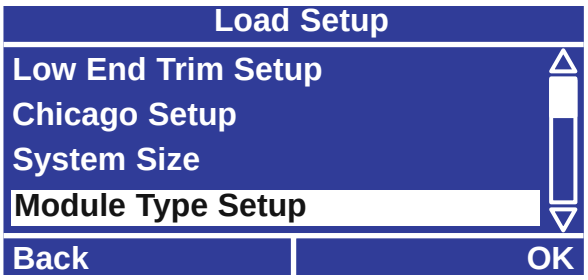
If you set the system size earlier in STEP 1, the Module Type Setup screen lists only the circuits used in your system.

E. When all the module types are set press OK or # (Done).

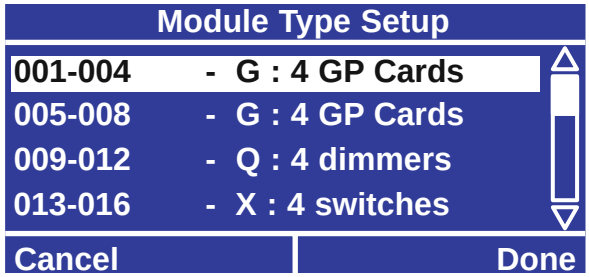
B.



C.



D.



Load Type Setup

Complete the Load Type Table at the back of this guide and then program the load types for your system circuits. The factory default load type for each circuit is Non-Dim.

***Note:** If you are unsure of the load type for a particular circuit, set the load type to Non-Dim until the correct setting is determined.*

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Load Setup** and press OK or # (OK).

C. Use ▲ and ▼ to highlight **Load Type Setup** and press OK or # (OK).

D. The Load Type Setup screen lists all the circuits. For each circuit, use ▲ and ▼ to select the circuit and ◀ and ▶ to select the load type.

Load type options depend on the module type assigned to the circuit:

Switching: Non-dim, Tridonic DSI, 0-10 V, DALI, PWM, 10-0 V, DALI LOG, DSI LOG

Dimming: Incandescent, MLV (Magnetic Low Voltage), Tu-Wire (ballasts), Neon, ELV (Electronic Low Voltage), Non-dim, Tridonic DSI, DSI LOG, 0-10 V, 10-0 V, DALI, DALI LOG, PWM, FDB (spec-grade only), auto detect (4A only)

Motors: Motor

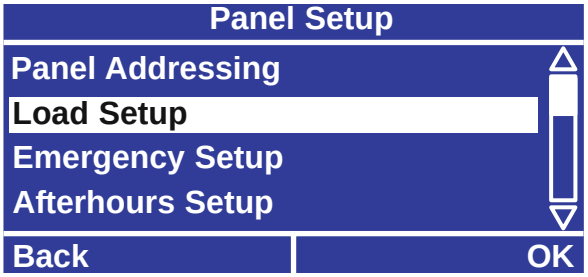
Fans: Fan

Note: Switching or dimming modules controlling Tridonic DSI, DSI LOG, 0-10 V, 10-0 V, DALI, DALI LOG, or PWM load types require TVM(s).

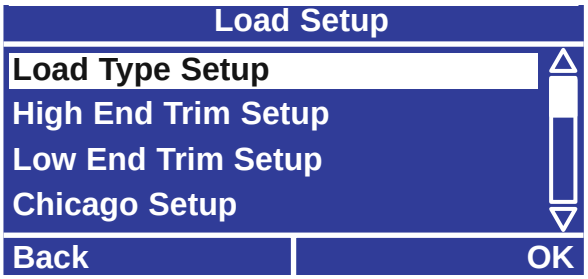
E. When all the load types are set press OK or # (Done).

Load Type setup is now complete and all settings are saved in the event of a power failure.

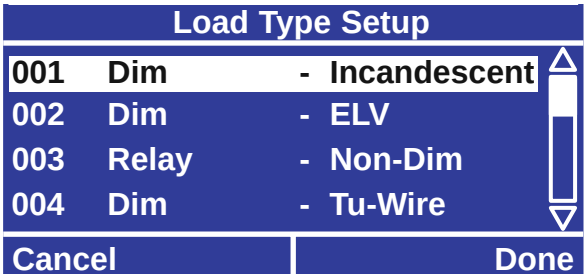
B.



C.



D.



Caution! Failure to correctly assign load types may damage loads, especially certain electronic transformers, electronic ballasts, and motors. Verify with the transformer or ballast manufacturer that the product can be dimmed with phase control dimming before setting to any load type other than Non-Dim.

High/Low End Trim Setup

High and low end trim settings limit the maximum and minimum output of a dimming circuit. Levels are set automatically when the load type is assigned. You should change the high or low end trim for a circuit only if the default setting needs to be adjusted.

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

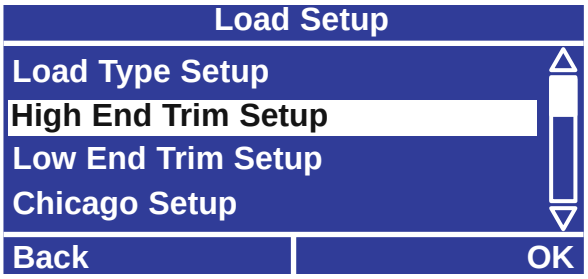
B. Use ▲ and ▼ to highlight **Load Setup** and press OK or # (OK).

C. Use ▲ and ▼ to highlight **High End Trim Setup** or **Low End Trim Setup** and press OK or # (OK).

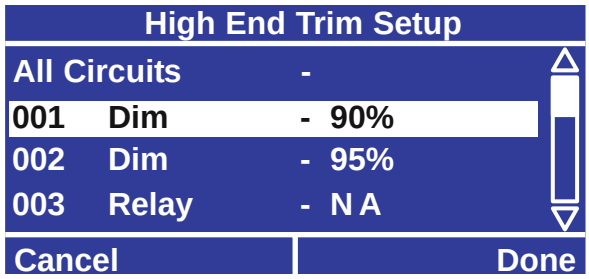
D. For each dimming circuit, use ▲ and ▼ to select the circuit and ◀ and ▶ to set the trim level. Non-dimming, motor, and fan circuits are set to NA (not any).

E. When all the trim levels are set press OK or # (Done).

C.



D.



Caution! Do not reduce the low end trim on a fluorescent load type. This will decrease lamp life and may damage ballasts.

Chicago Setup

This function is used to meet electrical installation codes in the city of Chicago, IL (USA). This setting limits how low a light level can be, including the levels in the “off” scene. This setting can be changed to a value from 10% to 60%, in 1% increments.

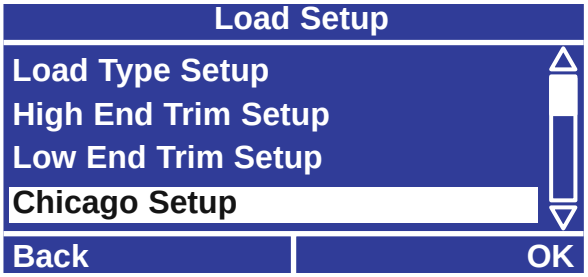
A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Load Setup** and press OK or # (OK).

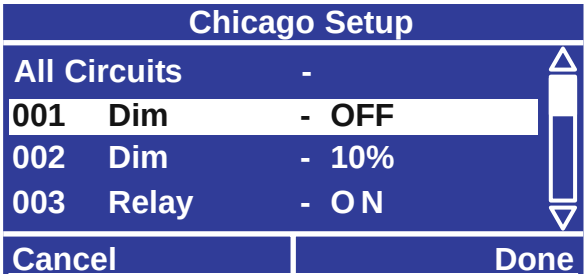
C. Use ▲ and ▼ to highlight **Chicago Setup** and press OK or # (OK).

D. Use ▲ and ▼ to select a circuit and ◀ and ▶ to set the Chicago limit. When all the circuit limits are set press OK or # (Done).

C.



D.



Time Clock Configuration

The *LCP128* system can be programmed to initiate scenes and other actions automatically at either a specific time of day or at a time relative to sunrise or sunset. It is important to configure the time clock as needed for your location.

Time clock configuration includes:

- Selecting a time format (12 or 24 hour).
- Setting the time.
- Setting the date.
- Setting the location, either by country/city or longitude/latitude.
- Adjusting sunrise and sunset times to accommodate special circumstances.
- Selecting whether to use daylight savings time and, if so, what rules to use.

Time Format

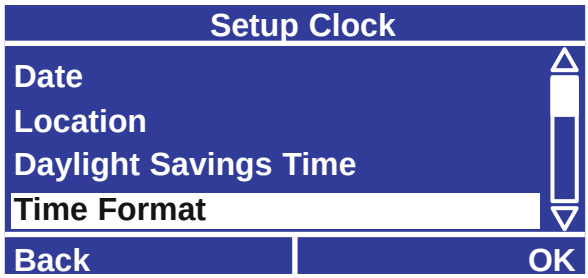
A. From the **Main Menu** use ▲ and ▼ to highlight **Time Clock Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Setup Clock** and press OK or # (OK).

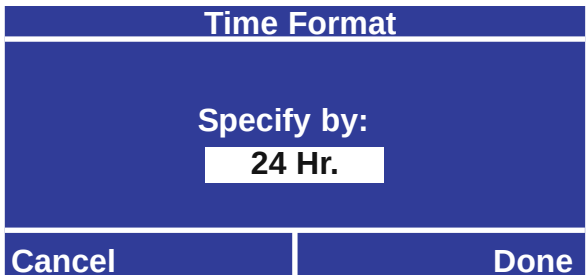
C. Use ▲ and ▼ to highlight **Time Format** and press OK or # (OK).

D. Use ▲ and ▼ to specify **24 Hr.** or **AM / PM** (12 Hr). Press OK or # (Done) to save changes.

C.



D.



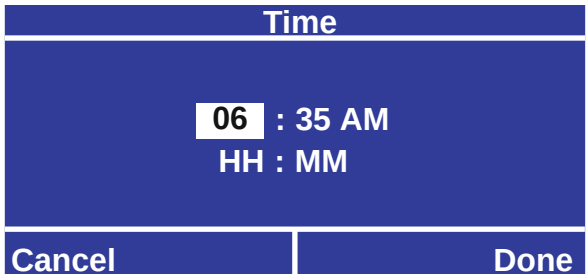
Time

A. From the **Setup Clock** menu use ▲ and ▼ to highlight **Time** and press OK or # (OK).

B. Use ▲ and ▼ to change the current time. Use ◀ and ▶ to alternate between hours and minutes.

C. Press OK or # (Done) to save changes.

B.



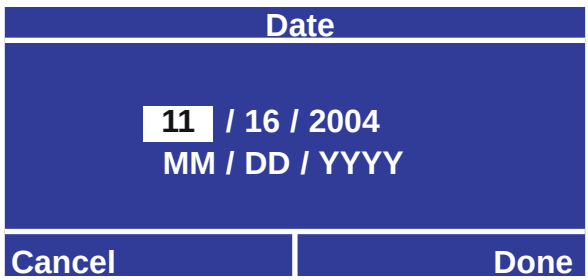
Date

A. From the **Setup Clock** menu use ▲ and ▼ to highlight **Date** and press OK or # (OK).

B. Use ▲ and ▼ to change the current date. Use ◀ and ▶ to change between month, day, and year. The first 2 digits are the month, the middle 2 are the day, and the last 4 are the year.

C. Press OK or # (Done) to save changes.

B.



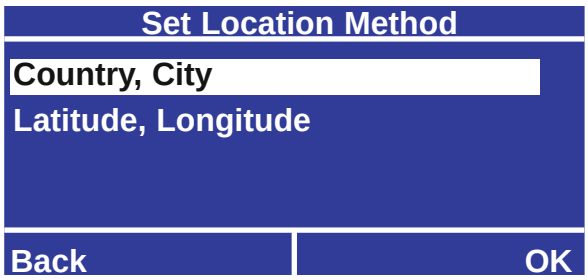
Location

Note: *Location must be set if using time clock events relative to sunrise or sunset.*

A. From the **Setup Clock** menu use ▲ and ▼ to highlight **Location** and press OK or # (OK).

B. Use ▲ and ▼ to select whether you want to set the location by country and city (recommended) or by latitude and longitude (if there are no nearby cities listed). Press OK or # (OK) when done.

B.



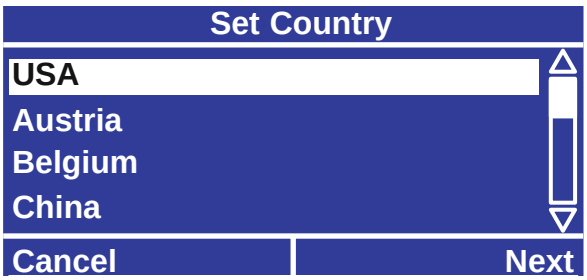
If Setting by Country and City

C. Use ▲ and ▼ to select the **Country** then press OK or # (Next).

In the USA, use ▲ and ▼ to select the **State** then press OK or # (Next).

D. Use ▲ and ▼ to select the **City** then press OK or # (Next).

C.



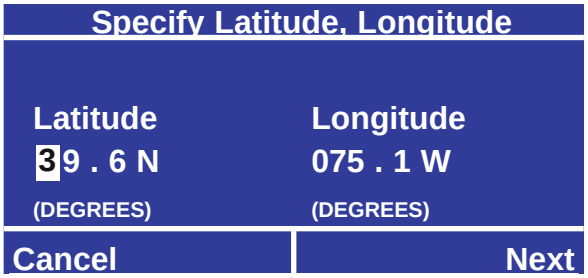
If Setting by Latitude and Longitude

C. Use ◀ and ▶ to select the digit and use ▲ and ▼ to set the latitude and longitude of your location in degrees and press OK or # (Next).

D. Use ▲ and ▼ to select the time zone for this location and press OK or # (Next). Values are listed as an offset from Greenwich Mean Time.

Example: If your location is 39 degrees 36 minutes north, enter 39.6N degrees. The minutes are converted to a decimal of a degree by dividing by 60.

C.



D.

Location (continued)

Entering Custom Country and City

E. To enter a custom country name, use ▲ and ▼ to select each letter, then press ▶ to advance and enter the next letter. Use ◀ to go back and change any letter. Press OK or # (Next) to continue.

F. To enter a custom city name, use ▲ and ▼ to select each letter, then press ▶ to advance and enter the next letter. Use ◀ to go back and change any letter. Press OK or # (Next) to continue.

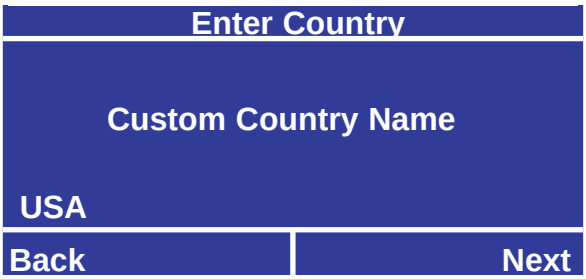
Adjusting Sunrise and Sunset

G. If needed, use this feature to shift your location's sunrise and sunset times by a fixed amount. This can be useful if there is a geographic feature (such as a mountain) that offsets the sunrise or sunset time for your location by a fixed amount. This can also be used to shift all time clock events that are relative to sunrise and sunset after they have been programmed.

If no offset is required, leave the offsets at 0:00 (default). Press OK or # (Done) to save changes.

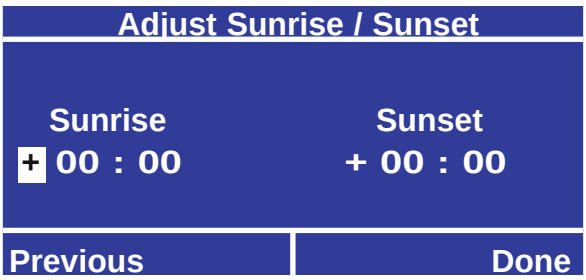
Note: *Do not use this function to compensate for daylight savings time. For procedures on how to program daylight savings time settings, refer to the next page.*

E.



F.

G.



Daylight Savings Time

Use this feature to set whether or not your location uses daylight savings time. If it does, you can configure when it starts and ends. When daylight savings time is used, the time will change automatically.

A. From the **Setup Clock** menu use ▲ and ▼ to highlight **Daylight Saving Time** and press OK or # (OK).

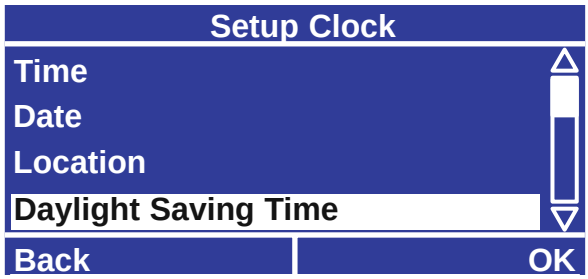
B. Use ▲ and ▼ to set whether or not your location uses daylight savings time, then press OK or # (Next).

C. If your location follows the **United States** rules for daylight savings time then select United States. Otherwise select **Other**. Press OK or # (Done) to save changes.

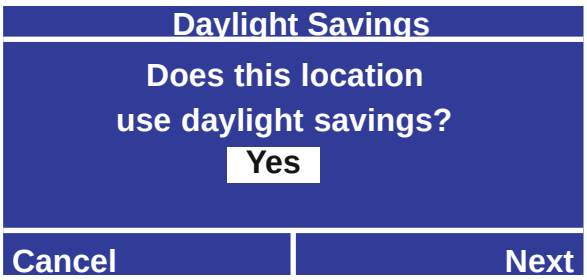
D. If you select **Other**, you are prompted to enter the rules. The default rules are set based on your location. You will need to know:

- The start month, week, and day.
- The end month, week, and day.
- The number of minutes to adjust for daylight savings time, up to 120 minutes.

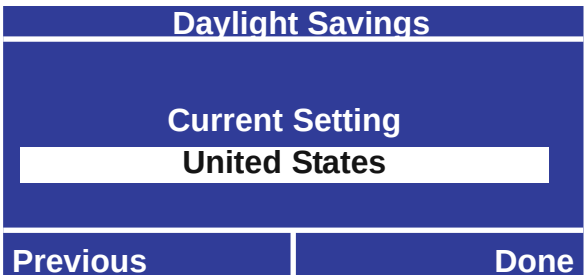
A.



B.



C.



Scene Modification

Scenes are stored lighting levels for each circuit in your system. Scenes can be used to create different lighting effects using a programmed mix of dimming and switching settings.

The *LCP128* system comes with 32 pre-configured scenes and 1 Off scene (see the table below for default scene settings). As you program your system, you can assign these scenes to time clock events. For example, at 6 PM each evening certain dimming circuit levels rise and additional circuits turn on. You can also assign scenes to control station inputs (wallstation buttons, key switches, and contact closures). This way, any time a button is pressed, key is turned, or contact closure is made, the system activates the desired scene.

In STEP 3, you can modify the preconfigured scenes as needed to create your own specific lighting environments.

Note: *In STEPS 4 and 5, you can also create additional custom scenes associated with a specific timeclock event or control station input.*

Scene	Default Settings for Dimming Circuits	Default Settings for Switching Circuits
Off	OFF	OFF
1	100%	ON
2	75%	ON
3	50%	ON
4	25%	ON
5 to 32	100%	ON

Modify Scenes

A. From the **Main Menu** use ▲ and ▼ to highlight **Scene Setup** and press OK or # (OK).

B. The Scene Modification screen lists the preconfigured scenes stored in your system. Use ▲ and ▼ to choose the scene you want to modify and press OK or # (Next).

Note: *Modified scenes will reflect changes in real time.*

C. The system lists each circuit and its current setting for this scene. Use ▲ and ▼ to select a circuit and ◀ and ▶ to change the setting for that circuit. To simultaneously change all circuits, select **All Circuits** and use ◀ and ▶ to change the setting.

Note: *The **All Circuits** function enables you to simultaneously adjust the percentage for all dimming circuits or to turn all circuits off or on.*

Scene circuit settings depend on the circuit type:

Switching: ON, OFF, --- (unaffected)

Dimming: OFF, 1 - 100%, --- (unaffected)

Motors: Open, Close, Stop, Jog Up, Jog Down, --- (unaffected)

Fans: Low, Medium, Medium-High, High, --- (unaffected)

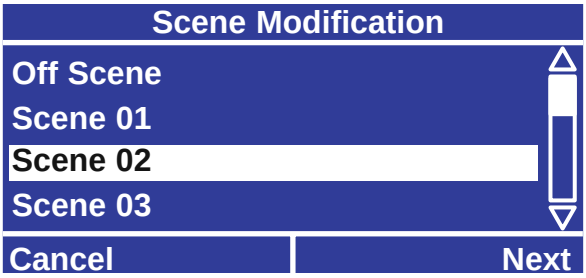
Note: *The **--- (unaffected)** setting means that the circuit is not affected by this scene.*

When you are finished modifying the scene press OK or # (Next).

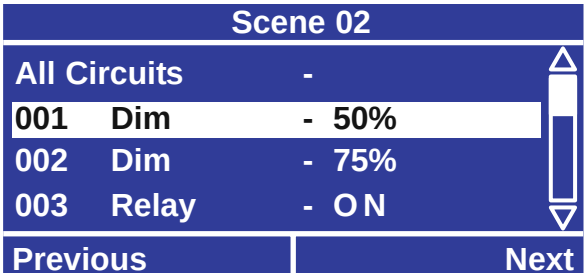
D. For dimming circuits affected by the scene, use ▲ and ▼ to set a fade time and press OK or # (Next).

E. For a combination of dimming and switching circuits, use ▲ and ▼ to set whether switches react at **Start of Fade** or **End of Fade**. Then press OK or # (Done).

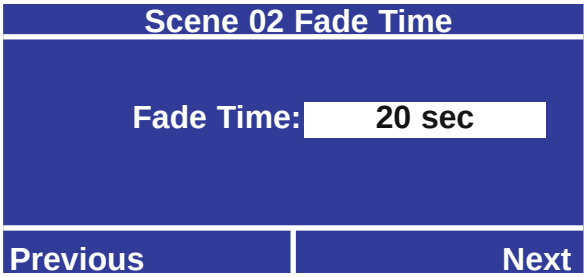
B.



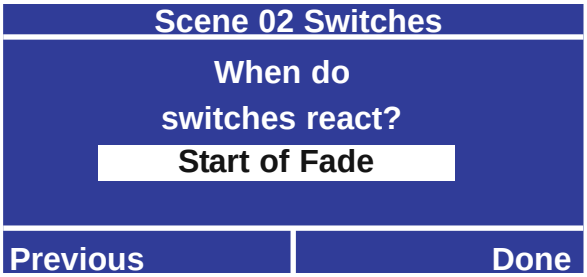
C.



D.



E.



Control Stations

Control stations are connected to the *LCP128* panel via the digital control link. Control stations can be wallstations (with various numbers of buttons), key switches (NTOMX-KS), contact closure input and output devices (OMX-AV, OMX-WCI), contact closure output devices (OMX-CCO-8), OMX-RS232 interfaces, or theatrical controls (ODMX-512). Each control station must be assigned a unique address. Addressing may be found in either the appropriate panel installation guide or installation guides for the individual devices. To set the address, refer to the instructions for each device.

Every wallstation button, key switch, or contact closure input can be assigned one of the following functions:

- **Scene** - A scene consists of a specified light level and fade time. Each time the button, key switch, or contact closure input is activated, the assigned circuits go to the programmed scene. A scene can also be used to control contact closure outputs.
- **Custom Scene** - A custom scene is a scene assigned to and programmed for a specific button press, key switch turn, or contact closure input. A custom scene may be recalled only by that single action to which it is assigned.
- **Lower Circuits** - Assigned dimming circuits are progressively lowered as long as input is received from the control station (for example, the button is held down, key is turned, contact closure is maintained). Circuits stay at this setting until another event or control station input occurs.
- **Raise Circuits** - Assigned dimming circuits are progressively raised as long as input is received from the control station (for example, the button is held down, key is turned, contact closure is maintained). Circuits stay at this setting until another event or control station input occurs.
- **Toggle** - Each time the button, key switch, or contact closure input is activated, the assigned circuits toggle between on and off. If the assigned circuits are in a mixed state (some on and some off), the circuits turn on.
- **Delay To Off** - Each time the button, key switch, or contact closure input is activated, the assigned circuit(s) turn off after the preset amount of time (1 - 90 minutes).
- **Enable Time Clock** - Enable the function of the time clock.
- **Disable Time Clock** - Disable the function of the time clock.

Before proceeding with STEP 4, complete the Control Station Table at the back of this guide. Record what each input (button, key switch, or contact closure) on each control station should do.

Note: *In STEP 4, you will configure contact closure inputs wired to a Lutron OMX-AV control station. Contact closure inputs wired directly to a panel are configured later in STEP 6.*

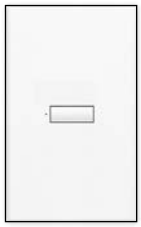
Factory Settings

When a control station type is not programmed in the system, the LCP128 uses an algorithm to intelligently guess the control station type, based on the button(s) pressed. Pressing the button(s) on a control station allows the LCP128 to identify it; some control stations can be identified with fewer or no button presses. Once the LCP128 has identified the control station, it assigns it the following defaults (note that these can be reprogrammed as desired):

- All button actions affect all circuits, and button presses select scenes
- All raise/lower actions raise and lower all circuits (non-dim loads set to 0% or 100%)
- Buttons labeled OFF are assigned to the OFF scene; if there is no labeled OFF button, the last button is assigned to OFF
- Button 1 is assigned to scene 1, button 2 is assigned to scene 2, and so on until the last (OFF) button
- For single-button control stations, the button toggles all circuits on and off
- Once any control station is programmed by the LCP128, the default settings are bypassed
- If all control station addresses are set to NO STATION, the system reverts to the factory defaults

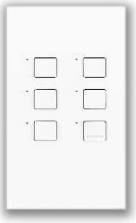
For button numbers on various control stations, see the section that follows.

Control Station Button Map: Factory Presets

	Button Number/Action	Model Number(s)/ Program as
	Toggle	S0-1B S0-1B0 1-button control
	1: Scene 1 2: Off	S0-2B S0-2B0 2-button control
	1: Scene 1 2: Scene 2 3: Off	S0-3B S0-3B0 3-button control
	1: Scene 1 2: Scene 2 3: Scene 3 4: Off	S0-4B S0-4B0 4-button control
	1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off	S0-4NRL S0-4NRL0 5-button control
	1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off Lower All Raise All	S0-4S S0-4SIR S0-4S0 S0-4SIR0 5-button with raise/lower
	1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off	S0-5B S0-5B0 5-button control
	1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Scene 5 6: Off	S0-6B S0-6B0 6-button control
	1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Scene 5 6: Scene 6 7: Off	S0-7B S0-7B0 7-button control
	Toggle	FOMX-1B FOMX-1B-SL 1-button control
	1: Scene 1 2: Off	NTOMX-2B 2-button control
	Clockwise: Scene 1 Counter-clockwise: Off	OMX-KS Keyswitch

Control Station Button Map: Factory Presets

Button Number/Action	Model Number(s)/ Program as
 1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off Up: Raise Down: Lower	NTOMX-4S-NRL NTOMX-4S-IR 5-button with raise/lower
 1: Scene 1 2: Off	EOMX-2B 2-button control
 1: Scene 1 2: Scene 2 3: Scene 3 4: Off	EOMX-4B 4-button control
 1: Scene 1 2: Scene 2 3: Scene 3 4: Off Lower All Raise All	EOMX-4S EOMX-4S-IR 5-button with raise/lower
 1-4 5-8 Scene 1 Scene 5 Scene 2 Scene 6 Scene 3 Scene 7 Scene 4 Scene 8 9: Off Lower All Raise All	EOMX-8S EOMX-8S-IR 9-button with raise/lower
 1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off 7: Raise 6: Lower	NTOMX-KP5 5-button with raise/lower
 1: Scene 1 7: Scene 6 2: Scene 2 8: Scene 7 3: Scene 3 9: Scene 8 4: Scene 4 10: Scene 9 5: Scene 5 11: Off 6: Raise 12: Lower	NTOMX-KP10 10-button with raise/lower
 1: Scene 1 7: Scene 6 12: Scene 11 2: Scene 2 8: Scene 7 13: Scene 12 3: Scene 3 9: Scene 8 14: Scene 13 4: Scene 4 10: Scene 9 15: Scene 14 5: Scene 5 11: Scene 10 16: Off 6: Raise All 17: Lower All	NTOMX-KP15 15-button with raise/lower

Button Number/Action	Model Number(s)/ Program as
 1: Scene 1 4: Scene 4 2: Scene 2 5: Scene 5 3: Scene 3 6: Off	NTOMX-LB6 NTOMX-LB6-RL 6-button control
 1: Scene 1 4: Scene 4 7: Scene 7 2: Scene 2 5: Scene 5 8: Scene 8 3: Scene 3 6: Scene 6 9: Off	NTOMX-LB9 NTOMX-LB9-RL 9-button control
 1: Scene 1 2: Off	OMX-2B-DW 2-button control
 1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off 6: Raise All 7: Lower All	OMX-7B-DW 5-button with raise/lower
 1: Scene 1 2: Scene 2 3: Scene 3 4: Scene 4 5: Off Up: Raise All Down: Lower All	OMX-4SLB-DW 5-button with raise/lower

Configure the Wallstations

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to choose the **Address** of the wallstation you would like to configure and press OK or # (Next).

Note: *The wallstation Address selected must match the Address switch setting on the wallstation.*

C. Use ▲ and ▼ to set the **Type** to **Wall Station** and press OK or # (Next).

D. Use ▲ and ▼ to select whether the station has **Permanent Raise and Lower Buttons** and press OK or # (Next).

E. Use ▲ and ▼ to set the **Number** of buttons and press OK or # (Next).

Note: *Do not count raise/lower buttons.*

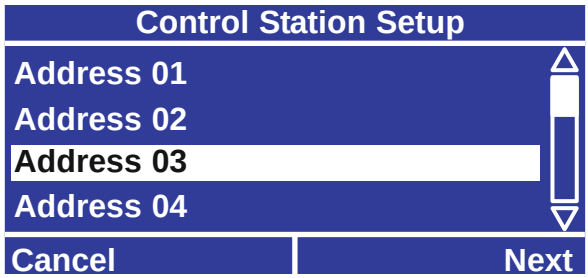
F. Use ▲ and ▼ to select the **Button** you want to program and press OK or # (Next).

Note: *To configure contact closure inputs (CCI), see page 35.*

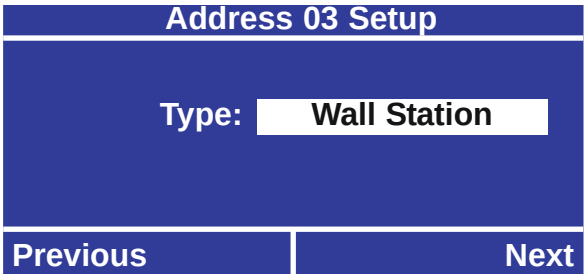
G. Use ▲ and ▼ to select the type of **Action** for this button: **Lower Circuits, Raise Circuits, Scene, Custom Scene, Enable Time Clock, Disable Time Clock, Delay to Off, Toggle,** or **No Action** and press OK or # (Next).

Refer to the following pages to program each type of action.

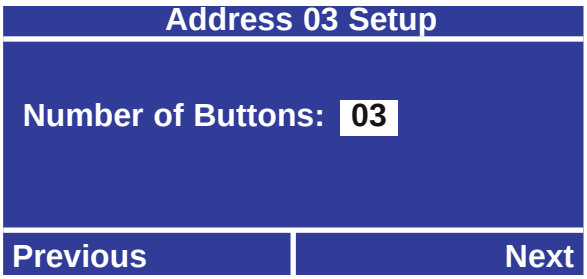
B.



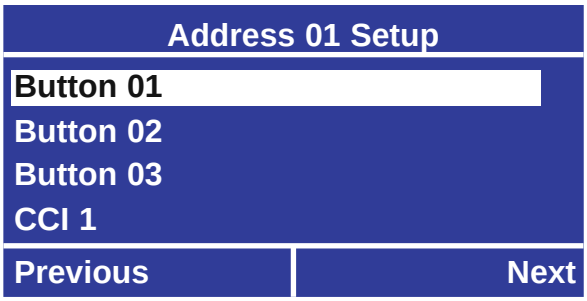
C.



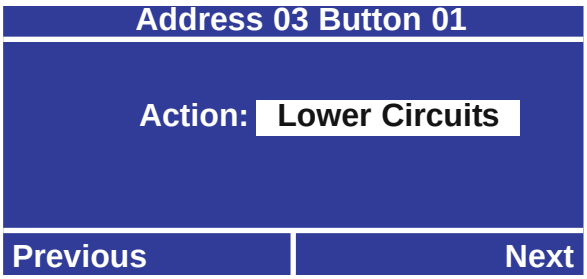
E.



F.



G.

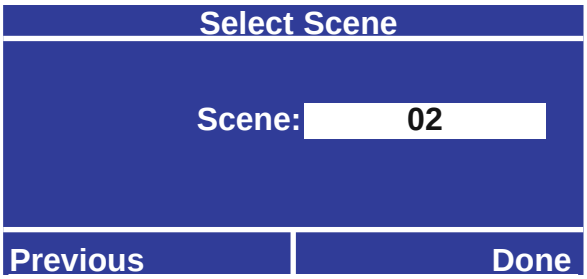


Configure the Wallstations (continued)

If Selecting a Scene Action

H. In step G, if you selected **Scene**, use ▲ and ▼ to select the scene and press OK or # (Done).

H.



If Selecting a Custom Scene Action

H. In step G, if you selected **Custom Scene**, the Select Circuits screen lists all the circuits. Use ▲ and ▼ to select a circuit and ◀ and ▶ to change the setting for that circuit. Or to simultaneously change all circuits, select **All Circuits** and use ◀ and ▶ to change the setting.

Note: *The **All Circuits** function enables you to simultaneously adjust the percentage for all dimming circuits or to turn all circuits off or on.*

Circuit settings depend on the circuit type:

Switching: ON, OFF, --- (unaffected)

Dimming: OFF, 1 - 100%, --- (unaffected)

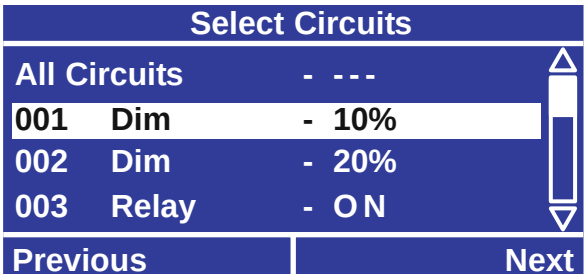
Motors: Open, Close, Stop, Jog Up, Jog Down

Fans: Low, Medium, Medium-High, High

Note: *The **---** (unaffected) setting means the circuit is not affected by this scene.*

When the circuits are programmed for this custom scene press OK or # (Next).

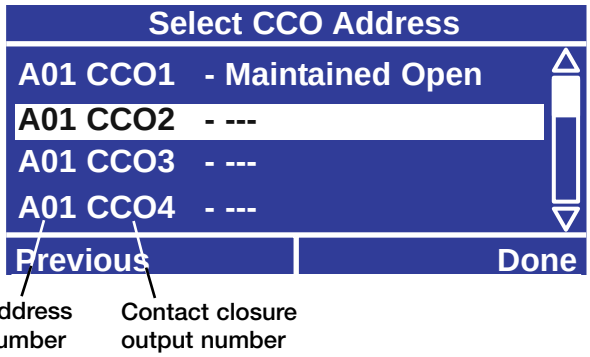
H.



I. The Select CCO Address screen is displayed only if control station devices with contact closure outputs (OMX-AV or OMX-CCO-8) have been entered into the system.

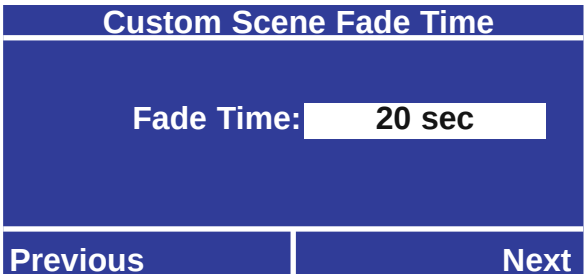
Use ▲ and ▼ to select the output to be associated with the button being programmed. Use ◀ and ▶ to change the setting for that output: **maintained open**, **maintained close, momentary pulse**, or **---** (unaffected). When the outputs are programmed for this custom scene, press OK or # (Done).

I.



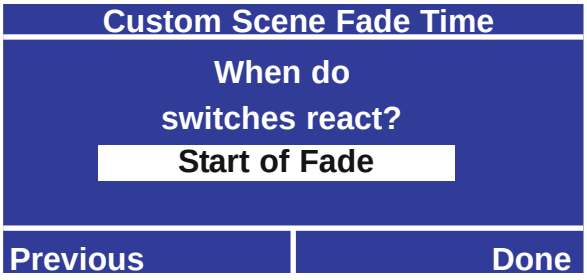
J. For dimming circuits affected by the custom scene, use ▲ and ▼ to set the **Fade Time** and press OK or #.

J.



K. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

K.



Configure the Wallstations (continued)

If Selecting a Delay to Off Action

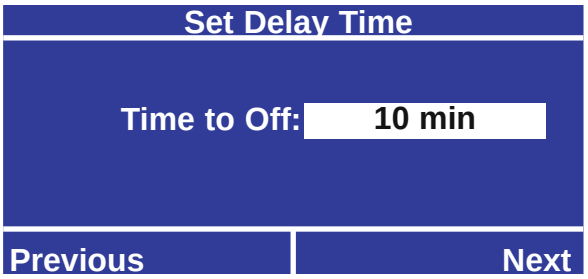
H. In step G, if you selected **Delay to Off**, use ▲ and ▼ to set the **Time to Off** and press OK or #.

I. The Assign Circuits screen lists all the circuits. Unassigned circuit numbers have hash lines going through them. Move the cursor to a circuit number and press OK to toggle between **Assigned** and **Unassigned** (dashed). All circuits can be toggled by selecting **ALL Circuits** and pressing OK. When the circuits are programmed press #.

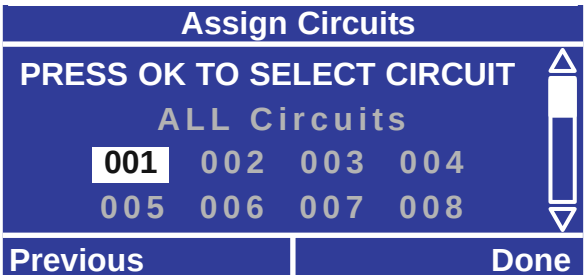
J. For dimming circuits affected by the action, use ▲ and ▼ to set the **Fade Time** and press OK or #.

K. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

H.



I.



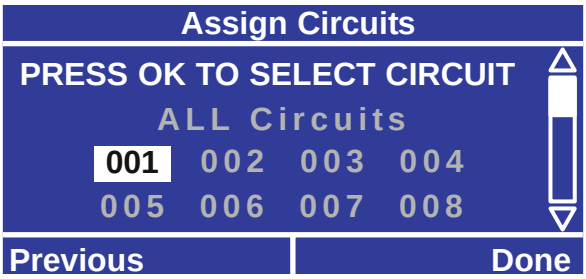
If Selecting a Lower Circuits, Raise Circuits, or Toggle Action

H. In step G, if you selected **Lower Circuits**, **Raise Circuits**, or **Toggle**, the Assign Circuits screen lists all the circuits. Unassigned circuits are presented as numbers with hash lines going through them. Move the cursor to a circuit number and press OK to toggle between **Assigned** and **Unassigned** (dashed). All circuits can be toggled by selecting **ALL Circuits** and pressing OK. When the circuits are programmed press #.

I. For dimming circuits affected by the action, use ▲ and ▼ to set the **Fade Time**.

J. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

H.



Configure Contact Closure Inputs for *seeTouch* Wallstations

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to choose the **Address** of the wallstation you would like to configure and press OK or # (Next).

Note: *The wallstation Address selected must match the Address switch setting on the wallstation.*

C. Use ▲ and ▼ to set the **Type** to **Wall Station** and press OK or # (Next).

D. Use ▲ and ▼ to select whether the station has **Permanent Raise and Lower Buttons** and press OK or # (Next).

E. Use ▲ and ▼ to set the **Number** of buttons and press OK or # (Next).

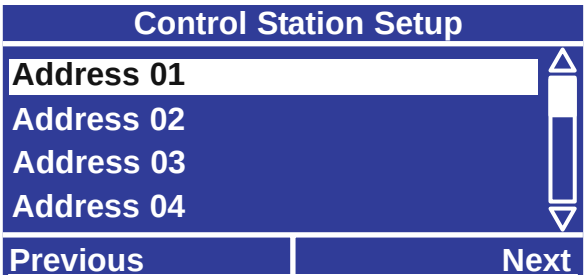
Note: *Do not count raise/lower buttons.*

F. Use ▲ and ▼ to select the **Contact Closure Input (CCI)** you want to program and press OK or # (Next).

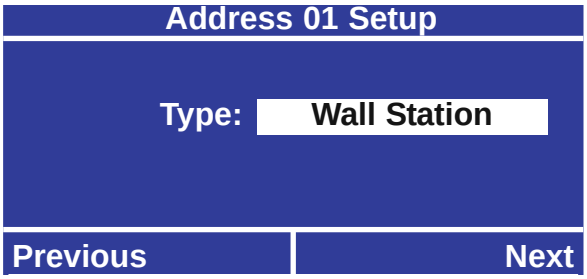
G. Use ▲ and ▼ to select whether you want to define an action for when the contact **Opens** or **Closes** and press OK or # (Next).

H. Use ▲ and ▼ to choose the type of **Action** for the CCI and press OK or # (Done).

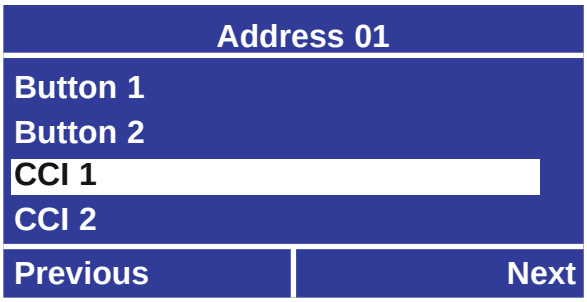
B.



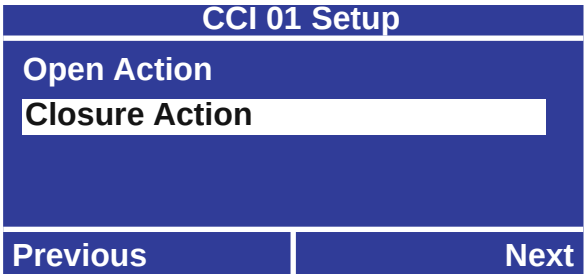
C.



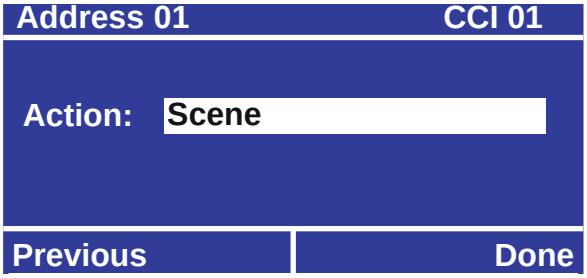
F.



G.



H.



Configure the OMX-CIR

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to choose the **Address** of the wallstation you would like to configure and press OK or # (Next).

Note: *The wallstation Address selected must match the Address switch setting on the OMX-CIR.*

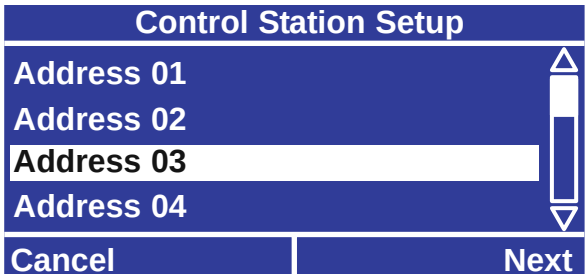
C. Use ▲ and ▼ to set the **Type** to **Wall Station** and press OK or # (Next).

D. Use ▲ and ▼ to select the **Button** you want to program and press OK or # (Next).

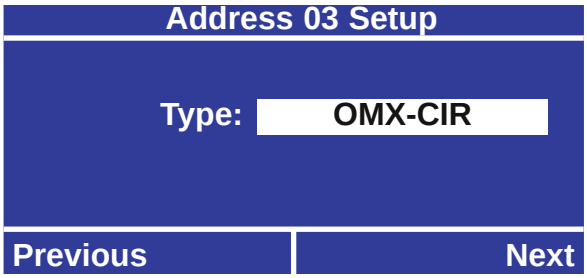
E. Use ▲ and ▼ to select the type of **Action** for this button: **Lower Circuits, Raise Circuits, Scene, Custom Scene, Enable Time Clock, Disable Time Clock, Delay to Off, Toggle,** or **No Action** and press OK or # (Next).

Refer to the following pages to program each type of action.

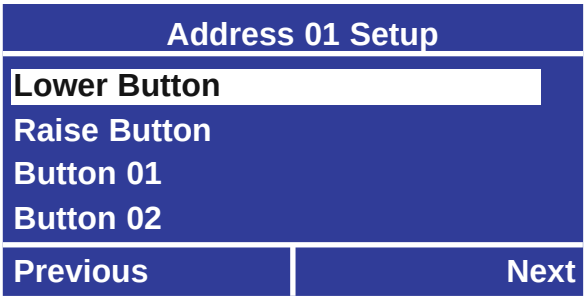
B.



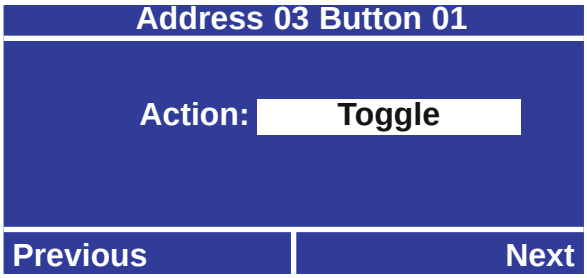
C.



D.



E.

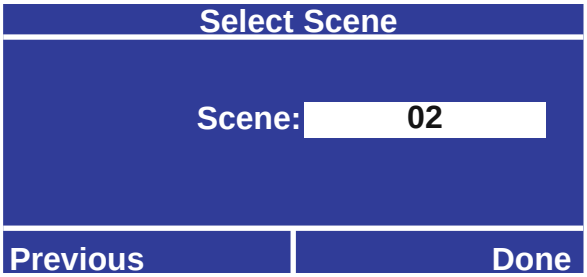


Configure the OMX-CIR (continued)

If Selecting a Scene Action

F. In step E, if you selected **Scene**, use ▲ and ▼ to select the scene and press OK or # (Done).

F.



If Selecting a Custom Scene Action

F. In step E, if you selected **Custom Scene**, the Select Circuits screen lists all the circuits. Use ▲ and ▼ to select a circuit and ◀ and ▶ to change the setting for that circuit. Or to simultaneously change all circuits, select **All Circuits** and use ◀ and ▶ to change the setting.

Note: *The **All Circuits** function enables you to simultaneously adjust the percentage for all dimming circuits or to turn all circuits off or on.*

Circuit settings depend on the circuit type:

Switching: ON, OFF, --- (unaffected)

Dimming: OFF, 1 - 100%, --- (unaffected)

Motors: Open, Close, Stop, Jog Up, Jog Down

Fans: Low, Medium, Medium-High, High

Note: *The **---** (unaffected) setting means the circuit is not affected by this scene.*

When the circuits are programmed for this custom scene press OK or # (Next).

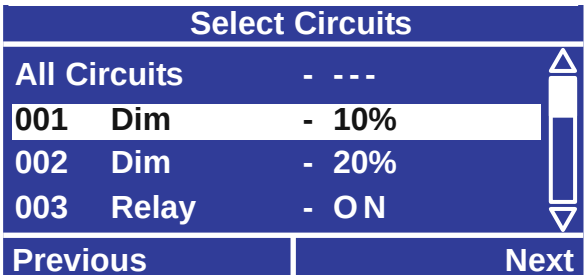
G. The Select CCO Address screen is displayed only if control station devices with contact closure outputs (OMX-AV or OMX-CCO-8) have been entered into the system.

Use ▲ and ▼ to select the output to be associated with the button being programmed. Use ◀ and ▶ to change the setting for that output: **maintained open**, **maintained close, momentary pulse**, or **---** (unaffected). When the outputs are programmed for this custom scene, press OK or # (Done).

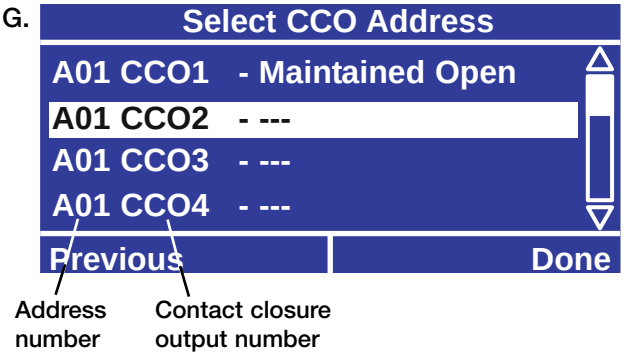
H. For dimming circuits affected by the custom scene, use ▲ and ▼ to set the **Fade Time** and press OK or #.

I. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

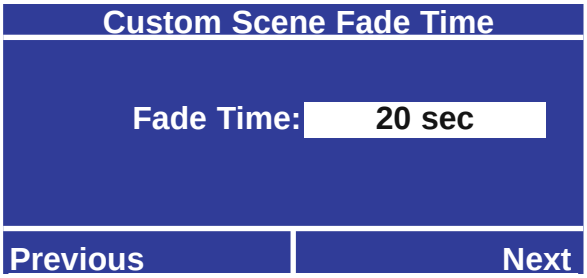
F.



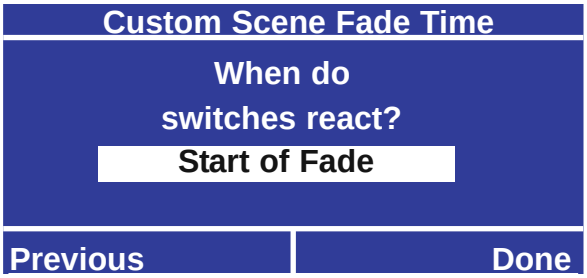
G.



H.



I.



Configure the OMX-CIR (continued)

If Selecting a Delay to Off Action

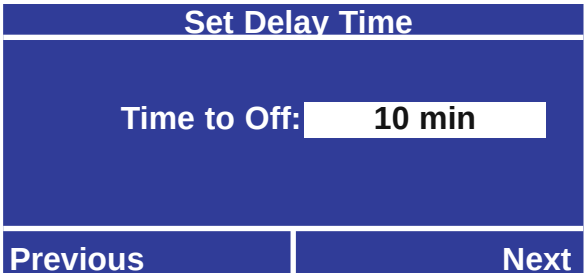
F. In step E, if you selected **Delay to Off**, use ▲ and ▼ to set the **Time to Off** and press OK or #.

G. The Assign Circuits screen lists all the circuits. Unassigned circuit numbers have hash lines going through them. Move the cursor to a circuit number and press OK to toggle between **Assigned** and **Unassigned** (dashed). All circuits can be toggled by selecting **ALL Circuits** and pressing OK. When the circuits are programmed press #.

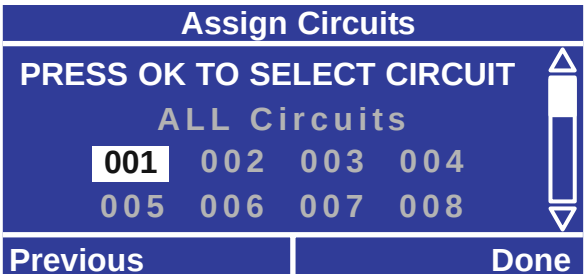
H. For dimming circuits affected by the action, use ▲ and ▼ to set the **Fade Time** and press OK or #.

I. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

F.



G.



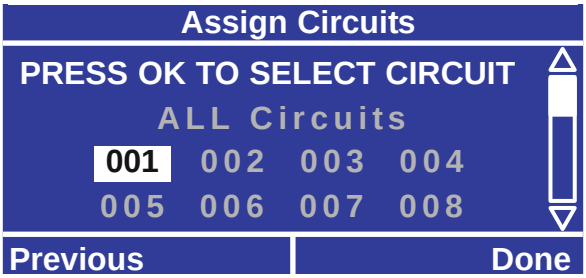
If Selecting a Lower Circuits, Raise Circuits, or Toggle Action

F. In step E, if you selected **Lower Circuits**, **Raise Circuits**, or **Toggle**, the Assign Circuits screen lists all the circuits. Unassigned circuits are presented as numbers with hash lines going through them. Move the cursor to a circuit number and press OK to toggle between **Assigned** and **Unassigned** (dashed). All circuits can be toggled by selecting **ALL Circuits** and pressing OK. When the circuits are programmed press #.

G. For dimming circuits affected by the action, use ▲ and ▼ to set the **Fade Time**.

H. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

F.



Configure Key Switch (NTOMX-KS)

Lutron's NTOMX-KS key switch control station can be programmed to initiate an action for a clockwise and counter-clockwise turn.

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight the address of the **NTOMX-KS** you would like to configure and press OK or # (Next).

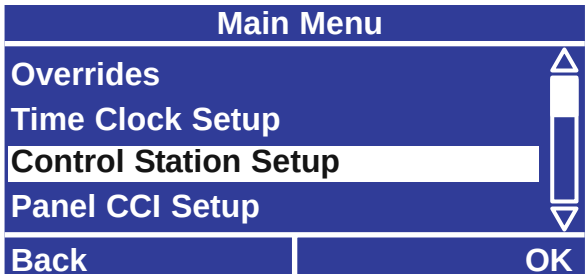
C. Use ▲ and ▼ to change control type to **Key Switch** and press OK or # (Next).

D. Use ▲ and ▼ to highlight which direction turn to program and press OK or # (Next). Each key switch can be programmed for a clockwise or counter-clockwise turn. Both may be programmed.

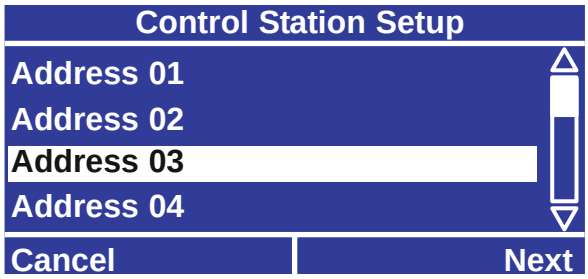
E. Use ▲ and ▼ to select the type of **Action** for this key turn: **Lower Circuits**, **Raise Circuits**, **Scene**, **Custom Scene**, **Enable Time Clock, Disable Time Clock, Delay to Off**, **Toggle,** and **No Action** and press OK or # (Next). Refer to the beginning of STEP 4 for an explanation of the various action types.

F. Program the **Lower Circuits**, **Raise Circuits**, **Scene**, **Custom Scene**, **Delay to Off**, or **Toggle** action using the same screen methods used to configure a wallstation button. Refer to "Configure the Wallstations" earlier in STEP 4.

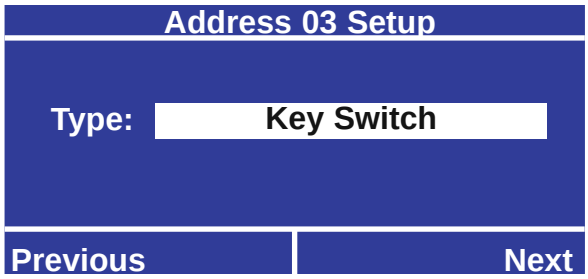
A.



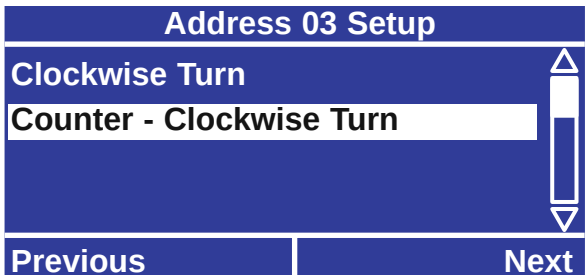
B.



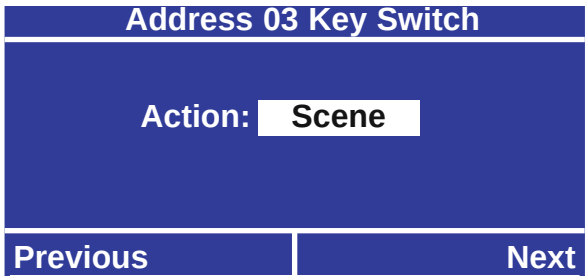
C.



D.



F.



Configure Contact Closure Inputs on OMX-AV/OMX-WCI

Lutron's OMX-AV or OMX-WCI control station can be programmed to initiate actions for up to five contact closure inputs.

Note: *For contact closure inputs wired directly to the LCP128 panel, refer to STEP 6.*

Note: *OMX-WCI has 7 contact closure inputs.*

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight the address of the **OMX-AV** you would like to configure and press OK or # (Next).

C. Use ▲ and ▼ to set the control **Type** to **OMX-AV** and press OK or # (Next)**.**

D. Each OMX-AV provides 5 inputs. Use ▲ and ▼ to highlight the **Contact Closure Input (CCI)** to program and press OK or # (Next). Or select **No CCI's** if only the contact closure outputs (CCOs) are being used.

E. Use ▲ and ▼ to select whether you want define an action for when the contact opens or when it closes and press OK or # (Next).

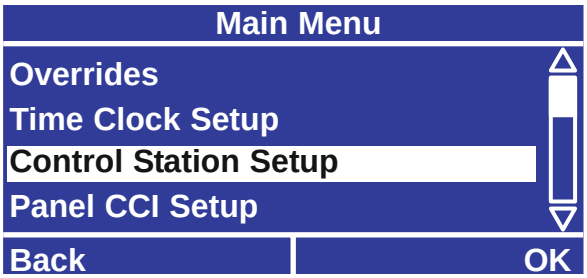
Note: *If there should be an action on both, first set up the* ***Open Action****, then follow this procedure again but choose* ***Closure Action****.*

F. Use ▲ and ▼ to select the type of **Action** for this CCI: **Lower Circuits**, **Raise Circuits**, **Scene**, **Custom Scene**, **Enable Time Clock, Disable Time Clock, Delay to Off**, **Toggle,** and **No Action** and press OK or # (Next). Refer to the beginning of STEP 4 for an explanation of the various action types.

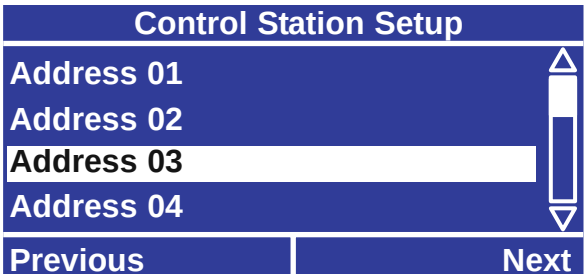
G. **For OMX-WCI**: Program the **Lower Circuits**, **Raise Circuits**, **Scene**, **Custom Scene**, **Delay to Off**, or **Toggle** action using the same screen methods used to configure a wallstation button. Refer to "Configure the Wallstations" earlier in STEP 4.

For OMX-AV: Program the **Disable Time Clock, Enable Time Clock, Scene**, **Custom Scene**, **Delay to Off**, or **Toggle** action using the same screen methods used to configure a wallstation button. Refer to "Configure the Wallstations" earlier in STEP 4.

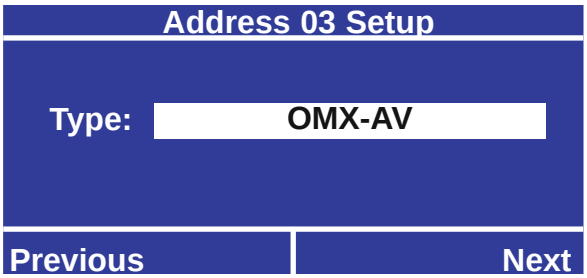
A.



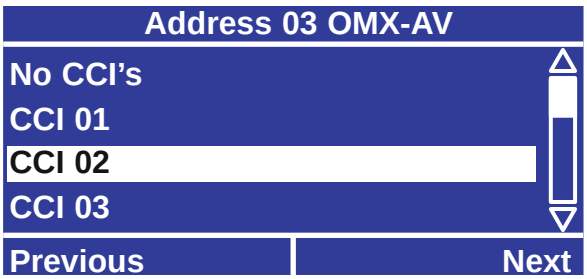
B.



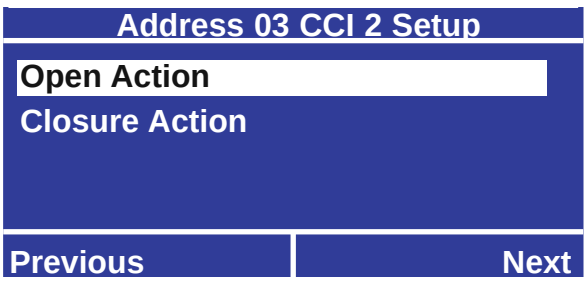
C.



D.



E.



Configure DMX Channels to Circuits on ODMX-512

Lutron's ODMX-512 control station can be programmed to 32 circuits in the system. The system can then take inputs from a theatrical stage console to assigned circuits in the system.

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight the address of the **ODMX-512** you would like to configure and press OK or # (Next).

C. Use ▲ and ▼ to set the control **Type** to **ODMX-512** and press OK or # (Next).

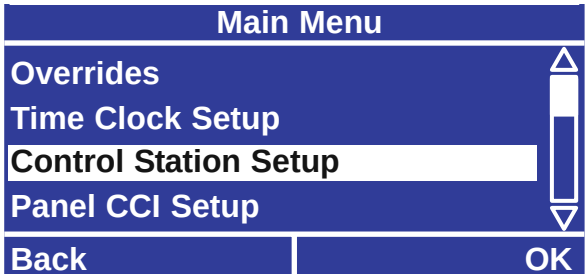
D. Use ▲ and ▼ to select the **DMX Activation Mode** and press OK or # (Next).

Note: *The DMX can be activated either when in connection or when the selected channel is set above 50%.*

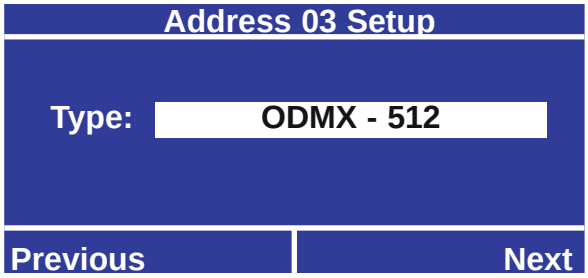
E. Use ▲ and ▼ to assign circuits to a DMX channel and press OK or # (Next).

Note: *The same DMX channel may be assigned to more than one circuit.*

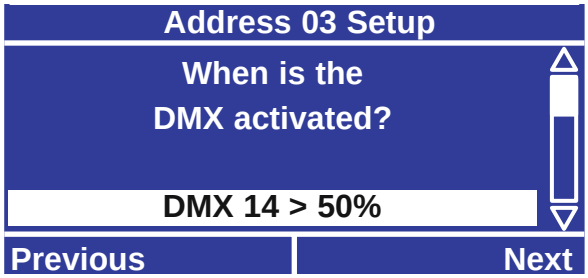
A.



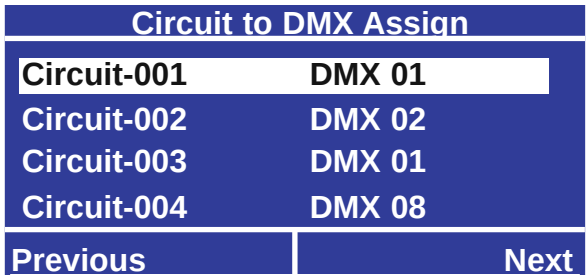
C.



D.



E.



Integration through RS232

Lutron's OMX-RS232 control station enables you to integrate your *LCP128* system with a building management system.

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight the address of the **OMX-RS232/OMX-CI-RS232** you would like to configure and press OK or # (Next).

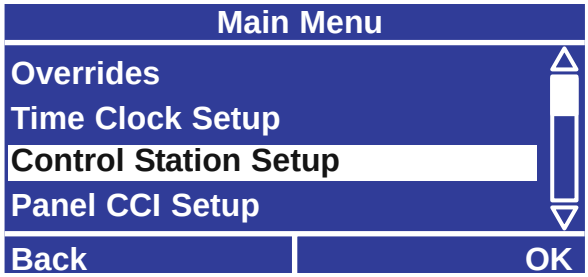
C. Use ▲ and ▼ to change control **Type** to **OMX-RS232 / OMX-CI-RS232** and press OK or # (Done).

Using the GRAFIK 6000® RS232 protocol.

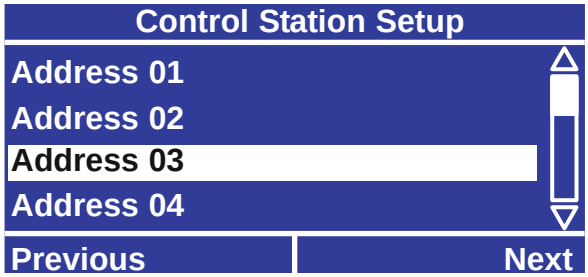
The OMX-RS232 is packaged and shipped with complete instructions and a protocol that details how to execute each command. Only a subset of the commands in that document work with the *LCP128* system and they are listed below:

Command	***LCP128* Function**
Fade to Level:	Sets a pattern or time delay to off
Multilevel:	Flash circuits
Get Level:	Request level
Simulate Press:	Simulate button press
Simulate Release:	Simulate button release
Enable Control Stations:	Enable control stations
Disable Control Stations:	Disable control stations
Set Clock:	Sets time and date
Time Now:	Request time
Astro Times:	Request sunrise / sunset times
Date:	Request date
Enable Time clock:	Enable time clock
Disable Time clock:	Disable time clock

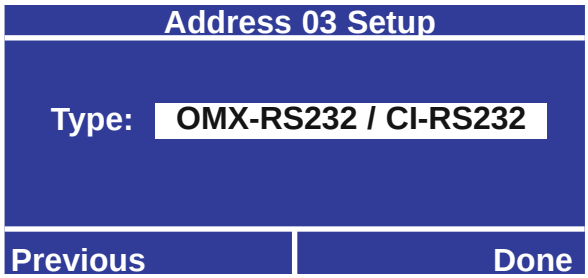
A.



B.



C.



Integration through Ethernet

Lutron's OMX-CI-NWK-E control station enables you to integrate your *LCP128* system with a building management system.

A. From the **Main Menu** use ▲ and ▼ to highlight **Control Station Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight the address of the **OMX-CI-NWK-E** you would like to configure and press OK or # (Next).

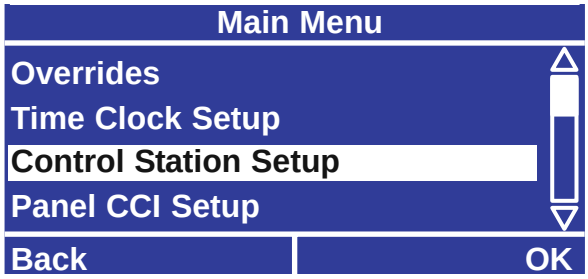
C. Use ▲ and ▼ to change control **Type** to **OMX-CI-NWK-E** and press OK or # (Done).

Using the GRAFIK 6000® RS232 protocol.

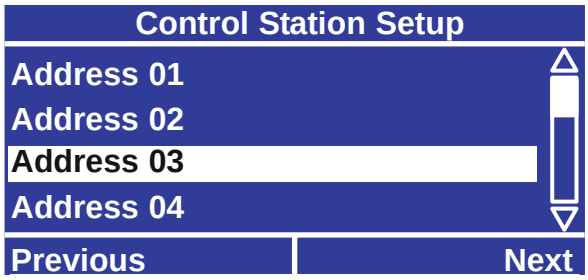
The OMX-CI-NWK-E is packaged and shipped with complete instructions and a protocol that details how to execute each command. Only a subset of the commands in that document work with the *LCP128* system and they are listed below:

Command	*LCP128* Function
Fade to Level:	Sets a pattern or time delay to off
Multilevel:	Flash circuits
Get Level:	Request level
Simulate Press:	Simulate button press
Simulate Release:	Simulate button release
Enable Control Stations:	Enable control stations
Disable Control Stations:	Disable control stations
Set Clock:	Sets time and date
Time Now:	Request time
Astro Times:	Request sunrise / sunset times
Date:	Request date
Enable Time clock:	Enable time clock
Disable Time clock:	Disable time clock

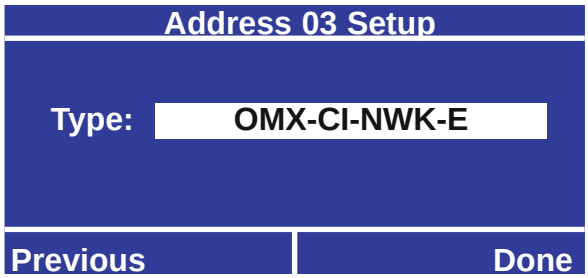
A.



B.



C.



Time Clock Events

Time clock events enable the system to initiate a scene or start/end afterhours mode at either a specific time of day or at a time relative to sunrise or sunset. 47 schedules are available—one for every day of the week, and 40 holiday schedules. There can be a total of up to 500 events and no more than 25 on any day / holiday. Holiday schedules always override the weekly schedule.

The options for time clock events are:

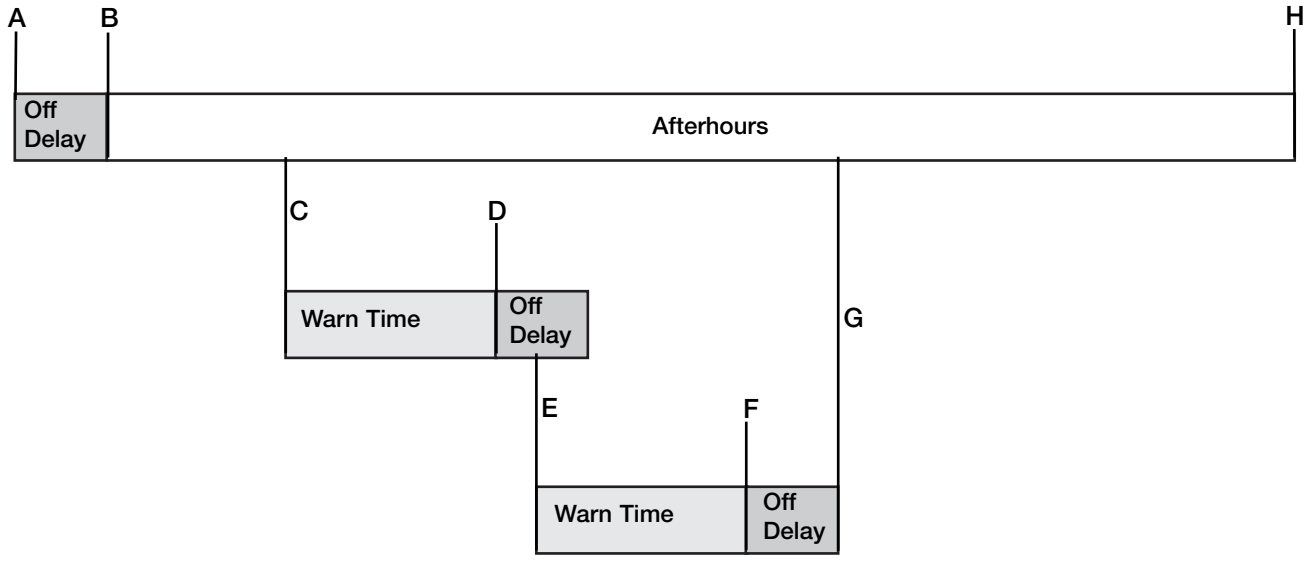
- **Scene** or **Custom Scene** - The assigned circuits go to the programmed scene/custom scene settings.
- **Enable or Disable Controls** - Enable or disable the function of control stations.
- **Afterhours Start** - Starts an energy saving mode that is used to turn lights off at the end of normal hours until the beginning of the next day. First, a scene or pattern of circuit levels is recalled for the space (**Afterhours Start**). Circuits programmed to turn off flash to warn any occupants that they are about to go out (number of flashes specified by **Flash Count**). Lights remain on to allow the occupant a chance to press a button to keep lights on (length of time is programmed as **Off Delay**). Finally, if a button has not been pressed, lights turn off automatically at the end of the delay period.

  If a button is pressed, occupancy sensor tripped, or another timeclock event occurs while the system is in **Afterhours** mode or in **Off Delay,** lights turn on and remain on for the programmed number of minutes, (**Warn Time**) then flash (number specified by **Flash Count**) and then turn off after the **Off Delay**.
- **Afterhours End** - When afterhours ends, the circuits are returned to their programmed state.

Example Scenario for Afterhours:

A. Afterhours start event—afterhours scene is recalled. The circuits that are going to turn off start to flash and off delay starts counting down.
B. System enters afterhours.
C. Button is pressed to turn lights on.
D. Lights flash notifying they will be turning off soon.
E. Button is pressed to keep lights on.
F. Lights flash notifying they will be turning off soon.
G. Lights turn off.
H. Afterhours end event.

Before proceeding with STEP 5, complete the Time Clock Event Table located at the back of this guide. Record when each event should occur and what it should do.



Adding Weekly Events

Weekly events occur each week on a specific day.

A. From the **Main Menu** use ▲ and ▼ to highlight **Time Clock Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Add Event** and press OK or # (OK).

C. Use ▲ and ▼ to highlight **Add Weekly Event** and press OK or # (OK).

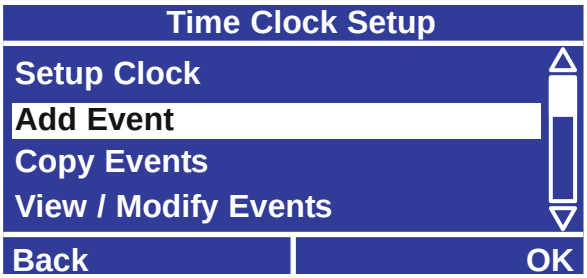
D. Use ▲ and ▼ to select the **Day** to which you would like to add the event and press OK or # (Next).

E. Use ▲ and ▼ to select **Fixed Time** or at a time relative to **Sunset** or **Sunrise.** Press ▶ to adjust the time or offset. Adjust the time using ▲ and ▼ and press OK or # (Next).

F. Use ▲ and ▼ to select the desired **Action** for the event: **Scene, Custom Scene, Enable or Disable Controls, Afterhours Start,** or **Afterhours End** and press OK or # (Next). Refer to the beginning of STEP 5 for an explanation of the various action types.

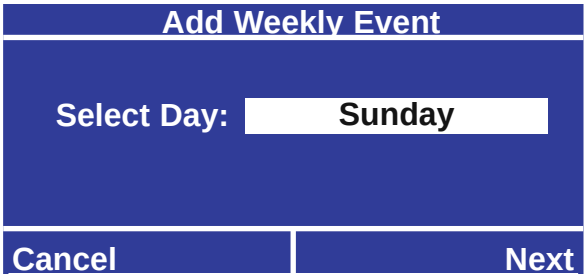
Note: *For Afterhours End, this step is complete.*

B.

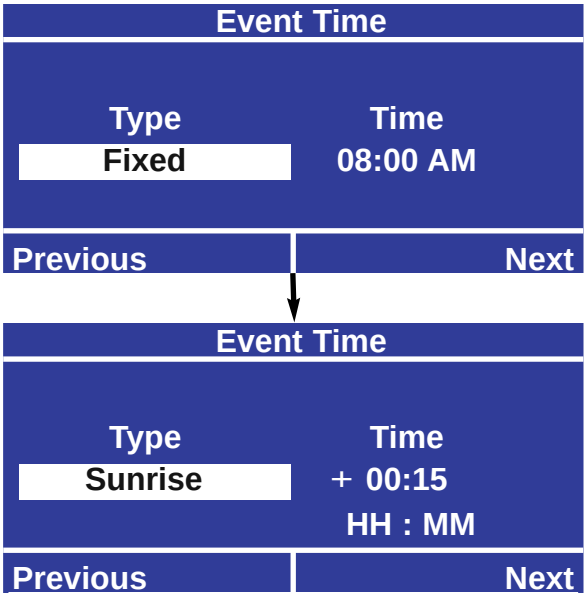


C.

D.



E.



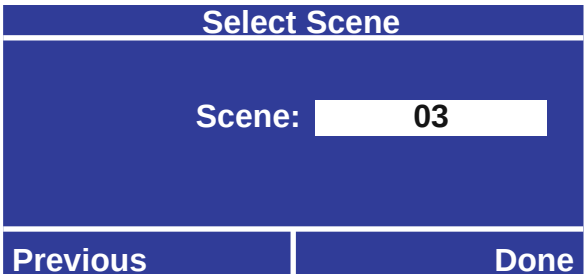
Adding Weekly Events (continued)

If Selecting a Scene Action

G. In step F, if you selected **Scene**, use ▲ and ▼ to select the desired scene and press OK or # (Done).

To add another event to this same schedule, select **Yes** when prompted "Modify More Events?"

G.



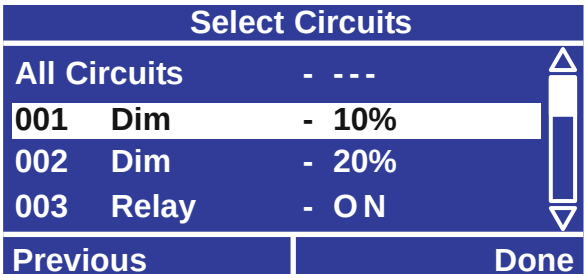
If Adding a Custom Scene Action

G. In step F, if you selected **Custom Scene**, set the circuit settings for the custom scene. Then press OK or # (Done).

To add another event to this same schedule, select **Yes** when prompted "Modify More Events?"

Note: *Modified scenes will reflect changes in real time.*

G.



If Selecting an Afterhours Start Action

G. In step F, if you selected **After Hours Start**, choose **Select Scene** or **Set Circuit Level**. Then press OK or # (Next).

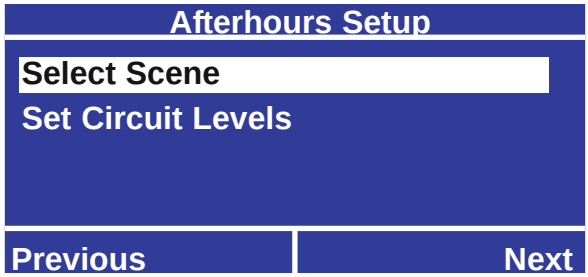
H. Select the scene or set the circuit levels to be used for afterhours mode. Then press OK or # (Done). Refer to the beginning of STEP 5 for a detailed description of how afterhours mode works.

Note: *Modified circuit levels will reflect changes in real time.*

To add another event to this same schedule, select **Yes** when prompted "Modify More Events?"

Note: *You will set the afterhours warn time, flash count, and off delay later in STEP 5.*

G.



Adding Holiday Events

Holiday events occur on a specific date and can last for 1 to 90 days.

A. From the **Main Menu** use ▲ and ▼ to highlight **Time Clock Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Add Event** and press OK or # (OK)**.**

C. Use ▲ and ▼ to highlight **Add Holiday Event** and press OK or # (OK)**.**

D. Use ▲ and ▼ to select the holiday to which you would like to add the event and press OK or # (Next).

To define a new holiday, select **New Holiday**.

- Enter the start date of the holiday.
- Enter the duration of the holiday. For example, New Year's might be defined as starting on December 31 and lasting 2 days (December 31 and January 1).

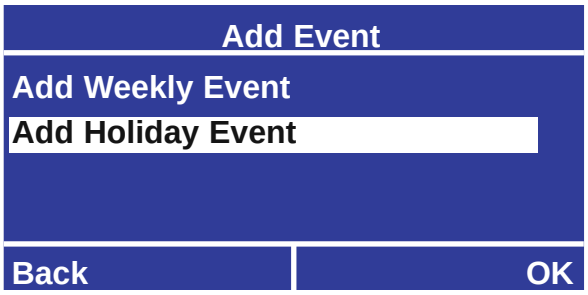
E. Use ▲ and ▼ to select **Fixed Time** or at a time relative to **Sunset** or **Sunrise.** Press ▶ to adjust the time or offset. Adjust the time using ▲ and ▼ and press OK or # (Next).

F. Use ▲ and ▼ to select the desired **Action** for the event: **Scene, Custom Scene, Enable or Disable Controls, Afterhours Start,** or **Afterhours End** and press OK or # (Next). Refer to the beginning of STEP 5 for an explanation of the various action types.

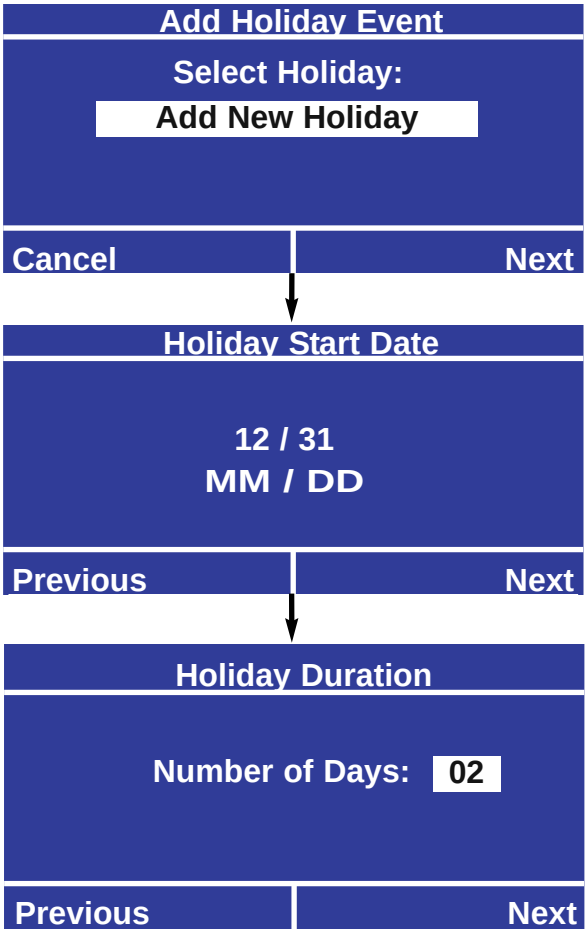
Program the action using the same method as for a weekly event. Refer to "Adding Weekly Events" earlier in STEP 5.

Note: *For Afterhours End, this step is complete.*

C.



D.



Copying Events

A. From the **Main Menu** use ▲ and ▼ to highlight **Time Clock Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Copy Events** and press OK or # (OK).

C. Use ▲ and ▼ to highlight **Copy Weekly Event** or **Copy Holiday Event** and press OK or # (OK).

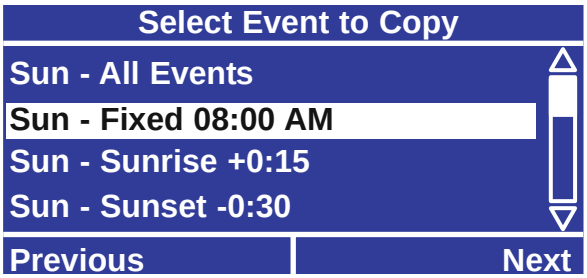
D. Use ▲ and ▼ to select the day of the week or holiday you would like to copy from and press OK or # (Next).

E. Use ▲ and ▼ to select the event you would like to copy and press OK or # (Next). If you would like to copy all events programmed for this day or holiday, select **All Events**.

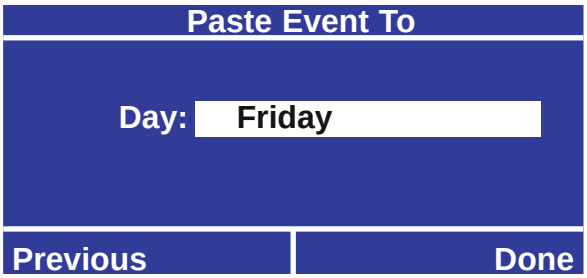
F. Use ▲ and ▼ to select the day or holiday you would like to paste to and press OK or # (Done). Holidays appear after the weekdays in the list. To add a new holiday, select **New Holiday** at the end of the list and then modify the existing holiday's information to save it as a new holiday

To paste the event to another day or holiday, select **Yes** when prompted to "Paste Again?".

E.



F.



Deleting Events

A. From the **Main Menu** use ▲ and ▼ to highlight **Time Clock Setup** and press OK.

B. Use ▲ and ▼ to highlight **Delete Event.**

C. Use ▲ and ▼ to highlight **Delete Weekly Event** or **Delete Holiday Event.**

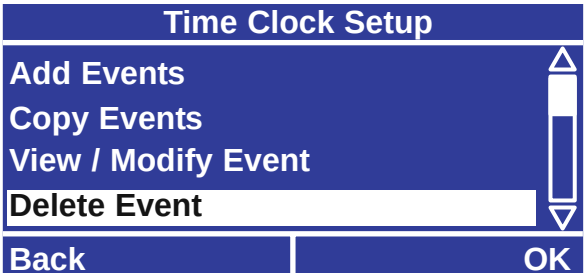
D. Use ▲ and ▼ to select the day of the week or holiday you would like to delete from.

E. Use ▲ and ▼ to select the event you would like to delete. If you would like to delete all events for that schedule, select **All Events**.

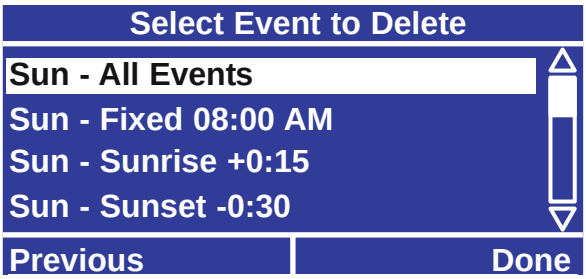
F. You are asked to confirm deleting the event(s). Press **Yes** to delete, otherwise press **No**.

To delete another event from that day or holiday, select **Yes** when prompted to "Delete Another?".

B.



E.



Viewing / Modifying Events

A. From the **Main Menu** use ▲ and ▼ to highlight **Time Clock Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **View/Modify Event** and press OK or # (OK).

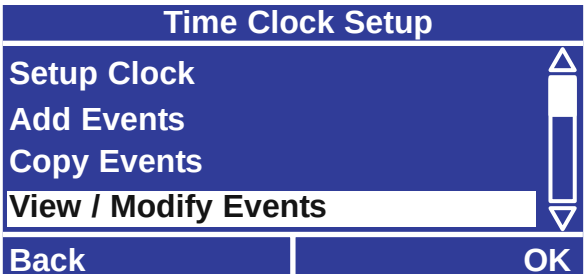
C. Use ▲ and ▼ to highlight **Modify Weekly Event** or **Modify Holiday Event** and press OK or # (OK).

D. Use ▲ and ▼ to select the day or holiday you would like to view or modify and press OK or # (Next).

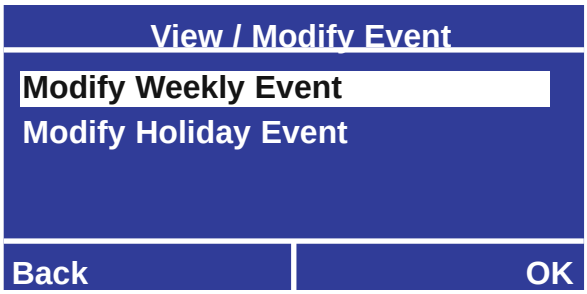
E. Use ▲ and ▼ to select the event you would like to view or modify and press OK or # (Next).

F. You now have the opportunity to modify this event. For procedures, refer to "Adding Weekly Events" or "Adding Holiday Events" earlier in STEP 5.

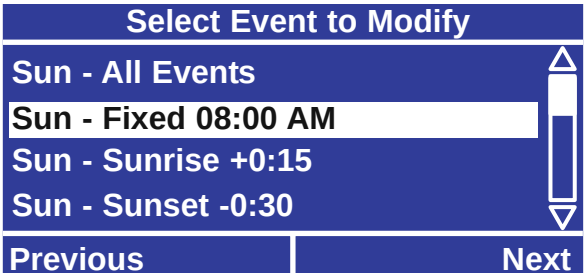
B.



C.



E.



Afterhours Setup

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Afterhours Setup** and press OK or # (OK).

C. Use ▲ and ▼ to set a **Warn Time**, from 1 to 180 minutes and press OK or # (Next).

D. Use ▲ and ▼ to set the **Flash Count**, from 1 to 15 flashes and press OK or # (Next).

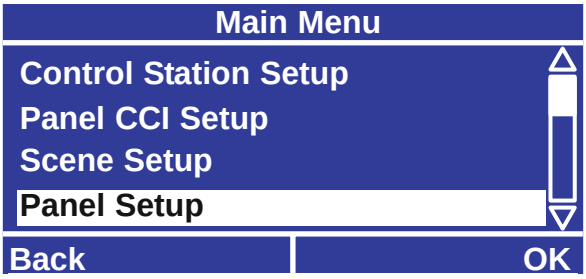
E. Use ▲ and ▼ to set an **Off Delay**, from 1 to 180 minutes and press OK or # (Done).

Notes:

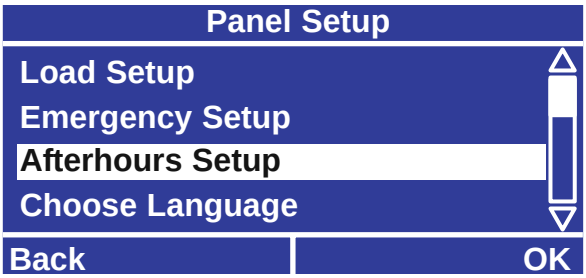
To add an afterhours start action, refer to "Adding Weekly Events" earlier in STEP 5.

120 minutes is the maximum allowable off delay in California Title 24.

A.



B.

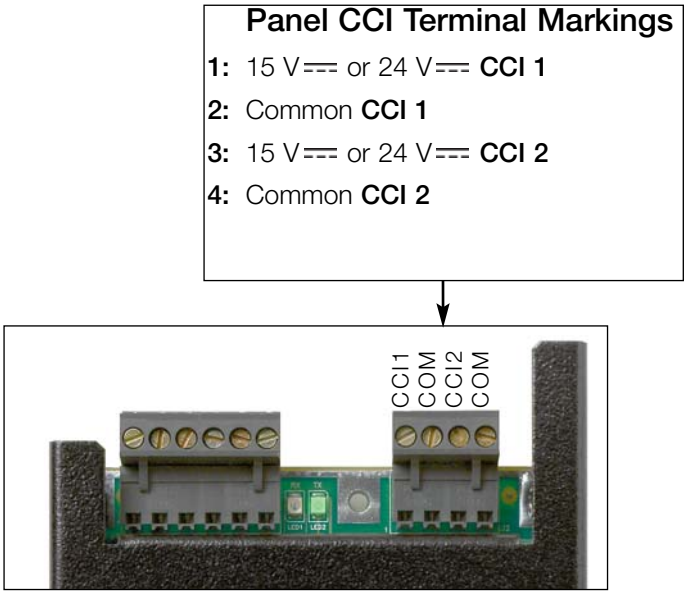


Panel Contact Closure Inputs

The *LCP128* controller has two contact closure inputs (see illustration below). Separate actions can be defined for the opening and closing of the contact. The choices are:

- **Scene** or **Custom Scene** - Each time the contact closure input is activated, the assigned circuits go to the programmed scene. A scene can also be used to control contact closure outputs.
- **Enable or Disable Time Clock -** Enable or disable the function of the time clock.
- **Toggle** - Each time the contact closure input is activated, the assigned circuits toggle between on and off. If the assigned circuits are in a mixed state (some on and some off), the circuits turn on.
- **Delay To Off** - Each time the contact closure input is activated, the assigned circuit(s) turn off after the preset amount of time (1 - 90 minutes).

Before proceeding with STEP 6, complete the Control Station Table located at the back of this guide. Record how each local contact closure should function. Designate them: Panel 1 CCI 1 Opening, Panel 1 CCI 1 Closing, Panel 1 CCI 2 Opening, Panel 1 CCI 2 Closing, and continue for Panel 2 through Panel 8 as required.



LCP128 controller Top

Configure Panel Contact Closure Inputs

Note: *For contact closure inputs wired to a Lutron OMX-AV control station, refer to STEP 4.*

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel CCI Setup** and press OK or # (OK).

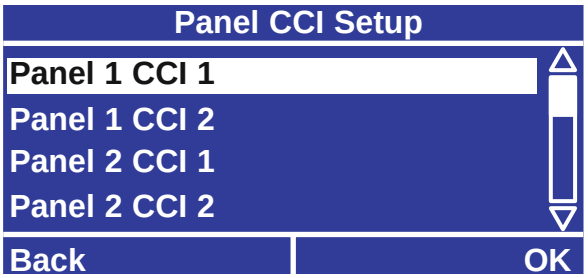
B. Use ▲ and ▼ to choose the contact closure input you want to configure and press OK or # (OK).

C. Use ▲ and ▼ to select whether you want to define an action for when the contact **Opens** or **Closes** and press OK or # (Next).

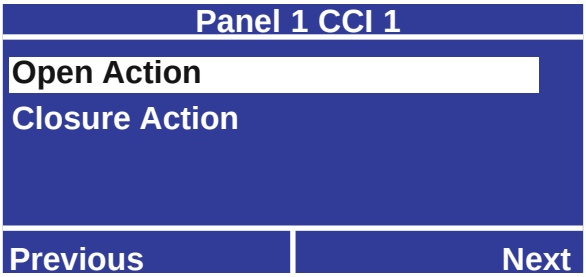
D. Use ▲ and ▼ to choose the type of **Action** for the CCI: **Scene**, **Custom Scene**, **Enable or Disable Time Clock**, **Enable or Disable Controls, Delay to Off**, **Toggle,** or **No Action**.

Program the desired action using the following procedures.

B.



C.



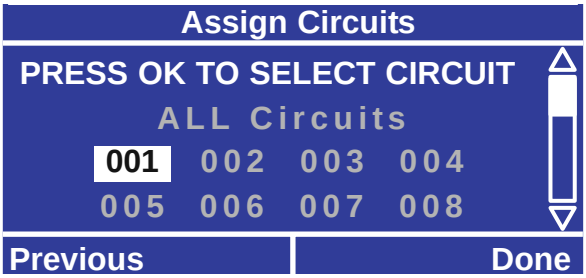
If Selecting a Toggle Action

E. In step D, if you selected **Toggle**, the Assign Circuits screen lists all the circuits. Unassigned circuits are presented as numbers with hash lines going through them. Move the cursor to a circuit number and press OK to toggle between **Assigned** and **Unassigned** (dashed). All circuits can be toggled by selecting **ALL Circuits** and pressing OK. When the circuits are programmed press #.

F. For dimming circuits affected by the action, use ▲ and ▼ to set the **Fade Time**.

G. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

E.

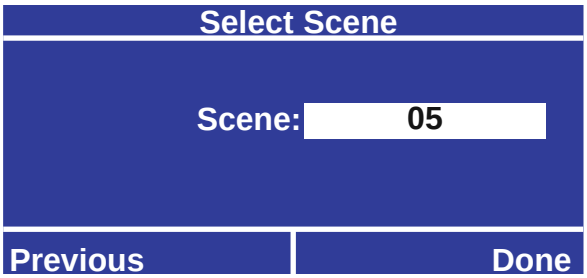


Configure Contact Closure Inputs (continued)

If Selecting a Scene Action

E. In step D, if you selected **Scene**, use ▲ and ▼ to select the scene and press OK or # (Done).

E.



If Selecting a Custom Scene Action

E. In step D, if you selected **Custom Scene**, the Select Circuits screen lists all the circuits. Use ▲ and ▼ to select a circuit and ◀ and ▶ to change the setting for that circuit. Or to simultaneously change all circuits, select **All Circuits** and use ◀ and ▶ to change the setting.

Note: *The* ***All Circuits*** *function enables you to simultaneously adjust the percentage for all dimming circuits or to turn all circuits off or on.*

Circuit settings depend on the circuit type:

Switching: ON, OFF, --- (unaffected)

Dimming: OFF, 1 - 100%, --- (unaffected)

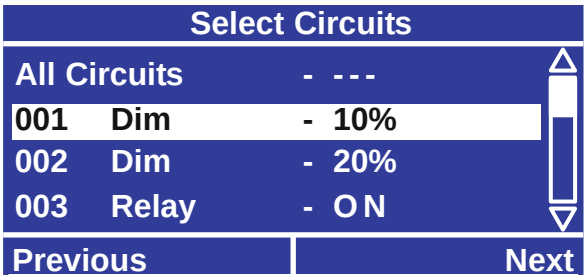
Motors: Raise, Lower, Stop, Jog Up, Jog Down

Fans: Low, Medium, Medium-High, High

Note: *The* ***---*** *(unaffected) setting means the circuit is not affected by this scene.*

When the circuits are programmed for this custom scene press OK or # (Next).

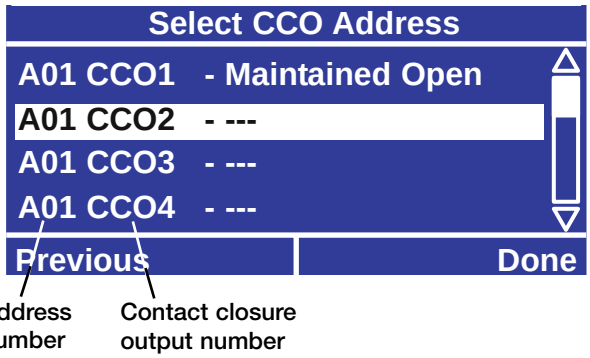
E.



F. The Select CCO Address screen is displayed only if control station devices with contact closure outputs (OMX-AV or OMX-CCO-8) have been entered into the system.

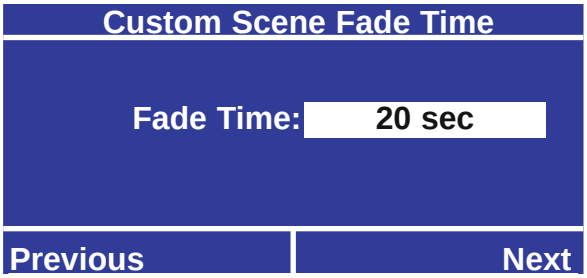
Use ▲ and ▼ to select the output to be associated with the scene being programmed. Use ◀ and ▶ to change the setting for that output: **maintained open**, **maintained close, momentary pulse**, or **---** (unaffected). When the outputs are programmed for this custom scene, press OK or # (Done).

F.



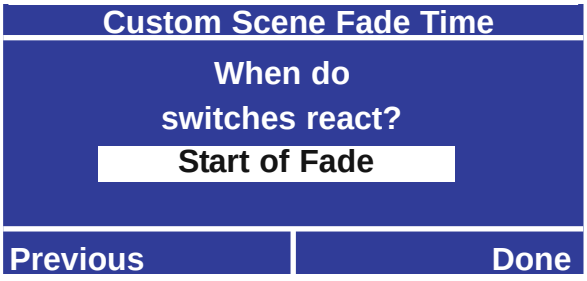
G. For dimming circuits affected by the custom scene, use ▲ and ▼ to set the **Fade Time** and press OK or #.

G.



H. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

H.



Configure Contact Closure Inputs (continued)

If Selecting a Delay to Off Action

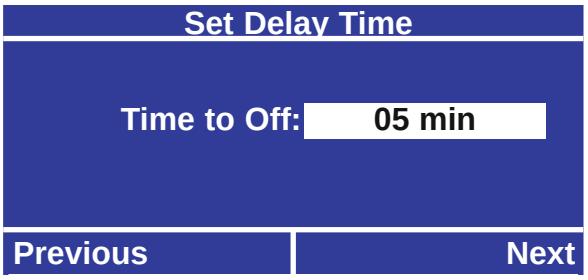
E. In step D, if you selected **Delay to Off**, use ▲ and ▼ to set the **Time to Off** and press OK or # (Next).

F. The Assign Circuits screen lists all the circuits. Unassigned circuits are presented as numbers with hash lines going through them. Move the cursor to a circuit number and press OK to toggle between **Assigned** and **Unassigned** (dashed). All circuits can be toggled by selecting **ALL Circuits** and pressing OK. When the circuits are programmed press #.

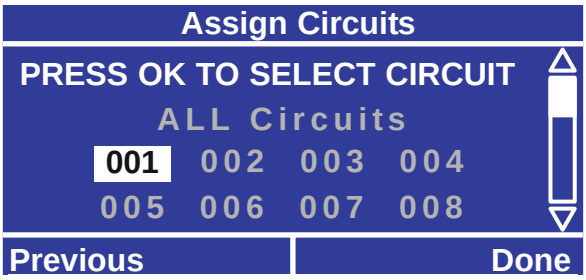
G. For dimming circuits affected by the action, use ▲ and ▼ to set the **Fade Time** and press OK or #.

H. For a combination of dimming and switching circuits, use ▲ and ▼ to set when the switches react (**Start of Fade** or **End of Fade**). Then press OK or #.

E.



F.



STEP 7

Emergency Power Mode

Perform this step only if you want to configure an emergency power mode when normal power is lost. All control station inputs and time clock events are ignored while in emergency power mode. This step defines if the panel has emergency circuits and, if so, how to configure the emergency settings. For multi-panel systems, emergency settings are configured on the master panel and each remote panel.

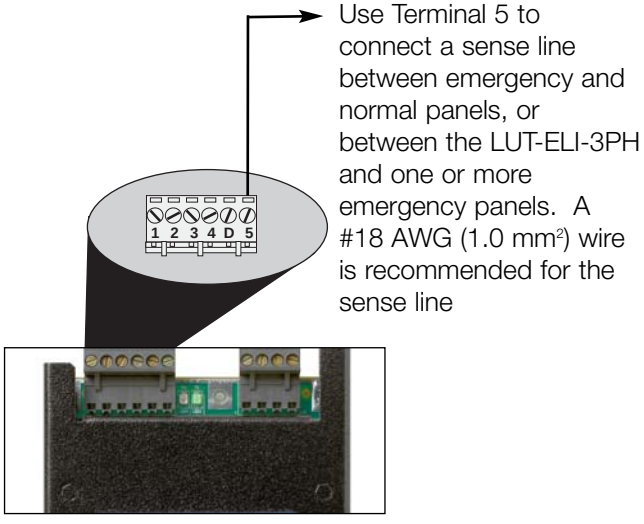
- Identify panels fed by normal (non-essential) power. Move their **emergency switches** to the left position, see illustration below.
- For all the emergency (essential) lighting panels, move the **emergency switches** to the right position, see illustration below.
- The essential and non-essential panels must be connected by a sense line wired to **terminal 5** on the link connector on the *LCP128* controller, see illustration below. (For wiring details see page 56).

  In this configuration, the emergency (essential) lighting panel will "sense" the normal panels' power. When normal power is lost, the emergency panel will go to the emergency settings (factory set to all circuits On).

  Panels with their switch in the center (unaffected) position will not affect or react to the sense line.

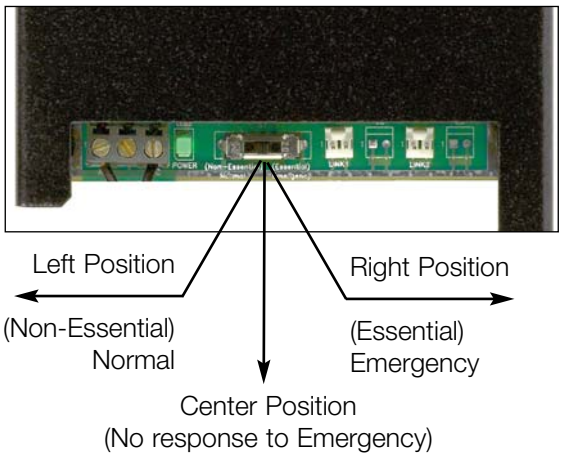
Notes:

- *If UL 924 certification is required, the Lutron Emergency Lighting Interface (LUT-ELI-3PH) may be used to meet code. The LUT-ELI-3PH senses the normal (non-essential) line voltage on all three phases (3PH) of normal power. When one or more phases of power are lost, the LUT-ELI-3PH will send a signal to **terminal 5** on the LCP128 controller(s). When the **emergency switch** is set to the right position (essential), the emergency lighting settings will be recalled. The LUT-ELI-3PH can be used with one or multiple panel systems.*
- *Loss of normal power can be simulated by turning off all connected normal (non-essential) panels' control breaker.*
- *When the emergency switch is in its center position (as shipped), terminal 5 on the panel does not respond to the emergency.*



LCP128 controller top

Three-position **Emergency Switch** is located at the bottom of the *LCP128* controller.



Configuring the Emergency Setting Levels

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Emergency Setup** and press OK or # (OK).

C. When asked if the panel has emergency functionality, use ▲ and ▼ to select **Yes** and press OK or # (Next).

D. The Emergency Setup screen lists all the circuits and their default emergency settings. Use ▲ and ▼ to select a circuit and ◀ and ▶ to change the setting for that circuit. To simultaneously change all circuits, select **All Circuits** and use ◀ and ▶ to change the setting.

Note: *The* ***All Circuits*** *function enables you to simultaneously adjust the percentage for all dimming circuits or to turn all circuits off and on.*

Circuit settings depend on the circuit type:

Switching: ON, OFF, --- (unaffected)

Dimming: OFF, 1 - 100%, --- (unaffected)

Motors: Open, Close, Stop, Jog Up, Jog Down

Fans: Low, Medium, Medium-High, High

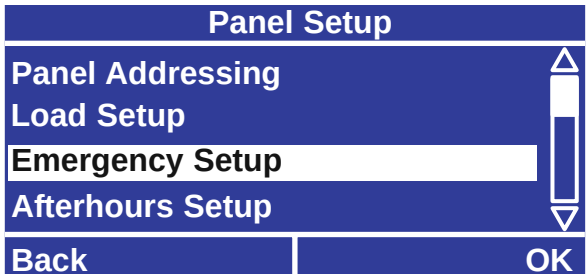
Note: *The* ***--- (unaffected)*** *setting means the circuit is not affected by emergency mode.*

When the circuits are programmed for emergency mode, press OK or # (Next).

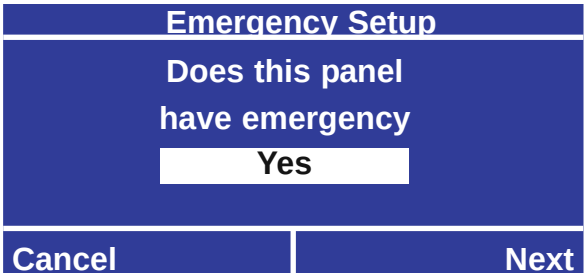
E. The Select CCO Address screen is displayed only if control station devices with contact closure outputs (OMX-AV or OMX-CCO-8) have been entered into the system. Use ▲ and ▼ to scroll through the list to select the output to be associated with the button being programmed. Use ◀ and ▶ to change the setting for that output between: **maintained open**, **momentary open**, **momentary close**, **maintained close** or **---** (unaffected). When the outputs are programmed press OK or # (Done) to update the database.

F. For multi-panel systems, repeat the procedure to program the emergency settings at each remote panel.

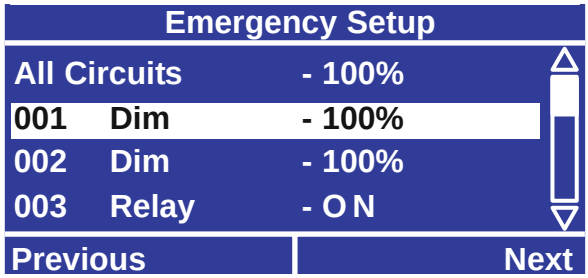
B.



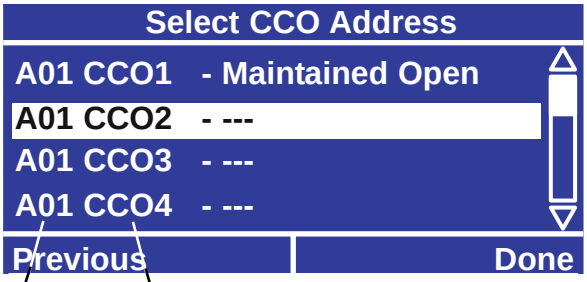
C.



D.



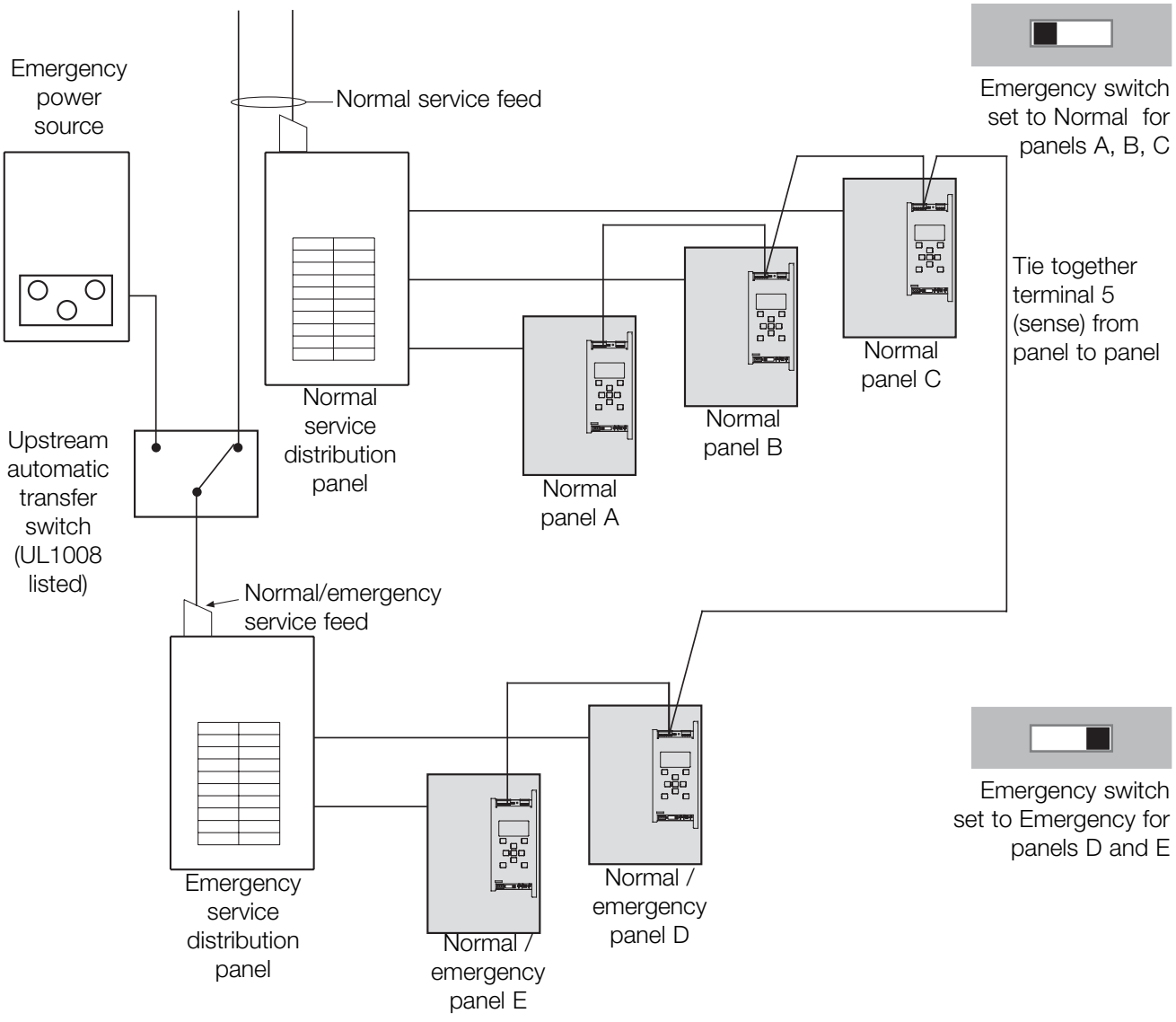
E.



Panel-to-Panel Wiring for Emergency Systems

To provide emergency lighting to a multi-panel system, wire as shown. Note that the Normal (non-essential) panels are fed from a normal utility power source, and the Normal/Emergency (essential) panels are fed from a normal power source that is switched to an emergency power source via an automatic transfer switch. Lutron power panels can not be fed from both normal and emergency power sources at the same time. Safety codes call for a physical separation between these power sources that is not provided in the power panels. The separation is typically provided in the UL1008 transfer switch.

Circuits in the normal panel and the emergency panel must be on the same control link; both the zone intensity and on/off information will be provided to both panels when normal power is present. All dimmers will go to the level set at the control. All load wires will go directly from the power panels (normal or emergency) to the loads. The #5 (Sense) terminal on the controller is a sense line for the emergency panel. In the normal panel this terminal #5 outputs a sense voltage indicating that normal power is present. When normal power is lost TO ALL NORMAL PANELS, the sense voltage is lost. If power is lost to only one normal panel (as shown below), the emergency panels will NOT come on. Provided the emergency power source has been switched to feed the emergency panel, all emergency circuits will be turned on to full intensity and the controls will be disabled. Also, if the sense line is opened between the group of normal panels and the group of emergency panels, the emergency panel will respond by sending its loads to full intensity.



Overview

From time to time, you may need to temporarily override the programmed settings for your system (for example, to raise or lower the lights in a single circuit).

The *LCP128* controller enables you to perform the following types of overrides:

- **Circuit Level Override** - Directly set a level for a dimming circuit or turn any circuit on or off. The override occurs immediately and remains in effect as long as the **Set Circuit Levels** screen is displayed on the controller LCD. Pressing **Done** to exit the **Set Circuit Levels** screen keeps the circuits at the override setting until they are changed by a control station input or time clock event. Pressing **Cancel** to exit the **Set Circuit Levels** screen returns the lights to their previous state.
- **Scene Override** - Directly apply circuit settings using a different scene. The override occurs immediately and remains in effect as long as the **Select Scene** screen is displayed on the controller. Pressing **Done** to exit the **Select Scene** screen keeps the circuits at the override setting until they are changed by a control station input or time clock event. Pressing **Cancel** to exit the **Select Scene** screen returns the lights to their previous state.
- **Time Clock Override** - Enable or disable all time clock events. When the time clock is re-enabled, missed events do not occur; control starts with the next scheduled event.
- **Control Station Override** - Enable or disable all control stations. When control stations are re-enabled, button presses, key turns, and contact closures are processed again.
- **Afterhours Override** - Ends afterhours mode until it is re-started by the time clock.

Note: *All override options are available from the master panel. Circuit level overrides are also available from remote panels.*

Override the Circuits by Setting Circuit Levels

A. From the **Main Menu** use ▲ and ▼ to highlight **Overrides** and press OK or # (OK).

Note: *From a remote panel, choose* ***Set Circuit Levels*** *from the* ***Main Menu****.*

B. Use ▲ and ▼ to choose **Set Circuit Levels** and press OK or # (OK)

C. The circuits are listed with their current settings displayed. Use ▲ and ▼ to select a circuit and ◀ and ▶ to change the setting for that circuit. To change all circuits, select All Circuits and use ◀ and ▶ to change the setting.

Note: *The* ***All Circuits*** *function enables you to adjust the percentage for all dimming circuits or to turn all circuits off and on.*

Circuit settings depend on the circuit type:

Switching: ON, OFF, Flash

Dimming: OFF, 1 - 100%, Flash

Motors: Open, Close, Stop, Jog Up, Jog Down

Fans: Low, Medium, Medium-High, High

Note: *The* ***Flash*** *setting cycles a circuit between On and Off once every few seconds - useful for locating a circuit in the space.*

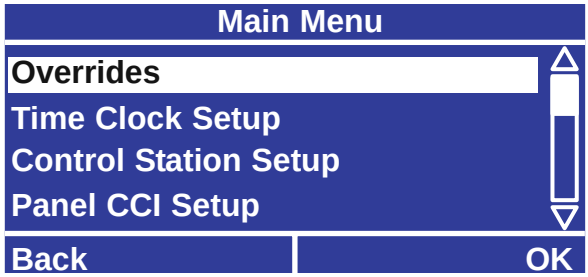
Changes take effect immediately. As long as the Set Circuit Levels screen is displayed, the circuits will remain at the set state. The settings override all other inputs (time clock events, button presses, contact closure inputs, etc.).

The override Set Circuit Levels screen will not time-out to the Home screen or screen saver.

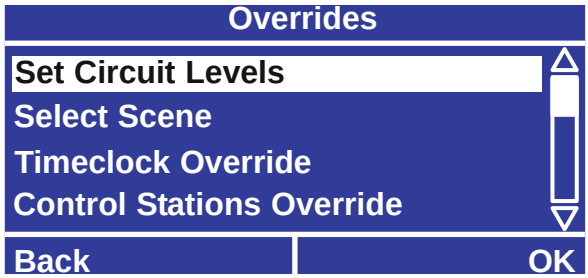
D. **To exit the Set Circuit Levels screen and keep the changed settings,** press OK or # (Done). The circuits will remain at the override setting until they are changed by a control station input or time clock event.

To exit the Set Circuit Levels screen and return the circuits to what they were before setting overrides, press * (Cancel).

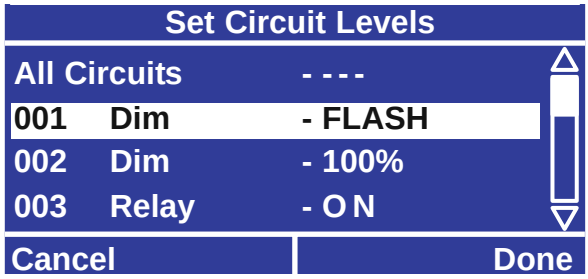
A.



B.



C.



Override Circuits Using a Scene

A. From the **Main Menu** use ▲ and ▼ to highlight **Overrides** and press OK or # (OK).

B. Use ▲ and ▼ to choose **Select Scene** and press OK or # (OK)

C. Use ▲ and ▼ to choose the **Scene** and press OK or # (Done).

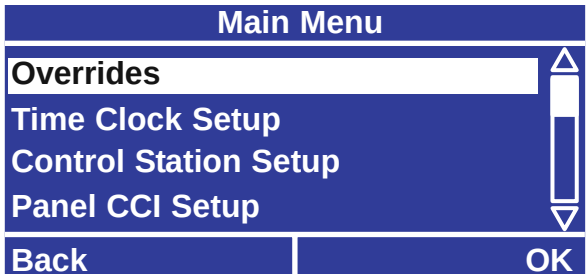
Changes take effect immediately. As long as the Select Scene screen is displayed, the circuits will stay at the selected scene. This setting overrides all other inputs (time clock events, button presses, contact closure inputs, and so on).

The override Select Scene screen will not time-out to the Home screen or screen saver.

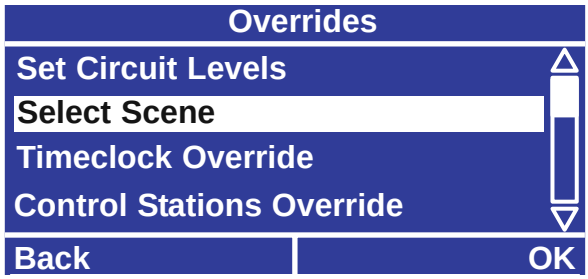
D. **To exit the Select Scene screen and keep the scene settings,** press OK or # (Done). The circuits will remain at the override setting until they are changed by a control station input or time clock event.

To exit the Select Scene screen and return the circuits to what they were before setting overrides, press * (Cancel).

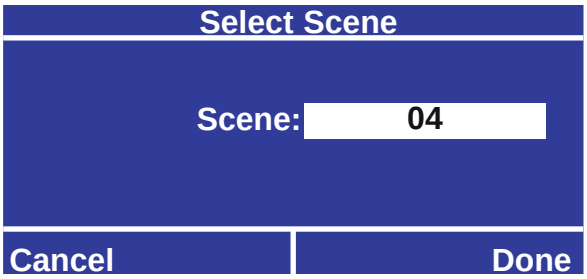
A.



B.



C.



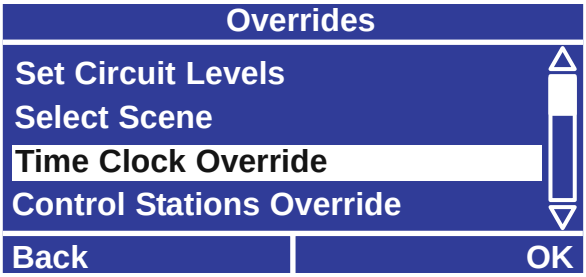
Disable or Enable all Time Clock Events

A. From the **Main Menu** use ▲ and ▼ to highlight **Overrides** and press OK or # (OK).

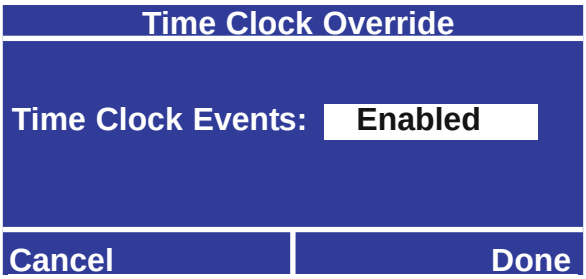
B. Use ▲ and ▼ to highlight **Time Clock Override** and press OK or # (OK).

C. Use ▲ and ▼ to change the setting to **Disabled** or **Enabled** and press OK or # (Done).

B.



C.



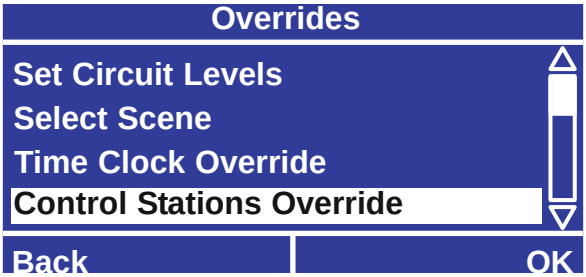
Disable or Enable all Control Stations

A. From the **Main Menu** use ▲ and ▼ to highlight **Overrides** and press OK or # (OK).

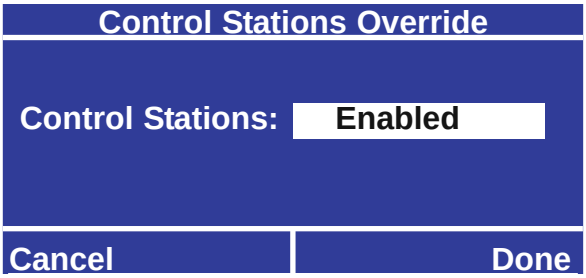
B. Use ▲ and ▼ to highlight **Control Stations Override** and press OK or # (OK).

C. Use ▲ and ▼ to change the setting to **Disabled** or **Enable** and press OK or # (Done).

B.



C.



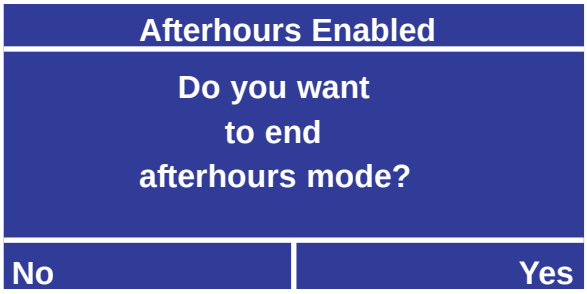
To End Afterhours Mode

A. From the **Main Menu** use ▲ and ▼ to highlight **Overrides** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Afterhours Override** and press OK or # (OK).

C. The screen title indicates whether afterhours mode is enabled or disabled. To end afterhours mode press # for **Yes**. (Or press * for **No**.)

C.



Locking and Unlocking the Controller

Overview

The *LCP128* controller may be password protected to prevent unauthorized access to system settings. If no controller buttons are pressed during a user-set time (1-90 minutes), the controller locks automatically. A 4-digit password must be set when locking is configured. This password must be entered before any of the menus can be accessed when the controller is locked. This password must also be entered to change the lockout settings.

Setting the Controller to Lock

A. From the **Main Menu** use ▲ and ▼ to highlight **Panel Setup** and press OK or # (OK).

B. Use ▲ and ▼ to highlight **Password Protection** and press OK or # (OK).

C. Use ▲ and ▼ to select either **Change Password** or **Set Lockout Time** and press OK or # (OK).

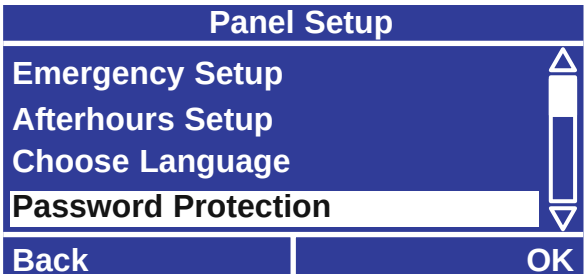
D. If **Set Lockout Time** is selected, use ▲ and ▼ to set the time of inactivity (no button presses on the controller) to wait before locking and press OK or # (Next). If you do not want the controller to lock, select **Do Not Lock**.

E. If **Change Password** is selected, enter the password you would like to set (default is 0 0 0 0). Use ◀ and ▶ to select the digit to change, and then ▲ and ▼ to change each value. When you have entered the password press OK or # (Next). Then re-enter the new password for confirmation and press OK or # (Done)

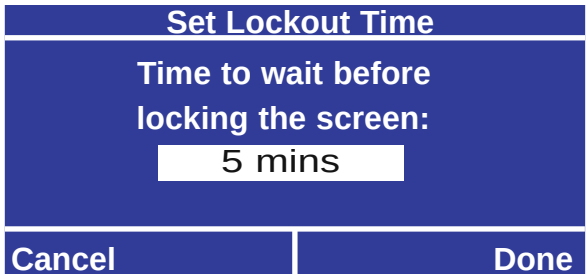
The controller will now lock after the set amount of time.

Note: *If you forget the password, contact Lutron Technical Support at (800) 523-9466 to unlock the controller.*

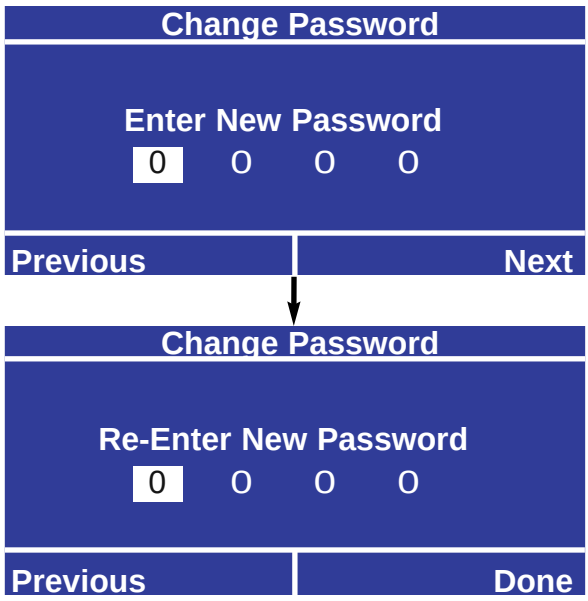
B.



D.



E.



Unlocking the Controller

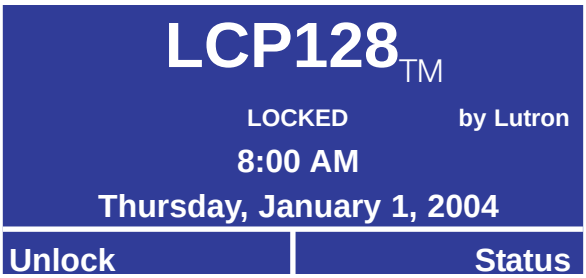
If the controller is locked, a LOCKED message is displayed on the Home screen. You need to unlock the controller before you can access the Main Menu.

A. Press * (Unlock).

B. To enter the password, use ◄ and ► to select the digit to change, and then ▲ and ▼ to change each value. When you have entered the password, press OK or # (OK).

Note: *If you forget the password, contact Lutron Technical Support at (800) 523-9466 to unlock the controller.*

A.



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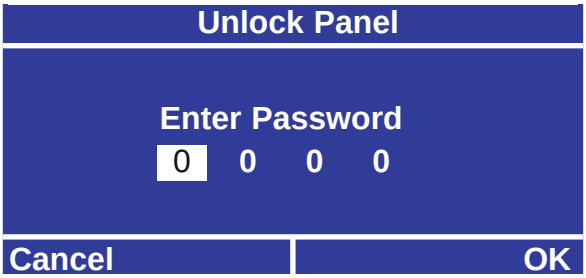


Troubleshooting Guide

Symptom	Likely Cause	Action(s) for Remedy
Circuits always ON or always OFF.	(a) Bypass jumpers have not been removed.	(a) Visually inspect the terminal blocks. If the metal bypass jumpers are installed, see the appropriate panel installation guide for proper circuit test and jumper removal procedure.
	(b) Controller is not powered.	(b) The 'POWER' LED at the bottom of the controller should be lit (refer to "Controller Overview" at the beginning of this guide for LED location). If it is not, there is no power, and the feed should be checked.
	(c) Controller is in the override screen.	(c) Press the ⌂ Home button to exit the override screen.
	(d) Emergency is active.	(d) Disable the emergency function by sliding the emergency switch at the bottom of the controller to the center position on all panels.
	(e) Circuit breaker is OFF.	(e) Turn the breaker on to verify proper power supply to each circuit. The breaker could be in the *LCP128* panel or in a separate distribution panel if the *LCP128* is a feed-through panel.
	(f) Duplicate panel addresses.	(f) Check that all panel addresses are unique. The panel address is listed on the Home screen. To change addresses, see STEP 1 in this guide for more information.
Circuit breakers are tripping.	(a) Circuits are overloaded.	(a) Check load continuity (between DH and N) with a meter, and verify that there is not a short. If shorted, repair the miswire or load failure. If not shorted, reset the breaker and measure the current on the circuit. If greater than 16 A, the circuit is overloaded and should be remedied by re-lamping to smaller loads or by "splitting" the circuit between two dimming circuits.

Troubleshooting Guide (continued)

Symptom	Likely Cause	Action(s) for Remedy
Control station buttons do not work.	(a) Link has a panel or control address conflict.	(a) Check all control station addresses, and ensure that there are no duplicate settings. See the appropriate panel installation guide for more information.
Control station LED's are flashing.	(b) Control station is addressed incorrectly.	(b) Check that the address of the non-working control station is correct and unique. See the appropriate panel installation guide for more information.
Control station buttons or CCI's work sporadically.	(c) Button is not programmed.	(c) Program the button's function at the controller. See STEP 3 in this guide for more information.
Control station LED's do not turn on.	(d) Control stations are disabled.	(d) Enable the control stations using the controller. See the "Overrides" section in this guide for more information.
	(e) Control station link is mis-wired.	(e) See the appropriate panel installation guide for proper wiring. If a T-tap was created to wire a control to the control station link, it should be no longer than 8 ft. (2.44m).
	(f) Emergency is active.	(f) Disable the emergency function by sliding the emergency switch at the bottom of the controller to the center position on all panels.
Control station does not perform defaults.	(g) At least one control station is programmed.	(g) Set all control stations to "NO STATION".
Panel contact closure inputs do not work.	(a) Input closure/opening is not occurring.	(a) Check that the device controlling the input is opening or closing properly.
	(b) Input is programmed incorrectly.	(b) Program the contact closure input function on the controller. See STEP 4 in this guide for more information. Note that open and closure actions can be programmed to conflict with each other, and this may cause undesirable results.
	(c) Input is mis-wired.	(c) See the appropriate panel installation guide for proper wiring.

Troubleshooting Guide (continued)

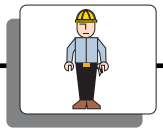
Symptom	Likely Cause	Action(s) for Remedy
Time clock events do not occur.	(a) Controller is in the override screen.	(a) Press the Home button to exit the override screen.
Sunrise or sunset events do not occur at the correct time.	(b) Timeclock is disabled.	(b) Enable the timeclock. See the “Overrides” section in this guide for more information.
	(c) Time is not set.	(c) Set the time. See STEP 5 in this guide for more information.
	(d) Date is not set correctly.	(d) Set the date. See STEP 5 in this guide for more information.
	(e) Location is not set correctly.	(e) Set the location. See STEP 5 in this guide for more information.
	(f) Holiday schedule is in effect.	(f) Check if there is a holiday on the date the event is not occurring. See STEP 5 in this guide for more information.
Circuits are flashing erratically.	(a) Duplicate panel addresses.	(a) Check that all panel addresses are unique. The panel address is listed on the Home screen. To change addresses, see STEP 1 in this guide for more information.
	(b) Duplicate control station addresses.	(b) Check that the address of each control station is correct and unique. See the appropriate panel installation guide for more information.
	(c) Contact closure input is controlling the circuits.	(c) Confirm that the contact closure input into the system is in a steady state. Verify this at every panel contact closure input and at every OMX-AV.
	(d) Control station link is mis-wired.	(d) See the appropriate panel installation guide for proper wiring. If a T-tap was created to wire a control to the control station link, it should be no longer than 8 ft. (2.44 m).
	(e) Timeclock events are occurring.	(e) Check the timeclock events for the day or holiday that coincide with the time of the erratic behavior. Holiday schedules override the 7 daily schedules. See STEP 5 in this guide for more information.
	(f) Afterhours mode is active.	(f) Afterhours mode may cause the lights to flash. See STEP 5 in this guide for more information.
Circuit levels don’t maintain values set through override screen.	(g) DMX is active.	(g) Disable DMX via the control station setup screen.

Troubleshooting Guide (continued)

Symptom	Likely Cause	Action(s) for Remedy
Contact closure outputs do not work.	(a) Controller is in the override screen.	(a) Press the ⌂ Home button to exit the override screen
	(b) Control Stations are disabled.	(b) Enable the controls. See the “Overrides” section in this guide for more information.
	(c) Link has an address conflict.	(c) Check all control station address switches and ensure that there are no duplicate settings.
	(d) Link is mis-wired.	(d) See the appropriate panel installation guide for proper wiring. If a T-tap was created to wire a control to the control station link, it should be no longer than 8 ft. (2.44 m).
	(e) System is programmed incorrectly.	(e) Check the action that initiates the output, and ensure that it is programmed correctly. See STEP 4 in this guide for more information.
Emergency does not work.	(a) Sense lines are not connected.	(a) For emergency to work, the right-most pin on the 6-pin connector at the top of the controller must be wired between panels. See the appropriate panel installation guide for more emergency sense wiring information.
	(b) Emergency switch is not set correctly.	(b) Essential emergency panels must have their emergency switch set to the right-most position. Non-Essential normal panels must have their emergency switch set to the left-most position.
	(c) There must be at least one non-essential panel and at least one essential panel.	(c) Essential emergency panels sense the presence of non-essential panels. Therefore, there must be at least one of each for emergency to work.
	(d) Emergency levels are not programmed.	(d) Emergency levels must be programmed. See STEP 7 in this guide for more information.
LCD backlight is OFF.	(a) Screen saver is on.	(a) Press any button on the controller.
	(b) Controller is not powered.	(b) The ‘POWER’ LED at the bottom of the controller should be lit. If it is not, there is no power, and the circuit should be checked for power.

Troubleshooting Guide (continued)

Symptom	Likely Cause	Action(s) for Remedy
RS232 commands do not work.	(a) Baud rate is wrong.	(a) Check that the baud rate switches on the OMX-RS232 are correct. The baud rate on the OMX-RS232 must match the baud rate of the sending device.
	(b) See 'Control station buttons do not work' Symptom of this troubleshooting section.	
OMX-CCO-8 is not working.	(a) Option switch on the OMX-CCO-8 is not set correctly.	(a) All Option switches should be in the ON position.
	(b) See 'Control station buttons do not work' Symptom of this troubleshooting section.	
OMX-AV outputs are not working.	(a) DIP switch 8 on OMX-AV is not set correctly.	(a) Set DIP switch 8 to ON. This sets the unit to handle maintained or momentary closures.
	(b) No external power supply on the outputs.	(b) The OMX-AV requires the outputs to be powered by an external power supply (30 V⎓) max).
	(c) See 'Control station buttons do not work' Symptom of this troubleshooting section.	
Password is unknown.		(a) Contact Lutron Technical Support to unlock the controller. Lutron contact information may be found at the end of this guide.
ODMX-512/DMX does not control lights.	(a) DMX is not active.	(a) Check the DMX activation mode. Ensure that ODMX and DMX boards are connected (via Link Status) and that the corresponding activation channel is above 50%. Also ensure that the master control on the stageboard is at 100%.



Wallstations and Key Switches

Clean front surface of control with a soft towel moistened with a mild soap solution (non-ammonia based). Clean approximately every six months.

Caution! Do not spray cleaning solution onto control as it may reach internal components.

LCP128™ Panels

1. Clean any dirt from air vent openings with a vacuum and check for any obstructions which may block air flow. Keep 12" (30.5 cm) above and below panels unobstructed.
2. If any extra wiring is brought into the power panel, thoroughly remove all metal chips, wire strands, insulation and other debris before reapplying power.
3. In the unlikely event of damage to dimming or switching equipment, turn off breakers, replace bypass jumpers, and turn on breakers. This will apply full power to lighting fixtures.

Glossary of Terms

- **Addressing** - how the controls on a link identify each other. Control stations are assigned an address between 1 and 32, using addressing switches 1 through 5 on the unit. Refer to the instructions shipped with the control station or the appropriate panel installation guide for further information.
- **Afterhours Mode** - a time clock mode typically used for turning selected lights off at the end of a building's normal business hours. The system first warns occupants that the lights are going to turn off by flashing the lights (flash count), then waits for a period of time (off delay) before automatically turning the lights off. If an occupant wants the lights to remain on (or turn back on), they can press a wallstation button that controls those lights. The lights then remain on for a set amount of time (warn time) and then the process repeats. This process continues until an afterhours end time clock event occurs.
- **Contact Closure Input (CCI)** - an input provided to the system in the form of two contacts completing a circuit (dry contact closure). This input could be from a button or a relay controlled by another system (fire alarm, building management system, etc.)
- **Contact Closure Output (CCO)** - an output provided from the system in the form of two contacts completing a circuit (dry contact closure). This output could be from a OMX-AV, OMX-CCO-8, button, key switch, or time clock event.
- **Control Link** - the daisy-chained link of control stations wired to the *LCP128* panel(s).
- **Control Station** - a device located on the control link that provides low-voltage inputs and / or outputs, typically a wallstation, key switch, OMX-CCO-8, OMX-RS232, or OMX-AV.
- **Custom Scene** - a scene assigned to and programmed for a specific time clock event, button press, or contact closure input.
- **Delay to Off**- up to a 90 minute delay programmed for a group of circuits before turning the lights off; can be recalled by pressing a single button.
- **DMX Theater Mode** - this mode turns off the air gap in the circuit, which provides immediate response time from lighting and other theatrical equipment. It does, however, decrease bulb life and eliminate a safety feature the air gap provides.
- **Emergency Mode** - a mode where all inputs to the system are disabled and circuits are dimmed or turned on or off as set in the emergency mode setup. Activated by the loss of power on the emergency sense line.
- **Flash Count** - the number of times the lights will flash to warn an occupant that the lights are going to turn off automatically.
- **Holiday** - a special time clock schedule that is set to start on a specific date and last a set number of days. The schedule for a holiday overrides the weekly schedule that would normally occur on that day.
- **Holiday Event** - a time clock event that is set to occur on a holiday.
- **LCD (Liquid Crystal Display)** - the graphical display built into the *LCP128* controller that is used to configure the system.
- **LED (Light Emitting Diode)** - an illuminated indicator to help in diagnosing controller and control station operation.
- **Maintained vs. Momentary** - a CCO from the *LCP128* can be programmed to be a pulse (momentary) or constant (maintained) output.
- **NTOMX-KS** - a control station that requires a key. The key switch can be programmed for a clockwise and counter-clockwise turn.
- **ODMX-512**- a control interface device that allows up to 32 DMX-512 inputs from a theatrical console/stageboard.
- **OMX-AV** - a control station that is connected to the control link and provides up to 5 contact closure inputs and 5 contact closure outputs.
- **OMX-CCO-8** - a control station that is connected to the control link and provides up to 8 contact closure outputs.
- **OMX-RS232** - a control interface device that facilitates building management integration through RS232 commands.
- **Open Action vs. Closure Action** - a CCI into the *LCP128* can be programmed to respond to the opening or closing of the contact.
- **Scene** - programmed settings for a circuit or group of circuits, creating an effect that can be recalled by pressing a single button, turning a key, etc.
- **Time Clock Event** - an action that is set to occur at a particular time of day or at a time relative to sunrise or sunset (astronomical).
- **Toggle** - an action that switches the assigned circuits between on and off. If the assigned circuits are in a mixed state (some on and some off), the circuits will turn on.
- **Wallstation** - a control station that mounts on a wall, contains one or more buttons, and wires to the control link. The buttons can be used to activate scenes, toggle circuits, etc.
- **Warn Time** - the amount of time a light can be turned on, by a wallstation or CCI, before automatically being turned off in afterhours mode.
- **Weekly Event** - a time clock event that is set to occur on a specific day of the week (Sunday - Saturday).

Panel Tables

How to Use These Tables:

- For each panel, fill in a description for each circuit. Label all spares.
- Cross out the circuits that do not exist.
- Fill in the system circuit numbers. (*continued on next page*)

Panel 1		
Panel Circuit	System Circuit	Description
1		
2		
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34		
35		
36		

Panel 2		
Panel Circuit	System Circuit	Description
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Panel Tables

How to Use These Tables (*continued*):

- Circuit 1 in panel 1 is system circuit 1. The circuit number is continuous from panel to panel. Continue numbering panels 2 through 4 (if present).

Panel 3		
Panel Circuit	System Circuit	Description
1		
2		
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24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		

Panel 4		
Panel Circuit	System Circuit	Description
1		
2		
3		
4		
5		
6		
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31		
32		
33		
34		
35		
36		

Panel Tables

Panel 5		
Panel Circuit	System Circuit	Description
1		
2		
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4		
5		
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12		
13		
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15		
16		
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24		
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26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		

Panel 6		
Panel Circuit	System Circuit	Description
1		
2		
3		
4		
5		
6		
7		
8		
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12		
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22		
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25		
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27		
28		
29		
30		
31		
32		
33		
34		
35		
36		

Panel Tables

Panel 7		
Panel Circuit	System Circuit	Description
1		
2		
3		
4		
5		
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24		
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26		
27		
28		
29		
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31		
32		
33		
34		
35		
36		

Panel 8		
Panel Circuit	System Circuit	Description
1		
2		
3		
4		
5		
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8		
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10		
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12		
13		
14		
15		
16		
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32		
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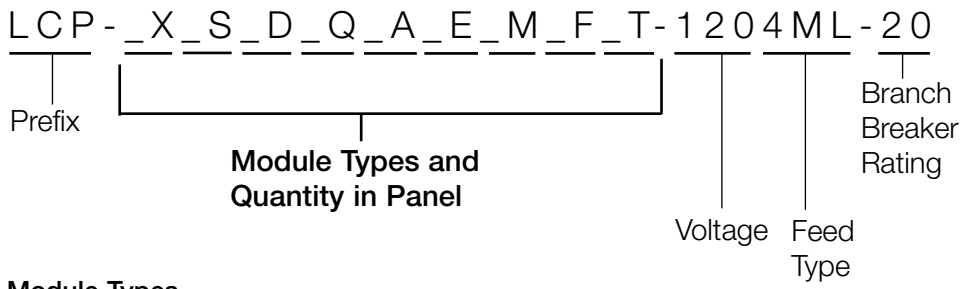
36		

Module Type Table

How to Use this Table:
- Record the proper module types for each panel.

The LCP128™ Panel Model Number

The model number for each *LCP128* panel in the system indicates the quantity and type of modules present in that panel.



Module Types

X = 4-circuit Switching (Relay) (XP)
S = 1-Circuit Dimming (1U)
D = 2-Circuit Dimming (2U)
Q = 4-Circuit Dimming (4U)
A = 4-Circuit Adaptive Dimming (4A)
E = 4-Circuit Electronic Low Voltage Dimming (4E)
M = 4-Circuit Motor (4M)
F = 4-Circuit Quiet Fan Speed Module (4FSQ)
T = 0-10 V Ballast Control Module (TVM). TVM(s) allow switching or dimming modules to control 0-10 V, PWM, DSI, DALI (broadcast), 10-0 V, DIS LOG, or DALI LOG load types.

Example Model Number:
LCP-2S4Q-1204ML-20
Panel with two 1-output dimming modules (2S) and four 4-output dimming modules (4Q), for a total of six modules.
Module types not present are omitted from the model number.

Modules are located in the panel in the order they appear in the model number, starting at the top of the panel going down. Note the types of modules in each panel and use this information for Module Type Setup in STEP 1.

Panel 1

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 2

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 3

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 4

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 5

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 6

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 7

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Panel 8

Module	Type
1	
2	
3	
4	
5	
6	
7	
8	
9	

Note: Spec-grade panels have only GP cards for module types.

Load Type Table

How to Use This Table:

- Refer to the load schedule for each panel and record the proper load type setting for each circuit.

Each circuit in every *LCP128* panel must be assigned a load type (see STEP 1 earlier in this guide). The load types available for each circuit depend upon the module type that provides that circuit. Below are the available load types.

Module Type	Load Type(s)	Description
X (XP)	Non-Dim	Light levels toggle between on and off with no intermediate dimming levels.
S / D / Q (1U / 2U / 4U)	Incandescent	For tungsten filament lamps.
	Magnetic Low Voltage (MLV)	For magnetic transformer low-voltage lighting.
	Tu-Wire	For fluorescent lamps equipped with Lutron Tu-Wire® dimming ballasts.
	Electronic Low Voltage (ELV)	For use with electronic transformer low-voltage lighting. Requires Lutron ELVI-1000 external interface.
	Non-Dim	Non-Dim
E (4E)	Electronic Low Voltage (ELV)	For use with electronic transformer low-voltage lighting.
A (4A)	Adaptive dimming module	For use with tungsten (incandescent) lamps, electronic low-voltage, magnetic low-voltage, neon.
M (4M)	Motor	For controlling motors.
F (4FSQ)	Fan	For controlling fan speed.
T (TVM)	0-10 V; 10-0 V	For dimming ballasts with 0-10 V⎓ control.
	PWM	For dimming ballasts with PWM control.
	Tridonic® DSI; DIS LOG	For dimming ballasts with Tridonic DSI control.
	DALI (broadcast only); DALI LOG	For dimming ballasts with DALI control. Broadcast only.
GP card (spec-grade only)	Incandescent	For tungsten filament lamps.
	Magnetic Low Voltage (MLV)	For magnetic transformer low-voltage lighting.
	Tu-Wire	For fluorescent lamps equipped with Lutron Tu-Wire® dimming ballasts.
	Electronic Low Voltage (ELV)	For use with electronic transformer low-voltage lighting. Requires Lutron ELVI-1000 external interface.
	Non-Dim	Non-Dim
	Hi-Lume FDB	Fluorescent dimming ballast
	Eco-10	Fluorescent dimming ballast
	Neon	For neon lighting
	TVM loads	See above

If a power interface is being used in your system, please use the following table to determine which load type is to be selected on the *LCP128* controller.

Load Type	Lutron Interface	Load Type Setting	Maximum Attached Load
Electronic Low Voltage (ELV)	ELVI-1000	ELV	960 W
Lutron Hi-lume® Ballasts	GRX-FDBI-16A-120	Tu-Wire	1920 W
0-10 V⎓ Ballasts	GRX-TVI	Tu-Wire	300 mA (sink max), 1920 W switched
<2000 W of Incandescent MLV, Halogen, Tu-Wire	NGRX-PB-WH	Incandescent	2000 W
>2000 W of Incandescent MLV, Halogen, Tu-Wire, Hi-lume	HP-2, HP-4, HP-6	Incandescent	2000 W, 4000 W, 6000 W

Control Location Table

How to Use This Table:

- For each control station, fill in the number of buttons and a brief description or location.

Address	Number of Buttons	Location / Description
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32		

Control Station Table

How to Use This Table:

- Fill in a line for each button or contact on each control station.
- Fill in a circuit description at the head of each column. *(continued on next page)*

Control Station / Button			Action	Sample			System Circuit / Description																			
Address	Location / Description	Button / Contact #	- Scene - Custom Scene - Raise - Lower - Toggle - Delay to Off (DTO), minutes	1 Kitchen Overhead	2 Kitchen Sink	3 Janitor's Closet	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Kitchen	1	Toggle	*	*		S	A	M	P	L	E														
1	"	2	Scene 1	80%	80%																					
2	Janitor's Closet	1	DTO, 5			*																				
Control Station / Button			Control Type	Sample			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Control Station Table (continued)

How to Use This Table (*continued*):

- For each button or contact, record the action and which circuits are being controlled.

System Circuit / Description																																							
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

Time Clock Event Table

How to Use This Table:

- Fill in a line with the day and time of each time clock event.
- For each event, record the action and which circuits are affected.

	Time		Action		
Day / Holiday	Fixed / Sunrise / Sunset	Time	Scene or Custom Scene	Afterhours Start	Afterhours End

	Time		Action		
Day / Holiday	Fixed / Sunrise / Sunset	Time	Scene or Custom Scene	Afterhours Start	Afterhours End

Contact Information
Warranty

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
USA
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299
TEL +1.610.282.3800
FAX +1.610.282.1243
Toll-Free 1.888.LUTRON1
Technical Support 1.800.523.9466

Brazil
Lutron BZ do Brasil Ltda.
AV, Brasil, 239, Jardim America
Sao Paulo-SP, CEP: 01431-000, Brazil
TEL +55.11.3885.5152
FAX +55.11.3887.7138

North and South America Technical Hotlines
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF United Kingdom
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
FREEPHONE (UK) 0800.282.107
Technical support +44.(0)20.7680.4481

WORLDWIDE OFFICES
France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33.(0)1.41.05.42.80
FAX +33.(0)1.41.05.01.80
FREEPHONE 0800.90.12.18

Germany
Lutron Electronics GmbH, Landsberger Allee 201, 13055 Berlin, Germany
TEL +49.(0)30.9710.4590
FAX +49.(0)30.9710.4591
FREEPHONE 00800.5887.6635

Italy
Lutron LDV, S.r.l.
FREEPHONE 800.979.208

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via del Carlos III, 84, planta 3ª,
08028, Barcelona, Spain
TEL +34.93.496.57.42
FAX +34.93.496.57.01
FREEPHONE 0900.948.944

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34.91.567.84.79
FAX +34.91.567.84.78
FREEPHONE 0900.948.944

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
15 Hoe Chiang Road, #07-03 Euro Asia Centre, Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

China, Beijing
Lutron GL Ltd. Beijing Representative Office
5th Floor, China Life Tower
No. 16 Chaowai Street, Chaoyang District, Beijing 100020 China
TEL +86.10.5877.1817
FAX +86.10.5877.1816

China, Guangzhou
Lutron GL Ltd. Guangzhou Representative Office
Suite A09, 23/F Tower A, Centre Plaza
161 Lin He Xi Lu, Tian He District, Guangzhou 510620 China
TEL +86.20.2885.8266
FAX +86.20.2885.8366

China, Shanghai
Lutron GL Ltd., Shanghai Representative Office
Suite 07, 39th Floor, Plaza 66
1266 Nan Jing West Road, Shanghai, 200040 China
TEL +86.21.6288.1473
FAX +86.21.6288.1751

Hong Kong
Lutron GL Ltd.
Unit 2808, 28/F, 248 Queen's Road East
Wanchai, Hong Kong
TEL +852.2104.7733
FAX +852.2104.7633

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20
Akasaka, Minato-ku, Tokyo 107-0052 Japan
TEL +81.3.5575.8411
FAX +81.3.5575.8420
FREEPHONE 0120.083.417

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Japan: +81.3.5575.8411
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other countries: +800.120.4491

Lutron Electronics Co., Inc.
One Year Limited Warranty

For a period of one year from the date of purchase, and subject to the exclusions and restrictions described below, Lutron warrants each new unit to be free from manufacturing defects. Lutron will, at its option, either repair the defective unit or issue a credit equal to the purchase price of the defective unit to the Customer against the purchase price of comparable replacement part purchased from Lutron. Replacements for the unit provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

If the unit is commissioned by Lutron or a Lutron approved third party as part of a Lutron commissioned lighting control system, the term of this warranty will be extended, and any credits against the cost of replacement parts will be prorated, in accordance with the warranty issued with the commissioned system, except that the term of the unit's warranty term will be measured from the date of its commissioning.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the unit pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; or (g) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the unit or any of its components.
3. Equipment and parts external to the unit, including those sold or supplied by Lutron (which may be covered by a separate warranty).
4. The cost of repairing or replacing other property that is damaged when the unit does not work properly, even if the damage was caused by the unit.

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF ANY TYPE, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. LUTRON DOES NOT WARRANT THAT THE UNIT WILL OPERATE WITHOUT INTERRUPTION OR BE ERROR FREE.

NO LUTRON AGENT, EMPLOYEE OR REPRESENTATIVE HAS ANY AUTHORITY TO BIND LUTRON TO ANY AFFIRMATION, REPRESENTATION OR WARRANTY CONCERNING THE UNIT. UNLESS AN AFFIRMATION, REPRESENTATION OR WARRANTY MADE BY AN AGENT, EMPLOYEE OR REPRESENTATIVE IS SPECIFICALLY INCLUDED HEREIN, OR IN STANDARD PRINTED MATERIALS PROVIDED BY LUTRON, IT DOES NOT FORM A PART OF THE BASIS OF ANY BARGAIN BETWEEN LUTRON AND CUSTOMER AND WILL NOT IN ANY WAY BE ENFORCEABLE BY CUSTOMER.

IN NO EVENT WILL LUTRON OR ANY OTHER PARTY BE LIABLE FOR EXEMPLARY, CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFITS, CONFIDENTIAL OR OTHER INFORMATION, OR PRIVACY; BUSINESS INTERRUPTION; PERSONAL INJURY; FAILURE TO MEET ANY DUTY, INCLUDING OF GOOD FAITH OR OF REASONABLE CARE; NEGLIGENCE, OR ANY OTHER PECUNIARY OR OTHER LOSS WHATSOEVER), NOR FOR ANY REPAIR WORK UNDERTAKEN WITHOUT LUTRON'S WRITTEN CONSENT ARISING OUT OF OR IN ANY WAY RELATED TO THE INSTALLATION, DEINSTALLATION, USE OF OR INABILITY TO USE THE UNIT OR OTHERWISE UNDER OR IN CONNECTION WITH ANY PROVISION OF THIS WARRANTY, OR ANY AGREEMENT INCORPORATING THIS WARRANTY, EVEN IN THE EVENT OF THE FAULT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, BREACH OF CONTRACT OR BREACH OF WARRANTY OF LUTRON OR ANY SUPPLIER, AND EVEN IF LUTRON OR ANY OTHER PARTY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

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TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify Lutron within the warranty period described above by calling the Lutron Technical Support Center at (800) 523-9466. Lutron, in its sole discretion, will determine what action, if any, is required under this warranty. To better enable Lutron to address a warranty claim, have the unit's serial and model numbers available when making the call. If Lutron, in its sole discretion, determines that an on-site visit or other remedial action is necessary, Lutron may send a Lutron Services Co. representative or coordinate the dispatch of a representative from a Lutron approved vendor to Customer's site, and/or coordinate a warranty service call between Customer and a Lutron approved vendor.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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This product may be covered by one or more of the following U.S. patents: 5,309,068; 5,633,540; 5,808,417; 6,046,550; 6,091,205; 6,188,181; 6,347,028; 6,380,692; and corresponding foreign patents. U.S. and foreign patents pending.

Lutron Electronics Co., Inc.
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P/N 032-182 Rev. A 2/07

LUTRON®

LCP128™

Dimming and Switching System
New Features Addendum

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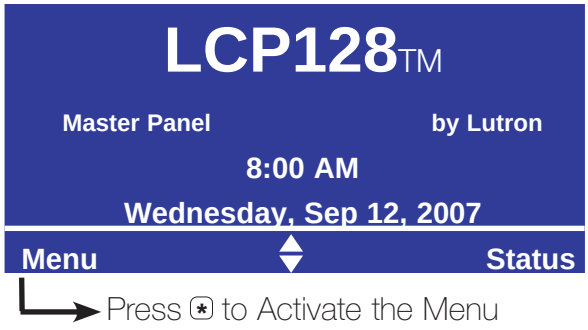
Menu Rearrangement

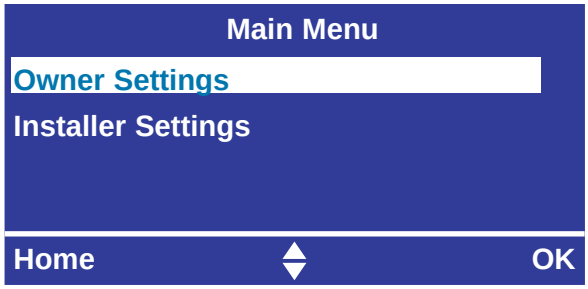
From the Home screen, press ⊛ to go to the Main Menu. If a password has been set, you need to enter it before continuing.

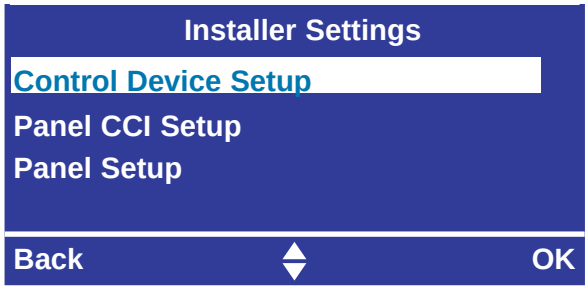
The Main Menu now includes two options: Owner settings, and Installer settings. Each of these two levels of user access now has its own password.

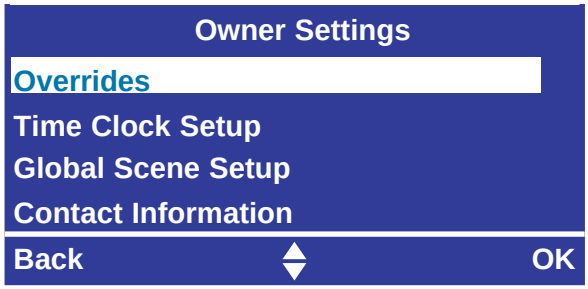
The Installer password grants access to menu items under both Installer settings and Owner settings. The Owner password grants access only to menu items under Owner settings.

See below for a list of menu items accessible from each menu.









Owner Settings Menu Items

Overrides:
Set Circuit Levels
Select Global Scene
Time Clock Override
Control Device Override
Afterhours Override

Time Clock Setup:
Setup Time Clock
Add Event
Copy Events
View / Modify Event
Delete Event

Global Scene Setup:
Off Scene
Global Scenes 01-32

Contact Information:
Lutron Technical Support
Software version information

Installer Settings Menu Items

Control Device Setup:
Addresses A01-A32

Panel CCI Setup:
Panels 1-8 and CCIs 1 and 2 for each

Panel Setup:
Panel Addressing
Load Setup
Emergency Setup
Afterhours Setup
Choose Language
Password Protection
Module Link Type

Scene Names: Global and Custom Scenes

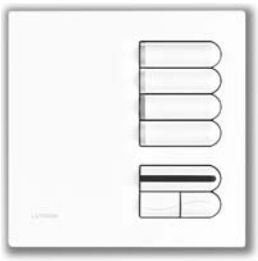
Scenes are programmed settings for a circuit or group of circuits, creating an effect that can be recalled by pressing a single button, turning a key, etc. Scenes can be used to create different lighting effects using a programmed mix of dimming and switching settings.

"Scenes" have been renamed to **Global scenes** to more clearly differentiate them from Custom scenes. A Global scene functions exactly the same as a Scene. Any changes to a global scene are automatically updated to all keypads that scene is assigned to. A **Custom scene** is assigned to and programmed for a specific time clock event, button press, or contact closure input.

Scene Toggle

A single button on any wallstation can be programmed to toggle a scene between the programmed circuit levels and Off.

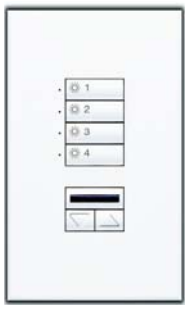
From the Main Menu, select Control Device Setup, then follow the menus to select the Address of the wallstation and the button you want to configure. Choose Scene Toggle as the Action you want the button to perform.



Scene Raise/Lower

Any button on a wallstation can be programmed to raise or lower scenes. The raise and lower buttons on a wallstation will affect only circuits of the last selected global or custom scene or scene toggle. Each wallstation on the link "remembers" its last selected scene when programmed to perform a scene raise/lower action.

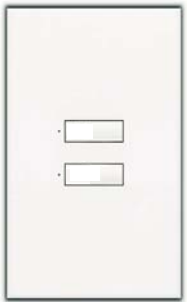
From the Main Menu, select Control Device Setup, then follow the menus to select the Address of the wallstation and the button you want to configure. You can then choose Raise Scene or Lower Scene as the Action you want the button to perform.



AC Shade Raise/Stop and Lower/Stop

Shades programmed using motor modules no longer require a third "stop" button on a wallstation. Simply releasing the raise or lower button will cause the shades to stop moving.

From the Main Menu, select Control Device Setup, then follow the menus to select the Address of the wallstation and the button you want to configure. You can then choose Raise Circuits or Lower Circuits as the Action you want the button to perform.



CCO Toggle

A toggle action has been added to CCOs on an LCP system.

Access this function from the Main Menu by selecting Control Device Setup, then follow the menus to select the Address of the wallstation and the button you want to configure. Choose Custom Scene, and set the circuit actions. In the following screen (which will appear only if at least one CCO is programmed into the system), select the CCO, then choose Toggle as the Action you want the button to perform.

Contact Information

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS

USA
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299
TEL +1.610.282.3800
FAX +1.610.282.1243
Toll-Free 1.888.LUTRON1
Technical Support 1.800.523.9466

Brazil
Lutron BZ do Brasil Ltda.
AV, Brasil, 239, Jardim America
Sao Paulo-SP, CEP: 01431-000, Brazil
TEL +55.11.3885.5152
FAX +55.11.3887.7138

North and South America Technical Hotlines
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS

United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF United Kingdom
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
FREEPHONE (UK) 0800.282.107
Technical support +44.(0)20.7680.4481

WORLDWIDE OFFICES

France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33.(0)1.41.05.42.80
FAX +33.(0)1.41.05.01.80
FREEPHONE 0800.90.12.18

Germany
Lutron Electronics GmbH, Landsberger Allee 201, 13055 Berlin, Germany
TEL +49.(0)30.9710.4590
FAX +49.(0)30.9710.4591
FREEPHONE 00800.5887.6635

Italy
Lutron LDV, S.r.l.
FREEPHONE 800.979.208

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via del Carlos III, 84, planta 3ª,
08028, Barcelona, Spain
TEL +34.93.496.57.42
FAX +34.93.496.57.01
FREEPHONE 0900.948.944

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34.91.567.84.79
FAX +34.91.567.84.78
FREEPHONE 0900.948.944

ASIAN HEADQUARTERS

Singapore
Lutron GL Ltd.
15 Hoe Chiang Road, #07-03 Euro Asia Centre, Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

China, Beijing
Lutron GL Ltd. Beijing Representative Office
5th Floor, China Life Tower
No. 16 Chaowai Street, Chaoyang District, Beijing 100020 China
TEL +86.10.5877.1817
FAX +86.10.5877.1816

China, Guangzhou
Lutron GL Ltd. Guangzhou Representative Office
Suite A09, 23/F Tower A, Centre Plaza
161 Lin He Xi Lu, Tian He District, Guangzhou 510620 China
TEL +86.20.2885.8266
FAX +86.20.2885.8366

China, Shanghai
Lutron GL Ltd., Shanghai Representative Office
Suite 07, 39th Floor, Plaza 66
1266 Nan Jing West Road, Shanghai, 200040 China
TEL +86.21.6288.1473
FAX +86.21.6288.1751

Hong Kong
Lutron GL Ltd.
Unit 2808, 28/F, 248 Queen's Road East
Wanchai, Hong Kong
TEL +852.2104.7733
FAX +852.2104.7633

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20
Akasaka, Minato-ku, Tokyo 107-0052 Japan
TEL +81.3.5575.8411
FAX +81.3.5575.8420
FREEPHONE 0120.083.417

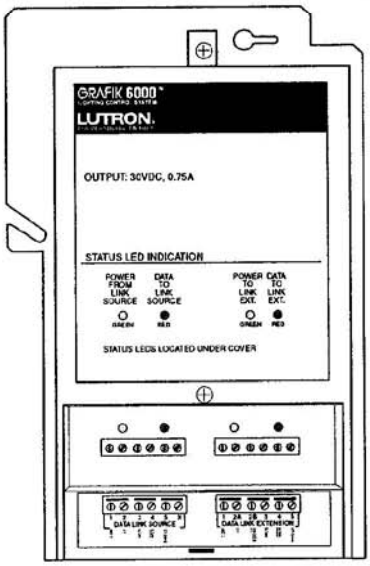
Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Japan: +81.3.5575.8411
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other countries: +800.120.4491

LUTRON®

GRAFIK 6000®
LIGHTING CONTROL SYSTEM

Installation Instructions
Please Leave for Occupant

MX-RPTR-100/120
MX-RPTR-220/240
Link Booster



Description

The Link Booster allows Wallstation or Dimmer Panel Links to be extended beyond their normal maximum distances. Included are:

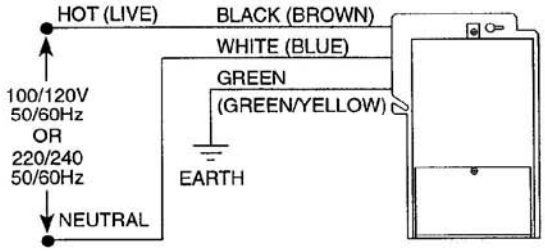
(1) MX-RPTR-100/120 or MX-RPTR-220/240
(2) LT-1 Link Termination Assembly

Important Notes

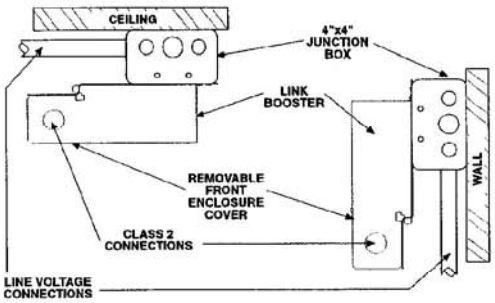
1. READ ALL INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.
2. The Link Booster must be installed by a qualified electrician.
3. Install in accordance with all local and national electrical codes.
4. Power must be OFF at the breaker or fuse supplying power to the Link Booster and the GRAFIK 6000 Processor Panel before installing. Do not connect high-voltage power to low-voltage terminals. Improper wiring can result in personal injury or damage to the control and to other equipment.
5. Link Booster may be installed up to 2000 ft. (600 m) maximum from the lighting control panel to provide an additional 2000 feet (600 m) of capacity. Up to three Link Boosters can be installed on a link to increase the link wiring length. Each Link Booster can power only 24 of the 32 maximum wallstation controls; or 0.75A.
6. The wire connectors provided are suitable for copper wire only. They can be used to join one #18, #16, #14, #12, or #10 AWG (1.0—3.0 mm²) with one or two #14 or #12 AWG.

Installation on a Wallstation Link

1. **Prewiring: The Wallstation Link requires special wiring considerations. Refer to the GRAFIK 6000 Installation Guide and Lutron job drawings for wiring restrictions and limitations that apply to your specific project.** Pull a power feed to the junction box where the Link Booster will be mounted. Power feed is only required when used on a Wallstation Link. Junction box may be wall-mounted or ceiling-mounted. Refer to local codes for additional mounting restrictions.
2. Turn power OFF.
   WARNING: Always turn the Link Booster power and the power to the GRAFIK 6000 Processor Panel off before doing any work. Failure to do so can result in serious personal injury and damage to equipment.
3. Strip wires so $^3/_8$ in. (9.5 mm) of bare wire is exposed. Connect the line voltage wiring to the wires exiting from the rear of the Link Booster as shown.



4. Mount the Link Booster to the junction box as shown in either Mounting Diagram. Unscrew and remove the front enclosure cover to expose the Class 2/PELV terminals and Status LEDs.



Mounting Diagrams

5. Strip insulation from Wallstation Link wires so $^3/_8$ in. (9.5 mm) bare wire is exposed. The terminals will accept up to two #18 AWG (1.0 mm²) wires. If wires are larger, splice a #18 wire to the wires to make the connection.

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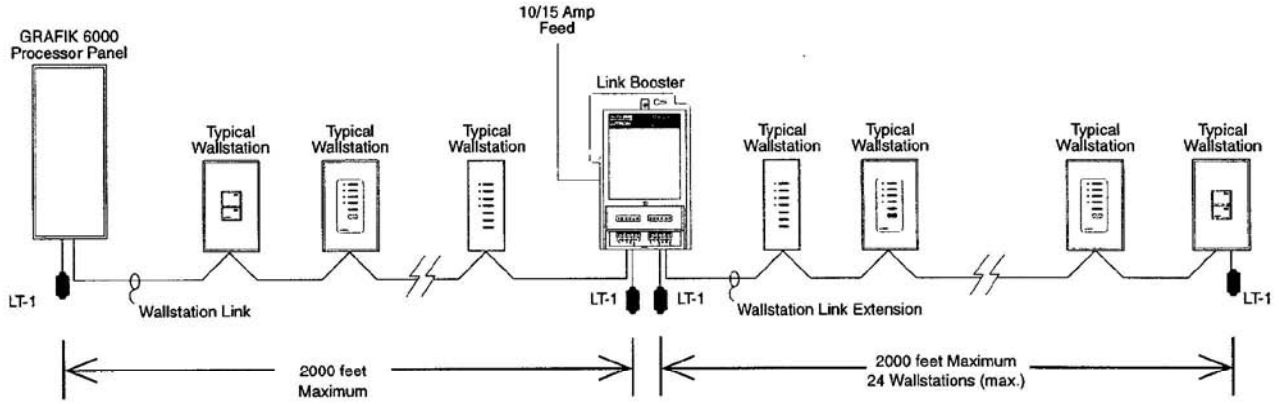
6. Review Wallstation Link Application No. 1 and No. 2 and wire the Link Booster into the Wallstation Link as shown in the appropriate drawings. LT-1s, Link Termination Assemblies, are required at each end of the Wallstation Link as shown. Confirm all connections.

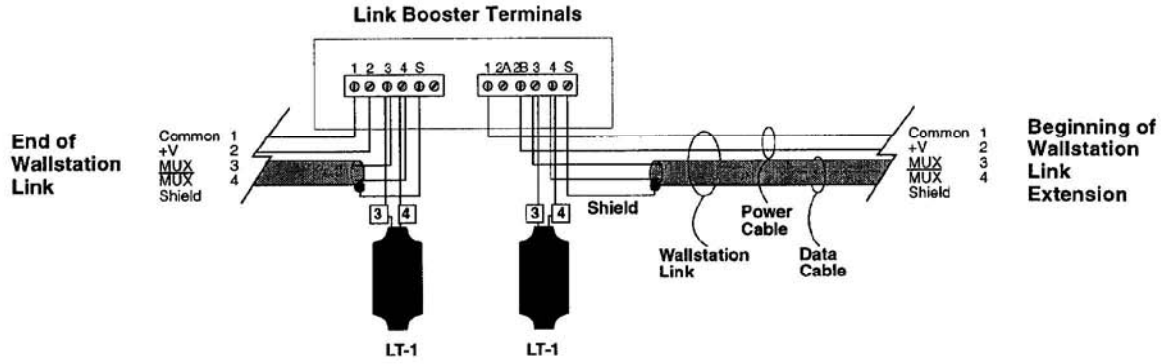
7. Replace front enclosure cover. Restore power to the Link Booster and the GRAFIK 6000 Processor Panel **after** installation of the system is complete.

Wallstation Link Application No. 1: Extension Wiring (Used to extend Wallstation Link length)

Wiring Overview



Link Booster Wiring Detail

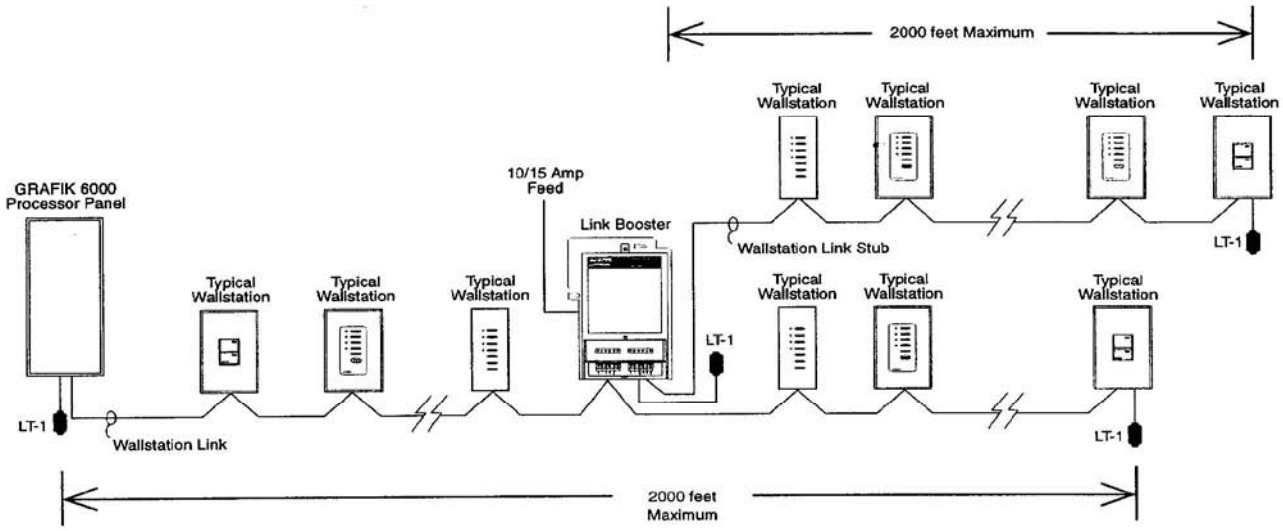


Wiring Notes:

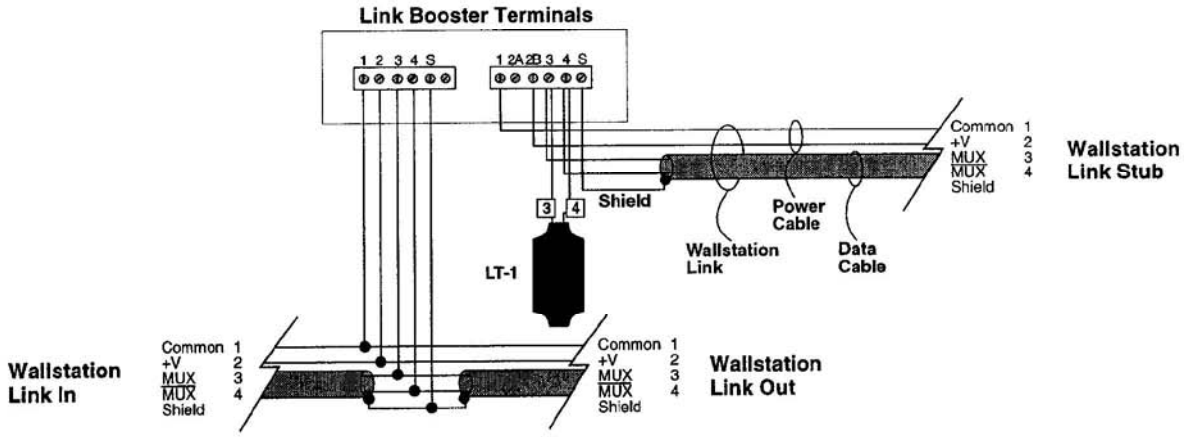
1. Lutron recommends that the connection of the Link Booster to the Wallstation Link be made inside the Link Booster. If a junction box (provided by others) is used instead, locate the box no more than 8 ft. (2.4 m) from the Link Booster.
2. Wallstation Link wiring must not be run in the same raceway as line voltage (main voltage) wiring.
3. Neither the Wallstation Link nor the Wallstation Link Extension can exceed 2000 ft. (600 m) in length.
4. Data cable shield must be maintained throughout the Wallstation Link. **DO NOT** connect the shield to earth ground.
5. Refer to the GRAFIK 6000 Installation Guide and Lutron job drawings for power cable and data cable (Wallstation Link) wiring restrictions and limitations.
6. Wallstation Link requires an LT-1, Link Termination Assembly, at each end of the Wallstation Link and each end of the Wallstation Link Extension.

Wallstation Link Application No. 2: Stub Wiring
(Used to correct a branched or "T-tapped" section of Wallstation Link)

Wiring Overview



Link Booster Wiring Detail

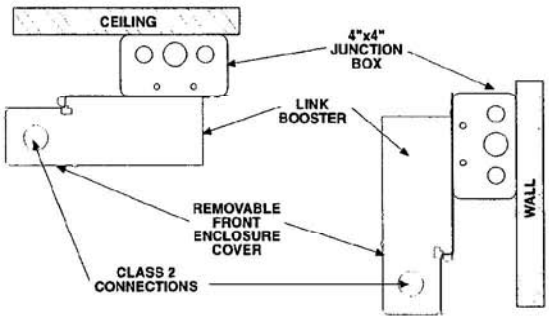


Wiring Notes:

1. Lutron recommends that the connection of the Link Booster to the Wallstation Link be made inside the Link Booster. If a junction box (provided by others) is used instead, locate the box no more than 8 ft. (2.4 m) from the Link Booster.
2. Wallstation Link wiring must not be run in the same raceway as line voltage (main voltage) wiring.
3. Neither the Wallstation Link nor the Wallstation Link Stub can exceed 2000 ft. (600 m) in length.
4. Data cable shield must be maintained throughout the Wallstation Link. **DO NOT** connect the shield to earth ground.
5. Refer to the GRAFIK 6000 Installation Guide and Lutron job drawings for power cable and data cable (Wallstation Link) wiring restrictions and limitations.
6. Wallstation Link requires an LT-1, Link Termination Assembly, at each end of the Wallstation Link and each end of the Wallstation Link Stub.

Installation on a Dimmer Panel Link

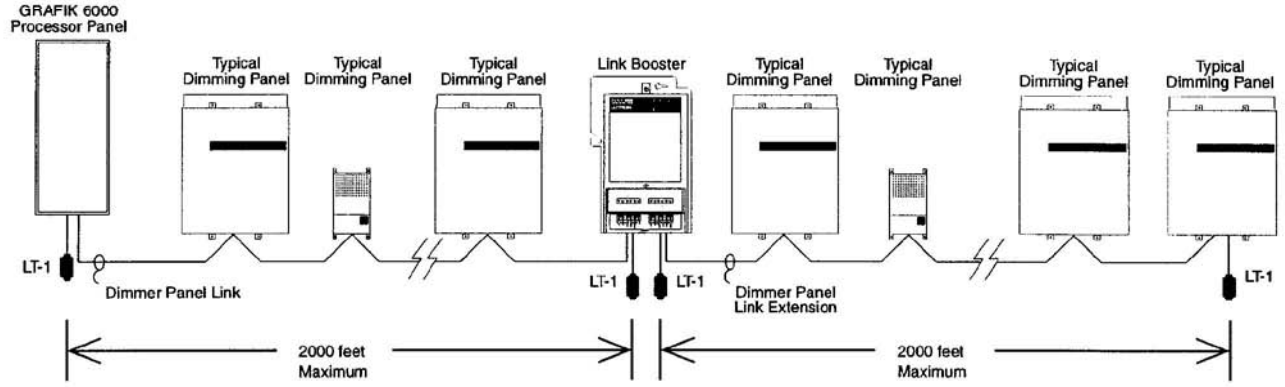
1. **Prewiring: The Dimmer Panel Link requires special wiring considerations. Refer to the GRAFIK 6000 Installation Guide and Lutron job drawings for wiring restrictions and limitations that apply to your specific project.**
2. Turn power OFF.
   WARNING: Always turn off power to the GRAFIK 6000 Processor Panel before doing any work. Failure to do so can result in serious personal injury and damage to equipment.
3. Using the wire connectors provided, cap off the three wires on the Link Booster. These wires are only used when installing the Link Booster to boost a Wallstation Link.
4. Mount the Link Booster to the junction box in one of two ways as shown in the Mounting Diagram at right. The Link Booster may be wall-mounted or ceiling-mounted. Refer to local electrical codes for additional restrictions. Unscrew and remove the front enclosure cover to expose the Class 2 terminals.
5. Strip insulation from Dimmer Panel Link wires so $^3/_8$ in. (9.5 mm) bare wire is exposed. The terminals will accept up to two #18 AWG (1.0 mm²) wires. If wires are larger, splice a #18 AWG (1.0 mm²) wire to the wires to make the connection.
6. Review Dimmer Panel Link Application No. 1 and No. 2 on the pages that follow and wire the Link Booster into the Dimmer Panel Link as shown in the appropriate drawing. LT-1s, Link Termination Assemblies, are required at each end of the Panel Link as shown. Confirm all connections.
   Note: When an installation uses a "sense line," the "sense line" (wire 5) must be maintained throughout the link; but, it does not connect to the Link Booster. For additional information about the "sense line," consult the panel to panel wiring section of the GRAFIK 6000 Installer's Guide.
7. Replace front enclosure cover. Restore power to the GRAFIK 6000 Processor Panel **after** the installation of the system is complete.



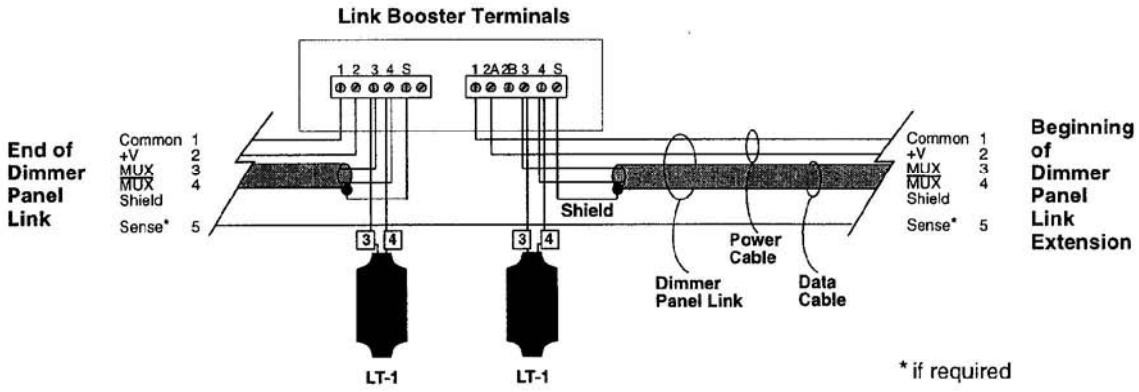
Mounting Diagrams

Dimmer Panel Link Application No. 1: Extension Wiring (Used to extend Dimmer Panel Link length.)

Wiring Overview



Link Booster Wiring Detail

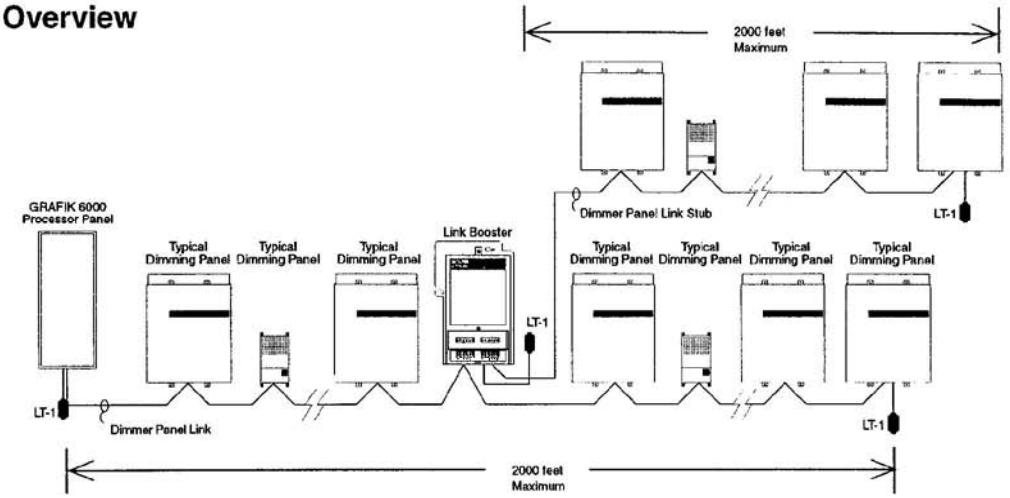


Wiring Notes:

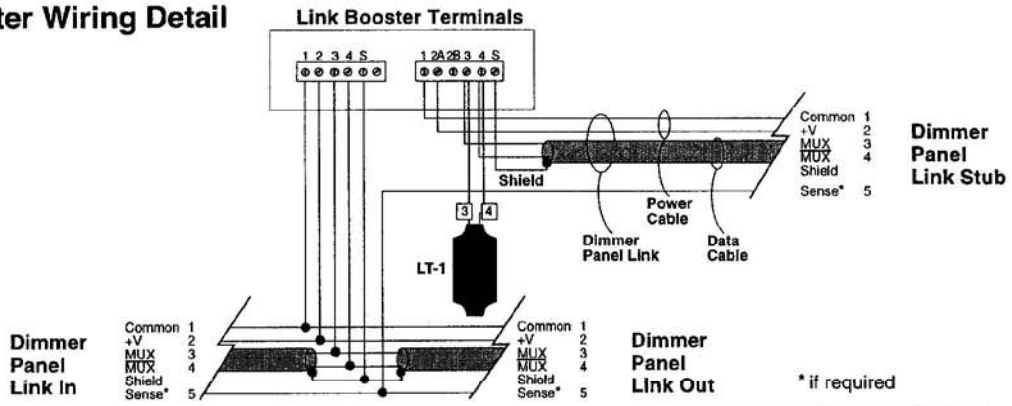
1. Lutron recommends that the connection of the Link Booster to the Dimmer Panel Link be made inside the Link Booster. If a junction box (provided by others) is used instead, locate the box no more than 8 ft. (2.4 m) from the Link Booster.
2. Dimmer Panel Link wiring must not be run in the same raceway as line voltage (main voltage) wiring.
3. Neither the Dimmer Panel Link nor the Dimmer Panel Link Extension can exceed 2000 ft. (600 m) in length.
4. Data cable shield must be maintained throughout the Dimmer Panel Link. **DO NOT** connect the shield to earth ground.
5. Refer to the GRAFIK 6000 Installation Guide and Lutron job drawings for power cable and data cable (Dimmer Panel Link) wiring restrictions and limitations.
6. Dimmer Panel Link requires an LT-1, Link Termination Assembly, at each end of the Dimmer Panel Link and each end of the Dimmer Panel Link Extension.

Dimmer Panel Link Application No. 2: Stub Wiring
(Used to correct a branched or "T-tapped" section of Dimmer Panel Link)

Wiring Overview



Link Booster Wiring Detail



Wiring Notes:

1. Lutron recommends that the connection of the Link Booster to the Dimmer Panel Link be made inside the Link Booster. If a junction box (provided by others) is used instead, locate the box no more than 8 ft. (2.4 m) from the Link Booster.
2. Dimmer Panel Link wiring must not be run in the same raceway as line voltage (main voltage) wiring.
3. Neither the Dimmer Panel Link nor the Dimmer Panel Link Stub can exceed 2000 ft. (600 m) in length.
4. Data cable shield must be maintained throughout the Dimmer Panel Link. **DO NOT** connect the shield to earth ground.
5. Refer to the GRAFIK 6000 Installation Guide and Lutron job drawings for power cable and data cable (Dimmer Panel Link) wiring restrictions and limitations.
6. Dimmer Panel Link requires an LT-1, Link Termination Assembly, at each end of the Dimmer Panel Link and each end of the Dimmer Panel Link Stub.

Internet: **www.lutron.com**
E-mail: **product@lutron.com**

WORLD HEADQUARTERS
Lutron Electronics Co. Inc.,
7200 Suter Road, Coopersburg, PA 18036-1299 U.S.A.,
TOLL FREE: (800) 523-9466 (U.S.A., Canada, Caribbean), Tel: (610) 282-3800;
International 1- 610-282-3800, Fax: (610) 282-3090; International 1-610-282-3090

ASIAN HEADQUARTERS
Lutron Asuka Co, Ltd.,
2F, Kowa Shiba-Koen Bldg., 1-11, Shiba-Koen 1 chome, Minato-ku, Tokyo, 105-0011 Japan,
TOLL FREE: (0120) 083417 (Japan), Tel: (03) 5405-7333;
International 81-3-5405-7333, Fax: (03) 5405-7496; International 81-3-5405-7496

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Lutron EA Ltd.,
Lutron House, 6 Sovereign Close, Wapping, London, E1 9HW, United Kingdom,
FREEPHONE: 0800 282107 (U.K.), Tel: (171) 702-0657;
International 44-171-702-0657, Fax: (171) 480-6899; International 44-171-480-6899

HONG KONG SALES OFFICE
Lutron GL (Hong Kong)
Unit 2911, 29th Floor, Bank of America Tower, Central, Hong Kong,
Tel: 2104-7733; International 852-2104-7733, Fax: 2104-7633; International 852-2104-7633

SINGAPORE
Lutron GL (Singapore)
1002 Tai Seng Ave., #02-2548 Tai Seng Ind. Estate, Singapore 534469,
Tel: 65 487 2820
Fax: 65 487 2825

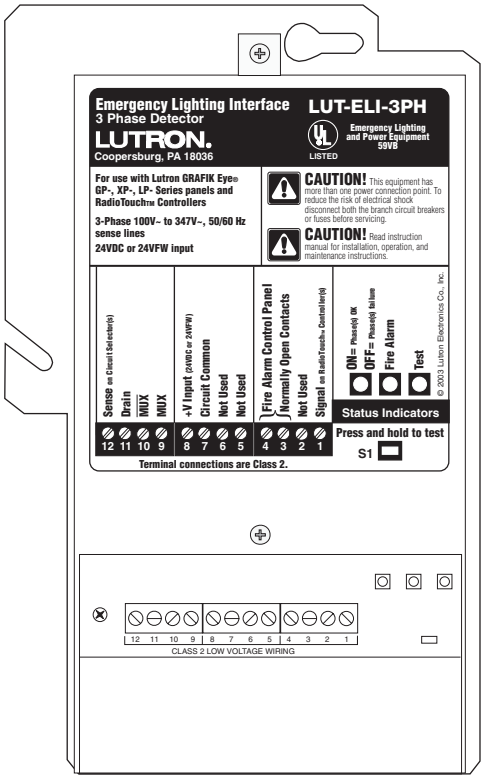
LUTRON®

Lutron Electronics Co., Inc.
Made and printed in U.S.A. 8/98
P/N 040-096 Rev.B

Emergency Lighting Interface
LUT-ELI-3PH and LUT-ELI-1PH

For use with Lutron GRAFIK Eye® GP, XP, LP panels and RadioTouch™ lighting controls

Installation and Operating Instructions



Caution: This device does not provide emergency power. An emergency (Essential) power source must be provided.

Listing

The Emergency Lighting Interface – LUT-ELI is **UL924 Listed** as "Emergency Lighting and Power Equipment." The interface shall be used with Lutron *GRAFIK Eye* GP, LP dimming panels, XP switching panels, and *RadioTouch* Controllers only.

Description

The LUT-ELI senses the line voltage on all three phases (3PH) or a single phase (1PH) and controls the emergency signal to the *RadioTouch* Controller or Circuit Selector for GP, XP, and LP panels. When one or more phases of power are lost, the LUT-ELI sends a signal to the *RadioTouch* Controller or Circuit Selector activating the emergency lighting mode. Any lights controlled by these devices will go to the emergency light level setting (factory set to 100% intensity). When normal power is restored, the lights will return to their previous intensities.

System Ratings

Voltage – 100 VAC-347 VAC 50/60 Hz, 1 and 3 phase versions

Current – 20 Amp maximum circuit breaker

Features

- Can be added to an existing system.
- Status indicator, indicates the phase status. Indicator 'ON' is normal mode, 'OFF' is emergency mode.
- A test switch is provided to perform a functional test of the system by simulating an emergency situation.
- The interface has inputs for a Fire Alarm Control Panel (FACP). A maintained dry contact closure received between the FACP inputs will actuate the emergency mode.

Note:
One LUT-ELI can be used with up to 32 Circuit Selectors or 100 *RadioTouch* Controllers.

Important Safeguards

- **Read and follow all safety instructions.**
- **Do not use outdoors.**
- **Do not let power supply cords touch hot surfaces.**
- **Do not mount near gas or electric heaters.**
- **Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.**
- **The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.**
- **Do not use this equipment for other than intended use.**
- **All servicing should be performed by qualified service personnel.**

Save these instructions.

Important Notes

1. Observe all national and local electrical codes and safety standards.
2. Follow these instructions.
3. Turn off power before installation.

Danger – Locate and lock the supply breaker(s) in the OFF position, or remove the supply fuse(s) before continuing. This equipment may have more than one power connection point.

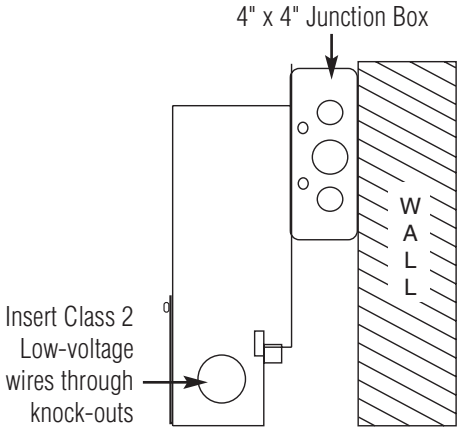
Important – Line voltage input to the LUT-ELI MUST be from the NORMAL (Non Essential) power source.

Table of Contents

Mounting the Interface

Mount the LUT-ELI onto a 4" x 4" junction box (not included, but available – Lutron part number 241-496).

Insert the Class 2 wires – through knock-outs as shown in the diagram. Remove front enclosure cover to expose the terminal blocks, test switch, and the status LEDs.



Connect the Class 2 wires to the Circuit Selector or *RadioTouch* Controller. Wiring to these devices will be described in the following steps.

Caution – Be sure all the power wires are completely inside the junction box before tightening the mounting screws.

Note: For emergency fixtures (fixtures that never turn off or have a battery back-up ballast in the fixture), call the Lutron Technical Support Center, (800) 523-9466 for restrictions and wiring requirements.

Installation of LUT-ELI with Line Voltage Connections in a *RadioTouch* System

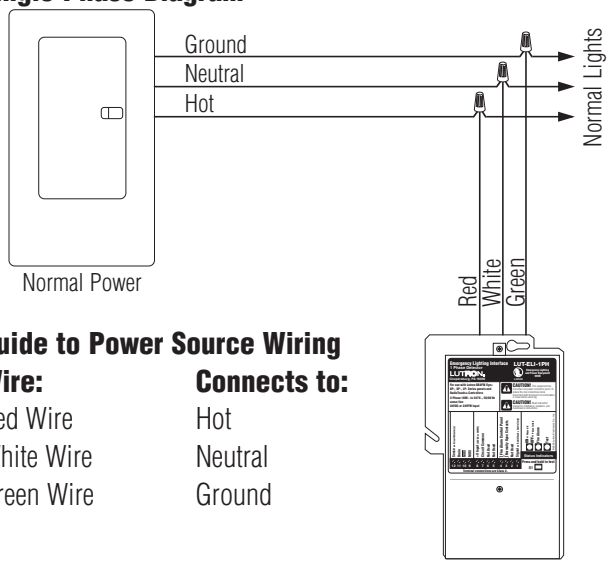
Step 1: Wiring from Mains

Turn power off

Danger – Locate and lock the supply breaker(s) in the OFF position, or remove the supply fuse(s) before continuing. This equipment may have more than one power connection point.

Important – Line voltage input to the LUT-ELI MUST be from the NORMAL power source. The LUT-ELI accepts 100 VAC-347 VAC 50/60 Hz input.

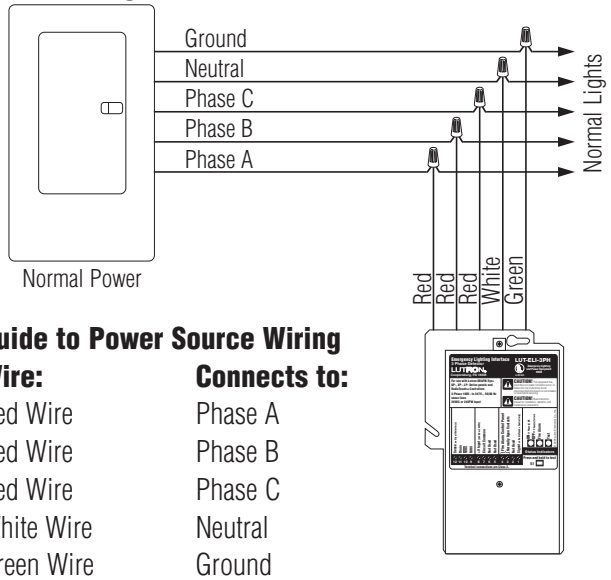
Single Phase Diagram



Guide to Power Source Wiring

Wire:	Connects to:
Red Wire	Hot
White Wire	Neutral
Green Wire	Ground

3 Phase Diagram



Guide to Power Source Wiring

Wire:	Connects to:
Red Wire	Phase A
Red Wire	Phase B
Red Wire	Phase C
White Wire	Neutral
Green Wire	Ground

Danger – Proper short circuit and overcurrent protection must be provided at the distribution panel. You can use up to a **20A maximum** circuit breaker for your installation.

Note: If your *RadioTouch* Controller, model number RTA-RX-F, RTA-RX-F-SC, or RTA-RX-SW was shipped before August 1, 2002 please contact Lutron Technical Support at (800) 523-9466 before connecting your LUT-ELI.

Note: When wiring for a backup/emergency source of power the *RadioTouch* Controller (models RTA-RX-F, RTA-RX-F-SC, RTA-RX-SW), being used for the backup/emergency lights (Unit A & B) **cannot** be controlled by an occupant sensor. Units A and B DIP switch #2 must be in the down position.

Step 2: Class 2 wiring to *RadioTouch* Controllers

One LUT-ELI can be connected in parallel with up to 100 *RadioTouch* Controllers.

Step A - Flip DIP switch #2 on the *RadioTouch* Controller to the down position.

Step B - Disconnect any occupant sensors wired to the *RadioTouch* Controller.

Step C - Make the following connections.

LUT-ELI	***RadioTouch* Controller**
Terminal 8 (+24V)	Terminal 4 (+24V), Unit A only
Terminal 7 (Common)	Terminal 6 (Circuit Common)
Terminal 1 (Signal)	Terminal 2 (Occ. Signal)

Important Note: When wiring multiple *RadioTouch* Controllers to the same emergency closure circuit, **only one Controller can be connected to the +24 (number 4) terminal.** Wiring +24 to multiple Controllers can damage your *RadioTouch* Controller and/or the LUT-ELI. See diagram below.

Step 3: Test the System

Please perform the following tests to ensure proper installation.

Loss of Normal (Non-Essential) power can be simulated by turning off one of the Normal (Non-Essential) phase(s) breaker(s) that the LUT-ELI is monitoring.

You should expect the following,

– All lights controlled by Emergency (Essential) Panel will go to FULL INTENSITY (factory set).

– PHASE ON/OFF Status Indicator (Green) will turn OFF as the above test creates a phase failure.

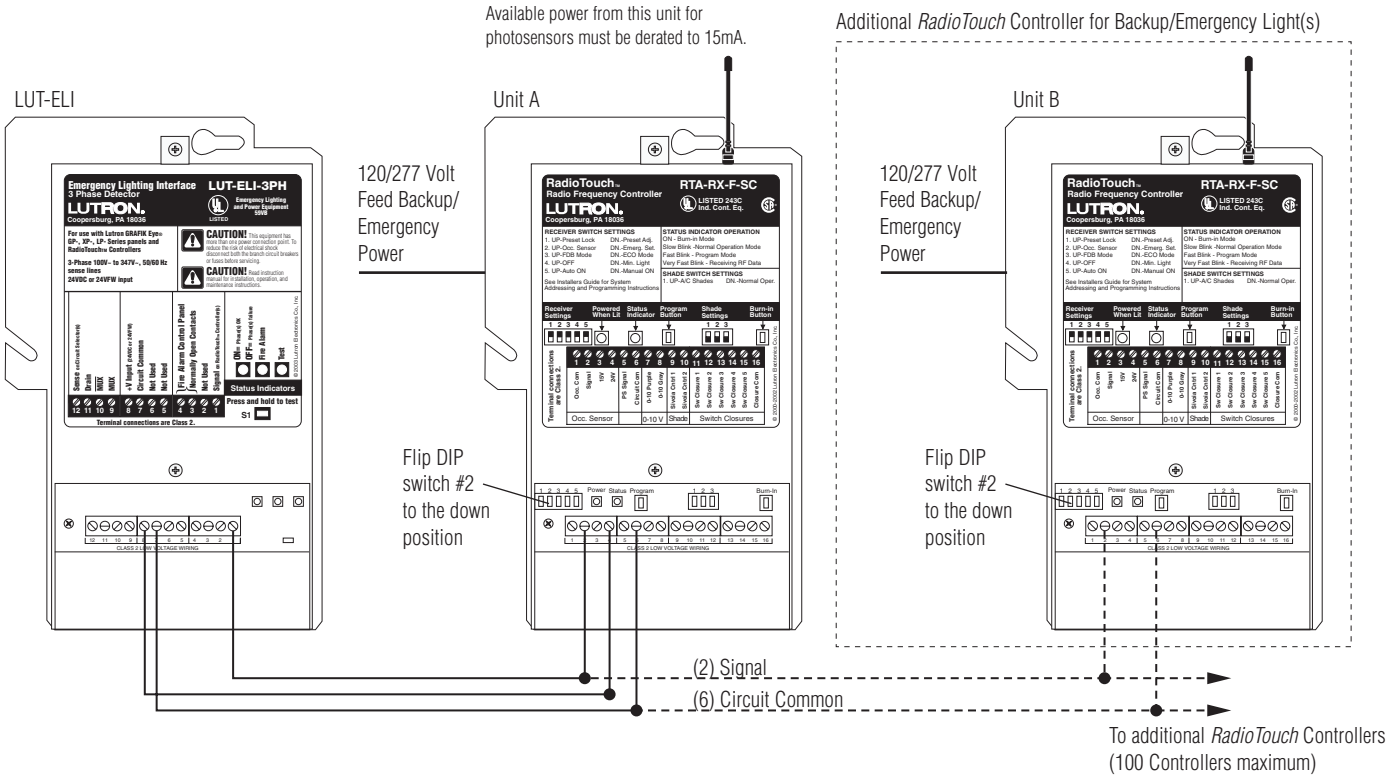
Or, press and hold Switch SW1 on the LUT-ELI

You should expect the following,

– TEST LED (Orange) will turn ON.

– All lights controlled by Emergency RadioTouch Controller will go to FULL INTENSITY (factory set).
Note: PHASE ON/OFF Status Indicator (Green) will not turn OFF as the above test does not create a phase failure.

– Upon releasing the switch SW1 all lights will return back to their original intensities.



Installation of LUT-ELI with Line Voltage Connections with *GRAFIK Eye* GP, LP, and XP Panels

Step1: Wiring from GP panel or Wiring from Mains (XP, LP)

Turn OFF power.

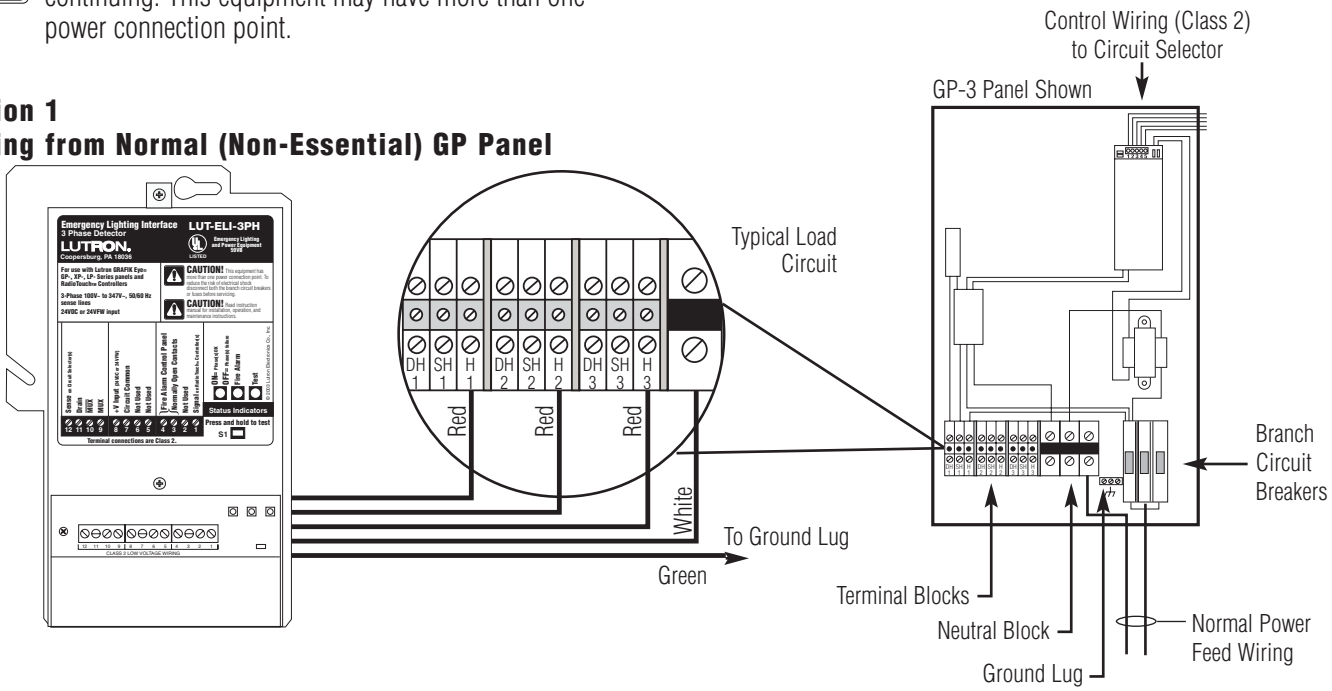
Danger – Locate and lock the supply breaker(s) in the OFF position, or remove the supply fuse(s) before continuing. This equipment may have more than one power connection point.

Important – Line voltage input to the LUT-ELI MUST be from the NORMAL power source – the same as to NORMAL (Non-Essential) panels.

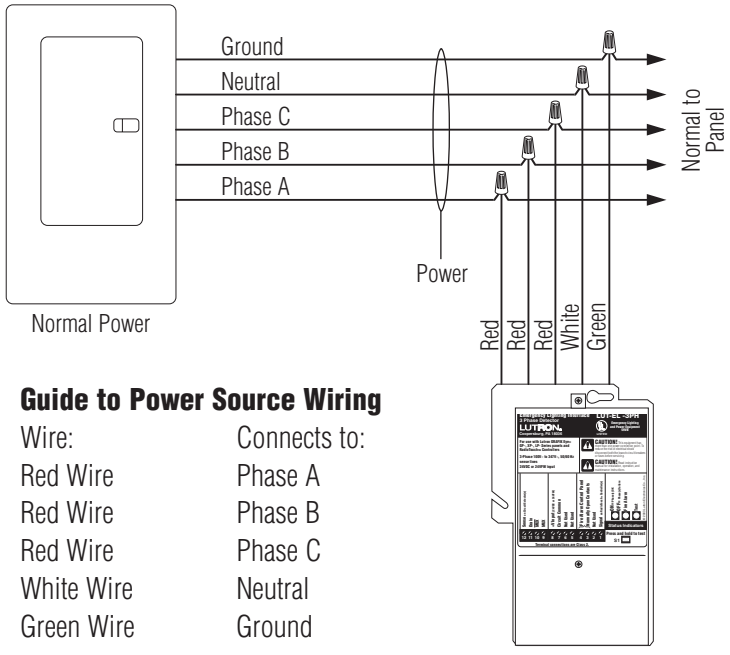
For installation directly to XP and LP panels consult the Lutron Technical Support Center at (800) 523-9466.

Danger – Proper short circuit and overcurrent protection must be provided at the distribution panel. You can use up to a **20A maximum** circuit breaker for your installation.

Option 1
Wiring from Normal (Non-Essential) GP Panel



Option 2
Wiring From Mains with GP, XP, and LP Panels



Guide to Power Source Wiring

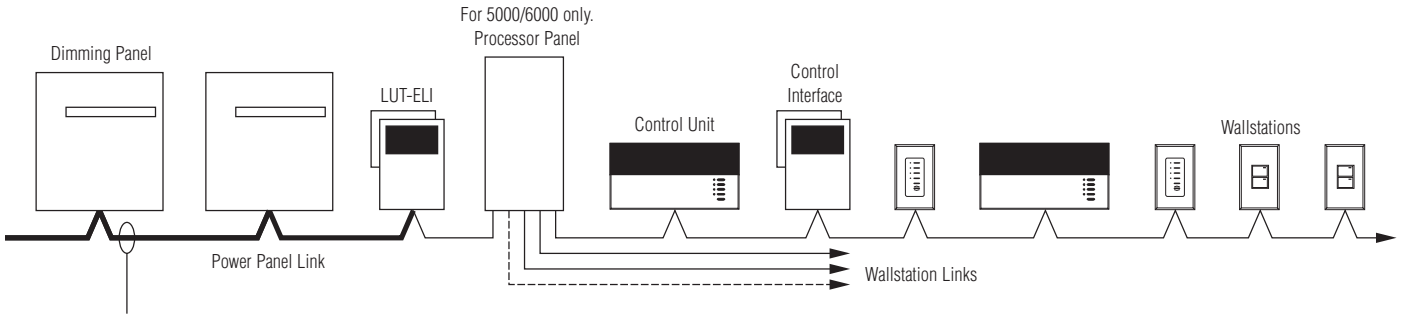
Wire:	Connects to:
Red Wire	Phase A
Red Wire	Phase B
Red Wire	Phase C
White Wire	Neutral
Green Wire	Ground

Step 2: GP, XP, and LP Low-voltage Class 2 (PELV) Wiring

Pull low-voltage type Class 2 wiring for system communications.

- Must be daisy-chained!
- Must run separately from line (mains) voltage.

Note: LUT-ELI can be placed anywhere in the power panel link.



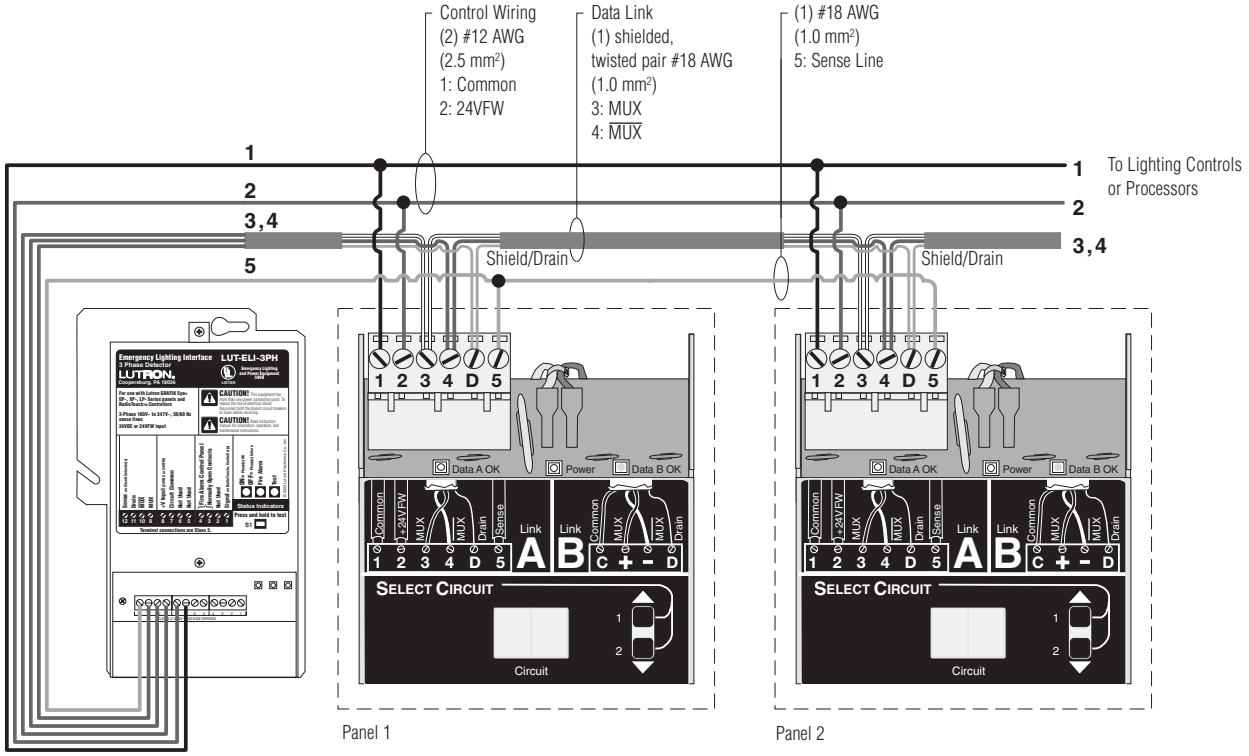
Panel-to-Panel wiring[1]
Include one extra #18 AWG (1.0 mm^2). Used as a "sense line" for emergency (essential) lighting.

† If you use Lutron cable, you can use smaller-gauge wires.

- If a Class 2 (PELV) wiring link is less than 500 feet (152 m), you can use GRX-CBL-346S:
  - Two #18AWG (1.0 mm^2) for control wiring.
  - One twisted, shielded pair #22 AWG (.625 mm^2) for data link.
  - No "sense line" included - add your own #18 AWG (1.0 mm^2).
- If a Class 2 (PELV) wiring link is 500 to 2000 feet (152 to 610 m), you can use GRX-CBL-46L:
  - Two #12 AWG (2.5 mm^2) for control wiring.
  - One twisted, shielded pair #22 AWG (.625 mm^2) for data link.
  - One #18 AWG (1.0 mm^2) for sense line between Panels.
- Lutron has also approved smaller-gauge cable from Belden, Liberty, Alpha, and Signature. Ask for Lutron *GRAFIK Eye* Cable.

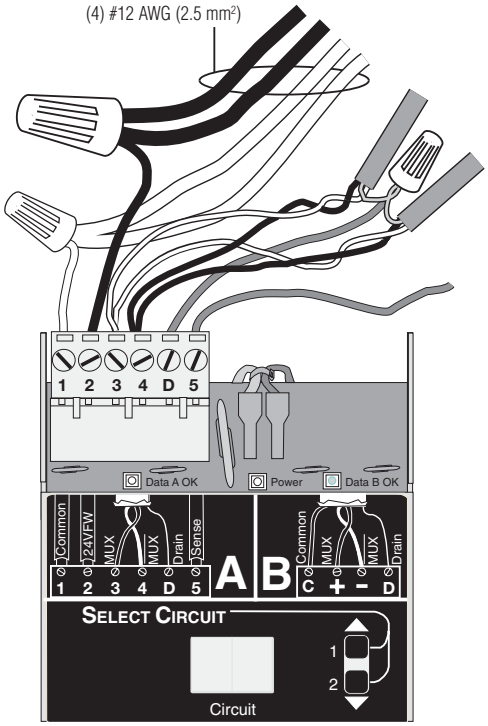
Step 2: (Continued)

Class 2 (PELV) Panel-to-panel wiring (all models)



Make the following connections.

LUT-ELI	Circuit Selector
Terminal 12 (Sense)	Terminal 5 (Sense)
Terminal 11 (Drain)	Terminal D (Drain)
Terminal 10 (MUX)	Terminal 4 (MUX)
Terminal 9 (MUX)	Terminal 3 (MUX)
Terminal 8 (+24V)	Terminal 2 (+24V)
Terminal 7 (Common)	Terminal 1 (Circuit Common)



Notes:

1. Emergency Power: The additional #18 AWG (1.0 mm²) wire is a "sense" line from terminal 12 on the LUT-ELI. This sense line allows an Emergency (Essential) Lighting Panel to "sense" when Normal (Non-Essential) power is lost. If more than one Emergency Lighting Panel needs to sense off a specific LUT-ELI, you may have to run a dedicated wire between each LUT-ELI and Emergency (Essential) panel(s).
2. Shield/Drain: Connect shielding as shown.
   - Do not connect to Ground (Earth) or Circuit Selector.
   - Connect the bare drain wires and cut off the outside shield.

Class 2 (PELV) Terminal Connections

Each low-voltage Class 2 (PELV) terminal can accept only two #18 AWG (1.0 mm²) wires. Two #12 AWG (2.5 mm²) conductors won't fit. Connect as shown.

Step 3: Set Circuit Selector Switch Position

Circuit Selector Switch (SW6) position (Normal/Emergency Switch)

Panels are shipped with SW6 (located at the base of each Circuit Selector) in the middle position.

All Emergency Panels

- Move SW6 to the right Emergency (Essential) position.

In this arrangement, the LUT-ELI will be the only unit controlling the sense line. If one or more phases go down, LUT-ELI sends a signal through the sense line to Emergency (Essential) panel(s). The lights controlled by these panels will go to 'ord' override levels (factory set to full intensity) When normal power is restored, lights will return to their previous intensities.

When SW6 is in its center position (as shipped), terminal 5 (sense) has no affect on the Circuit Selector operation.

Switch position SW6 on the Circuit Selector MUST be in the Right position on ALL EMERGENCY Panels.

Step 4: Test the System

Please perform the following tests to ensure proper installation.

Loss of Normal (Non-Essential) power can be simulated by turning off one of the Normal (Non-Essential) phase(s) breaker(s) that the LUT-ELI is monitoring.

You should expect the following,

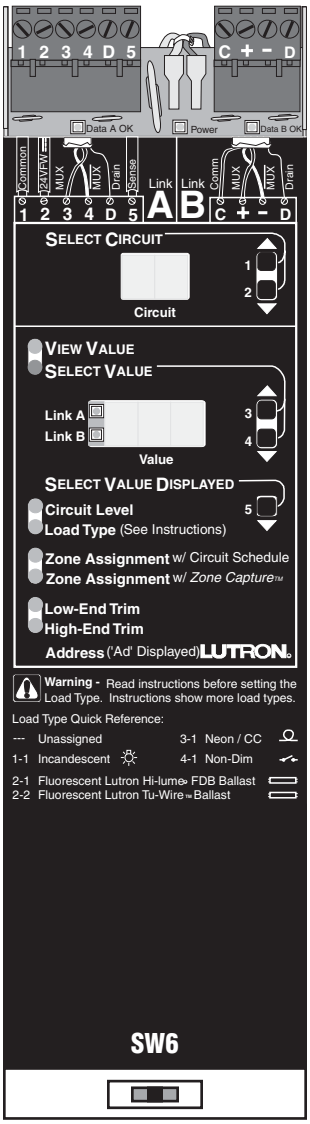
– PHASE ON/OFF Status Indicator (Green) will turn OFF as the above test creates a phase failure.
– Circuit Selector on Emergency (Essential) Panel will go to 'ord' override mode.
– All lights controlled by Emergency (Essential) Panel will go to FULL INTENSITY (factory set).
– All lights controlled by Normal (Non-essential) Panel will freeze at their respective intensities.

OR, Press and hold Switch SW1

You should expect the following,

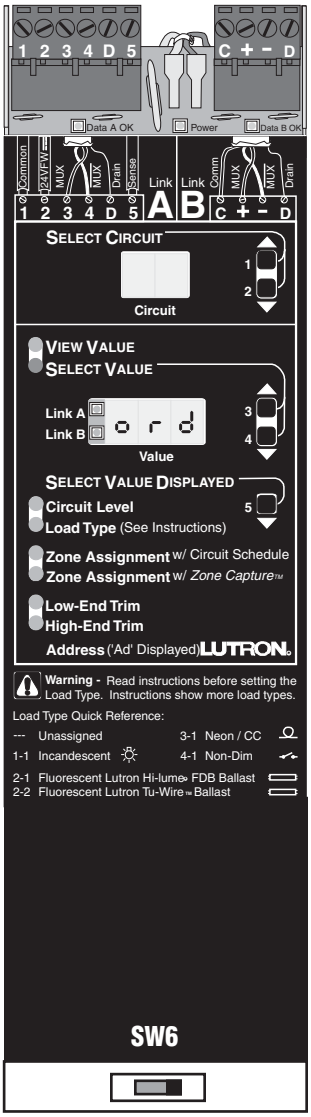
– TEST LED (Orange) will turn ON.
NOTE: PHASE ON/OFF Status Indicator (Green) will not turn OFF as the above test doesn't create a phase failure.
– Circuit Selector on Emergency (Essential) Panel will go to 'ord' override mode.
– All lights controlled by Emergency (Essential) Panel will go to FULL INTENSITY (factory set).
– All lights controlled by Normal (Non-essential) Panel will freeze at their current intensities.
– Upon releasing switch SW1, all lights will return back to their previous intensities.

Circuit Selector in (Non-Emergency) Panel



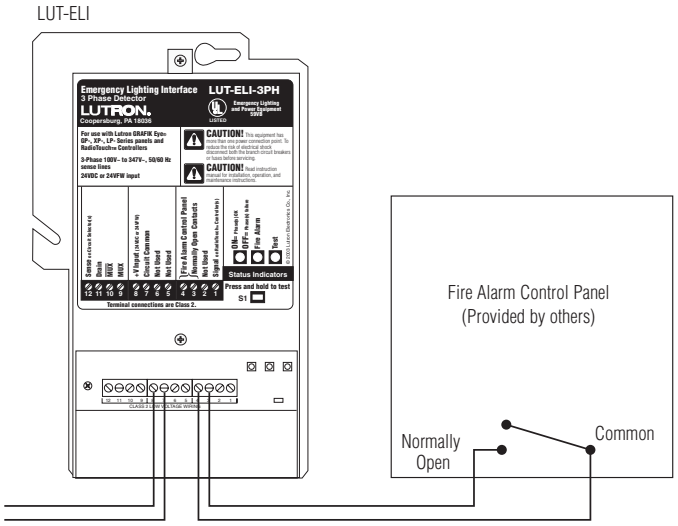
Keep in Middle Position

Circuit Selector in Emergency (Essential) Lighting Panel



Move Right

Connections to Fire Alarm Control Panel (FACP) Low-voltage Class 2 Connections



Note: Wiring diagram does not show connections to Lutron lighting controls.

Important – Only use with normally open dry contact closure. When the contact closure is triggered it must be maintained for the LUT-ELI to go into Emergency Mode. Once the contact is released (open) the LUT-ELI will return the *GRAFIK Eye* GP, XP, LP panel(s) or *RadioTouch* Controller(s) back to normal operation mode.

Consult your Fire Alarm Control Panel's Instruction manual before connecting the LUT-ELI.

Danger – Do not connect any voltage source to the FACP inputs on the LUT-ELI If voltage is provided by the FACP and connected to the LUT-ELI, it can damage the LUT-ELI.

Troubleshooting
LUT-ELI and *RadioTouch* Controllers

LUT-ELI Troubleshooting Guide

RadioTouch Controller

Symptom	Possible Cause	Solution
Lights are at full intensity and can not be controlled by an addressed transmitter	• LUT-ELI is not connected to Signal on the *RadioTouch* Controller	Connect terminal 2 "signal" from the *RadioTouch* Controller to "signal on *RadioTouch* Controller" on the LUT-ELI
	• One or more of the phases feeding the LUT-ELI are off (phase LED on the LUT-ELI will be off)	Turn ON all normal power phases to LUT-ELI
	• Neutral is not connected on the LUT-ELI (phase LED on the LUT-ELI will be OFF)	Connect neutral
	• 24VDC is not connected on the LUT-ELI (phase LED on the LUT-ELI will be OFF)	Connect terminal 4 "+24VDC" from *RadioTouch* Controller to "+24" on the LUT-ELI
	• There is a short across FACP and normally open contact (FACP LED will be ON)	Remove short

LUT-ELI Troubleshooting Guide

RadioTouch Controller (continued)

Symptom	Possible Cause	Solution
Lights do not turn ON and do not go to high end when the test switch is pressed	• DIP switch 2 on the *RadioTouch* Controller is in the UP position	Move DIP switch 2 on the *RadioTouch* Controller to the DOWN position
	• 24VDC and signal are swapped	Connect terminal 4 "+24VDC" from the *RadioTouch* Controller to "+24" on the LUT-ELI and connect terminal 2 "signal" from the *RadioTouch* Controller to "signal on *RadioTouch* Controller" on the LUT-ELI
	• 24VDC and common wires are swapped	Connect terminal 4 "+24VDC" from the *RadioTouch* Controller to "+24" on the LUT-ELI and connect terminal 6 "COM" from the *RadioTouch* Controller to "Common" on the LUT-ELI
	• Common and signal are swapped	Connect terminal 6 "COM" from the *RadioTouch* Controller to "Common" on the LUT-ELI and connect terminal 2 "signal" from the *RadioTouch* Controller to "signal on *RadioTouch* Controller" on the LUT-ELI
Lights do not turn ON and do not go to high end when one or more of the normal power phases are turned OFF	• DIP switch 2 on the *RadioTouch* Controller is in the UP position	Move DIP switch 2 on the *RadioTouch* Controller to the DOWN position
	• 24VDC and signal are swapped	Connect terminal 4 "+24VDC" from the *RadioTouch* Controller to "+24" on the LUT-ELI and connect terminal 2 "signal" from the *RadioTouch* Controller to "signal on *RadioTouch* Controller" on the LUT-ELI
	• That *RadioTouch* Controller is not powered by the emergency circuit power	Power the *RadioTouch* Controller from the emergency circuit and not from normal
	• The emergency transfer switch is not switching over	Consult transfer switch manufacture for troubleshooting
	• LUT-ELI is connected to the emergency circuit	Connect the LUT-ELI to normal power
	• 24VDC and common wires are swapped	Connect terminal 4 "+24VDC" from the *RadioTouch* Controller to "+24" on the LUT-ELI and connect terminal 6 "COM" from the *RadioTouch* Controller to "Common" on the LUT-ELI
	• Common and signal are swapped	Connect terminal 6 "COM" from the *RadioTouch* Controller to "Common" on the LUT-ELI and connect terminal 2 "signal" from the *RadioTouch* Controller to "signal on *RadioTouch* Controller" on the LUT-ELI

LUT-ELI Troubleshooting Guide

Circuit Selector (*GRAFIK Eye* GP-, XP-, LP Series Panels)

Symptom	Possible Cause	Solution
Lights are at full intensity and can not be controlled by the wallstation (Circuit Selector reads “ord”)	• Sense wire is not connected from the Circuit Selector to the LUT-ELI	Connect terminal 5 “sense” from the Circuit Selector to “sense” on the LUT-ELI
	• One or more of the phases feeding the LUT-ELI are off (phase LED on the LUT-ELI will be OFF)	Turn ON all normal power phases to LUT-ELI
	• Neutral is not connected on the LUT-ELI (phase LED on the LUT-ELI will be OFF)	Connect neutral
	• 24VFW is not connected on the LUT-ELI (phase LED on the LUT-ELI will be OFF)	Connect terminal 2 “24VFW” from the Circuit Selector to “+24” on the LUT-ELI
	• There is a short across FACP and normally open contact (FACP LED will be ON)	Remove short
	• 24VFW and sense are swapped	Connect terminal 2 “24VFW” from the Circuit Selector to “+24” on the LUT-ELI and connect terminal 5 “sense” from the Circuit Selector to “sense” on the LUT-ELI
	• Common and sense are swapped	Connect terminal 1 “Common” from the Circuit Selector to “Common” on the LUT-ELI and connect terminal 5 “sense” from the Circuit Selector to “sense” on the LUT-ELI
Lights do not turn ON and do not go to high end when the test switch is pressed	• SW6 on the Circuit Selector is in the middle position or far left position	Move SW6 on the Circuit Selector to the far right position
	• 24VDC and common wires are swapped	Connect terminal 2 “24VFW” from the Circuit Selector to “+24” on the LUT-ELI and connect terminal 1 “Common” from the Circuit Selector to “Common” on the LUT-ELI
Lights do not turn ON and do not go to high end when one or more of the normal power phases are turned OFF	• SW6 on the Circuit Selector is in the middle position or far left position	Move SW6 on the Circuit Selector to the far right position
	• 24VDC and common wires are swapped	Connect terminal 2 “24VFW” from the Circuit Selector to “+24” on the LUT-ELI and connect terminal 1 “Common” from the Circuit Selector to “Common” on the LUT-ELI
	• That Emergency Panel is not powered by the emergency circuit	Power the Emergency Panel from the emergency circuit and not from normal power
	• The emergency transfer switch is not switching over	Consult transfer switch manufacture for troubleshooting
	• LUT-ELI is connected to the emergency circuit	Connect the LUT-ELI to normal power

Limited Warranty

Lutron will, at its option, repair or replace any unit that is defective in materials or manufacture within one year after purchase. For warranty service, return unit to place of purchase or mail to Lutron at 7200 Suter Rd., Coopersburg, PA 18036-1299, postage pre-paid.

THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES, AND THE IMPLIED WARRANTY OF MERCHANTABILITY IS LIMITED TO ONE YEAR FROM PURCHASE. THIS WARRANTY DOES NOT COVER THE COST OF INSTALLATION, REMOVAL OR REINSTALLATION, OR DAMAGE RESULTING FROM MISUSE, ABUSE, OR DAMAGE FROM IMPROPER WIRING OR INSTALLATION. THIS WARRANTY DOES NOT COVER INCIDENTAL OR CONSEQUENTIAL DAMAGES. LUTRON'S LIABILITY ON ANY CLAIM FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE MANUFACTURE, SALE, INSTALLATION, DELIVERY, OR USE OF THE UNIT SHALL NEVER EXCEED THE PURCHASE PRICE OF THE UNIT.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitation on how long an implied warranty may last, so the above limitations may not apply to you.

WORLD HEADQUARTERS
Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299 U.S.A.
TOLL FREE: (800) 523-9466 (U.S.A., Canada, and the Caribbean)
Tel: (610) 282-3800; International 1610 282-3800
Fax: (610) 282-3090; International 1610 282-3090

EUROPEAN HEADQUARTERS
Lutron EA Ltd.
Lutron House
6 Sovereign Close
Wapping
London, E1W 3JF, England
FREEPHONE: 0800 282107 (U.K.)
Tel: (0171) 702-0657; International 44-207-702-0657
Fax: (0171) 480-6899; International 44-207-480-6899

ASIAN HEADQUARTERS
Lutron Asuka Co., Ltd.
No. 16 Kowa Bldg. 4F
1-9-20 Akasaka, Minato-ku
Tokyo 107-0052 Japan
TOLL FREE: (0120) 083417 (Japan)
Tel: (03) 5574-8411; International 81-3-5575-8411
Fax: (03) 5575-8420; International 81-3-5575-8420

HONG KONG SALES OFFICE
Tel: 2104-7733; International 852-2104-7733
Fax: 2104-7633; International 852-2104-7633

Technical and Sales Assistance

If you have questions concerning the installation or operation of this product, call the toll-free **Lutron Technical Support Center.** Please provide exact model number when calling.

U.S.A., Canada, and the Caribbean
(800) 523-9466 27 hrs/7 days

other countries
(610) 282-3800 8:00a.m. – 8:00p.m. ET
Our address on the web is http://www.lutron.com

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MADE AND PRINTED IN U.S.A.
P/N 031-224 Rev. A 3/03

LUTRON®

GRAFIK Eye®

GRAFIK Systems
Installation Instructions
Occupant Copy Please Read

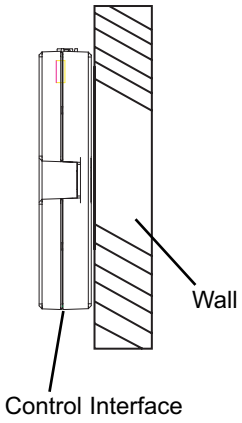
GRX-CI-NWK-E, GRX-CI-RS232, GRX-IA-CI-NWK-E, GRX-IA-CI-RS232, OMX-CI-NWK-E, OMX-CI-RS232, and GRX-CI-PRG Interface Controls
Class 2/PELV Devices 15V⎓ 200mA

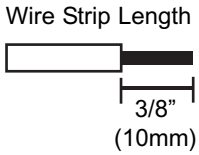
Please refer to the enclosed CD for the product Specification Sheets and Operation Manuals, Ethernet Device IP program, and RS232 Protocol information.

Mounting

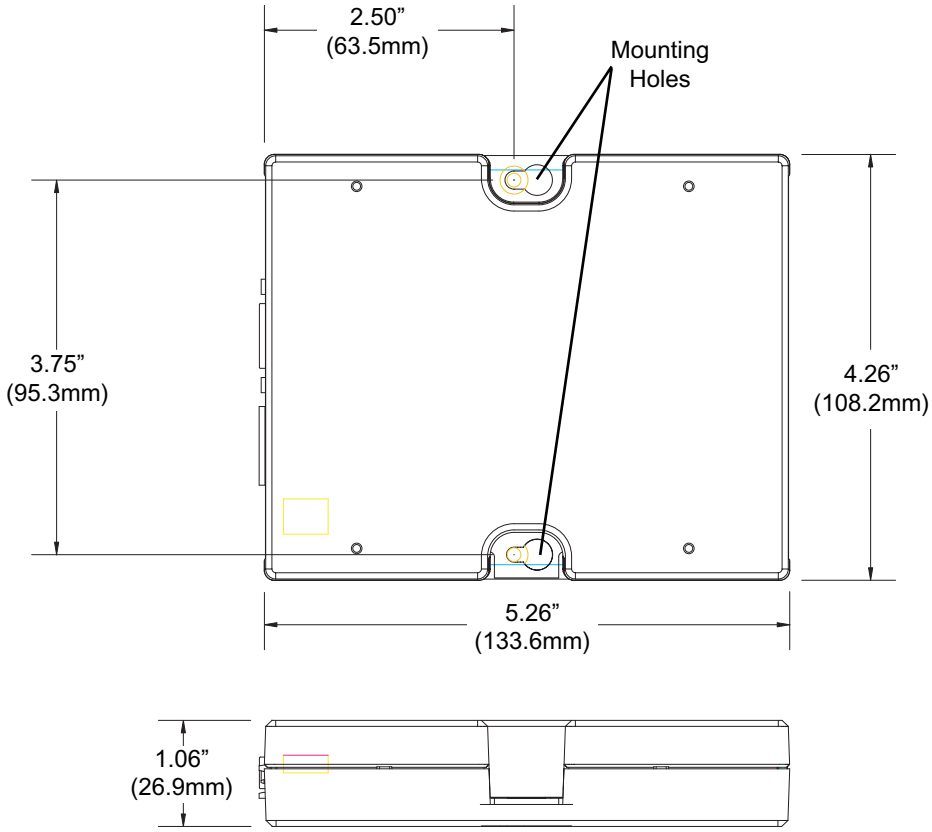
1. Mount the Control Interface directly on a wall, as shown in the Mounting Diagram, using screws (not included). When mounting, provide sufficient space for connecting cables.
   The unit can also be placed in the LUT-19AV-1U AV rack using the screws provided with the unit. The LUT-19AV-1U will hold up to four units.
2. Strip 3/8 in. (10mm) of insulation from wires. Each Data Link terminal will accept up to two #18 AWG (1.0mm^2) wires.
3. Connect wiring as shown in the Wiring Diagram (next page). LED 1 lights continuously (Power) and LED 7 blinks rapidly (Data Link RX) when the Class 2 (PELV) Data Link is installed correctly.

Mounting Diagram





Dimensions



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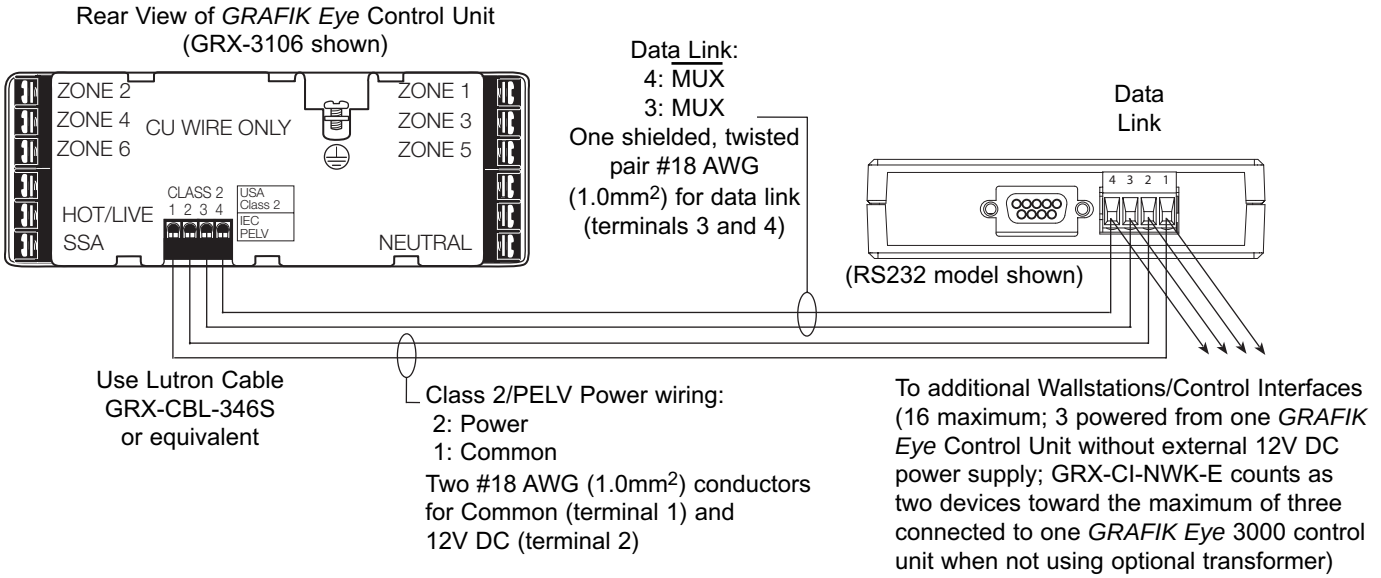
Low-Voltage Class 2 (PELV) Wiring

Important Notes

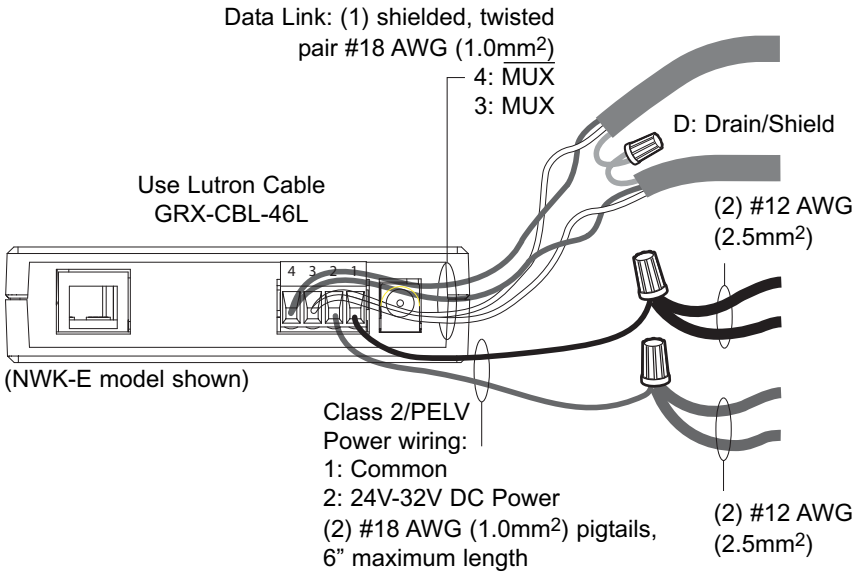
- Install in accordance with all applicable regulations.
- **CAUTION:** Do **not** connect line voltage/mains power to device. Improper wiring can result in personal injury or damage to the device or to other equipment.
- This control can use Class 2/PELV wiring methods. Check with your local electrical inspector for compliance with national and local codes and wiring practices.
- Make daisy-chain connections to the low-voltage Class 2 (PELV) Data Link terminals on the end of the Control Interface.
- Do not use T-taps. Run all wires in and out of the terminal block.
- Each terminal accepts up to two #18 AWG (1.0mm^2) wires.

Control Interface Wiring: GRX-3000 Control Unit



Control Interface Wiring: GRX-4000 Control Unit or OMX Control Station Device Link

(Data Link connection shown)

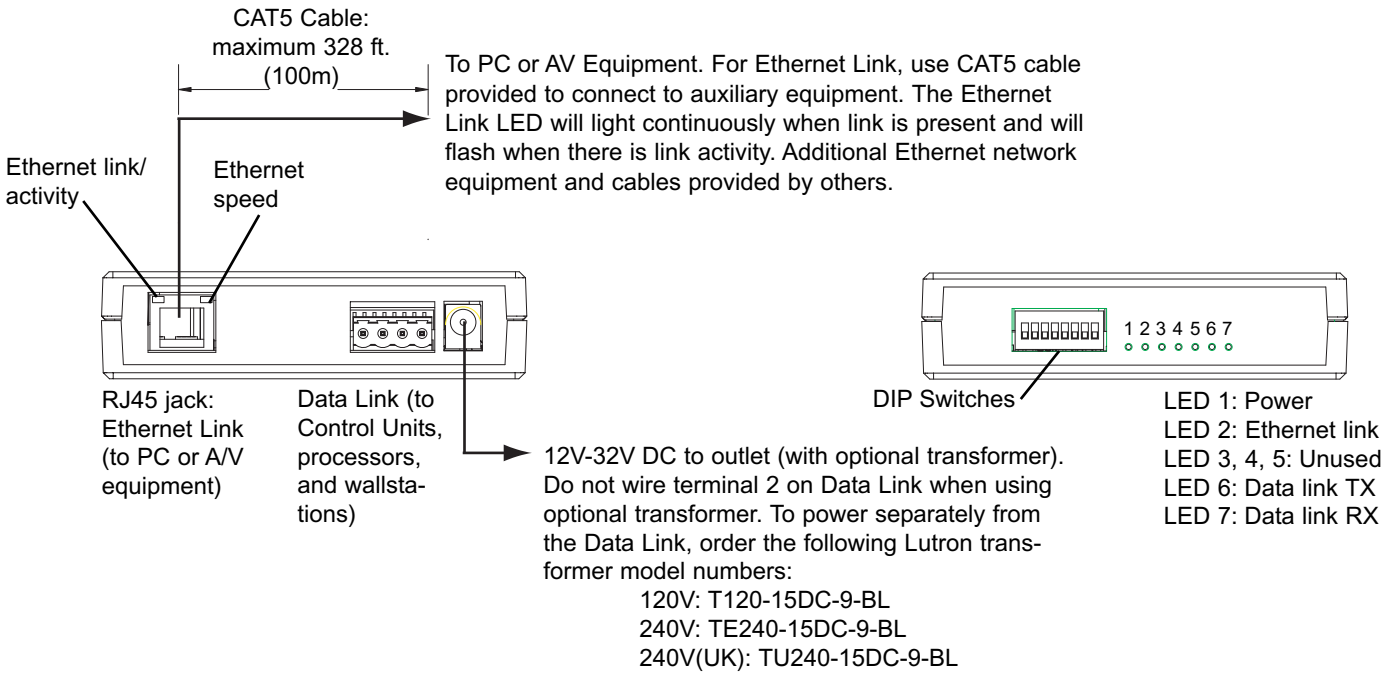


Note: Do not connect Drain/Shield to Ground (Earth) or Wallstation/Control Interfaces. Connect the bare drain wires and cut off the outside shield.

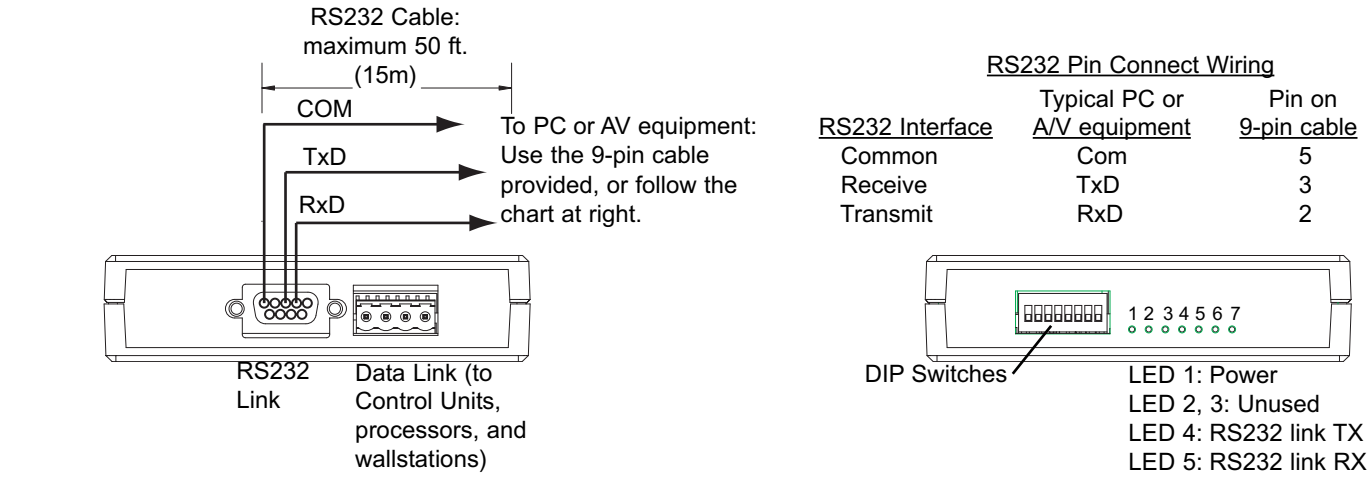
Note: #12 AWG (2.5mm^2) conductors for Common (terminal 1) and 24V-32V DC Power (terminal 2) will not fit in terminals; use #18 AWG pigtails (< 6”).

A/V Connections and Signal/Link Information

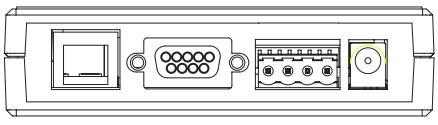
GRX-CI-NWK-E, OMX-CI-NWK-E



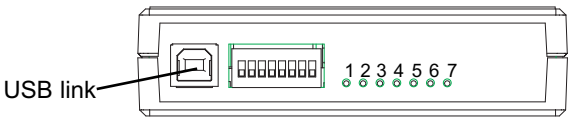
GRX-CI-RS232, OMX-CI-RS232



GRX-CI-PRG



Links and connections are same as shown for above units.



LED 1: Power
LED 2: Ethernet link
LED 3: Unused
LED 4: RS232 link TX
LED 5: RS232 link RX
LED 6: Data link TX
LED 7: Data link RX

Please refer to the enclosed CD for the product Specification Sheets and Operation Manuals, Ethernet Device IP program, and RS232 Protocol information.

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036
TEL +1-610-282-3800
FAX+1-610-282-1243

EUROPEAN HEADQUARTERS
Lutron EA Ltd.
6 Sovereign Close, Wapping London, E1W 3JF
United Kingdom
TEL +44-207-702-0657
FAX +44-207-480-6899
FREEPHONE (UK) 0800-282-107

WORLDWIDE OFFICES

Germany
Lutron Electronics GmbH, Landsberger Allee 201,
13055 Berlin, Germany
TEL +49-30-9710-4590
FAX +49-30-9710-4591
FREEPHONE 00800-5887 6635

France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33-(0)1-41-05-42-80
FAX +33-(0)1-41-05-01-80
FREEPHONE 0800-90-12-18

Italy
Lutron LDV, Srl
FREEPHONE 800-979-208

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34-91-567-8479
FAX +34-91-567-8478
FREEPHONE 0900-948-944

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via Carlos III, 84, planta 3a, 08028,
Barcelona, Spain
TEL +34-93-496-5742
FAX +34-93-496-5750
FREEPHONE 0900-948-944

Hong Kong
Lutron GL Ltd.
Room 2808, 28/F, MLC Tower,
248 Queen's Road East, Wanchai, Hong Kong
TEL +852-2104-7733
FAX +852-2104-7633

Singapore
Lutron GL Ltd.
6A Upper Cross Street, Singapore 058326
TEL +65-6220-4666
FAX +65-6220-4333

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20, Akasaka,
Minato-ku, Tokyo 107-0052 Japan
TEL +81-3-5575-8411
FAX +81-3-5575-8420

China, Beijing
Lutron GL Ltd.
5th. Floor, China Life Tower, No. 16, Chaowai Street,
Chaoyang District, Beijing 100020 China
TEL +86-10-5877-1817
FAX +86-10-5877-1816

China, Shanghai
Lutron GL Ltd.
Suite 07, 39th. Floor, Plaza 66,
1266 Nan Jing West Road, Shanghai, 200040 China
TEL +86-21-62881473
FAX +86-21-62881751

LIMITED WARRANTY

Lutron will, at its option, repair or replace any unit that is defective in materials or manufacture within one year after purchase. For warranty service, return unit to place of purchase or mail to Lutron at 7200 Suter Rd., Coopersburg, PA 18036-1299, postage pre-paid. *This warranty is in lieu of all other express warranties, and the implied warranty of merchantability is limited to one year from purchase. This warranty does not cover the cost of installation, removal or reinstallation, or damage resulting from misuse, abuse, or improper or incorrect repair, or damage from improper wiring or installation. This warranty does not cover incidental or consequential damages. Lutron's liability on any claim for damages arising out of or in connection with the manufacture, sale, installation, delivery, or use of the unit shall never exceed the purchase price of the unit.* This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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Made and printed in U.S.A. 5/05
P/N 040-228 Rev. A

GRAFIK® Systems

Operation Instructions
Occupant Copy

Please Read

OMX-CI-RS232 and OMX-CI-NWK-E Control Interfaces

PELV (Class 2: USA) Devices 15V ⎓ 200mA

OMX-CI-NWK-E

OMX-CI-RS232

Description

GRAFIK 5000, 6000, and 7000; LCP128; and Softswitch128 can be interfaced with your personal computer or auxiliary audio/visual equipment via TCP/IP communication over Ethernet (GRX-CI-NWK-E) or RS232 (GRX-CI-RS232). The interface can be used to execute Control Commands and allow for Status Monitoring. Commands can be found in the *GRAFIK* Systems RS232 Protocol and command set on the enclosed CD and on the Lutron website. Not all systems support all commands.

Communication Settings: OMX-CI-NWK-E

To configure your device to talk to the *GRAFIK Eye* Ethernet Interface, open a Telnet session with the following default IP address, port, and login information.

Default IP Address: 192.168.250.1
Default Port: 23 (Telnet Port)
Default Login for Connection 1: 'nwk'
Default Login for Connection 2: 'nwk2'

If you wish to send these commands from a PC, run the Microsoft® Windows® Telnet program or an equivalent program.

Communication Settings: OMX-CI-RS232

To configure your device to talk to the OMX-CI-RS232 Interface, use the data conventions listed below.

BAUD (based on DIP switches)
8 DATA BITS
1 STOP BIT
NO PARITY

If you wish to send these commands from a PC, run the Microsoft® Windows® Hyper Terminal program or an equivalent program. Then, select Local Echo, Line Feed, and Carriage Return inbound and outbound. This allows you to see the characters that you are typing as well as keep the responses from overwriting typed characters.

Command

All commands below are preceded with the five-character command string prefix '~11h '

The HEX equivalent of the '~11h ' string is:

0x7E (~)
0x31(1)
0x31(1)
0x68(h)
0x20(space)

The '~' clears the buffer in the device and prepares it to receive commands. The '11' is a constant. The 'h' indicates that all commands and data following this command string will be in the hexadecimal format. Optionally, a 'd' could be used for the commands and data to be entered in the decimal format. The decimal option is available only for communication via the *GRAFIK* 6000 or 7000 panel's local RS232 port.

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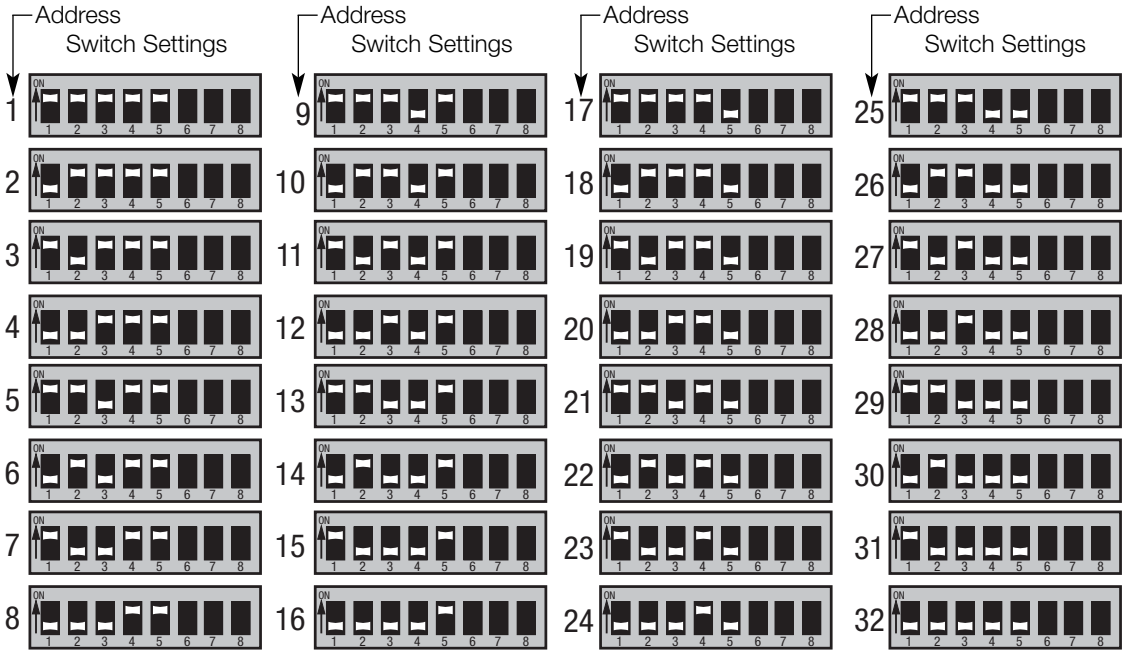
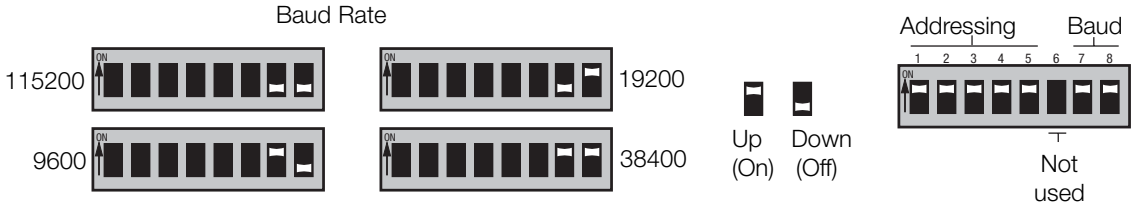
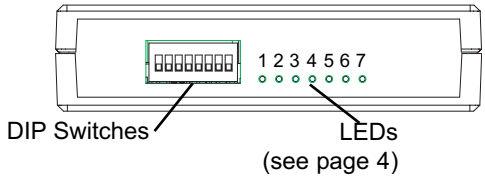
DIP Switch Settings

In order to properly communicate on the CSD link, the control interface must have its address set. Use the Lutron-supplied drawings to determine the required address, and find it in the table below. Switches 1-5 set the address of the control interface. Switches 7 and 8 set the baud rate.







Device Communication Information (OMX-CI-NWK-E Only)

Server Description

The OMX-CI-NWK-E is running a Telnet server that allows up to two connections at a time. The server defaults to run at IP Address 192.168.250.1 and Port 23 (default Telnet Port).

A PC, touch screen, or any device that can initiate a Telnet client connection and send ASCII strings makes a connection to the server at the above address and port. After connecting, the device provides a login prompt and waits for a login name. (No password is necessary.) After logging in, the device waits for ASCII strings to perform commands. These strings can be found in the *GRAFIK* Systems RS232 Protocol and Command Set on the enclosed CD and the Lutron website.

Example sequence of events

login: nwk<cr>
connection established<cr><lf>
~11h 12 2<cr>
#1 OK<cr><lf>

Description of the sequence of events

- A connection is made by a Telnet client to the OMX-CI-NWK-E at IP address 192.168.250.1 Port 23.
- Once connected, the OMX-CI-NWK-E sends 'login: ' back to the Telnet client. Note: The last character in 'login: ' is a space.
- The Telnet client sends 'nwk' followed by a Carriage Return (CR; adding a Line Feed after the CR is OK).
- OMX-CI-NWK-E responds with 'connection established' followed by a Carriage Return and Line Feed.
- OMX-CI-NWK-E then waits for the ASCII strings that can be found in the *GRAFIK* Systems RS232 Protocol and Command Set.
- The Telnet client sends '~11h 12 2' followed by a Carriage Return (adding a Line Feed after the CR is OK) to select scene 2 on the *GRAFIK* System.
- OMX-CI-NWK-E responds with '#1 OK' followed by a Carriage Return and Line Feed to indicate that one command was executed properly.

Connection 1 and Connection 2

- Connection 1 and Connection 2 can both be running at the same time. The two connections act exactly the same except for one characteristic: Connection 1 will allow another connection with the correct login name to disconnect an existing connection to Connection 1.
- Connection 2 will reject any other attempts to connect to Connection 2 if there is already a device connected to Connection 2.
- Connection 1 and Connection 2 are differentiated using different login names.

Changing Default Communication Settings

Default IP Address: 192.168.250.1
Default Subnet Mask: 255.255.255.0
Default Gateway: 0.0.0.0
Default Connection 1 Login: ‘nwk’
Default Connection 2 Login: ’nwk2’

To configure your device from the default network settings, use the Lutron Device IP program included on the CD provided.

After installing Device IP on Windows® XP, 2000, or 98SE, click on the icon to run the program. Click Discover Devices, and the program will search for Lutron devices and report back the settings of all devices found. Enter your network setting changes and click Update Device to change the settings. The device is now updated and does not need to be rebooted.

The following RS232 commands have also been added to the *GRAFIK* Systems RS232 Protocol and Command Set for reading and changing network settings.

Note: Before using the commands below to change the OMX-CI-NWK-E default network settings, you must first make sure your computer’s IP address is 192.168.250.xxx (where xxx is not 1) in order to connect to the device. This is not necessary when using using Lutron Device IP program. (Note that these commands are not prefixed by ~11h.)

Set IP Address: ‘~sip xxx.xxx.xxx.xxx<cr>’
Example: ‘~sip 192.168.250.1<cr>’
Response: ‘#1 OK’
Read IP Address: ‘~rip<cr>’
Response: ‘:ip 192.168.250.1 #1 OK’

Set Subnet Mask ‘~ssm xxx.xxx.xxx.xxx<cr>’
Example: ‘~ssm 255.255.255.0<cr>’
Response: ‘#1 OK’
Read Subnet Mask: ‘~rsm<cr>’
Response: ‘:sm 255.255.255.0 #1 OK’

Set Gateway ‘~sgw xxx.xxx.xxx.xxx<cr>’
Example: ‘~sgw 192.168.250.100<cr>’
Response: ‘#1 OK’
Read Gateway: ‘~rgw<cr>’
Response: ‘:gw 192.168.255.100 #1 OK’

Set Login Name ‘~sln [connection #] [existing login] [new login]<cr>’
Example: ‘~sln 2 nwk2 lutron<cr>’’
Response: ‘#1 OK’
Read Login Name: ‘~rln [connection #]<cr>’
Example: ‘~rln 2<cr>’’
Response: ‘:ln 2 lutron #1 OK’
Note: Login names can be a maximum of 8 characters and cannot include spaces.

The settings above will not take effect until after a reset or power cycle. The ‘~rst<cr>’ command will close all connections and reset the device.

LED Information (OMX-CI-NWK-E models only)

See page 2 for location.

LED 1: Power: Lights continuously when Data Link Pins 1 and 2 (common and power) are wired correctly or optional transformer is plugged in.

LED 2: Ethernet Link: Lights continuously when a connection is established, and flashes when there is activity on the Ethernet link.

LED 3, 4, and 5: Unused.

LED 6: Data Link TX: Flashes when the interface is transmitting information on the OMX Link.

LED 7: Data Link RX: Flashes when the interface is receiving information on the OMX Link. When properly wired, flashes continuously.

RJ45 Jack LEDs: Left LED lights continuously when the Ethernet link is established, and flashes when there is activity on the Ethernet link. Right LED lights continuously when a 100BaseT connection is established, and is off when a 10BaseT connection is established.

LED Information (OMX-CI-RS232 models only)

See page 2 for location.

LED 1: Power: Lights continuously when Data Link Pins 1 and 2 (common and power) are wired correctly.

LED 2 and 3: Unused.

LED 4: RS232 Link TX: Flashes when the Control Interface is transmitting information on the RS232 Link.

LED 5: RS232 Link RX: Flashes when the Control Interface is receiving information on the RS232 Link.

LED 6: Data Link TX: Flashes when the Control Interface is transmitting information on the OMX Link.

LED 7: Data Link RX: Flashes when the interface is receiving information on the OMX Link. When properly wired, flashes continuously.

Please refer to the enclosed CD for the product Specification Sheets and Operation Manuals, Ethernet Device IP program, and RS232 Protocol information.

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299 USA
TEL +1.610.282.3800
FAX +1.610.282.1243
Technical Support 1.800.523.9466
Toll-Free 1.888.LUTRON1

Brazil
Lutron BZ do Brasil, Ltda.
Avenida Brasil, 239, Jardim America,
Sao Paulo-SP, CEP: 01431-001, Brasil
TEL +55.11.3885.5152
FAX +55.11.3887.7138

Technical Support
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF UK
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
Technical support +44.(0)20.7680.4481
FREEPHONE 0800.282.107

France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33.(0)1.41.05.42.80
FAX +33.(0)1.41.05.01.80
FREEPHONE 0800.90.12.18

Germany
Lutron Electronics GmbH,
Landsberger Allee 201,
13055 Berlin, Germany
TEL +49.(0)30.9710.4590
FAX +49.(0)30.9710.4591
FREEPHONE 00800.5887.6635

Italy
Lutron LDV, S.r.l.
FREEPHONE 800.979.208

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via del Carlos III, 84, planta 3ª 08028 Barcelona, Spain
TEL +34.93.496.57.42
FAX +34.93.496.57.01
FREEPHONE 0900.948.944

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34.91.567.84.79
FAX +34.91.567.84.78
FREEPHONE 0900.948.944

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
15 Hoe Chiang Road,
#07-03 Euro Asia Centre,
Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

China, Beijing
Lutron GL Ltd.
Beijing Representative Office
5th Floor, China Life Tower,
No. 16 Chaowai Street,
Chaoyang District, Beijing 100020 China
TEL +86.10.5877.1817
FAX +86.10.5877.1816

China, Guangzhou
Lutron GL Ltd.
Guangzhou Representative Office
Suite A09, 23/F Tower A, Center Plaza,
161 LinHeXiLu, Tian He District, Guangzhou 510620 China
TEL +86.20.2885.8266
FAX +86.20.2885.8366

China, Shanghai
Lutron GL Ltd.
Suite 07, 39th Floor, Plaza 66,
1266 Nan Jing West Road,
Shanghai, 200040 China
TEL +86.21.6288.1473
FAX +86.21.6288.1751

Hong Kong
Lutron GL Ltd.
Unit 2808, 28/F, 248 Queen's Road East,
Wanchai, Hong Kong
TEL +852.2104.7733
FAX +852.2104.7633

Japan
Lutron Asuka Co., Ltd.
No. 16 Kowa Building, 4F,
1-9-20, Akasaka, Minato-ku,
Tokyo 107-0052 Japan
TEL +81.3.5575.8411
FAX +81.3.5575.8420

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Japan: +81.3.5575.8411
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other Areas: +65.6220.4666

Lutron Electronics Co., Inc.
One Year Limited Warranty

For a period of one year from the date of purchase, and subject to the exclusions and restrictions described below, Lutron warrants each new unit to be free from manufacturing defects. Lutron will, at its option, either repair the defective unit or issue a credit equal to the purchase price of the defective unit to the Customer against the purchase price of comparable replacement part purchased from Lutron. Replacements for the unit provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

If the unit is commissioned by Lutron or a Lutron approved third party as part of a Lutron commissioned lighting control system, the term of this warranty will be extended, and any credits against the cost of replacement parts will be prorated, in accordance with the warranty issued with the commissioned system, except that the term of the unit's warranty term will be measured from the date of its commissioning.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the unit pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; or (g) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the unit or any of its components.
3. Equipment and parts external to the unit, including those sold or supplied by Lutron (which may be covered by a separate warranty).
4. The cost of repairing or replacing other property that is damaged when the unit does not work properly, even if the damage was caused by the unit.

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GRAFIK Systems

RS232 and Ethernet OMX Integration Protocol
Language Reference
Softswitch128® (XPS), LCP128™, and GRAFIK 5000, 6000®, 7000

Command Set to Communicate with GRAFIK Systems RS232 and Ethernet Interfaces

Contents

LUTRON®

General Information

In this document, values that are specified as hexadecimal are followed by a lowercase “h”. In those cases, the “h” is not actually typed in a command string to indicate a hexadecimal number (see individual command string examples). If not follwed by “h”, numbers are assumed to be decimal values, except hexadecimal command numbers and hexadecimal numbers shown in examples.

Note that “~11h”, which precedes commands to clear the buffer, is not a hexadecimal value, and that lowercase “h” must be included in the command string (see Command String Formats, and indivdual command string examples).

System Maximums

System	System Scene	System Zone/Circuit	System Space
LCP128	32 total + Off 0 - 20h	128 total 0 - 7Fh	N/A
Softswitch	32 total + Off 0 - 20h	512 total 0 - 1FFh	N/A
GRAFIK 5000, 6000, 7000	16000 maximum 0 - 3E80h	512 maximum 0 - 1FFh	500 maximum 0 - 1F4h

Note: Some system zones may remain unused. Check your job drawings for details.
Unused scenes and zones must be accounted for when assigning system scene and zone numbers.

Intensity Level

Range	0 - 7Fh	0 - 99%
Set to Off	0h (0%)	Opens air gap relay
Set to Minimum	1h	Only for non-dim zones
Set to Maximum (full On)	7Fh (99%)	On for non-dim zones

Cycles

Cycles are important when working with fade times and delays. One cycle is 0.1 second. Ten (10) seconds = 100 (64h) cycles.

General Information (continued)

COMMUNICATION SETTINGS

RS232 Settings

To configure your device to talk to the OMX-CI-RS232 Interface, use the data conventions listed below.

9600/19200/38400/115200 BAUD
8 DATA
1 STOP
NO PARITY
NO FLOW CONTROL

If you wish to send these commands from a PC, run Microsoft Windows® Hyper Terminal or an equivalent program. Then, select Local Echo, Line Feed, and Carriage Return inbound and outbound. This allows you to see the characters that you are typing as well as keep the responses from overwriting typed characters. Refer to the table below for dipswitch settings to select baud rates.

BAUD	DIP SWITCH 7	DIP SWITCH 8
9600	ON	OFF
19200	OFF	ON
38400	ON	ON
115200	OFF	OFF

Ethernet Settings

To configure your device to talk to a *GRAFIK Eye* Ethernet Interface, open a Telnet session with the following default IP address, port, and login information.

ATTRIBUTE	DEFAULT VALUE
Default IP Address	192.168.250.1
Default Subnet Mask	255.255.255.0
Default Port	23 (Telnet Port)
Default Login for Connection 1	‘nwk’
Default Login for Connection 2	‘nwk2’

If you wish to send these commands from a PC, run the Microsoft Windows® Telnet program or an equivalent program. In most situations, the IP address should have the first three sets (192.168.250) equal to the first three sets on the machine to which it is connected (with the last different), and the subnet mask equal to 255.255.255.0. The device information may also be managed using Lutron’s DeviceIP software program, which can be found on the enclosed CD.

General Information (continued)

Command Structure

All data values are 16 bits (0 - FFFFh) or (0 - 65,535) and are separated by spaces (20h). Leading zeros do not have to be entered.

COMMAND STRING FORMATS	
Syntax	[~11h] [command # in hexadecimal] [parameters in hexadecimal]<CR>
Allowed Values	~11h clears input buffer (“h” must be lowercase) command the command ID number, in hexadecimal parameters optional; a list of one or more items; either circuits/ zones or scenes that are to receive this command <CR> carriage return executes command
Example	~11h (command) (parameters in hexadecimal) FFFFh (command) (parameters in hexadecimal)(<CR>)
Additional Information	The execution of the command is stopped when an item encountered is higher than the maximum item defined in the system. More than one command can be specified in an input string by using a separator (FFFFh) For the OMX-RS232, the command string has a maximum length of 30 characters; other devices have a maximum string length of 128 characters.

General Information (continued)

System Responses to Commands

After each command line is entered, the interface transmits a response to the command. This response always begins as follows:

ASCII	~
hexadecimal	7Eh

Response Strings

Event	LCP/XPS Response	GRAFIK 5000/6000/7000 Response

Command executed properly	#N OK
	N = number of commands executed properly
		#N OK
		N = number of commands executed properly

Error generated on the interface (error in command format)	ERROR #N
	N = error number
		ERROR #N
		N = error number

Error generated on the processor	~UI ERROR N N = error number	#0 OK UI ERROR N N = error number
Command has requested information from the processor (e.g., Time command)	~:<response string>	:<response string>#1 OK

Refer to the Error Codes in Appendix A for explanations of error codes.

End of Response

The response string will always end as follows:

ASCII	<CR>	<LF>
hexadecimal	0Dh	0Ah

System Responses to Status Requests

The system responds to a status request string with a response string that contains status information in the same order it was requested. The response takes the following form:

SYSTEM RESPONSES	
Syntax	~:xx [response] [response] ... N OK
Allowed Values	~: precedes most responses xx last 2 digits of the hex command that was sent response the status information requested; number of response substrings mirrors number of commands sent N OK N is the number of commands executed 0Dh sends a carriage return 0Ah sends a line feed
Example	~11h 805 101<CR> Request current intensity level of zone 257 :05 5F The intensity level of system zone 257 is 95 (out of 128 levels) (75%)
Additional Information	Spaces separate response substrings. Note: Not all commands generate a response.

Ethernet Setup Commands (OMX-CI-NWK-E only)

Note: Before using the commands below to change the OMX-CI-NWK-E default network settings, you must first change your computer's IP address to 192.168.250.xxx (where xxx is not 1) in order to connect to the device. Ethernet setup commands will not take effect until after the device resets or completes a power cycle. The 'rst<CR>' command will close all connections and reset the device. If you use the Device IP program provided on the CD, you will not need to use the manual commands or change your computer's IP address.

Note: These commands begin with "~", not "~11h" as all other commands do.

SET IP ADDRESS	
Command Name	**sip**
Description	Sets the IP address of the device.
Syntax	~sip xxx.xxx.xxx.xxx<CR>
Allowed Values	xxx is a value from 0 - 255; each group is separated by a period (2Fh)
Example	~sip 192.168.250.1<CR> Sets IP device to address 192.168.250.1
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ IP ADDRESS	
Command Name	**rip**
Description	Returns the IP address of the device.
Syntax	~rip<CR>
Response	:ip xxx.xxx.xxx.xxx

SET SUBNET MASK	
Command Name	**ssm**
Description	Sets the Subnet Mask of the device.
Syntax	~ssm xxx.xxx.xxx.xxx<CR>
Allowed Values	xxx is a value from 0 - 255; each group is separated by a period (2Fh)
Example	~ssm 255.255.255.0<CR> Sets Subnet Mask to 255.255.255.0
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ SUBNET MASK	
Command Name	**rsm**
Description	Returns the Subnet mask of the device.
Syntax	~rsm<CR>
Response	:sm xxx.xxx.xxx.xxx

Ethernet Setup Commands (continued)

SET GATEWAY	
Command Name	**sgw**
Description	Sets the gateway address of the device.
Syntax	~sgw xxx.xxx.xxx.xxx<CR>
Allowed Values	xxx is a value from 0 - 255; each group is separated by a period (2Fh)
Example	~sgw 192.168.250.100<CR> Sets gateway address to 192.168.250.100
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ GATEWAY	
Command Name	**rgw**
Description	Returns the gateway address of the device.
Syntax	~rgw<CR>
Response	:gw xxx.xxx.xxx.xxx

SET LOGIN NAME	
Command Name	**sln**
Description	Sets the login name of the device.
Syntax	~sln [connection #] [existing login] [new login]<CR>
Allowed Values	Connection # can be 1 or 2 Login names can be a maximum of 8 characters and cannot include spaces
Example	~sln 2 nwk2 lutron<CR> Changes the password for connection 2 to lutron from nwk2.
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ LOGIN NAME	
Command Name	**rln**
Description	Reads the login name of the device and returns it.
Syntax	~rgw [connection #]<CR>
Allowed Values	Connection # can be 1 or 2
Example	~rln 2<CR>
Response	:ln 2 lutron

DEVICE RESET	
Command Name	**rst**
Description	Resets the device. All connections are immediately closed and the device resets.
Syntax	~rst<CR>

Circuit/Zone/Scene Commands

FADE TO LEVEL	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**7**
Description	All circuits/zones specified in the command will fade from their current intensity level to the new intensity level using the specified delay and fade times.
Syntax	~11h 7 [level] [fade] [delay] [zone(s)]<CR>
Allowed Values	Level 0 - 7Fh; 128 intensity levels available Fade number of cycles; 10 cycles = 1 second maximum 6300 seconds (63000 or F618h cycles) Delay number of cycles; 10 cycles = 1 second maximum 6300 seconds (63000 or F618h cycles) Zones LCP128: 0 - 7Fh (128 circuits) XPS/Softswitch128: 0 - 1FFh (512 circuits) GRAFIK 5000/6000/7000: 0 - 1FFh (512 zones)
Example	~11h 7 7F 32 0 A B<CR> Immediately sends zones 10 and 11 to 7Fh intensity level (full On), with a fade time of 0 seconds and a delay of 0 seconds.
Additional Information	The fade transition starts after the delay.

FADE TO LEVELS AND REPEAT	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**D**
Description	After an initial delay time, the circuits/zones will go first to one setting, then to a second setting. Each setting allows the user to specify the delay time (which dictates how long the circuits/zones stay at that level), fade time, and intensity level. Then, the circuits/zones will repeat both intensity levels a specified number of times. If zero repeats are specified, circuits/zones fade to the original intensity level over the first fade time. If 255 (FFh) repeats are specified, only a new circuit/zone command will stop the progression.
Syntax	~11h D [delay] [level1] [fade1] [delay1] [level2] [fade2] [delay2] [repeat] [zone(s)]<CR>
Allowed Values	Delay number of cycles; 10 cycles = 1 second Level 0 - 7Fh; 128 intensity levels available Fade number of cycles; 10 cycles = 1 second maximum 6300 seconds (63000 or F618h cycles) Repeat 0 - FFh (number of times to repeat after first cycle) Zones LCP128: 0 - 7Fh (128 circuits) XPS/Softswitch128: 0 - 1FFh (512 circuits) GRAFIK 5000/6000/7000: 0 - 1FFh (512 zones)
Example	~11h D 0 7F 0 5 0 0 5 4 10 11<CR> Immediately flash zones 16 and 17 5 times between Off and 100% at a 1-second frequency, and then return to their initial settings.
Additional Information	For *Softswitch128*, values greater than 0 are full On and 0 is Off.

Circuit/Zone/Scene Commands (continued)

SELECT SYSTEM SCENE	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**12**
Description	This command selects a system scene using the previously stored set of intensity levels, fade times, and delay times. A scene selection will cancel any previous commands for the space and circuits/zones involved in the preset.
Syntax	~11h 12 [scene(s)] <CR>
Allowed Values	Scenes LCP128, XPS/Softswitch128: 0 - 20h (32 scenes + Off) GRAFIK 5000/6000/7000: 0 - 3E80h (16000 scenes)
Example	~11h 12 1 11 40<CR> Select system scenes 1, 17, and 64.
Additional Information	Scene selections in locked zones or zones being programmed are ignored. This command does not apply to GRAFIK 5000, 6000, or 7000 scene numbers within spaces.

HALT ZONE	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**1**
Description	Permanently stops all zone dynamics and freezes the zone's level until another command affects the zone.
Syntax	~11h 1 [zone(s)] <CR>
Allowed Values	Zones GRAFIK 5000/6000/7000: 0 - 200h (512 zones)
Example	~11h 1 7 8 B<CR> Freeze system zones 7, 8, and 11 at their current intensity levels.

TOGGLE ZONE	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**6**
Description	If the zone intensity level is at any intensity level between 1 - 7Fh, this command turns the zone Off (0). If the zone intensity level is Off, it turns the zone On to max (7Fh). The transition will take place over a period of fade cycles. After a toggle fade is complete, the zone is in steady state.
Syntax	~11h 6 [fade] [zone(s)] <CR>
Allowed Values	Fade number of cycles; 10 cycles = 1 second maximum 6300 seconds (63000 or F618h cycles) Zones GRAFIK 5000/6000/7000: 0 - 200h (512 zones)
Example	~11h 6 14 7 8 A<CR> Toggle system zones 7, 8, and 10 with a 2-second (20-cycle) fade time.

Circuit/Zone/Scene Commands (continued)

RAMP CIRCUITS UP	
Applicable Systems	LCP128™ XPS Softswitch128®
Command Number (hex)	**500 (switch press; start raise)** **600 (switch release; stop raise)**
Description	Ramps programmed circuits up. The wallstation (or virtual wallstation) button must be programmed as raise in the system. Only circuits programmed to the raise button are affected. Note: Wallstations need not be physically present in the system, but they must be programmed in the system.
Syntax	~11h [command number] [address] [button]<CR>
Allowed Values	Command 500 for switch press; 600 for switch release Address 0 - 5Fh 0 - 1Fh for *LCP128*/XPS with no XPS-E Link Expander 0 - 5Fh for XPS with XPS-E Link Expander Button Programmed button number on that wallstation
Example	~11h 500 010C<CR> Raise programmed circuits using the raise button on wallstation address 2 on link 0. Raise button is button 12. ~11h 600 010C<CR> Stop raising programmed circuits using the raise button on wallstation address 2 on link 0.
Additional Information	Convert button numbers and addresses to zero-based hexadecimal (e.g., button 1 = 0h).

RAMP CIRCUITS DOWN	
Applicable Systems	LCP128™ XPS Softswitch128®
Command Number (hex)	**500 (switch press; start lower)** **600 (switch release; stop lower)**
Description	Ramps programmed circuits down. The wallstation (or virtual wallstation) button must be programmed as lower in the system. Only circuits programmed to the lower button are affected. Note: Wallstations need not be physically present in the system, but they must be programmed in the system.
Syntax	~11h [command number] [address] [button]<CR>
Allowed Values	Command 500 for switch press; 600 for switch release Address 0 - 5Fh 0 - 1Fh for *LCP128*/XPS with no XPS-E Link Expander 0 - 5Fh for XPS with XPS-E Link Expander Button Programmed button number on that wallstation
Example	~11h 500 010B<CR> Lower programmed circuits using the raise button on wallstation address 2 on link 0. Lower button is button 11. 11h 600 010B<CR> Stop lowering programmed circuits using the raise button on wallstation address 2 on link 0.
Additional Information	Convert button numbers and addresses to zero-based hexadecimal (e.g., button 1 = 0h).

Circuit/Zone/Scene Commands (continued)

RAMP UP SYSTEM ZONE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**B**
Description	Increase the intensity level of the specified zone(s) at a specified rate, and repeat as specified. The actual step sizes are divided by 256 (100h), then added to the zone's intensity level (from 0 - 7Fh) every 0.1 second. For example, a step size of 200h causes an intensity change of about 15% a second.
Syntax	~11h B [initial rate] [repeat rate] [zone(s)] <CR>
Allowed Values	Initial rate step size ÷ 256 Repeat rate step size ÷ 256 Zones 0 - 200h (512 zones)
Example	~11h B 200 200 0 1<CR> 200h ÷ 100h = increment intensity by 2 every 0.1 second, or 20 per second. Zone intensity levels range from 0 - 7Fh; 20h ÷ 7Fh = 15%. Ramp up system zones 0 and 1 at a rate of about 15% per second.

RAMP DOWN SYSTEM ZONE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**C**
Description	Decrease the intensity level of the specified zone(s) at a specified rate, and repeat as specified. The actual step sizes are divided by 256 (100h), then subtracted from the zone's intensity level (from 0 - 7Fh) every 0.1 second. For example, a step size of 500h causes an intensity change of about 40% a second.
Syntax	~11h C [initial rate] [repeat rate] [zone(s)] <CR>
Allowed Values	Initial rate step size ÷ 256 Repeat rate step size ÷ 256 Zones 0 - 200h (512 zones)
Example	~11h C 500 500 FF 100 101<CR> 500h ÷ 100h = increment intensity by 5 every 0.1 second, or 50 per second. Zone intensity levels range from 0 - 7Fh; 50h ÷ 7Fh = 40%. Ramp down system zones 255, 256, and 257 at a rate of about 40% per second.

Circuit/Zone/Scene Commands (continued)

RAMP UP ALL ZONES IN LAST SCENE SELECTED	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**20**
Description	This command looks at the zones within the specified space. If any zones are at the specified unaffected intensity level, those zones do not change. All other zones increase at the specified rate. If the specified unaffected intensity level is 80h, all zones will ramp up. To stop this ramp up, use the Stop Scene Ramp Up command (22). See Ramp Up System Zone command (B) above for details on the step size values.
Syntax	~11h 20 [unaffected level] [initial rate] [repeat rate] [space(s)]<CR>
Allowed Values	Unaffected level 0 - 80h; 80h = all zones in space will ramp up Initial rate step size ÷ 256 Repeat rate step size ÷ 256 Zones 0 - 200h (512 zones)
Example	~11h 20 0 200 200 7 A<CR> Ramp up all zones in the current space than are On (at any intensity level other than 0) in system spaces 7 and 10
Additional Information	The preset profile will ***not*** be preserved. Zone intensity levels will become equal (full) after a full ramp up.

RAMP DOWN ALL ZONES IN LAST SCENE SELECTED	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**21**
Description	This command looks at the zones within the specified space. If any zones are at the specified unaffected intensity level, those zones do not change. All other zones decrease at the specified rate. If the specified unaffected intensity level is 80h, all zones will ramp down. To stop this ramp down, use the Stop Scene Ramp Down command (23). See Ramp Down System Zone command (C) above for details on the step size values.
Syntax	~11h 21 [unaffected level] [initial rate] [repeat rate] [space(s)]<CR>
Allowed Values	Unaffected level 0 - 80h; 80h = all zones in space will ramp down Initial rate step size ÷ 256 Repeat rate step size ÷ 256 Zones 0 - 200h (512 zones)
Example	~11h 21 80 200 200 0<CR> Ramp down all zones in the current space in system space 0
Additional Information	The preset profile will ***not*** be preserved. Zone intensity levels will be 0 (Off) after a full ramp down.

Circuit/Zone/Scene Commands (continued)

STOP RAMP UP ALL ZONES IN LAST SCENE SELECTED	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**22**
Description	This command looks at the zones within the specified space and determines which system scene is currently selected in each space. It then halts those zones in the space that are currently in Ramp Up mode.
Syntax	~11h 22 [space(s)]<CR>
Allowed Values	Zones 0 - 200h (512 zones)
Example	~11h 22 0 10<CR> Stop ramping up zones in spaces 0 and 16

STOP RAMP DOWN ALL ZONES IN LAST SCENE SELECTED	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**23**
Description	This command looks at the zones within the specified space and determines which system scene is currently selected in each space. It then halts those zones in the space that are currently in Ramp Down mode.
Syntax	~11h 23 [space(s)]<CR>
Allowed Values	Zones 0 - 200h (512 zones)
Example	~11h 23 0 10<CR> Stop ramping down zones in spaces 0 and 16

SELECT SYSTEM SCENE USING OVERRIDE TIMES	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**13**
Description	This command selects a system scene using the previously stored set of intensity levels. It overrides the stored fade and delay times for each zone involved, and uses the specified fade and delay times.
Syntax	~11h 13 [fade] [delay] [scene(s)]<CR>
Allowed Values	Fade number of cycles; 10 cycles = 1 second Delay number of cycles; 10 cycles = 1 second Scenes 0 - 3E80h (16000 scenes)
Example	~11h 13 A 19 1 11 40<CR> Select system scenes 1, 17, and 64 using a 1-second fade time and a 2.5-second delay time.

Circuit/Zone/Scene Commands (continued)

SELECT TEMP SCENE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**1C**
Description	This command selects the defined temporary preset.
Syntax	~11h 1C [zone] [intensity level] [fade] [delay] [repeat all variables for additional zones]<CR>
Allowed Values	Zones 0 - 200h (512 zones) Intensity level 0 - 7Fh Fade number of cycles; 10 cycles = 1 second maximum 6300 seconds (63000 or F618h cycles) Delay number of cycles; 10 cycles = 1 second maximum 6300 seconds (63000 or F618h cycles)
Example	~11h 1C 1 7F 32 0 2 0 A 32<CR> Send system zone 1 immediately to full using a 5-second fade time, while sending zone 2 to Off using a 1-second fade time after a 5-second delay.
Additional Information	The temporary scene remains until another scene is selected. Wallstation LEDs are not affected by this command.

SELECT SCENE OF SPACE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**1E**
Description	This command selects the scene number in the given space (not the system scene number). Scene selection in multiple spaces may be accomplished by adding space/scene pairs.
Syntax	~11h 1E [sys space] [space scene] [repeat variables for additional spaces]<CR>
Allowed Values	Spaces 0 - 200h (512 zones) Scene 0 - 3E80h (16000 scenes)
Example	~11h 1E 0 7 1 7<CR> Select the eighth scene of system spaces 0 and 1. (The first scene in each space is scene 0.)

Circuit/Zone/Scene Commands (continued)

GET CIRCUIT/ZONE INTENSITY LEVEL	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**805**
Description	Requests the current intensity level (0 - 7Fh) of the specified circuit/ zone
Syntax	~11h [zone]<CR>
Allowed Values	Zones LCP128: 0 - 7Fh (128 circuits) XPS/Softswitch128: 0 - 1FFh (512 circuits) GRAFIK 5000/6000/7000: 0 - 1FFh (512 zones)
Response	:05 [intensity level] Values 0 - 7Fh
Example	~11h 805 101<CR> Request current intensity level of zone 257 :05 5F The intensity level of system zone 257 is 95 (out of 128 levels) (75%)

GET STATUS OF SPACE	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**801**
Description	This command requests information about a space, such as the last scene selected and if a sequence is currently running.
Syntax	~11h 801 [sys space]<CR>
Allowed Values	System space 0 - 7FFFh
Response	:01 [space] [system scene on] [system sequence running] FFFFh =no sequence running
Example	~11h 801 0<CR> Get status of system space 0. :01 0 7 FFFFh System space 0 is running system scene 7 with no sequence running.
Additional Information	This command returns the system scene number. See Get Status of Scenes in Space (command 830) for the command that returns space scene numbers.

Circuit/Zone/Scene Commands (continued)

GET STATUS OF SCENES IN SPACE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**830**
Description	This command requests information about a space, such as whether a current scene is On or whether a timed sequence is running.
Syntax	~11h 830 [sys space]<CR>
Allowed Values	System space 0 - 7FFFh
Response	:01 [space] [system scene on] [system sequence running] FFFFh =no sequence running
Example	~11h 830 0<CR> Get scene status of system space 0. :01 0 2 FFFFh System space 0 is running scene 2 with no sequence running.
Additional Information	This command returns the space scene number. See Get Status of Space (Command 801) for the command that returns system scene numbers.

Time/Date/Timeclock Commands

SET SYSTEM TIME AND DATE	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**207**
Description	This command sets the system clock to the specified time and date. The system clock begins running with the specified time (seconds = 0) upon completing the command.
Syntax	~11h 207 [hour] [min] [month] [date] [year] [day]<CR>
Allowed Values	Hour 0 - 17h (24-hour format) Min 0 - 3Bh (0 - 59 minutes after the hour) Month 1 - Ch (1 = January) Date 1 - 1Fh (1 - 31) Year 0 - 63h Day 1 - 7h (1 = Sunday)
Example	~11h 207 11 00 1 19 61 7<CR> Set the system clock to 5:00 p.m. on Saturday, January 25, 1997.

GET SYSTEM TIME	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**808**
Description	This command requests the current system time, and returns it formatted as the number of minutes past midnight.
Syntax	~11h 808<CR>
Response	:08 [minutes past midnight, in hexadecimal]
Example	~11h 808<CR> :08 398 The current time is 920 minutes past midnight (3:20 p.m.).

GET SYSTEM DATE	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**80A**
Description	This command requests the current system date
Syntax	~11h 80A<CR>
Response	:0A [month] [date] [year] [day]
Example	~11h 80A<CR> :0A 9 11 2 3 The month is 9 (September), the date is 17, the year is 2 (2002), and the day is 3 (Tuesday).
Additional Information	See Set System Time and Date, above, for specific date value information.

Time/Date/Timeclock Commands (continued)

GET SUNRISE/SUNSET TIMES	
Applicable Systems	LCP128™ · XPS Softswitch128® · GRAFIK 5000™/6000®/7000™
Command Number (hex)	**809**
Description	This command requests today's sunrise and sunset times, and returns them formatted as the number of minutes past midnight.
Syntax	~11h 809<CR>
Response	:09 [sunrise, in minutes past midnight, in hexadecimal] [sunset, in minutes past midnight, in hexadecimal]
Example	~11h 809<CR> :09 18B 47D Today's sunrise is 395 minutes past minutes (6:35 a.m.), and today's sunset is 1149 minutes past midnight (7:09 p.m.).

GET TIMECLOCK STATUS	
Applicable Systems	LCP128™ · XPS Softswitch128® · GRAFIK 5000™/6000®/7000™
Command Number (hex)	**802**
Description	This command requests the status of the system timeclock, including the current schedule running, the next scheduled event's type and time, and the next event script.
Syntax	~11h 802 [space]<CR>
Response	:02 [space] [schedule] [next event] [next time] [next script]
Allowed Values	Space — Where the timeclock is Schedule — Current schedule running Next event — N = no more event is schedule D = timeclock is disabled A = astronomic event R = real-time event Next time — Specified in minutes past midnight Next script
Example	~11h 802 7<CR> Request timeclock status in system space 7 :02 7 48 R 3FC 23B The timeclock in system space 7 is running schedule 73; the next scheduled event is a real-time event that will occur at 1020 minutes past midnight (5:00 p.m.) and will run system script 572.
Additional Information	If bit 15 is set in the next event time (event time is greater than 8000h), the event is a "catch-up" event.

Time/Date/Timeclock Commands (continued)

DISABLE TIMECLOCK UNTIL AN ENABLE IS ISSUED	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**201**
Description	This command stops any timeclock events from occurring in the selected spaces until an Enable Timeclock command is issued for those spaces.
Syntax	~11h 201 [space timeclock(s)]<CR>
Allowed Values	Timeclocks 0 - 1F4h
Example	~11h 201 0 1 2 3<CR> Disable the timeclocks in spaces 0, 1, 2, and 3.

DISABLE TIMECLOCK UNTIL END OF DAY OR UNTIL AN ENABLE IS ISSUED	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**202**
Description	This command stops any timeclock events from occurring in the selected spaces until an Enable Timeclock command is issued for those spaces, or for the duration of the current day (whichever occurs first).
Syntax	~11h 202 [space timeclock(s)]<CR>
Allowed Values	Timeclocks 0 - 1F4h
Example	~11h 202 0 1 2 3<CR> Disable the timeclocks in spaces 0, 1, 2, and 3.

Time/Date/Timeclock Commands (continued)

ENABLE TIMECLOCK	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**205**
Description	This command enables the listed timeclocks (if they are currently disabled). The next event to occur will be the next scheduled event in that space.
Syntax	~11h 205 [space timeclock(s)]<CR>
Allowed Values	Timeclocks 0 - 1F4h
Example	~11h 205 0 11<CR> Enable the timeclocks in spaces 0 and 17.

ENABLE TIMECLOCK AND EXECUTE MISSED COMMANDS	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**203**
Description	This command enables the listed timeclocks (if they are currently disabled). It will then execute all events that were missed since the previous midnight. The next event to then occur will be the next scheduled event in that space.
Syntax	~11h 203 [space timeclock(s)]<CR>
Allowed Values	Timeclocks 0 - h
Example	~11h 203 15 16<CR> Enable the timeclocks in spaces 21 and 22, and execute all timeclock events that were missed after midnight.

ENABLE TIMECLOCK AND EXECUTE PREVIOUS COMMAND	
Applicable Systems	GRAFIK 5000™/6000®/7000™
Command Number (hex)	**204**
Description	This command enables the listed timeclocks (if they are currently disabled). It will then execute all events that were scheduled to run at the time this command was executed. The next event to then occur will be the next scheduled event in that space.
Syntax	~11h 204 [space timeclock(s)]<CR>
Allowed Values	Timeclocks 0 - h
Example	~11h 204 7<CR> Enable the timeclock in space 7, and execute all timeclock events that were to occur at the time of enabling.

Wallstation Commands

ENABLE WALLSTATION	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**300**
Description	This command enables all inputs on the listed wallstations.
Syntax	~11h 300 [wallstation(s)]<CR>
Allowed Values	Link number 0 - Bh (only Link 0 for *LCP128*/XPS) Wallstation on link 0 - 1Fh
Example	~11h 300 14<CR> Enable the 21st wallstation on the first link (Link A).
Additional Information	The wallstation value changes to indicate both the link number and the wallstation number on the link. The first digit is the hexadecimal link number; the last two digits are the hexidecimal wallstation number on that link.

DISABLE WALLSTATION	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**301**
Description	This command disables all inputs on the listed wallstations.
Syntax	~11h 301 [wallstation(s)]<CR>
Allowed Values	Link number 0 - Bh (only Link 0 for *LCP128*/XPS) Wallstation on link 0 - 1Fh
Example	~11h 301 207<CR> Disable the 8th wallstation on the third link (Link C).
Additional Information	The wallstation value changes to indicate both the link number and the wallstation number on the link. The first digit is the hexadecimal link number; the last two digits are the hexidecimal wallstation number on that link.

Wallstation Commands (continued)

SIMULATE WALLSTATION SWITCH PRESS	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**500 - 50B** (note: *LCP128*/XPS use only 500)
Description	This command simulates a switch press from any system wallstation. The system runs the programmed script response for the “pressed” switch.
Syntax	~11h 50x [switch(es)]<CR> The third digit of the command (the “x” in 50x) is the hexadecimal equivalent of the number of the wallstation link. Link number 0 - Bh
Allowed Values	Wallstation on link 0 - 1Fh Switch on wallstation 0 - 1Fh
Example	~11h 501 F04<CR> Simulate a switch press of the fifth switch (switch 4) on the 16th wallstation (wallstation 15) on the second link (link 1).
Additional Information	For *Softswitch* systems that include a link expander, use command 500 for links B and C. Wallstation addresses are 0 - 5Fh. The switch value changes to indicate both the wallstation number and the Switch number on the wallstation. The first two digits are the hexadecimal wallstation number; the last two digits are the hexidecimal switch number on that wallstation.

SIMULATE WALLSTATION SWITCH RELEASE	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**600 - 60B** (note: *LCP128*/XPS use only 600)
Description	This command simulates a switch release from any system wallstation. The system runs the programmed script response for the “released” switch.
Syntax	~11h 60x [switch(es)]<CR> The third digit of the command (the “x” in 60x) is the hexadecimal equivalent of the number of the wallstation link. Link number 0 - Bh
Allowed Values	Wallstation on link 0 - 1Fh Switch on wallstation 0 - 1Fh
Example	~11h 602 300<CR> Simulate a switch release of the first switch (switch 0) on the fourth wallstation (wallstation 5) on the third link (link 2).
Additional Information	For *Softswitch* systems that include a link expander, use command 600 for links B and C. Wallstation addresses are 0 - 5Fh. The switch value changes to indicate both the wallstation number and the Switch number on the wallstation. The first two digits are the hexadecimal wallstation number; the last two digits are the hexidecimal switch number on that wallstation.

Wallstation Commands (continued)

SET SYSTEM VARIABLE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**40D**
Description	This command sets the state of the system variables specified to the specified value.
Syntax	~11h 40D [value] [variable(s)]<CR>
Allowed Values	Value 0 - FFh (256 decimal) Variable 0 - 400h (1024 decimal)
Example	~11h 40D 0 0 6<CR> Set the first and seventh system variables to the value of 0.

GET VARIABLE VALUE	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**815**
Description	This command requests the value of a system variable.
Syntax	~11h 815 [variable(s)]<CR>
Response	:15 [variable value]
Allowed Values	Variable 0 - 400h (1024 decimal)
Example	~11h 815 0<CR> Get the value of the first system variable. :15 FF The value of the first system variable is 255.

Wallstation Commands (continued)

GET WALLSTATION/CONTROL STATION DEVICE STATUS	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**803**
Description	This command requests the priority and the enable/disable status of all switches on the specified wallstation.
Syntax	~11h 803 [wallstation]<CR>
Allowed Values	Wallstation on link 0 - 1Fh
Response	:03 [wallstation] [switches and status] Priority value in lower four bits (0 - F). If disabled, bit 7 is set in priority value (80 - 8F).
Example	~11h 803 207<CR> Check the status of the wallstation at the 8th address on the third link. :03 7 5 5 5 5 5 5 5 On link 3, wallstation 8, all switches are priority 5 (enabled).

GET SWITCH/BUTTON STATUS	
Applicable Systems	GRAFIK 5000TM/6000®/7000TM
Command Number (hex)	**804**
Description	This command requests the priority of the given wallstation button.
Syntax	~11h 804 [wallstation] [switch]<CR>
Allowed Values	Wallstation on link 0 - 1Fh Switch on wallstation 0 - 1Fh
Response	:04 [switch] [priority] Priority value in lower four bits (0 - F). If disabled, bit 7 is set in priority value (80 - 8F).
Example	~11h 804 207 0<CR> Get the status of the first switch on the 8th wallstation on the third link. :04 207 0 On link 3, wallstation 8, switch 1 is priority 0 (enabled).

Diagnostic Commands

GET OPERATING SYSTEM REV LEVEL	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**811**
Description	This command requests the revision level of the embedded operating software. It is used for diagnostic purposes.
Syntax	~11h 811<CR>
Response	:11 [rev level]
Example	~11h 811<CR> :11 300 The current operating software is revision 300h.

GET BOOT CODE REV LEVEL	
Applicable Systems	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™
Command Number (hex)	**812**
Description	This command requests the revision level of the embedded system boot software. It is used for diagnostic purposes.
Syntax	~11h 812<CR>
Response	:12 [boot rev level]
Example	~11h 812<CR> :12 114 The current boot software is revision 114h.

COMMANDS LISTED BY NUMBER

Command Number	Command Name	Applicable Systems	Page #
1	Halt Zone	GRAFIK 5000™/6000®/7000™	9
6	Toggle Zone	GRAFIK 5000™/6000®/7000™	9
7	Fade to Level	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	8
B	Ramp Up System Zone	GRAFIK 5000™/6000®/7000™	11
C	Ramp Down System Zone	GRAFIK 5000™/6000®/7000™	11
D	Fade to Levels and Repeat	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	8
12	Select System Scene	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	9
13	Select System Scene Using Override Times	GRAFIK 5000™/6000®/7000™	13
1C	Select Temp Scene	GRAFIK 5000™/6000®/7000™	14
1E	Select Scene of Space	GRAFIK 5000™/6000®/7000™	14
20	Ramp Up All Zones in Last Scene Selected	GRAFIK 5000™/6000®/7000™	12
21	Ramp Down All Zones in Last Scene Selected	GRAFIK 5000™/6000®/7000™	12
22	Stop Ramp Up All Zones in Last Scene Selected	GRAFIK 5000™/6000®/7000™	13
23	Stop Ramp Down in Last Scene Selected	GRAFIK 5000™/6000®/7000™	13
201	Disable Timeclock Until an Enable is Issued	GRAFIK 5000™/6000®/7000™	19
202	Disable Timeclock Until End of Day or Until an Enable is Issued	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	19
203	Enable Timeclock and Execute Missed Commands	GRAFIK 5000™/6000®/7000™	20
204	Enable Timeclock and Execute Previous Command	GRAFIK 5000™/6000®/7000™	20
205	Enable Timeclock	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	20
207	Set System Time and Date	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	17
300	Enable Wallstation	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	21
301	Disable Wallstation	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	21
40D	Set System Variable	GRAFIK 5000™/6000®/7000™	23
500, 600	Ramp Circuits Up/Down	LCP128™ XPS Softswitch128®	10
500-50B	Simulate Wallstation Switch Press	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	22
600-60B	Simulate Wallstation Switch Release	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	22

Command Number	Command Name	Applicable Systems	Page #
801	Get Status of Space	GRAFIK 5000™/6000®/7000™	15
802	Get Timeclock Status	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	18
803	Get Wallstation/Control Station Device Status	GRAFIK 5000™/6000®/7000™	24
804	Get Switch/Button Status	GRAFIK 5000™/6000®/7000™	24
805	Get Zone Intensity	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	15
808	Get System Time	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	17
809	Get Sunrise/Sunset Times	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	18
80A	Get System Date	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	17
811	Get Operating System Rev Level	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	25
812	Get Boot Code Rev Level	LCP128™ XPS Softswitch128® GRAFIK 5000™/6000®/7000™	25
815	Get Variable Value	GRAFIK 5000™/6000®/7000™	23
830	Get Status of Scenes in Space	GRAFIK 5000™/6000®/7000™	16

Appendix A: ASCII Character Lookup

Chart for Allowable Characters

ASCII	Hex Value	Decimal Value
:	3A	58
space	20	32
#	23	35
~	7E	126
<CR>	0D	13
<lf>	0A	10
0	30	48
1	31	49
2	32	50
3	33	51
4	34	52
5	35	53
6	36	54
7	37	55
8	38	56
9	39	57
A	41	65
B	42	66
C	43	67
D	44	68
E	45	69
F	46	70
G	47	71
H	48	72
I	49	73
J	4A	74
K	4B	75
L	4C	76
M	4D	77
N	4E	78
O	4F	79
P	50	80
Q	51	81
R	52	82
S	53	83
T	54	84
U	55	85
V	56	86
W	57	87
X	58	88
Y	59	89
Z	5A	90
a	61	97
b	62	98
c	63	99
d	64	100
e	65	101
f	66	102
g	67	103
h	68	104
i	69	105
j	6A	106
k	6B	107
l	6C	108
m	6D	109
n	6E	110
o	6F	111
p	70	112
q	71	113
r	72	114
s	73	115
t	74	116
u	75	117
v	76	118
w	77	119
x	78	120
y	79	121
z	7A	122

Error Codes

Error	Description
1	232 string framing or overrun error Wrong baud rate selected by sender or receiver, or sender is sending too fast
2	232 string buffer error Input string was longer than 36 characters total (including ~11h)
4	No response from the processor (occurs if the interface address is disabled)
5	No tilde (~) sent
6	No ~11h sent
8	232 string check is wrong when using ~11h
31	Network address illegally formatted. 4 octets required (xxx.xxx.xxx.xxx)
100	Invalid Telnet login number
101	Invalid Telnet login
102	Login name exceeds 8 characters
103	Invalid number of arguments

Appendix B: Conversion Chart for Intensities

Intensity (0 - 127)	Percentage (0 - 100)	Intensity (0 - 127)	Percentage (0 - 100)
0	0	65	51
1	1	66	52
2	2	67	53
3	3	68	54
4	4	69	55
5	4	70	56
6	5	71	56
7	6	72	57
8	7	73	58
9	8	74	59
10	8	75	60
11	9	76	60
12	10	77	61
13	11	78	62
14	12	79	63
15	12	80	63
16	13	81	64
17	14	82	65
18	15	83	66
19	15	84	67
20	16	85	67
21	17	86	68
22	18	87	69
23	19	88	70
24	19	89	71
25	20	90	71
26	21	91	72
27	22	92	73
28	23	93	74
29	23	94	75
30	24	95	75
31	25	96	76
32	26	97	77
33	26	98	77
34	27	99	78
35	28	100	79
36	29	101	80
37	30	102	81
38	30	103	82
39	31	104	82
40	32	105	83
41	33	106	84
42	34	107	85
43	34	108	85
44	35	109	86
45	36	110	87
46	37	111	88
47	38	112	89
48	38	113	89
49	39	114	90
50	40	115	90
51	41	116	91
52	41	117	92
53	42	118	93
54	43	119	93
55	44	120	94
56	45	121	95
57	45	122	96
58	46	123	97
59	47	124	98
60	48	125	98
61	49	126	99
62	49	127	100
63	50		
64	51		

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
USA
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036-1299
TEL +1.610.282.3800
FAX +1.610.282.1243
Toll-Free 1.888.LUTRON1
Technical Support 1.800.523.9466

North and South America Technical Hotlines
USA, Canada, Caribbean: 1.800.523.9466
Mexico: +1.888.235.2910
Central/South America: +1.610.282.6701

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF United Kingdom
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
FREEPHONE (UK) 0800.282.107
Technical support +44.(0)20.7680.4481

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
15 Hoe Chiang Road, #07-03 Euro Asia Centre, Singapore
089316
TEL +65.6220.4666
FAX +65.6220.4333

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Indonesia: 001.803.011.3994
Japan: +81.3.5575.8411
Macau: 0800.401
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other countries: +65.6220.4666

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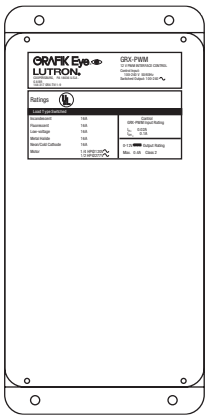
GRAFIK Eye®

Installation and Operation Instructions
Please Read before Installing
Occupant Copy

GRX-PWM Control Interface
GRX-PWM-JA Control Interface
Phase Control to PWM
100-277 V~ 50/60 Hz



Description

The GRX-PWM provides 12 V⎓ Pulse Width Modulated (PWM) control and ballast switching capabilities in one enclosure. With the GRX-PWM, a *GRAFIK Eye* 3000 Series Control Unit* can control PWM ballasts powered by 100-277 V~ and provide switching relays that can handle the in-rush current for a full circuit of ballasts. The GRX-PWM can also be used to switch any of the load types listed below.

*GRX-PWM will also work with Lutron GP or LP panel outputs.

Product Specifications

FEATURES.....Provides a PELV (Class 2: USA) isolated 12 V⎓ 1 kHz PWM output signal that conforms to IEC60929 and JIS C8120-2.
Accepts a constant-gate drive fluorescent signal

INPUT VOLTAGE RATING	100/120 V~, 50/60 Hz
SWITCHED VOLTAGE RATING	100-277 V~, 50/60 Hz
H2 TERMINAL INPUT RATING	200 mA max
DH2 TERMINAL INPUT RATING	100 mA
12 V⎓ PWM OUTPUT RATING	400 mA - sources current only

Source/Load Type	Switched Hot Current 100-277 V~
Fluorescent:	
Lutron Eco-10™ (TVE Series)	16 A
Electronic Capacitive Non-Dim	16 A
Other Manufacturer's 12 V⎓ PWM Ballasts *(12 V⎓ PWM source only)*	16 A
Incandescent	16 A
Low-Voltage	16 A
Metal Halide	16 A
Neon/Cold Cathode	16 A
Motors	1/4 HP @ 100-120 V~ 1/2 HP @ 200-277 V~

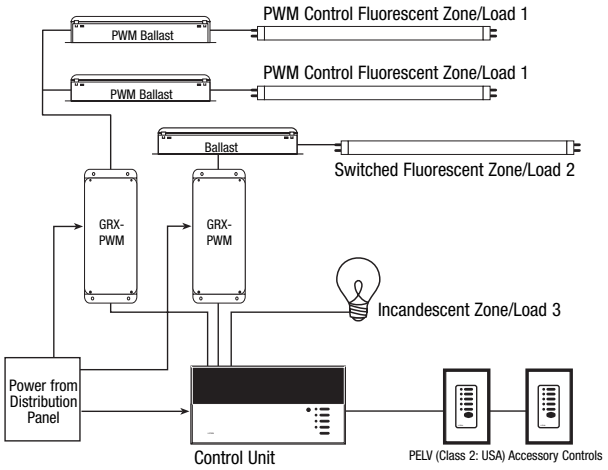
TERMINALS	Two #12-20 AWG (0.5-2.5 mm²) conductors per terminal.
MOUNTING	NEMA Type 1 enclosure, indoor use only.
ENVIRONMENTAL	32-104°F (0-40°C).
WEIGHT	4.25 lb. (2 kg)

Mounting

Find a suitable location for mounting.

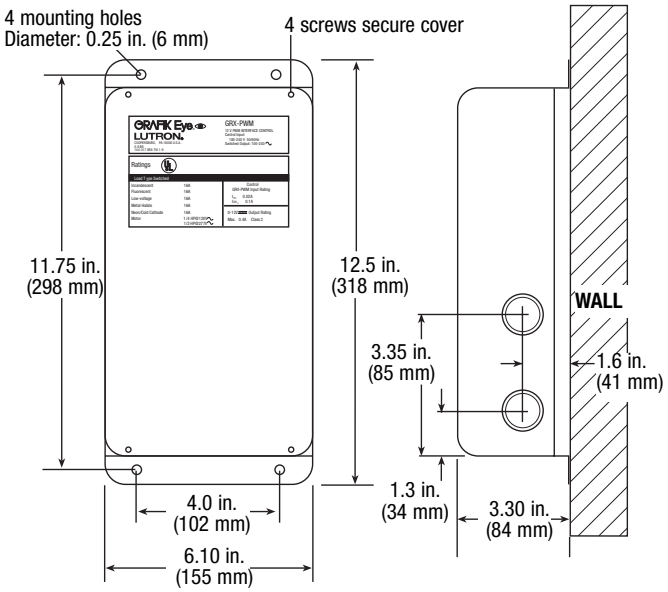
- Decide on the proper location for the GRX-PWM (NEMA Type 1 enclosure, indoor use only). See System Wiring Layout below.
- The environment where the GRX-PWM is placed must have an ambient temperature range of 32-104°F (0-40°C).
- Mount the enclosure vertically on a wall (screws not provided). See Mounting Diagram below.
- Mounting method must be able to support weight and forces applied during installation.
- Internal relays will click while in operation; mount where audible noise is acceptable.

System Wiring Layout



Note: When using a Control Unit, a GRX-PWM is required for each 12 V⎓ PWM fluorescent zone. (A 3-zone Control Unit with two fluorescent zones and one incandescent zone is shown as an example.)

Mounting Diagram



LUTRON®

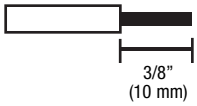
100-277 V~ Control Interface

Important Installation Information

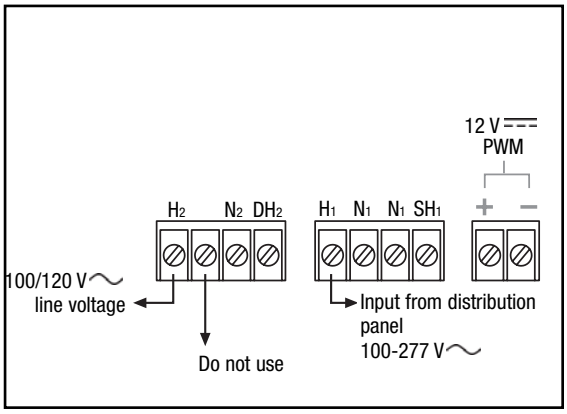
- Install in accordance with all national and local electrical codes.
- Check for short-circuited loads during new installations before wiring the GRX-PWM.

Caution: Multiple feeds may enter this enclosure. Locate and lock each feed circuit breaker/MCB in the OFF position before wiring the Interface.

- Proper short-circuit and overload protection must be provided at the distribution panel. You can use up to a 20 A maximum circuit breaker/MCB or equivalent (tripping curve C according to IEC 898/EN60898 is recommended) with adequate short-circuit breaking capacity for your installation.
- Terminal blocks are rated for two #12-20 AWG (0.5-2.5 mm^2) wires per terminal.
- Strip 3/8 in. (10 mm) of insulation from wires.



- Wiring Diagram A shows a GRX-PWM wired from one distribution panel. If the power requirement of the complete system is less than an MCB/circuit breaker rating, one feed can be jumpered inside the enclosure (as shown).
- Wiring Diagram B shows a GRX-PWM wired from two separate distribution panels that may be different phases or voltages.
- Use the internal terminal block label to see where to land wires.
  - The label shows two separate Hot terminals (H_1 & H_2).
    H_1 is the Hot feed to power the lighting load.
    H_2 is the Hot feed that powers internal circuitry of the GRX-PWM.
    *H_2 has a 100/120 V~ connection. Do **not** use the unlabeled terminal.*



Note 1: Not all terminal blocks receive a connection.

Note 2: The power feed to the Control Unit and H_2 of the GRX-PWM must be the same phase!
PELV (Class 2: USA), 12 V⎓ PWM wiring from a ballast to the GRX-PWM must be separated from the power wiring. Enter the PELV (Class 2: USA) wires through the knockout adjacent to the 12 V⎓ PWM terminal blocks. The Nomex® barrier ensures separation and is flexible to allow access to the terminals. The barrier must be in place when installation is complete.

GRX-PWM Internal Terminal Block Label Definitions

H_2 100/120 V~	Power input for GRX-PWM control (line voltage ***must be*** 100/120 V~ only)
N_2	Neutral for GRX-PWM control
DH_2	*GRAFIK Eye* 3000 Series Control Unit Lighting Zone connection (Phase Control Input to GRX-PWM)
H_1	Power input for lighting load (switched voltage can be 100-277 V~)
N_1	Neutral for lighting load (2 terminals provided and internally tied together — one for input neutral, and one for load neutral)
SH_1	Switched output to power lighting load
+ -	PWM control signal terminals

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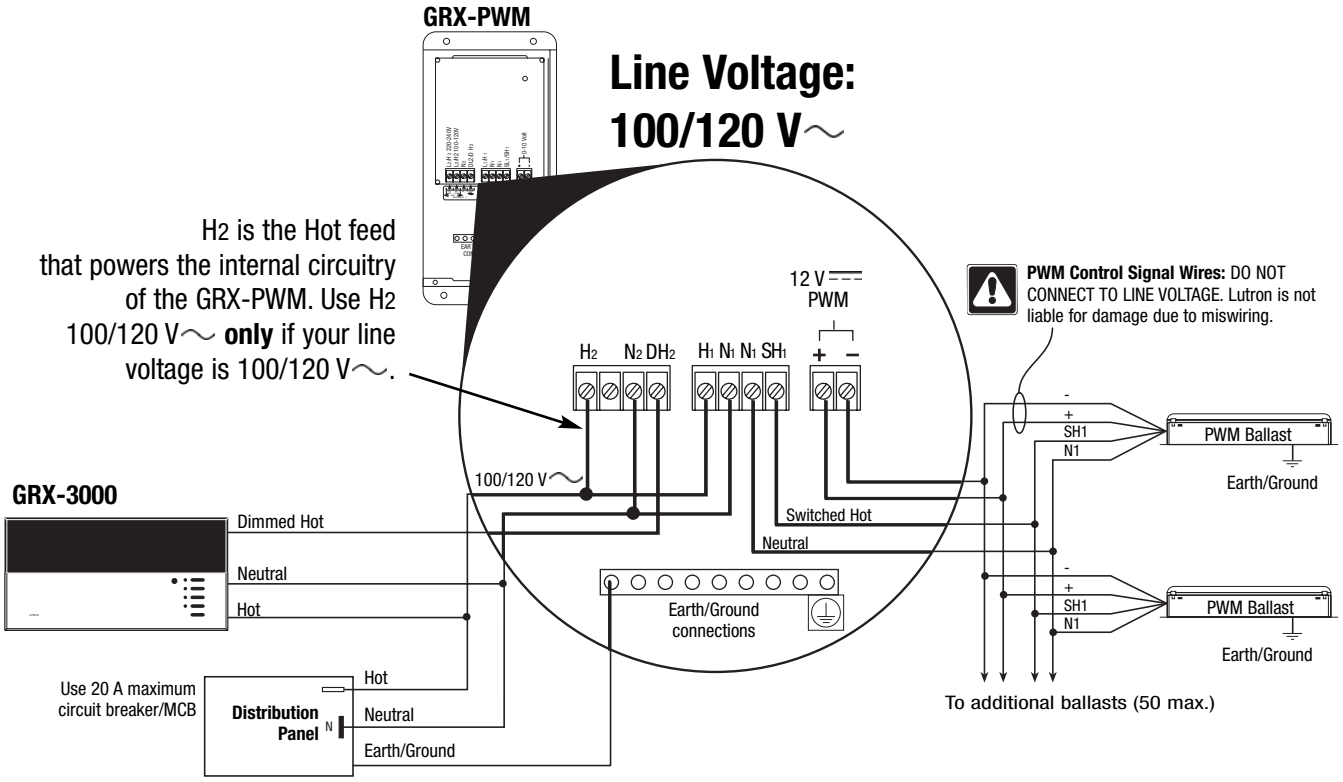
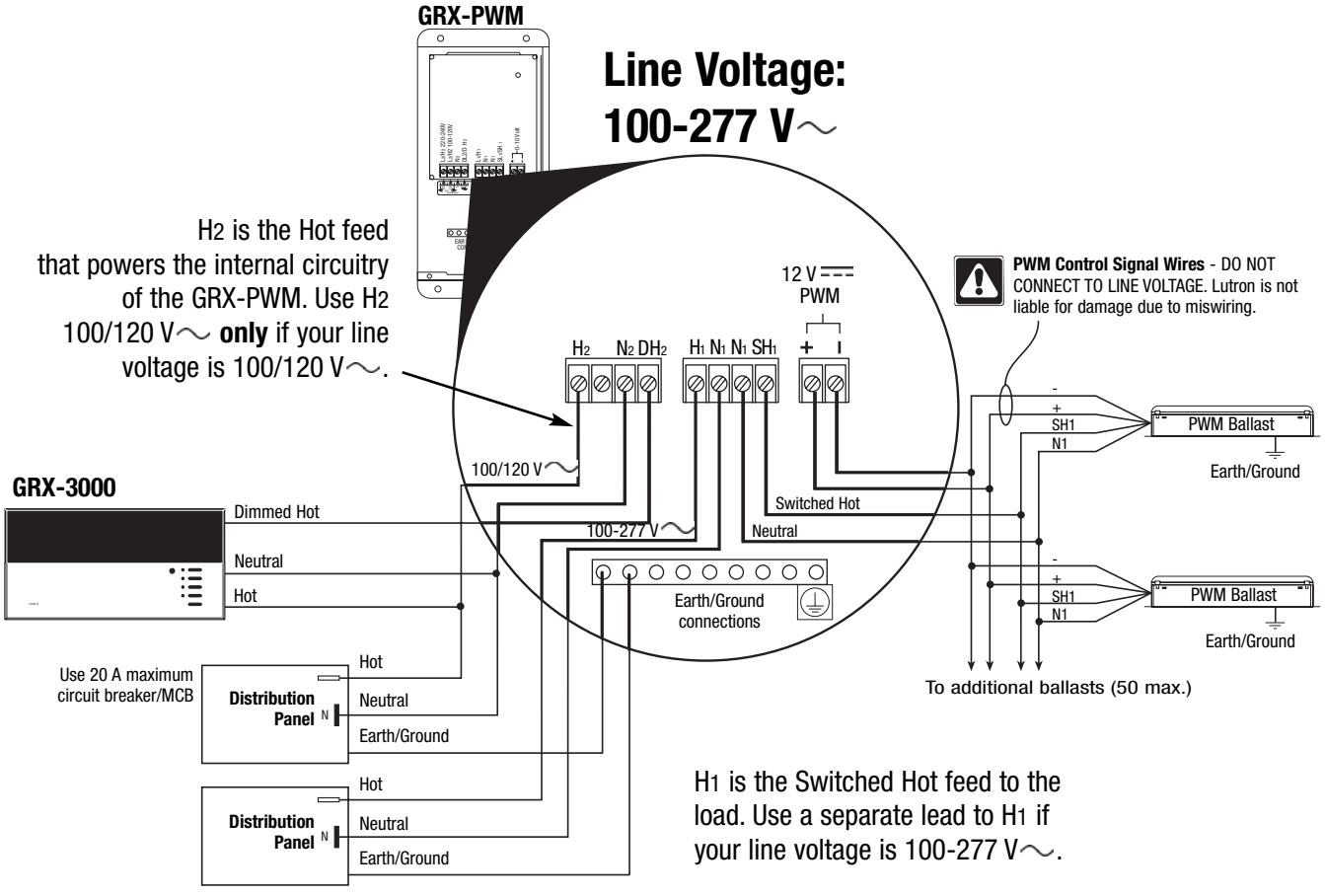
Wiring Diagram A: 100/120 V~ GRX-PWM: 1 Distribution Panel



Wiring Diagram B: 100-277 V~ GRX-PWM: 2 Distribution Panels



H1 is the Switched Hot feed to the load. Use a separate lead to H1 if your line voltage is 100-277 V~.

Operation

After wiring is complete, supply power to the GRX-PWM to check for proper operation.

- With the cover removed, an LED will provide visual feedback about the operation of the system.
- When power is first applied, the LED will turn on for 8 seconds to indicate start-up mode and then start to flash in one of two ways to indicate the status of the system:

1. Standard Operation

- The LED will flash at a rate of twice per second to signify proper communication between the Control Unit and the Interface.

2. Incorrect Operation - No Active Input

- The LED will repeatedly turn on for 1 second, then off for 1 second, to indicate that there is not an active phase control input to the GRX-PWM. Make sure that the phase control dimmer is ON and connected to the GRX-PWM at the terminal block marked DH_2. Check that the corresponding zone for the DH_2 terminal is ON and the light level is not set at the minimum output.
- When the LED indicates proper input of a phase control signal, then the output can be checked by looking at the load and checking operation from the Control Unit.
- For non-dimming ballasts, select non-dim load type on the *GRAFIK Eye* Control Unit and do not connect ballasts to PWM's + and - terminals.

Make sure that the Control Unit is set for **Fluorescent Load Type**. (Refer to *GRAFIK Eye* 3000 Series Installer's Guide.) If the load type is not set correctly, proper dimming will not occur.

Troubleshooting

Symptom	Possible Cause	Solution
PWM Ballast does not dim or control unit to the Interface.	Miswire	Verify that LED pulses twice per second. If not, check wiring from phase control unit to the Interface.
	Power is OFF	Make sure that the *GRAFIK Eye* 3000 Series Control Unit is ON.
	Miswire	Check for proper polarity of PWM signals at terminal blocks. Does it match what is at every ballast? A miswire at any ballast will cause all ballasts to go to the low end.
	Incorrect control setup	*GRAFIK Eye* 3000 Series Control Unit is not configured for fluorescent load type.
Light does not switch on	Miswire	Check that the SH_1 connection goes to the ballasts.
	Miswire	Check that the DH_2 connection is actually wired to a phase control input.
Light does not switch off	Miswire	Check that load is connected to SH terminal.
	Miswire	Check that the DH_2 connection is actually wired to a phase control input.
LED is not illuminated	No power input	Check that power is applied to the Interface.

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036
TEL +1-610-282-3800
FAX +1-610-282-1243

EUROPEAN HEADQUARTERS
Lutron EA Ltd.
6 Sovereign Close, Wapping, London, E1W 3JF United Kingdom
TEL +44-207-702-0657
FAX +44-207-480-6899
FREEPHONE (UK) 0800-282-107
Technical support +44-(0)20-7680-4481

WORLDWIDE OFFICES

Brazil
Lutron BZ do Brasil Ltda.
AV, Brasil, 239, Jardim America,
Sao Paulo-SP, CEP01431-000, Brasil
TEL +55 11 3885-5152

France
Lutron LTC, S.A.R.L.
90 rue de Villiers, 92300 Levallois-Perret France
TEL +33-(0) 1-41-05-42-80
FAX +33-(0) 1-41-05-01-80
FREEPHONE 0800-90-12-18

Germany
Lutron Electronics GmbH, Landsberger Allee 201, 13055 Berlin, Germany
TEL +49-309-710-4590
FAX +49-309-710-4591
FREEPHONE 00800-5887 6635

Italy
Lutron LDV, S.r.l.
FREEPHONE 800-979-208

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85, 28020 Madrid, Spain
TEL +34-91-567-84 79
FAX +34-91-567-84 78
FREEPHONE 0900-948-944

Spain, Barcelona
Lutron CC, S.R.L.
Gran Via del Carlos III, 84, planta 3a, 08028,
Barcelona, Spain
TEL +34-93-496-57 42
FAX +34-93-496-57 01
FREEPHONE 0900-948-944

China, Beijing
Lutron GL Ltd.
5th Floor, China Life Tower, No. 16 Chaowai Street, Chaoyang District, Beijing 100020 China
TEL +86-10-5877-1817
FAX +86-10-5877-1816

China, Shanghai
Lutron GL Ltd.
Suite 07, 39th Floor, Plaza 66,
1266 Nan Jing West Road, Shanghai, 200040 China
TEL +86-21-6288-1473
FAX +86-21-6288-1751

China, Guangzhou
Lutron GL Ltd. Guangzhou Representative Office
Plaza Business and Conference Centre (Guangzhou)
Suite A09, 23/F Tower A, Center Plaza,
161 LinHeXiLu, Tianhe District, Guangzhou 510620 China
TEL +86-20-2885-8266
FAX +86-20-2885-8366

Hong Kong
Lutron GL Ltd.
Room 2808, 28/F, 248 Queen's Road East,
Wanchai, Hong Kong
TEL +852-2104-7733
FAX +852-2104-7633

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20, Akasaka,
Minato-ku, Tokyo 107-0052 Japan
TEL +81-3-5575-8411
FAX +81-3-5575-8420

Singapore
Lutron GL Ltd.
6A Upper Cross Street, Singapore 058326
TEL +65-6220-4666
FAX +65-6220-4333

Asia Technical Hotlines
Northern China: 10-800-712-1536
Southern China: 10-800-120-1536
Hong Kong: 800-901-849
Singapore: 800-120-4491
Taiwan: 00-801-137-737
Thailand: 001-800-120-665853

Lutron Electronics Co., Inc.
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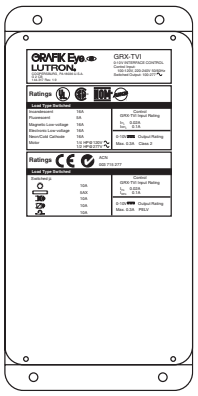
P/N 031-267 Rev. A

GRAFIK Eye®

Installation and Operation Instructions
Read Before Installing
Occupant Copy

GRX-TVI Control Interface
Phase Control to 0-10V
100-127V and 220-240V/CE

English



Description

The GRX-TVI provides 0-10V control and ballast switching capabilities in one enclosure. The GRX-TVI gives *GRAFIK Eye* 3000 Series Control Units the ability to control any 0-10V ballasts powered by 100V-277V (**ballast must provide 0-10V sourcing of current**) and provides switching relays that can handle the in-rush current for a circuit of ballasts. The GRX-TVI gives a *GRAFIK Eye* 3000 Series Control Unit the ability to both dim and switch electronic ballasts, such as *Lutron's Eco-10*™ (TVE models). The GRX-TVI can also be used to switch any of the load types listed below.

Product Specifications

FEATURES.....Provides a Class 2/PELV isolated 0-10V output signal that conforms to EN60929 and IEC60929
Accepts a constant-gate drive fluorescent signal (100-127V, 220-240V, 50/60Hz)
INPUT POWER RATING.....100-127/220-240V, 50/60Hz
H2/L2 TERMINAL INPUT RATING.....20mA
DH2/DL2 TERMINAL INPUT RATING.....100mA
0-10V OUTPUT RATING.....10µA-300mA - Sinks current only (maximum 150 ballasts)

Source/Load Type	230V (CE)	100-127V/ 200-277V
Fluorescent: *Lutron Eco-10*™ (TVE Series)	—	16A
Electronic Capacitive Non-Dim	10A	16A
Other Manufacturer's 0-10V Ballasts *(0-10V source only)*	10A	16A
Incandescent	10A	16A
Low-Voltage	10A	16A
Metal Halide	10A	16A
Neon/Cold Cathode	10A	16A
Motors	1/4HP @ 100-120V 1/2HP @ 200-277V 1/2HP @ 230V CE	

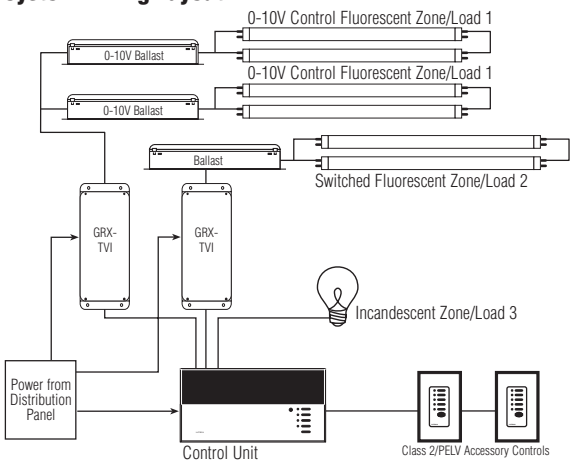
TERMINALS Two #12-20AWG (0.5-2.5 mm²) conductors per terminal.
MOUNTING NEMA Type 1 enclosure, indoor use only.
ENVIRONMENTAL 32—104 ˚F (0—40 ˚C).
WEIGHT 4.25 lb. (2kg)

Mounting

Find a suitable location for mounting.

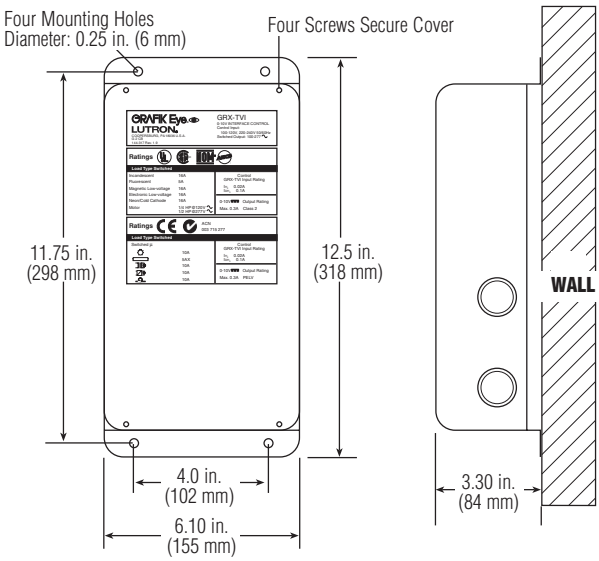
- Decide on the proper location for the GRX-TVI (NEMA Type 1 enclosure, indoor use only). See System Wiring Layout below.
- The environment where the GRX-TVI is placed must have an ambient temperature range of 32—104 °F (0—40 °C).
- Mount the enclosure vertically on a wall (screws not provided). See Mounting Diagram below.
- Mounting method must be able to support weight and forces applied during installation.
- Iinternal relays will click while in operation — mount where audible noise is acceptable.

System Wiring Layout



Note: When using a Control Unit, a GRX-TVI is required for each 0-10V fluorescent zone. (A 3-zone Control Unit with two fluorescent zones and one incandescent zone is shown as an example.)

Mounting Diagram



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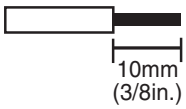
220-240V/CE Control Interface

Important Installation Information

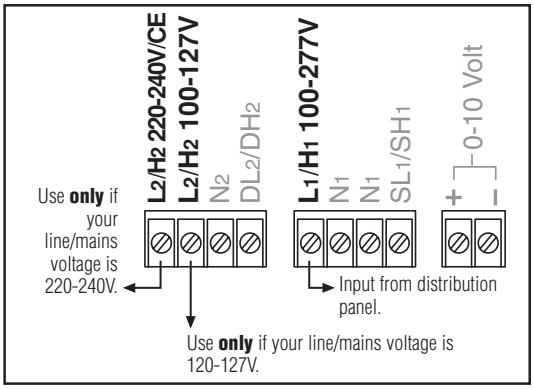
- Install in accordance with all national and local electrical codes.
- Check for short circuited loads during new installations before wiring the GRX-TVI.

Caution: Multiple feeds may enter this enclosure. Locate and lock each feed circuit breaker/MCB in the OFF position before wiring the Interface.

- Proper short circuit and overload protection must be provided at the distribution panel. You can use up to a 20A (16A for CE) maximum circuit breaker/MCB or equivalent (tripping curve C according to IEC 898/EN60898 is recommended) with adequate short circuit breaking capacity for your installation.
- Terminal blocks are rated for two #12-22 AWG (0.5-2.5 mm^2) wires per terminal.
- Strip 3/8 in. (10 mm) of insulation from wires.



- Wiring Diagram A shows a GRX-TVI wired from one distribution panel. If the power requirement of the complete system is less than an MCB/circuit breaker rating, one feed can be jumpered inside the enclosure (as shown).
- Wiring Diagram B shows a GRX-TVI wired from two separate distribution panels that may be different phases or voltages.
- Use the internal terminal block label to see where to land wires.
  - — The label shows two separate Hot/Live terminals (L_1/H_1 & L_2/H_2).
    L_1/H_1 is the Hot/Live feed to power the lighting load.
    L_2/H_2 is the Hot/Live feed that powers internal circuitry of the GRX-TVI.
    *L_2/H_2 has a 100-127V connection **and** a 220-240V connection - use **only** the one corresponding to line voltage for your application.*



Note 1: Not all terminal blocks receive a connection.

Note 2: The power feed to the Control Unit and L_2/H_2 of the GRX-TVI must be the same phase!
Class 2/PELV, 0-10V wiring from a ballast to the GRX-TVI-CE must be separated from the power wiring. Enter the Class 2/PELV wires through the knockout adjacent to the 0-10V terminal blocks. The Nomex® barrier ensures separation and is flexible to allow access to the terminals. The barrier must be in place when installation is complete.

GRX-TVI Internal Terminal Block Label Definitions

Use ***only one*** input according to Input Voltage:

L_2/H_2 240V	Power input for GRX-TVI control (line/mains voltage ***must be*** 220-240V)
L_2/H_2 127V	Power input for GRX-TVI control (line/mains voltage ***must be*** 100-127V)
N2	Neutral for GRX-TVI control
DL_2/DH	GRAFIK Eye 3000 Series Control Unit Lighting Zone connection (Phase Control Input to GRX-TVI)
L_1/H_1	Power input for lighting load
N_1	Neutral for lighting load (2 terminals provided and internally tied together — one for input neutral and one for load neutral)
SL_1/SH_1	Switched output to power lighting load
+ -	0-10V control signal wires (***ballast must provide a 0-10V source only***)

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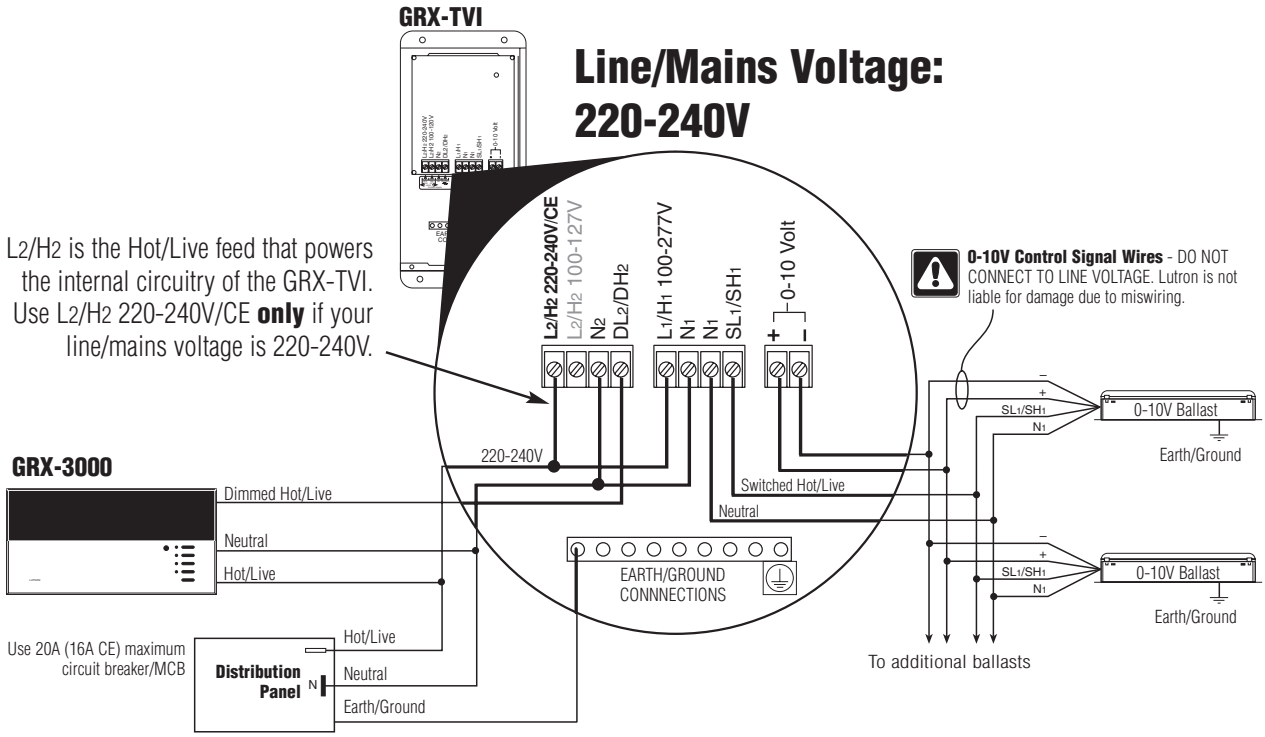
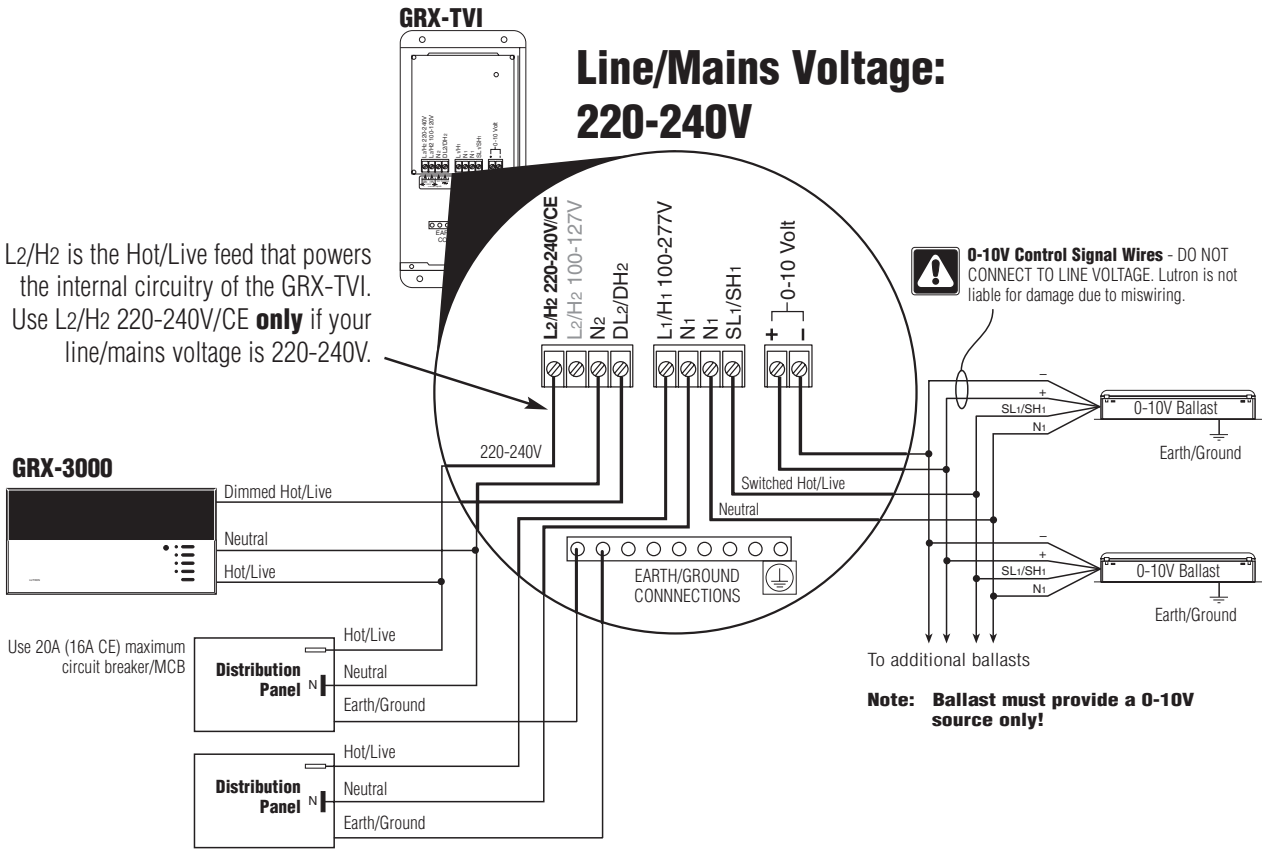
Wiring Diagram A: 220-240V/CE GRX-TVI — 1 Distribution Panel



Wiring Diagram B: 220-240V/CE GRX-TVI — 2 Distribution Panels



Note: Ballast must provide a 0-10V source only!

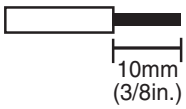
100-127V Control Interface

Important Installation Information

- Install in accordance with all national and local electrical codes.
- Check for short circuited loads during new installations before wiring the GRX-TVI.

Caution: Multiple feeds may enter this enclosure. Locate and lock each feed circuit breaker/MCB in the OFF position before wiring the Interface.

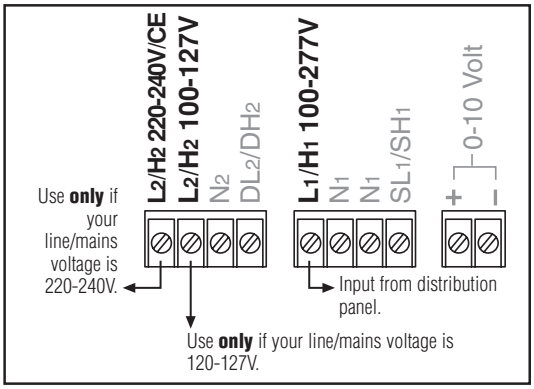
- Proper short circuit and overload protection must be provided at the distribution panel. You can use up to a 20A (16A for CE) maximum circuit breaker/MCB or equivalent (tripping curve C according to IEC 898/EN60898 is recommended) with adequate short circuit breaking capacity for your installation.
- Terminal blocks are rated for two #12-22 AWG (0.5-2.5 mm^2) wires per terminal.
- Strip 3/8 in. (10 mm) of insulation from wires.



- Wiring Diagram C shows a GRX-TVI wired from one distribution panel. If the power requirement of the complete system is less than an MCB/circuit breaker rating, one feed can be jumpered inside the enclosure (as shown).
- Wiring Diagram D shows a GRX-TVI wired from two separate distribution panels that may be different phases or voltages.
- Use the internal terminal block label to see where to land wires.
  - The label shows two separate Hot/Live terminals (L1/H1 & L2/H2).
    L1/H1 is the Hot/Live feed to power the lighting load.
    L2/H2 is the Hot/Live feed that powers internal circuitry of the GRX-TVI.
    *L2/H2 has a 100-127V connection **and** a 220-240V connection - use **only** the one corresponding to line voltage for your application.*

    Note 1: Not all terminal blocks receive a connection.

    Note 2: The power feed to the Control Unit and L2/H2 of the GRX-TVI must be the same phase!
    Class 2/PELV, 0-10V wiring from a ballast to the GRX-TVI-CE must be separated from the power wiring. Enter the Class 2/PELV wires through the knockout adjacent to the 0-10V terminal blocks. The *Nomex*® barrier ensures separation and is flexible to allow access to the terminals. The barrier must be in place when installation is complete.



GRX-TVI Internal Terminal Block Label Definitions

Use ***only one*** input according to Input Voltage:

L2/H2 240V	Power input for GRX-TVI control (line/mains voltage ***must be*** 220-240V)
L2/H2 127V	Power input for GRX-TVI control (line/mains voltage ***must be*** 100-127V)
N2	Neutral for GRX-TVI control
DL2/DH	GRAFIK Eye 3000 Series Control Unit Lighting Zone connection (Phase Control Input to GRX-TVI)
L1/H1	Power input for lighting load
N1	Neutral for lighting load (2 terminals provided and internally tied together — one for input neutral and one for load neutral)
SL1/SH1	Switched output to power lighting load
+ -	0-10V control signal wires (***ballast must provide a 0-10V source only***)

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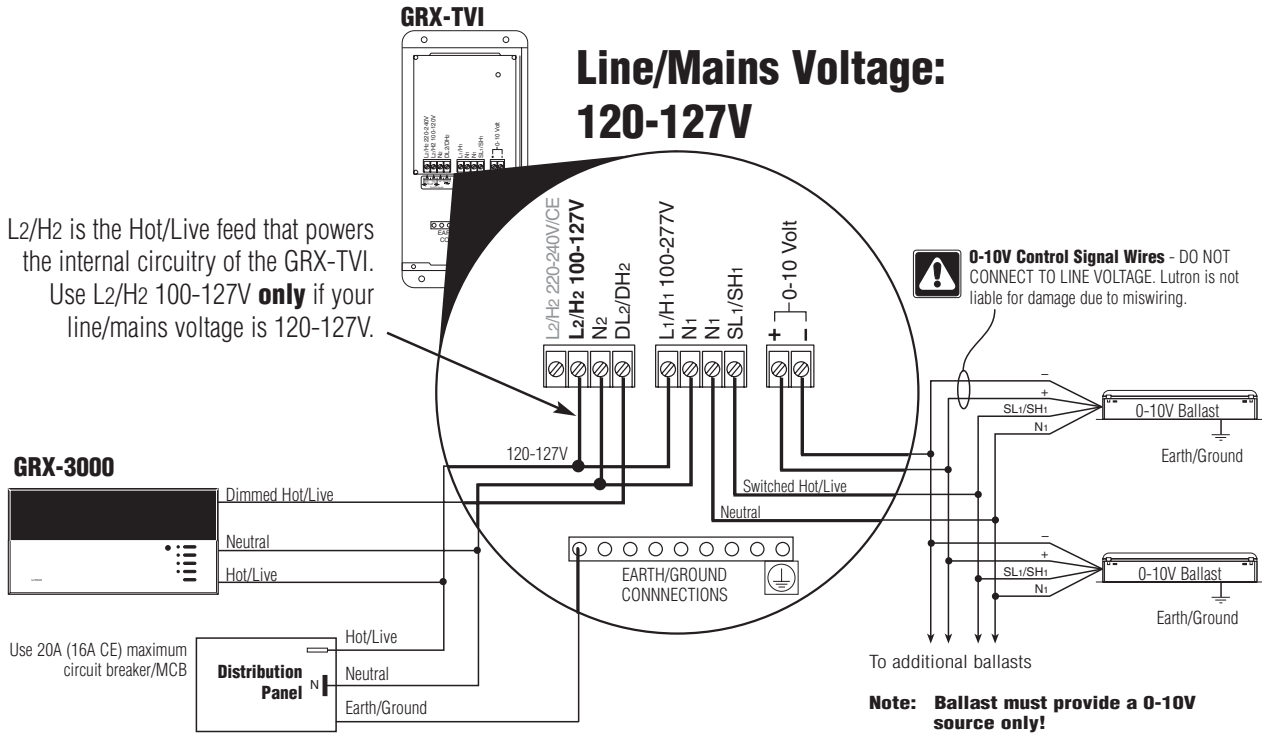
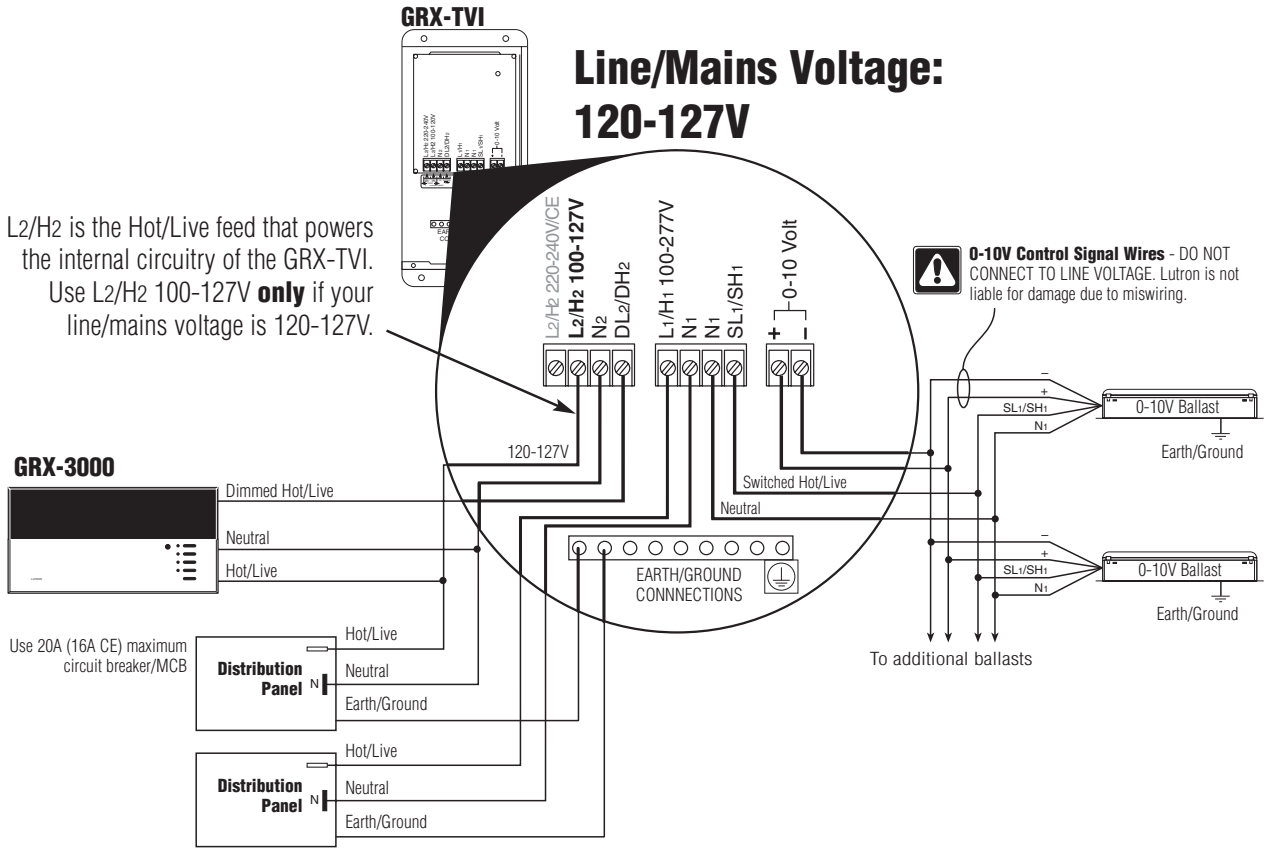
Wiring Diagram C: 100-127V GRX-TVI — 1 Distribution Panel



Wiring Diagram D: 100-127V GRX-TVI — 2 Distribution Panels



Operation

After wiring is complete, supply power to the GRX-TVI to check for proper operation.

- With the cover removed, an LED will provide visual feedback about the operation of the system.
- When power is first applied, the LED will turn on for 8 seconds to indicate start-up mode and then start to flash in one of two ways to indicate the status of the system:

  1. Standard Operation
  - The LED will flash at a rate of twice per second to signify proper communication between the Control Unit and the Interface.

  2. Incorrect Operation - No Active Input
  - The LED will repeatedly turn on for 1 second then off for 1 second to indicate that there is not an active phase control input to the GRX-TVI. Make sure that the phase control dimmer is ON and connected to the GRX-TVI at the terminal block marked DL2/DH2. Check that the corresponding zone for the DL2/DH2 terminal is ON and the light level is not set at the minimum output.
- When the LED indicates proper input of a phase control signal, then the output can be checked by looking at the load and checking operation from the Control Unit.
- For non-dimming ballasts, select non-dim load type on the GRAFIK Eye Control Unit and do not connect ballasts to 0-10V terminals.

Make sure that the Control Unit is set for **Fluorescent Load Type**. (Refer to *GRAFIK Eye* 3000 Series Installer's Guide.) If the load type is not set correctly, proper dimming will not occur.

Troubleshooting

Symptom	Possible Cause	Solution
0-10V Ballast does not dim or control unit to the Interface.	Miswire	Verify that LED pulses twice per second. If not, check wiring from phase control unit to the Interface.
	Power is OFF	Make sure that the *GRAFIK Eye* 3000 Series Control Unit is ON.
	Miswire	Check for proper polarity of 0-10V signals at terminal blocks. Does it match what is at every ballast? A miswire at any ballast will cause all ballasts to go to the low end.
	Incorrect Control Setup	*GRAFIK Eye* 3000 Series Control Unit is not configured for fluorescent load type.
Light does not switch on	Miswire	Check that the SL1/SH1 connection goes to the ballasts.
	Miswire	Check that the DL2/DH2 connection is actually wired to a phase control input.
Light does not switch off	Miswire	Load is not connected to SH (SL) terminal.
	Miswire	Check that the DL2/DH2 connection is actually wired to a phase control input.
LED is not illuminated	No Power Input	Check that power is applied to the Interface.

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
Lutron Electronics Co. Inc.,
TOLL FREE: (800) 523-9466
(U.S.A., Canada, Caribbean)
Tel: (610) 282-3800;
International +1- 610-282-3800
Fax: (610) 282-1243;
International +1-610-282-1243

EUROPEAN HEADQUARTERS
Lutron EA Ltd.,
Tel: (207) 702-0657;
International +44-207-702-0657
Fax: (207) 480-6899;
International +44-207-480-6899

GERMANY
Lutron Electronics GmbH
Tel: (309) 710-4590;
International +49-309-710-4590
Fax: (309) 710-4591;
International +49-309-710-4591

FRANCE
Lutron LTC
International +33-1-44-70-72-00
Int'l Fax: +33-1-44-70-00-19

ASIAN HEADQUARTERS
Lutron Asuka Corporation (Japan)
Tel:(03)-5575-8411;
International (03)-5575-8411
Fax: +(03) -5575-8420;
International +81-3-5575-8420

HONG KONG SALES OFFICE
Lutron GL (Hong Kong)
Tel: 2104-7733;
International +852-2104-7733
Fax: 2104-7633;
International +852-2104-7633

SINGAPORE
Lutron GL (Singapore)
Tel: +65-6220-4666
Fax: +65-6220-4333

LIMITED WARRANTY

Lutron will, at its option, repair or replace any unit that is defective in materials or manufacture within one year after purchase. For warranty service, return unit to place of purchase or mail to Lutron at 7200 Suter Rd., Coopersburg, PA 18036-1299, postage pre-paid.

This warranty is in lieu of all other express warranties, and the implied warranty of merchantability is limited to one year from purchase. This warranty does not cover the cost of installation, removal or reinstallation, or damage resulting from misuse, abuse, or improper or incorrect repair, or damage from improper wiring or installation. This warranty does not cover incidental or consequential damages. Lutron's liability on any claim for damages arising out of or in connection with the manufacture, sale, installation, delivery, or use of the unit shall never exceed the purchase price of the unit.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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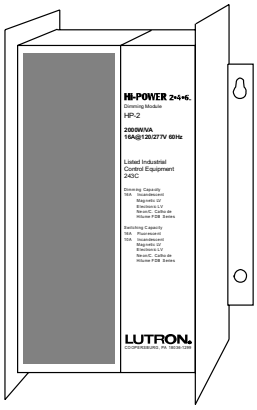
Made and printed in U.S.A. 8/03
P/N 032-119 Rev. B

Hi-POWER 2•4•6™

Installation Instructions

Please Leave for Occupant

HP-2, HP-4, & HP-6
Dimming Module
120/277VAC, 60Hz



Description

The Hi-POWER 2•4•6 Dimming Module provides the capability to control a large zone of lighting from either a Lutron incandescent wallbox dimmer or from Class 2 controls. Multiple modules can be used together in a system to control a total load of up to 30,000W/VA. The Hi-POWER 2•4•6 Dimming Module can dim 120V incandescent, magnetic low-voltage, electronic low-voltage, neon/cold-cathode loads, 277V magnetic low-voltage, and Lutron's Hi-lume® FDB-series and Eco-10™ 120V and 277V fluorescent dimming ballasts. It can also switch these loads (except Hi-lume FDB and Eco-10 ballasts) as well as metal halide and non-capacitive fluorescent loads.

Important Notes

Please Read Before Installation

1. Install in accordance with all local and national electrical codes.
2. **CAUTION:** Only a qualified electrician should install this system. Turn power OFF at circuit breakers or remove fuses before wiring. Do not wire with power on. Improper wiring can result in personal injury or damage to equipment. Damage to product caused by wiring with power on voids warranty.
3. Do not remove factory-installed bypass jumpers on load circuit terminals until load circuits are tested (see Start-up Procedure on page 5).
4. The Hi-POWER dimming modules are designed to operate in ambient temperatures between 0°C-40°C (32°F-104°F).
5. To reduce the risk of overheating and possible damage to other equipment, the module must be mounted as shown on page 2. Failure to provide adequate space for cooling may result in overheating and void the warranty.
6. Module hums slightly during operation and the internal relay clicks when the circuit is turned on and off. Choose an installation location where these sounds are acceptable.
7. Operation of dimmed low-voltage circuit with all lamps inoperative or removed may result in current flow in excess of normal levels. To avoid transformer overheating and possible failure, Lutron strongly recommends the following:
   a. Do not operate dimmed low-voltage circuits without lamps in place.
   b. Replace burned-out lamps immediately.
   c. Use transformers incorporating thermal protection or fused transformer primary windings to prevent transformer failure due to overcurrent.
8. Dimmed electronic low-voltage transformers may produce an audible noise when dimmed. For more information, call the toll-free ***Lutron Hotline*** at 1-800-523-9466.
9. See "Neon/Cold-Cathode Dimming" (pages 14-15) before attempting to dim neon/cold-cathode lamps.
10. For proper dimming performance fluorescent lamps must be operated at full intensity for 100 hours prior to dimming.

Electrical Ratings

Module		HP-2	HP-4	HP-6
Inputs Required	Control Circuit 120VAC, 60Hz	1 (20VA)	1 (20VA)	1 (20VA)
	Load Circuit 120/277[1-4] VAC, 60Hz	1	2	3
Outputs Available	Dimmed Hot	1	2	3
	Switched Hot	1	2	3
Minimum load per Module	Hi-lume FDB or Eco-10 ballasts	1	2	3
	All other loads	50W/VA	100W/VA	150W/VA
Heat Dissipation	BTU/Hr Maximum	200	400	600

Capacity of each Output [2,3]

Load Type	**Dimmed**	**Switched**[4]
Incandescent	16A (1920W)	10A
Magnetic Low-Voltage, Electronic Low-Voltage, or Neon/Cold-Cathode	16A (1920VA)	10A
Hi-lume FDB or Eco-10 Fluorescent	16A	–
Fluorescent (non-capacitive)	–	16A
Metal Halide	–	10A

[1] 277V Hi-lume FDB or Eco-10 fluorescent, or 277V magnetic low-voltage only.

[2] Any load circuit can be connected to any phase.

[3] Each load circuit may be connected to a different load type; however, load types cannot be mixed on the same circuit.

[4] Switched loads may be either 120 or 277VAC.

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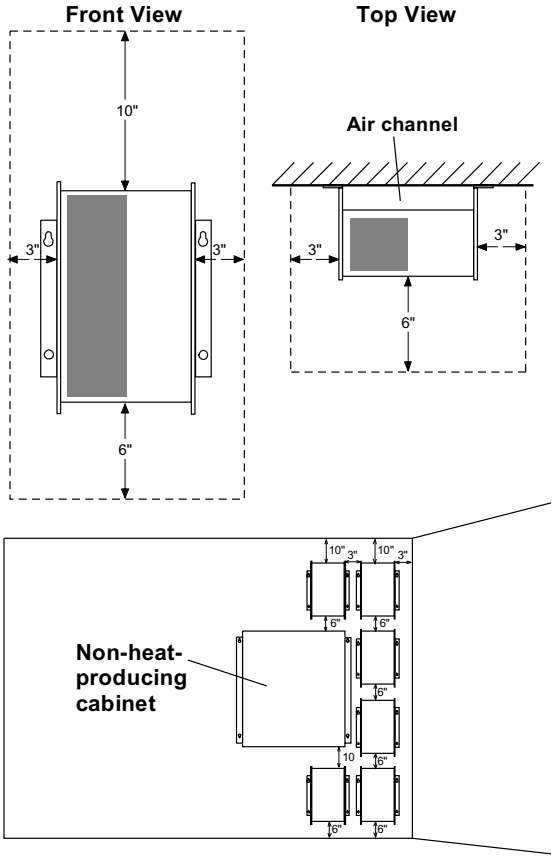
Mounting and Dimensions

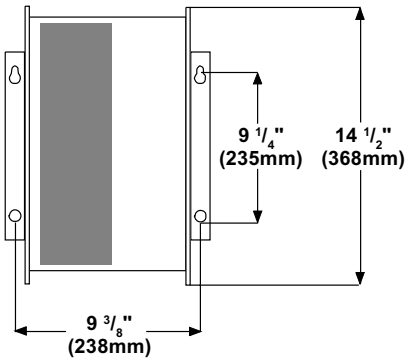
1. **Choose an appropriate location.**
   Select a convenient location such as an electrical closet or basement. Make sure location is at least 6' from sensitive equipment (and its wiring). Also, make sure to locate module where its sounds (relays clicking and slight humming) are acceptable. Ensure ambient temperatures are between 0°C-40°C (32°F-104°F). Module must be mounted away from steam pipes, direct sunlight, or other heat sources.
2. **Plan placement of modules (see below).**
   Modules must be mounted vertically. Make sure nothing blocks the air channel between the back of the module and the wall.
   - Leave 6" (152mm) of space above and below modules and 3" (76mm) of space on either side of modules.
   - Leave 10" (204mm) between the top of the module and the ceiling, and 6" (152mm) between the bottom of the module and the floor.
   - Leave 6" (152mm) of clearance in front of each module.

Airspace Required

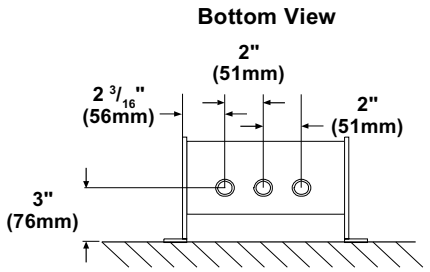


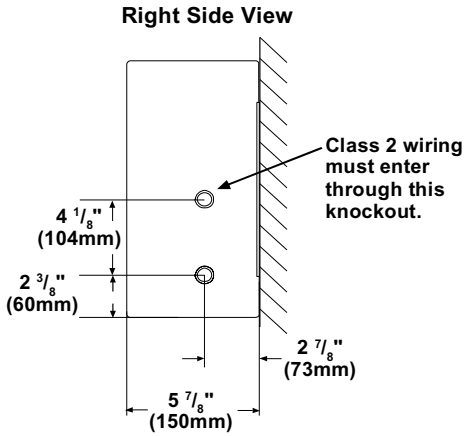
3. **Mount modules (see below).**
   Using the mounting dimensions shown below, mark (while keeping the module vertical), then drill mounting holes.
   Securely fasten the module to the wall. Mounting holes are keyed to facilitate mounting.

Mounting Dimensions



Knockout Locations





Wiring

WARNING: Turn power OFF to all circuits before installing any part of the Dimming System. Wiring with the power on can result in serious personal injury or damage to equipment.

1. Pull dedicated feeds.
For each circuit in the Hi-POWER module, pull a 20A dedicated feed: one circuit for the HP-2, two circuits for the HP-4, and three circuits for the HP-6 (see Typical System Wiring Diagram).

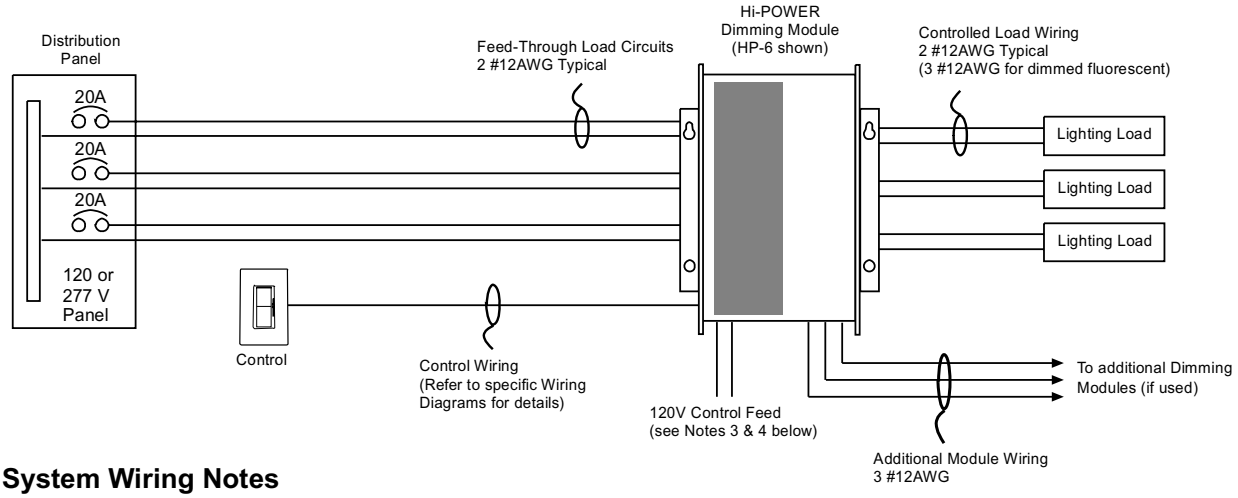
2. Provide control circuit power to first module.
The Hi-POWER module requires power to operate its circuitry. This control circuit can be wired from any of the dedicated feeds coming into the Hi-POWER module as long as they have an additional 20VA of capacity available for each Hi-Power module connected to the same control (refer to Power Feed Wiring Diagram on page 4 for terminal locations). Do not wire control circuit power to any additional modules.

IMPORTANT: If more than one module is used, only connect power to the control circuit of the first module.

For GRAFIK Eye systems, the control circuit must be on the same phase as the circuit for the GRAFIK Eye Control Units. Lutron recommends pulling the control circuit from the GRAFIK Eye Control Unit's feed circuit if 20VA additional capacity per Hi-POWER module is available. Alternately, power may be provided to the control circuit from any circuit with an excess capacity of 20VA per Hi-POWER module as long as the circuit is on the same phase as the GRAFIK Eye Control Unit (see Control Wiring Diagram 13 on page 11 for more information).

3. Wire between Hi-POWER modules.
If more than one Dimming Module is being operated from the same control, run 3 #12 wires from the Additional Module Terminals on the first module to the Additional Module Terminals on the next. No connection is made to the Control Circuit Terminals on the additional modules. Wire additional modules until all are connected in a line. See Power Feed Wiring Diagram on page 4 for location of the Additional Module Terminals. Wiring is 1 to 1, 2 to 2, 3 to 3. Do not cross wires.

Typical System Wiring Diagram



System Wiring Notes

1. Load circuit input feeds can be connected to any phase.
2. Power and control wires must be run in separate raceways. Run individual neutrals for each input and load circuit.
3. Module requires a 120V control circuit input feed. It can be provided from any source, such as one of the load circuits, with 20VA of spare capacity for each Hi-POWER module in the system (For GRAFIK Eye 3000, the control circuit feed must be on same phase as the power for the GRAFIK Eye Control Unit.) If necessary, a 277:120V, 100VA transformer may be used to obtain proper input. (Examples are Acme #TA-2-81303, Hammond Mfg. #MH100GP, or equivalents.)
4. In systems with more than one dimming module per lighting zone, connect feed to control circuit of first module only. **Control circuits must be 120V only**.
5. The diagram represents a three load circuit model (HP-6). For one circuit (HP-2) or two circuit (HP-4) applications, the number of circuits controlled differs, but the wiring will be the same. A different load type may be used on each circuit if desired. However, do not mix load types on the same load circuit.
6. 15A circuit breakers may be used in place of 20A circuit breakers. Do not exceed 1440W per 15A circuit.

4. Wire to Controlled Loads.

Load wiring differs depending on the load type and whether the load is dimmed or switched (see below). Refer to Load Wiring Diagrams on page 7 for load wiring specifics.

	Load Wiring Diagram	
Load Type	**Dimmed**	**Switched**
Incandescent	1	3
Magnetic Low-Voltage	1	3
Electronic Low-Voltage	1	3
Neon/Cold-Cathode	1	3
Hi-lume FDB	2	–
Eco-10	2	–
Fluorescent (non-capacitive)	–	3
Metal Halide	–	3

NOTE: Electronic and magnetic low-voltage transformers may create an audible noise when connected to a dimmer.

5. Wire to Controls.

Control wiring will vary depending on the type of control being used. Refer to the appropriate page for the necessary control wiring:

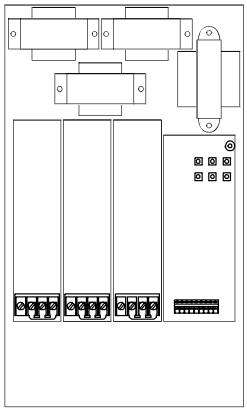
Control Type	Control Wiring Diagram	Page
Single-pole dimmer*	1	8
Mechanical 3-way dimmer*	2-4	8
Maestro	5-7	9
Vareo	8-10	10
Nova T* Infrared	11	11
Nova T* Omnislide	12	11
GRAFIK Eye 3000	13	11
Class 2 Control (raise/lower)	14	12-13

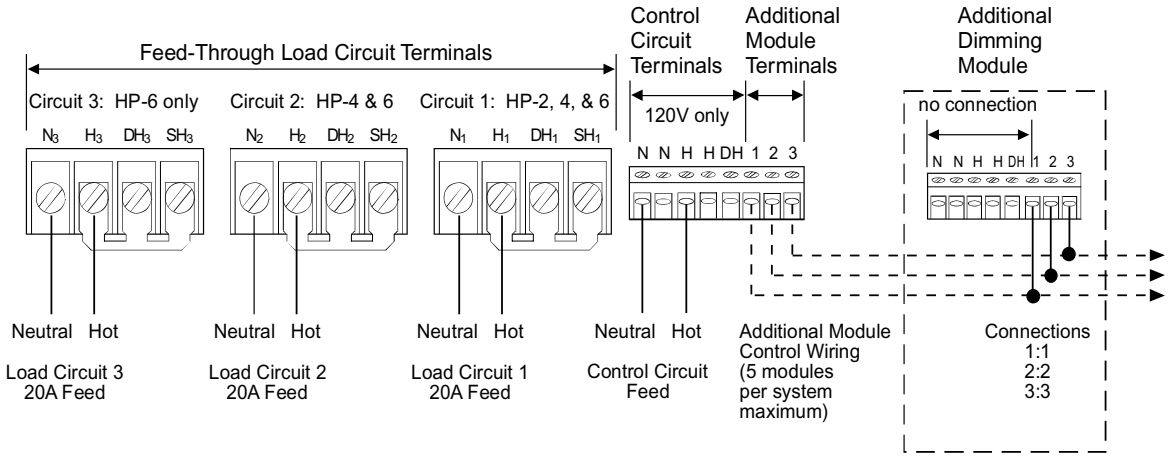
* Rotary, Glyder, Ariadni, Skylark, Diva, Luméa, Nova T* Slide-to-Off, Nova T* Preset, Nova Slide-to-Off, Nova Preset, Centurion, and Athena.

6. Start-up system.

Go to Start-up Procedure on page 5 to put the dimming system in operation.

Power Feed Wiring Diagram





Start-up Procedure

Check Load Circuits.

1. Make sure the factory-installed bypass jumper(s) are still in place between the H (Hot), SH (Switched Hot), and DH (Dimmed Hot) terminals of each load circuit. Replace module cover. Turn circuit breakers on for each load circuit (1 circuit for HP-2, 2 circuits for HP-4, and 3 circuits for HP-6). Each Load Circuit Indicator Light inside the dimming module should light to full intensity.
2. Check the input current to the Hot terminal of each load circuit with a “clamp-on” type current probe. The current should be no more than 16A for dimmed loads or 10A for switched loads (16A for non-capacitive fluorescent). See diagram.
3. Turn loads ON for at least 10 minutes. If any circuit breaker trips, turn power OFF, then locate and correct miswire or overload.
4. Repeat the above steps until the circuit breaker does not trip. If the Hi-POWER module is controlled by a line voltage dimmer, proceed to Check Control Circuit section (next column). If the module is controlled by Class 2 controls, proceed to "Remove Bypass Jumpers" (next column).

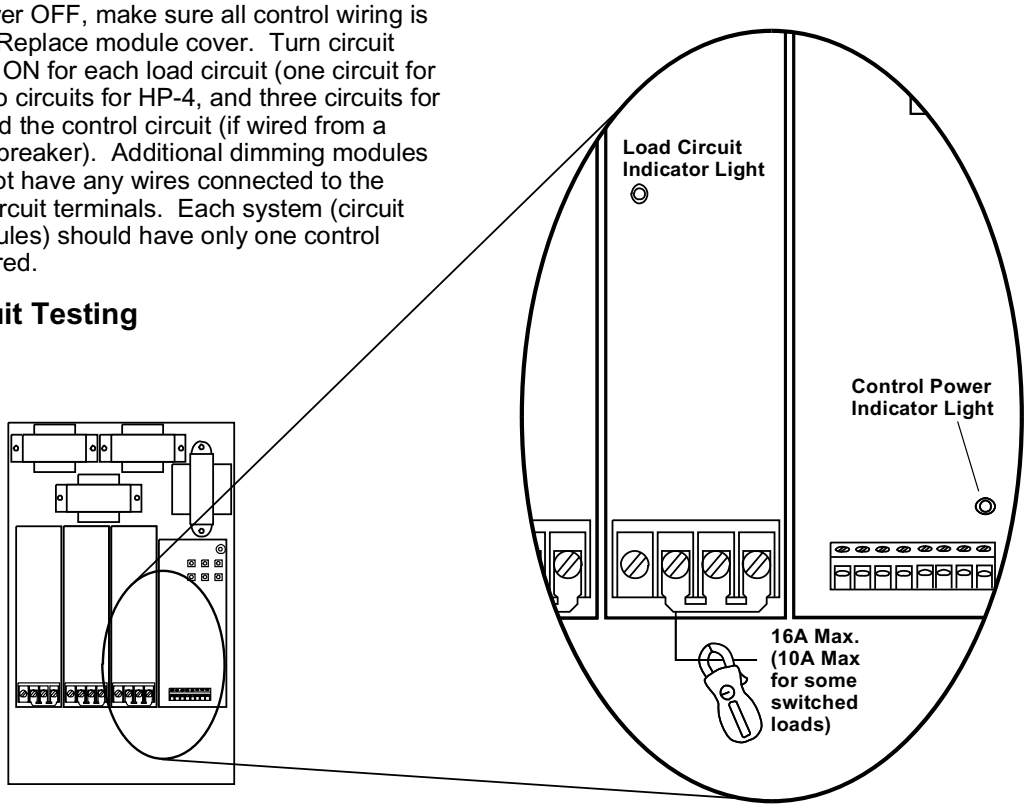
Check Control Circuit (line-voltage dimmer only).

1. With power OFF, make sure all control wiring is correct. Replace module cover. Turn circuit breakers ON for each load circuit (one circuit for HP-2, two circuits for HP-4, and three circuits for HP-6) and the control circuit (if wired from a different breaker). Additional dimming modules should not have any wires connected to the control circuit terminals. Each system (circuit and modules) should have only one control circuit wired.
2. Adjust slider/knob/rocker on control, then switch control on and off. The lighting should remain on full, but the control power indicator light should dim up and down and/or switch on or off as the control is adjusted. Make sure the Load Circuit Indicator Lights are not dimming or switching on or off with the control. If they are, control and load wiring are incorrect. Correct wiring errors and repeat Start-up Procedure.

Remove Bypass Jumpers.

1. Turn power OFF. Make sure to remove power from all circuits providing power to the Hi-POWER dimming module.
2. Remove the load circuit bypass jumper(s) from all modules. Do not remove factory-installed jumper from Class 2 terminal block when using Lutron NTRCS-1, NRCS-1, and RCS-1 controls. See wiring diagram on pages 12-13 for details.
3. Turn power ON to all circuits. Test the control(s) to make sure they adjust the light level. The system should now function properly. If not, refer to the Troubleshooting section on page 16.
4. Proceed to Calibration on page 6.

Load Circuit Testing



Calibration

High-End and Low-End Trim Adjustment
The high-end and low-end light levels are adjustable to get the best dimming range for the particular application and load type.

- **For Lutron Hi-lume or ECO-10 fluorescent loads:** This unit is factory-calibrated and does not require low-end light adjustment. If lamps flicker or drop out at minimum dimming level there may be an installation error. Continued use of the system in this mode will cause premature lamp failure. If this is occurring, call the ***Lutron Hotline*** at 1-800-523-9466. For proper dimming performance fluorescent lamps must be operated at full intensity for 100 hours.
- **For incandescent, magnetic low-voltage, and electronic low-voltage loads:** Some adjustment will be necessary to achieve full-range dimming.
- **For neon/cold-cathode loads:** Depending on the installation, you may be able to achieve a lower dimming range. The low-end should be adjusted so that no flickering occurs or the transformer may fail prematurely.

Control Adjustment: Line-voltage incandescent dimmer

CAUTION: For all adjustments, use the supplied non-conductive probe. Failure to do so can result in personal injury or damage to equipment. Do not use screwdriver or finger.

High-End Trim

1. Adjust the wall control to its full intensity position.
2. Using the non-conductive probe, push the small buttons labeled “RAISE” or “LOWER” (see diagram at right) to make the high-end light level brighter or dimmer.
3. Repeat for each load circuit as necessary.

Low-End Trim

1. Adjust the wall control to its minimum position.
2. Using the non-conductive probe, push the small buttons labeled “RAISE” or “LOWER” (see diagram at right) to make the low-end light level brighter or dimmer.
3. Repeat for each load circuit as necessary.

Control Adjustment: Class 2 Raise/Lower

CAUTION: For all adjustments, use the supplied non-conductive probe. Failure to do so can result in personal injury or damage to equipment. Do not use screwdriver or finger.

High-End Trim

1. Using the non-conductive probe, turn the Fade Rate Adjust (see figure below) fully counterclockwise.
2. Activate the raise function on the control for 10 seconds to bring the lights to their maximum intensity.
3. Using the non-conductive probe, push the small buttons labeled “RAISE” or “LOWER” (see figure below) to make the high end light level brighter or dimmer.
4. Repeat for each load circuit as necessary.

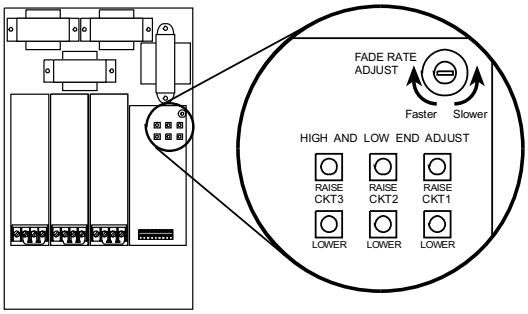
Low-End Trim

1. Using the non-conductive probe, turn the Fade Rate Adjust (see figure below) fully counterclockwise.
2. Activate the lower function on the control for 10 seconds to bring the lights to their minimum intensity.
3. Using the non-conductive probe, push the small buttons labeled “RAISE” or “LOWER” to make the low-end light level brighter or dimmer.
4. Repeat for each load circuit as necessary.

Fade Rate Adjustment (Class 2 controls only)

The fade rate is the time it takes for the lights to go from the lowest to highest intensity (or vice-versa) when activating a Class 2 wired raise/lower control. If you are using Class 2 wired NTRCS-1, NRCS-1, or RCS-1 multi-location wall controls, the Hi-POWER module is factory preset to the fastest fade rate. The fade rate can be changed in increments of approximately 2, 4, 8, 15, 30, and 60 seconds. Use the non-conductive probe to turn the Fade Rate Adjust (see figure below) clockwise to fade faster or counterclockwise to fade slower.

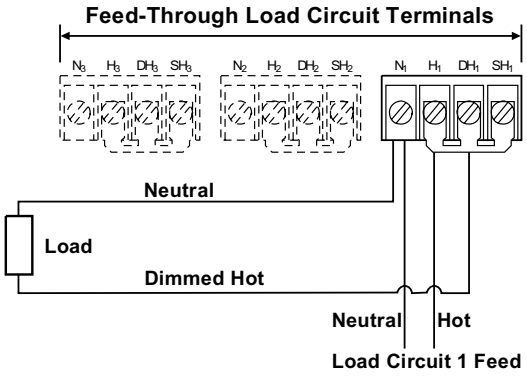
Intensity and Fade Adjust Location



Load Wiring

Diagram 1

Dimmed loads:
Incandescent, Magnetic Low-Voltage, Electronic Low-Voltage, Neon/Cold-Cathode

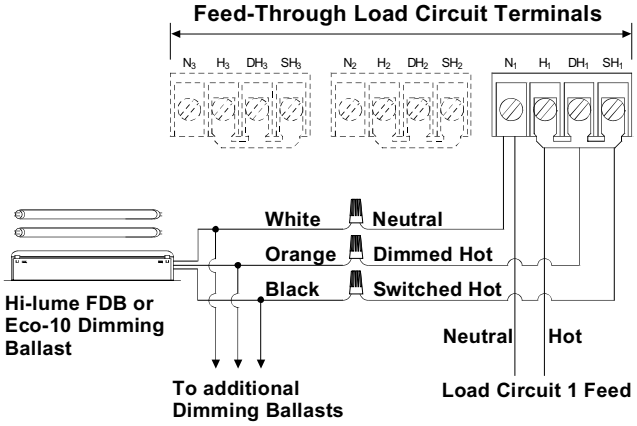


Wiring notes:

1. For Neon/Cold-Cathode loads, refer to pages 14 and 15 for proper installation.
2. Terminal blocks are rated for 2 #12 AWG max.
3. Load wiring must be 120VAC.
4. The diagrams represent a single load circuit model (HP-2). For two circuit (HP-4) or three circuit (HP-6) applications, repeat the same wiring method for each circuit. A different load type may be used on each circuit if desired. However, do not mix load types on the same load circuit.

Diagram 2

Dimmed Loads:
Hi-lume FDB and Eco-10 Fluorescent Dimming Ballasts

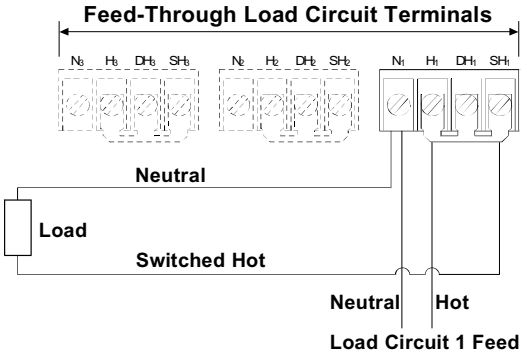


Wiring notes:

1. Use only Lutron Hi-lume or Eco-10 Fluorescent Dimming Ballasts.
2. Terminal blocks are rated for 2 #12 AWG max.
3. Load wiring may be 120VAC or 277VAC. Control circuit must be 120VAC.
4. The diagrams represent a single load circuit model (HP-2). For two circuit (HP-4) or three circuit (HP-6) applications, repeat the same wiring method for each circuit. A different load type may be used on each circuit if desired. However, do not mix load types on the same load circuit.

Diagram 3

Switched loads:
Incandescent, Magnetic Low-Voltage, Electronic Low-Voltage, Neon/Cold-Cathode, Non-Capacitive Fluorescent, and Metal Halide



Wiring notes:

1. Terminal blocks are rated for 2 #12 AWG max.
2. Load wiring may be 120VAC or 277VAC. Control circuit must be 120VAC.
3. The diagram represented a single load circuit model (HP-2). For two circuit (HP-4) or three circuit (HP-6) applications, repeat the same wiring method for each circuit. A different load type may be used on each circuit if desired. However, do not mix load types on the same load circuit.

Control Wiring

Diagram 1: Single-pole Dimmer

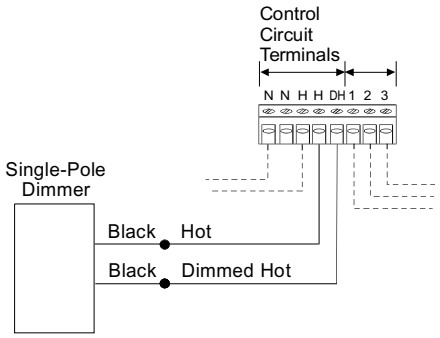


Diagram 2: Mechanical 3-way Dimmer (Single location)

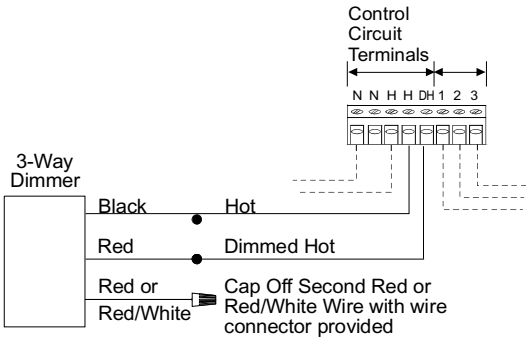


Diagram 3: Mechanical 3-way Dimmer (Two location)

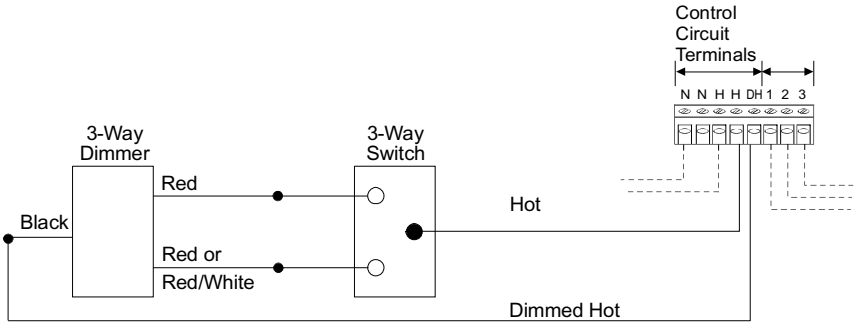
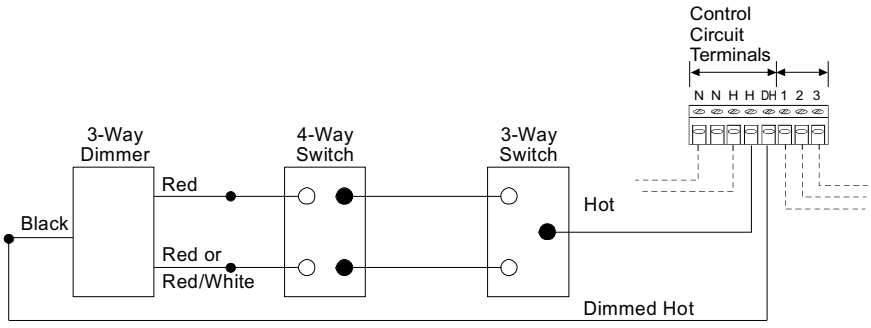


Diagram 4: Mechanical 3-way Dimmer (Three location)



Control Wiring

Diagram 5: Maestro Incandescent Dimmer (Single location)

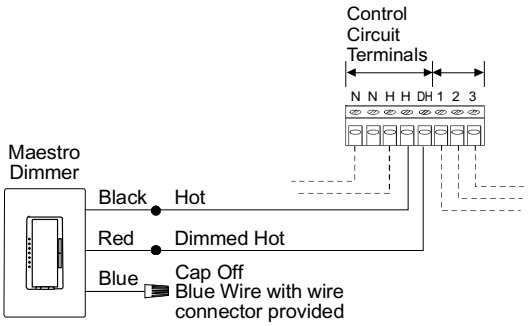


Diagram 6: Maestro Incandescent Dimmer (Two location)

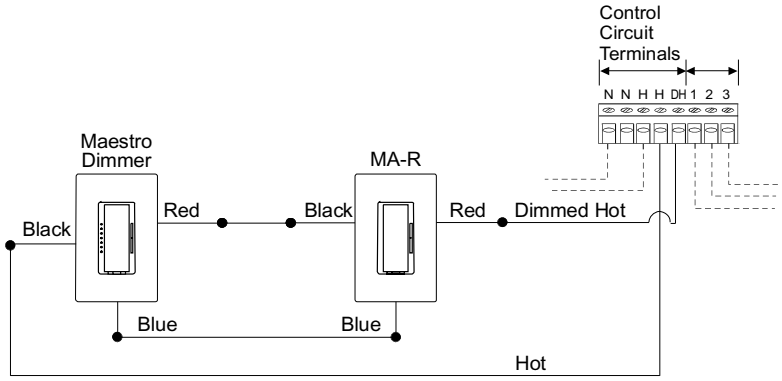
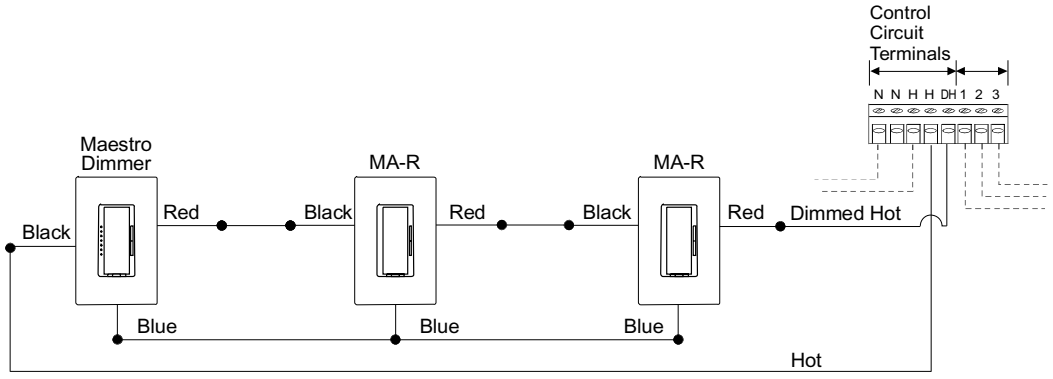


Diagram 7: Maestro Incandescent Dimmer (Three location)



Control Wiring

Diagram 8: Vareo Dimmer (Single location)

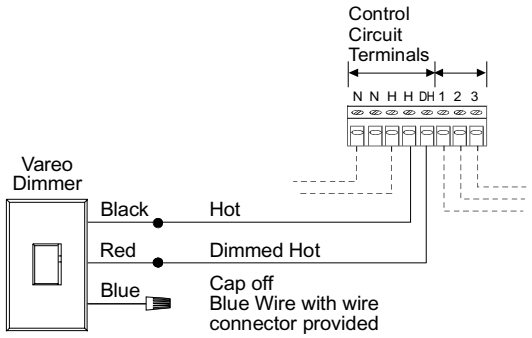


Diagram 9: Vareo Dimmer (Two location)

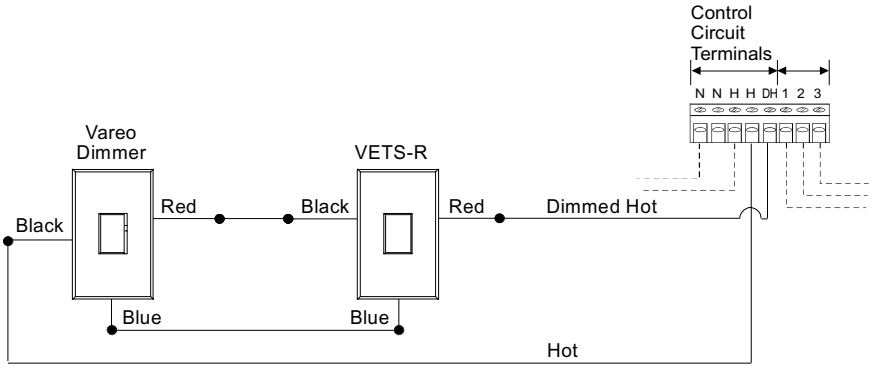
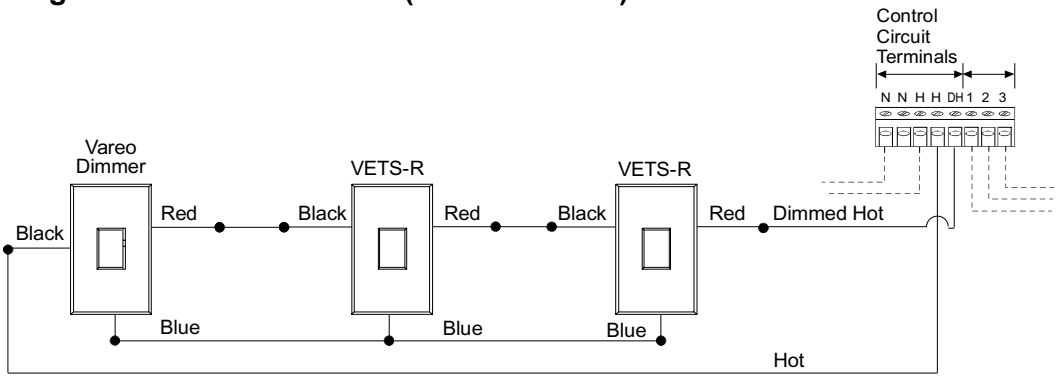


Diagram 10: Vareo Dimmer (Three location)



Control Wiring

Diagram 11: Nova T* Infrared Dimmer

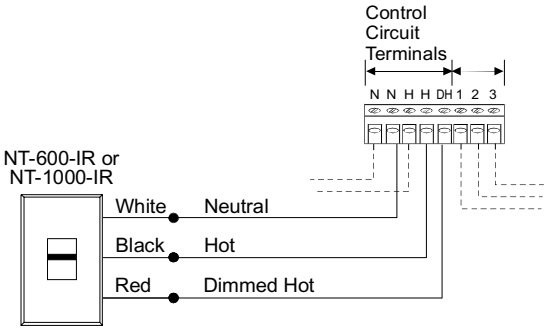


Diagram 12: Nova T* Omnislide Dimmers (Two location)

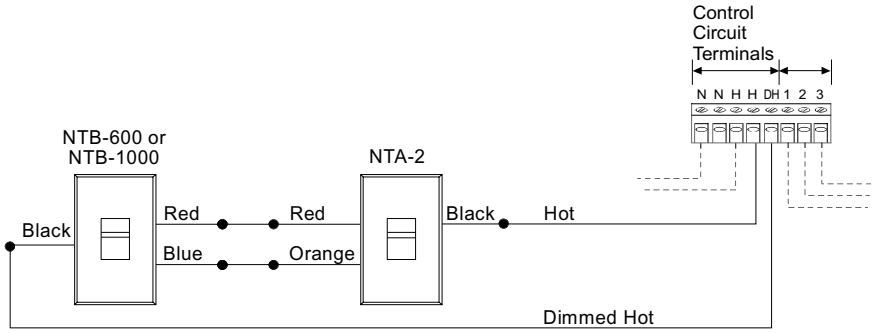
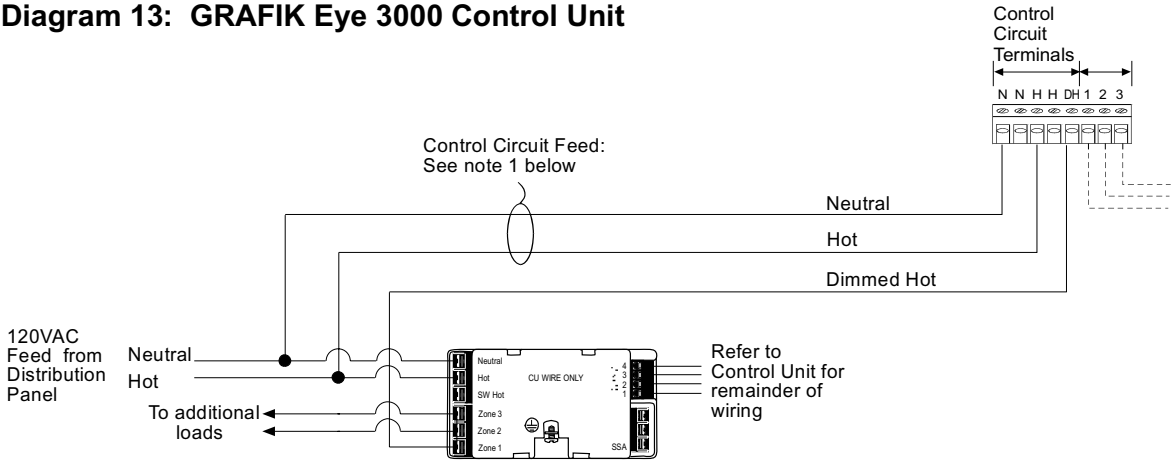


Diagram 13: GRAFIK Eye 3000 Control Unit



Rear View of GRAFIK Eye Control Unit
(GRX-3003 shown)

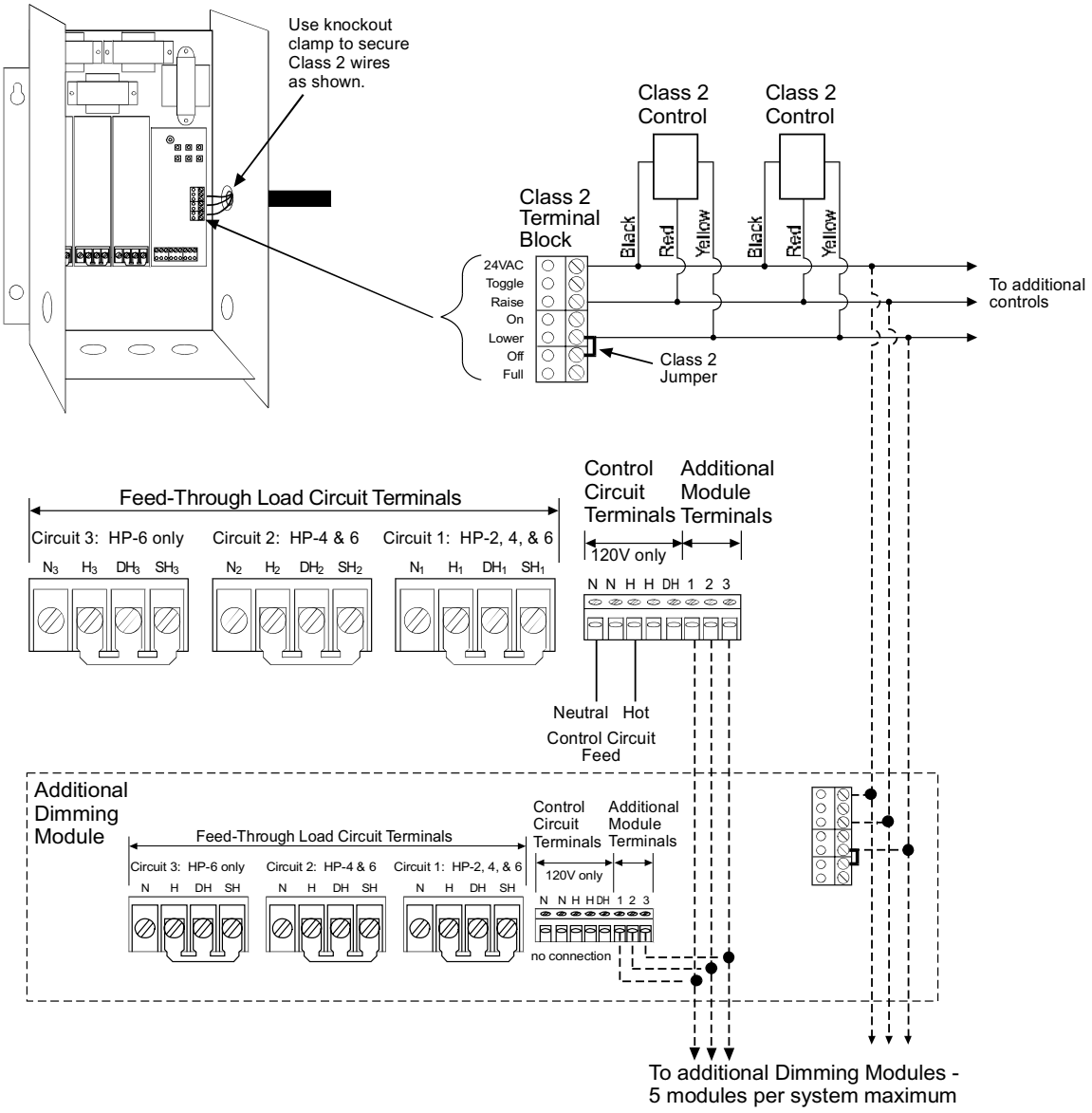
GRAFIK Eye 3000 Wiring Notes:

1. Control Circuit feed is shown coming from the GRAFIK Eye Control Unit's feed. The load for each Hi-POWER module connected to the circuit is 20VA. If the circuit does not have sufficient capacity to support the load of the module(s), the Control Circuit feed can be supplied from any circuit with sufficient capacity as long as it is on the **same phase** as the GRAFIK Eye Control Unit.
2. Load type should be set as incandescent on the GRAFIK Eye Control Unit.
3. Dimmed Hot is shown as Zone 1 in the diagram, but can be provided from any zone on the Control Unit.
4. Refer to GRAFIK Eye Installation Sheet for remainder of Control Unit wiring.

Control Wiring

Diagram 14: Class 2 Controls: NTRCS-1, NRCS-1, RCS-1

These controls provide single-location or multi-location raise/lower dimming with "off" at low-end. For other Class 2 control options refer to page 13.



Class 2 Wiring Notes:

1. Class 2 terminal block is removable. It is packaged loose with the dimming module.
2. Position terminal block so wires exit as shown through the knockout indicated. Class 2 wiring must exit through this knockout.
3. To avoid contact between Class 2 wires and branch circuit wiring below, maintain 1-1/2" or less of Class 2 wiring within the enclosure. Do not leave any extra wire within the enclosure. Secure wiring using a knockout clamp.
4. **DO NOT** remove Class 2 factory bypass jumper between the Lower and Off terminals when using NTRCS-1, NRCS-1, or RCS-1 controls.

Class 2 Control Options

Definitions of Control Options

RAISE Increases the light level while the switch is activated.

LOWER Decreases light level while the switch is activated. Does not turn lights off.

LOWER/OFF Decreases light level while the switch is activated. Turns lights off after the low-end is reached.

ON Fades lights on to preset level.

OFF Fades lights off.

TOGGLE Fades lights on to preset level if they are off, fades lights off if they are on.

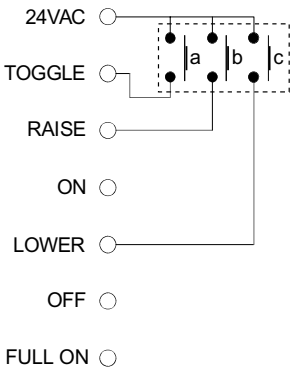
FULL ON Turns lights on instantly to full when the switch is activated. No other control options are available while this switch is activated. Must be a maintained switch closure.

FADE RATE Rate at which the light level changes while you activate a control option (for example, the rate at which the light level changes as you hold the RAISE button and the rate at which the lights fade on or off when you press the on or off). For all of the above options except “full on”, the FADE RATE is adjustable inside the dimming module. See page 6 for location and adjustment instructions.

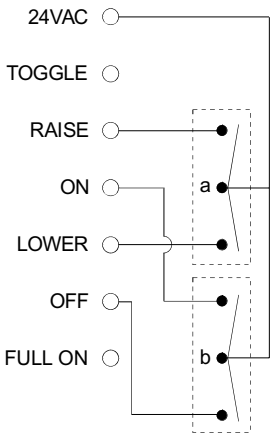
How to Access Control Options:

The desired Control Option is accessed with a 24VAC switch closure. Switch closures must be rated for switching 5mA at 24VAC RMS. See the chart below for the specific terminations of the switch closure on the Class 2 terminal block and type of switch closure permissible. See page 12 for the Class 2 terminal block location and terminal designations.

Typical Class 2 Control Wiring Examples:



Example 1: Three SPST momentary pushbuttons. Switch "a" controls the TOGGLE on/off function. Switch "b" controls the RAISE function. Switch "c" controls the LOWER function.



Example 2: Two momentary, center off SPDT switches. Switch "a" performs the RAISE and LOWER functions. Switch "b" performs the ON/OFF functions.

Control Option	Switch Closure Between:	Switch Closure Type
RAISE	RAISE and 24VAC terminals	Either momentary or maintained
LOWER	LOWER and 24VAC terminals Remove factory installed jumper between LOWER & OFF terminals	Either momentary or maintained
LOWER/OFF	LOWER and 24VAC terminals DO NOT remove factory installed jumper between LOWER & OFF terminals	Either momentary or maintained
ON	24VAC and ON	Either momentary or maintained
OFF	24VAC and OFF	Either momentary or maintained
TOGGLE	24VAC and TOGGLE	Must be momentary
FULL ON	24VAC and FULL ON	Must be maintained

Neon/Cold-Cathode Dimming

Overview

Successful dimming of neon and cold-cathode sources can be achieved through proper equipment selection and installation. The following installation suggestions and Derated Luminous Tube Length Chart for Dimming Applications must be used for optimum performance.

1. If equipment is selected and installed as specified here, a dimming range of 95-10% light should be possible.
2. The electrical properties of argon fill gas make it easier to dim than red neon fill gas; therefore, installations using argon fill gas will be more successful than neon installations.
3. In addition to the following guidelines, all installations must meet the NEC and local codes.

Lamps

1. Neon/cold-cathode lamps must be manufactured to proper lamp pressurization (standard lamp pressure) without impurities. If pressurization is not standard or impurities are present, poor performance will result.
2. Neon/cold-cathode tubing should be well supported to avoid rattling when dimmed.
3. Lutron recommends using only the transformer/ tube combinations in the Derated Luminous Tube Length Chart for Dimming Applications. Other combinations will flicker and perform poorly. Note that there are few successful combinations for red neon tubes smaller than 11 mm.

Transformers

1. Normal power factor transformers must be used; electronic transformers cannot be dimmed.
2. When choosing transformer secondary currents, note that the higher the transformer current rating, the brighter the light from the tube.
3. Transformers must be sized according to the chart. These modified charts must be used by neon/cold-cathode transformer suppliers to size the transformer for dimming applications. Do not use standard luminous tube length charts to size transformers in dimming applications. Poor performance will result.
4. Transformers must be thermally-protected or fused.
5. Power factor correction capacitors, if present must be disconnected. If power correction is required, call the toll-free ***Lutron Hotline*** for details on power factor correction at the lighting controller.
6. Transformers should be sized to run as close as possible to full load footage as shown in the chart.

Wiring

1. High voltage (GTO-15) cable connecting a transformer output terminal to a cold-cathode tube must not be longer than twenty feet.
2. All GTO-15 cables should be spaced a minimum of four inches from any other GTO-15 cable.
3. It is recommended that only one GTO-15 cable be run per conduit.
4. Optimal dimming performance is achieved when GTO-15 cable is enclosed in plastic conduit or run without conduit. If codes require metal conduit, aluminum is preferred and lengths must be kept to less than six feet per transformer.
5. Braided or shielded GTO-15 cable must not be used for dimming applications.

Luminous Tube Length Chart for Neon/Cold-cathode Dimming Applications

Transformer Ratings			Approximate number of feet of tubing																				
Secondary Voltage (V)	Secondary Short Circuit Current (mA)	Input Volt-Amperes with Secondary Short Circuit (VA)	Neon Fill (clear or fluorescent red)											Argon /Mercury Fill (colors other than neon red)										
			Tube Size (millimeters)											Tube Size (millimeters)										
			25	22	20	18	15	14	13	12	11	10	9	25	22	20	18	15	14	13	12	11	10	9
15000	60	900	77	64	58	54	45	X	X	X	X	X	X	96	80	72	64	58	51	48	44	38	35	X
	30	450	77	64	58	54	45	X	X	X	X	X	X	96	80	72	64	58	51	48	44	38	35	X
	20	270					X	X	X	X	X	X	X					X	X	X	X	X	X	X
12000	60	720	59	50	46	41	34	32	29	26	X	X	X	76	63	56	50	44	40	37	35	30	28	X
	30	360	59	50	46	41	34	32	29	26	X	X	X	76	63	56	50	44	40	37	35	30	28	X
	20	225					X	X	X	X	X	X	X					X	X	X	X	X	X	X
9000	120	1080	58	49	41	35	28	25	25	23	20	17	X	74	62	50	42	37	33	30	28	26	22	X
	60	540	50	43	36	30	25	23	22	20	18	16	X	64	54	44	36	32	29	26	26	22	20	X
	30	270	50	43	36	30	25	23	22	20	X	X	X	64	54	44	36	32	29	26	26	22	20	X
	20	180					21	20	18	16	X	X	X					27	25	23	22	18	16	X
7500	120	900	44	35	29	24	22	20	20	17	16	14	X	56	44	36	31	28	26	25	22	20	18	X
	60	450	38	31	25	21	20	18	16	16	14	13	X	49	38	31	28	25	22	22	20	18	16	X
	30	225	38	31	25	21	20	18	16	16	X	X	X	49	38	31	28	25	22	22	20	18	16	X
	20	150					16	16	15	14	X	X	X					22	20	18	17	15	14	X
6000	120	720	35	29	24	20	18	16	16	14	13	11	X	44	37	30	26	22	21	20	18	16	14	X
	60	360	30	25	21	17	16	14	14	12	11	10	X	38	32	26	22	19	18	17	15	14	13	X
	30	180	30	25	21	17	16	14	14	12	X	X	X	38	32	26	22	19	18	17	15	14	13	X
	20	130					14	13	12	10	X	X	X					18	16	14	14	12	10	X
5000	120	600	28	24	20	16	15	14	13	10	9	8	X	37	30	25	21	18	18	15	14	12	10	X
	60	300	25	21	17	14	13	12	11	9	8	8	X	32	26	22	18	16	15	13	13	10	10	X
	30	160	25	21	17	14	13	12	11	9	X	X	X	32	26	22	18	16	15	13	13	10	10	X
	20	100					11	10	10	8	X	X	X					14	13	12	11	9	8	X
4000	60	240	20	17	14	12	10	9	8	8	7	6	X	26	22	18	15	14	13	12	11	9	8	X
	30	140	20	17	14	12	10	9	8	8	X	X	X	26	22	18	15	14	13	12	11	9	8	X
	20	90					8	8	8	7	X	X	X					11	10	10	10	7	6	X
3000	60	180	13	10	9	8	8	7	7	6	5	5	X	18	14	13	11	10	9	8	7	6	6	X
	30	100	13	10	9	8	8	7	7	6	5	5	X	18	14	13	11	10	9	8	7	6	6	X
	20	75					6	6	5	5	4	3	X					8	7	6	6	5	4	X
2000	30	75					5	5	5	5	X	X	X					7	6	6	6	5	4	X
	20	50					5	4	4	4	X	X	X					6	6	6	5	4	3	X
Recommended gas pressure, mm/Hg			6	7	7.5	8	9	10	10	11	12	13		6	7	7.5	8	9	10	10	11	12	13	

NOTES:

- This table has been modified for dimming applications. When calculating total length of tube, add approximately 1 foot for each section of tubing (each pair of electrodes).
- **Do not** use this table for non-dimming installations.
- X denotes a combination which cannot be successfully dimmed.
- Tube length is shown in feet. To convert to meters: 1 foot = 0.305 meters.

WARNING: Potentially hazardous high voltage can be present. Testing, handling, and servicing should be performed only by a qualified electrician.

Troubleshooting Guide

Symptom	Causes	Solution
Lights do not come on.	Load input feed power not present	Check load power indicator light(s) and verify that all input breakers are on and wiring is connected properly.
	Control input feed power is not present.	Check control power indicator light and verify that the control wiring is connected properly.
Lights cannot be dimmed.	Bypass jumpers are not removed.	Remove bypass jumpers on load circuit terminal blocks.
	Dimmed load is miswired to switched hot output load terminal.	Compare load wiring to wiring diagrams on page 7.
	Low-end trim is set too high.	Refer to page 6 and adjust low-end trim.
	Control dimmer is not operating properly.	Check that Control Power Indicator Light dims when control is adjusted; check wiring.
	Shorted triac - usually caused by a load short or overload.	Try to adjust high-end or low-end trim. If lights remain at full, triac is shorted. Contact Lutron for a Replacement Triac Kit . Verify proper load size and load wiring before replacing triac.
Portion of slider travel does not affect light level.	High- and/or low-end trim need adjustment.	Refer to page 6 and adjust high- and/or low-end trim settings.
Hi-lume FDB or Eco-10 lamps flicker at low-end.	Lamps not operated at full intensity before dimming.	Operate lamps at full intensity for 100 hours prior to dimming.
	Hi-lume FDB or ECO 10 ballasts improperly wired to Dimming Module.	Refer to wiring diagram on page 7 and correct wiring.
Neon lamps flicker at low-end.	Low-end trim is set too low.	Refer to page 6 and adjust low-end trim.
	There is a problem with the neon installation.	Refer to pages 14 and 15 for approved neon dimming installation specifications.
Switched load does not turn off.	Bypass jumper not removed.	Remove bypass jumpers on load circuit terminal blocks.
Lights do not dim low enough.	Low-end trim needs adjustment.	Refer to page 6 and adjust low-end trim.
Lights do not brighten to full or remain at low-end.	High-end trim is set too low.	Refer to page 6 and adjust high-end trim.
Lights on different dimming modules dim at different rates when using Class 2 raise/ lower controls.	Fade rate adjustment set differently on each module.	Refer to page 6 and adjust fade rates so that they are the same.
Circuit breaker trips on power up.	Additional dimming module slaves wired incorrectly.	Compare additional module wiring to diagrams on page 4.

Worldwide Technical and Sales Assistance

If you need assistance, call the toll-free ***Lutron Technical Assistance Hotline***:
(800) 523-9466 (U.S.A., Canada and the Caribbean)
Other countries call (610) 282-3800
FAX (610) 282-3090

Warranty

Lutron will, at its option, repair or replace any control that is defective in materials or manufacture within one year after the purchase. For warranty service, return control to place of purchase or mail to Lutron at 7200 Suter Road, Coopersburg, PA 18036-1299, postage prepaid.
This warranty is in lieu of all other warranties, express or implied, and the implied warranty of merchantability is limited to one year from purchase. This warranty does not cover the cost of installation, removal, or reinstallation, or damage resulting from misuse, abuse, or improper wiring or installation.
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty may last, so the above limitations and exclusions may not apply to you.

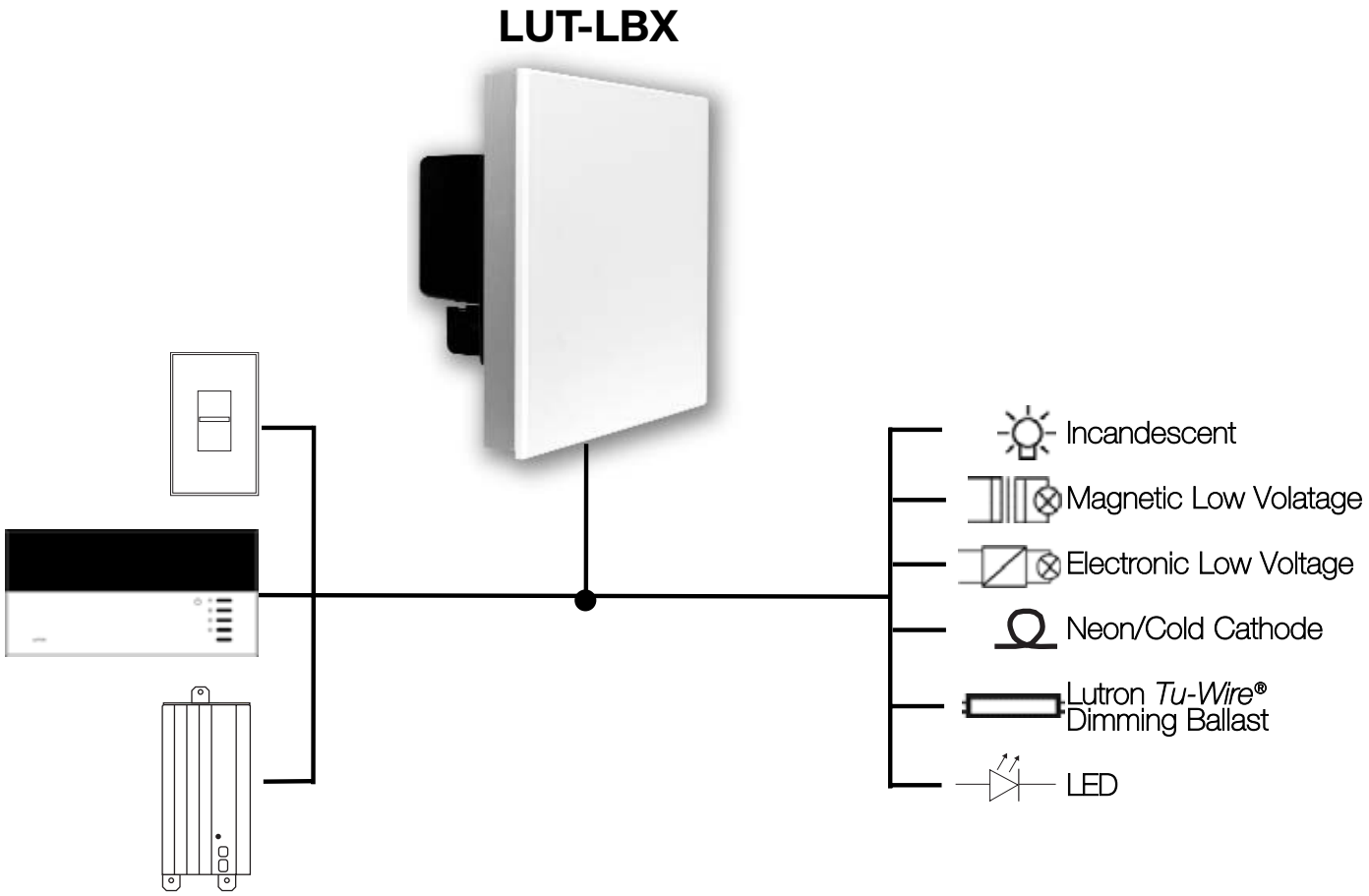
LUTRON®

Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299 USA
Made and Printed in U.S.A. 6/96 P/N 030-452 Rev. B

LUT-LBX Synthetic Minimum Load
For use with Reverse and Forward Phase Dimmers

Installation Instructions

Please Read



- This device provides capability for certain Lutron dimmers to control low-wattage loads from 0 watts up to the dimmer's minimum rating.
- It presents a simulated load to the dimmer to meet the minimum load requirements even when the actual load is smaller.

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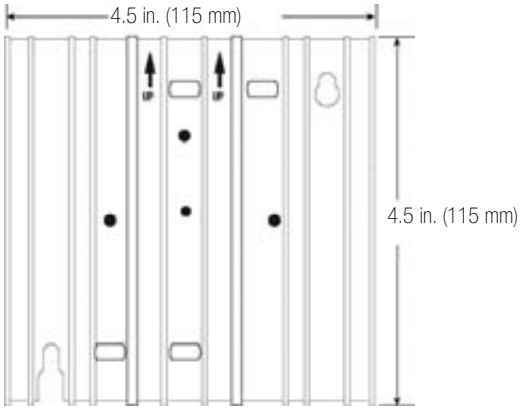
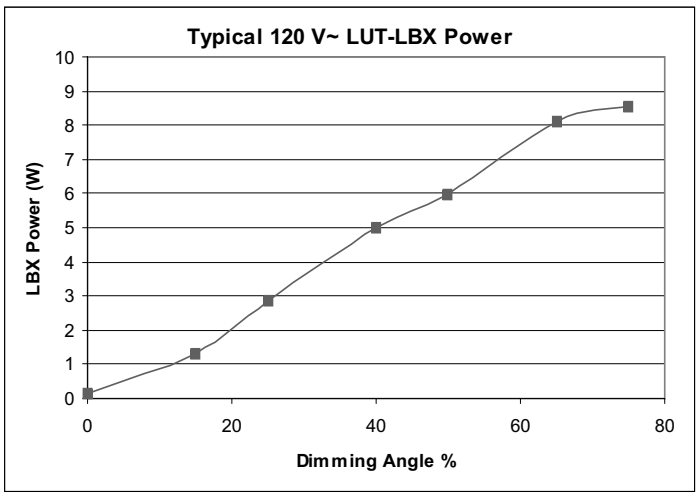


Interface shown with faceplate removed

This "load-side" equipment installs on the zone wiring in parallel with the lighting load. It provides an equivalent minimum load for Lutron dimmers when the actual load is too low for proper control unit operation.

Input:

- 120 V~ 100 mA 50/60 Hz (LUT-LBX)
- Power dissipation less than 10 watts

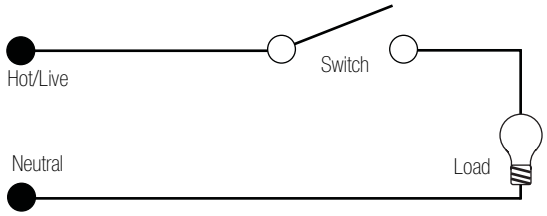


Danger! Always turn OFF the circuit breakers/MCB or remove the main fuses from the power line before doing any work. Failure to do so can result in serious personal injury. **Disconnect all power sources before servicing unit.**

1. This Interface must be installed by a qualified electrician in accordance with all applicable regulations.
2. Improper wiring can result in personal injury, damage to the Interface, or damage to other equipment.
3. One **LUT-LBX** per circuit below minimum load.
4. The **LUT-LBX** must be mounted with arrows on yoke facing upward to ensure adequate cooling.
5. **CAUTION!** Dimmed magnetic low-voltage transformers: To avoid excessively high current flow that can cause transformer overheating and failure, observe the following:
   (a) Do not operate the MLV dimmers with all of the lamps removed or with any lamps inoperative.
   (b) Replace any burned out lamps immediately.
   (c) Use only transformers that incorporate thermal protection or fused primary windings.
6. The LUT-LBX does not change the approved load types of the dimmer. Use the required dimmer for the given load type.
7. For LED lighting dimming operation, refer to Application Note #138.

Test load for short circuits

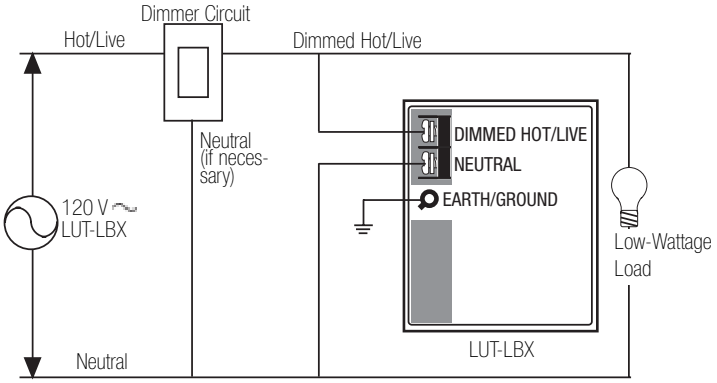
- Turn power Off.
- Connect standard switch between Hot/Live lead and the load wire to test circuit.
- Turn power On and check for short or open circuits.



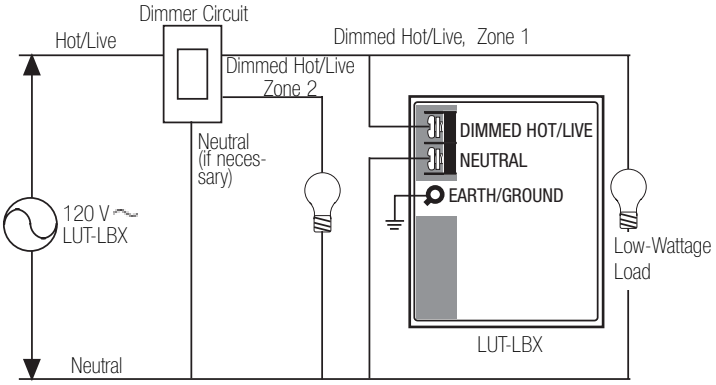
Installation Instructions

1. Turn power Off to the Control Unit.
2. Mount standard U.S. 2-gang wallbox (available from Lutron, P/N 241-496); 3 1/2 in. (89 mm) deep is strongly recommended, 2 3/4 in. (68 mm) minimum. Allow at least 4 1/2 in. (110 mm) clearance above/below Interfaces to ensure proper heat dissipation.
3. Strip 1/2 in. (12 mm) insulation from all wires in wallbox and wire as shown. All connections are made using #12 AWG to #16 AWG (2.5 - 1 mm^2) wire. Power terminals can accept up to two #12 AWG (2.5 mm^2) wires. The recommended installation torque is 9.0 in.•lbs. (1.0 N•m) for line voltage connections.

Single-Zone Wiring



Dual-Zone Wiring

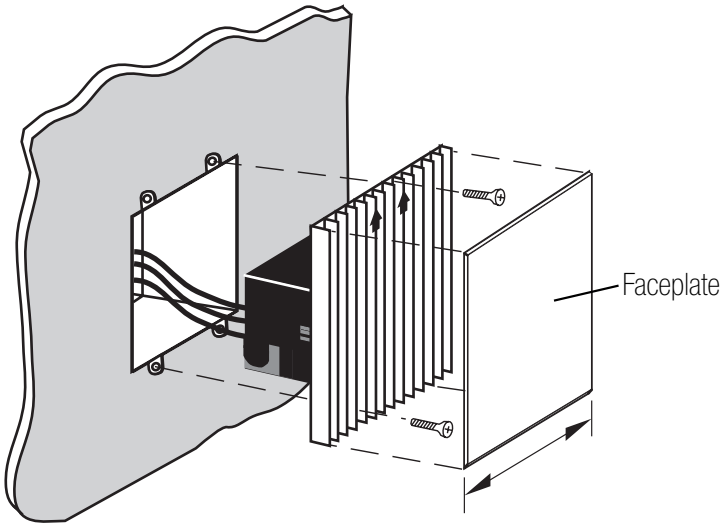


* Wallbox may be recess mounted or surface mounted. If mounting Interface in a panel, please refer to Panel Mounting section for important information.

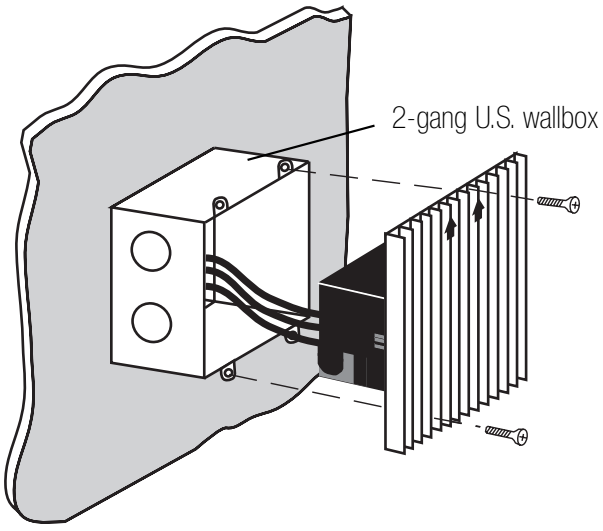
Mounting: Interface must be mounted *vertically!*

1. Confirm all connections and mount the Interface using the screws provided.
2. Restore power to the system.

Recess Mount

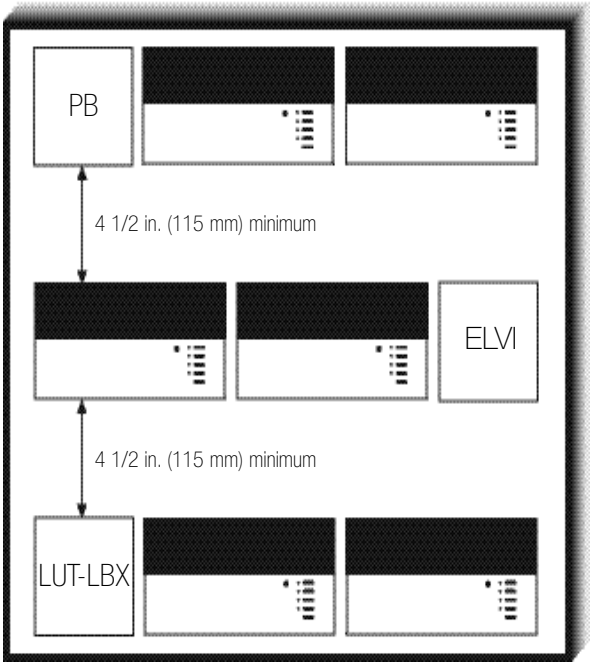


Surface Mount



Panel Mounting

- The enclosure must be in accordance with all local and national electrical codes.
- Lutron does not recommend using a door to enclose the front of a panel, since this restricts airflow to the *GRAFIK Eye* Control Units and Interfaces.
- If mounting multiple Control Units or Interfaces in an enclosure:
  1. Ambient temperature within an enclosure must remain between 32 - 104 °F (0 - 40 °C).
  2. If not mounting in a metal enclosure, all units must be mounted in a wallbox.
- To improve heat dissipation of the Interface, remove the faceplate from the unit.



GRAFIK Eye Control Units and Interface Units dissipate heat when operating. Obstructing these units can cause malfunction to both the Control Unit and the Interface if ambient temperature does not remain between 32 - 104 °F (0 - 40 °C).

Troubleshooting Guide

Symptom	Causes	Solution
Lights do not come on.	Power is off	Restore power to the control unit.
	Miswire	Confirm wiring per wiring diagrams.
	Bulb(s)/lamp(s) burned out	Replace bulb(s)/lamp(s).
	Control Unit	Refer to troubleshooting section of Control Unit Installation Guide.
Lights turn on/off unexpectedly.	Load Type	Confirm that the load type being switched/dimmed is compatible with the control unit or dimmer being used. Line/Mains voltage phase control dimming only.
	Miswire	Confirm wiring per wiring diagrams.
	Control Unit	Refer to the troubleshooting section of Control Unit Installation Guide.
	Damaged/disconnected LUT-LBX	Lighting load does not meet minimum requirements of dimmer; check for damage or disconnection.

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA 18036
TEL +1-610-282-3800
FAX +1-610-282-1243
Toll-Free 1-888-LUTRON1
Technical Support 1-800-523-9466

EUROPEAN HEADQUARTERS
Lutron EA Ltd.
6 Sovereign Close, Wapping, London, E1W 3JF United Kingdom
TEL +44-207-702-0657
FAX +44-207-480-6899
FREEPHONE (UK) 0800-282-107
Technical support +44-(0)20-7680-4481

ASIAN HEADQUARTERS
Lutron GL Ltd.
15 Hoe Chiang Road,
#07-03 Euro Asia Centre,
Singapore 089316
TEL +65-6220-4666
FAX +65-6220-4333

Hong Kong
Lutron GL Ltd.
Room 2808, 28/F,
248 Queen's Road East,
Wanchai, Hong Kong
TEL +852-2104-7733
FAX +852-2104-7633

Japan
Lutron Asuka Co. Ltd.
No. 16 Kowa Building, 4F, 1-9-20,
Akasaka, Minato-ku, Tokyo 107-0052
Japan
TEL +81-3-5575-8411
FAX +81-3-5575-8420

Asia Technical Hotlines
Northern China: 10-800-712-1536
Southern China: 10-800-120-1536
Hong Kong: 800-901-849
Indonesia: 001.803.011.3994
Japan: +81.3.5575.8411
Macau: 0800.401
Singapore: 800-120-4491
Taiwan: 00-801-137-737
Thailand: 001-800-120-665853
Other Areas: +65-6220-4666

Lutron Electronics Co., Inc.
One Year Limited Warranty

For a period of one year from the date of purchase, and subject to the exclusions and restrictions described below, Lutron warrants each new unit to be free from manufacturing defects. Lutron will, at its option, either repair the defective unit or issue a credit equal to the purchase price of the defective unit to the Customer against the purchase price of comparable replacement part purchased from Lutron. Replacements for the unit provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

If the unit is commissioned by Lutron or a Lutron approved third party as part of a Lutron commissioned lighting control system, the term of this warranty will be extended, and any credits against the cost of replacement parts will be prorated, in accordance with the warranty issued with the commissioned system, except that the term of the unit's warranty term will be measured from the date of its commissioning.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the unit pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; or (g) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the unit or any of its components.
3. Equipment and parts external to the unit, including those sold or supplied by Lutron (which may be covered by a separate warranty).
4. The cost of repairing or replacing other property that is damaged when the unit does not work properly, even if the damage was caused by the unit.

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF ANY TYPE, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. LUTRON DOES NOT WARRANT THAT THE UNIT WILL OPERATE WITHOUT INTERRUPTION OR BE ERROR FREE.

NO LUTRON AGENT, EMPLOYEE OR REPRESENTATIVE HAS ANY AUTHORITY TO BIND LUTRON TO ANY AFFIRMATION, REPRESENTATION OR WARRANTY CONCERNING THE UNIT. UNLESS AN AFFIRMATION, REPRESENTATION OR WARRANTY MADE BY AN AGENT, EMPLOYEE OR REPRESENTATIVE IS SPECIFICALLY INCLUDED HEREIN, OR IN STANDARD PRINTED MATERIALS PROVIDED BY LUTRON, IT DOES NOT FORM A PART OF THE BASIS OF ANY BARGAIN BETWEEN LUTRON AND CUSTOMER AND WILL NOT IN ANY WAY BE ENFORCEABLE BY CUSTOMER.

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TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify Lutron within the warranty period described above by calling the Lutron Technical Support Center at (800) 523-9466. Lutron, in its sole discretion, will determine what action, if any, is required under this warranty. To better enable Lutron to address a warranty claim, have the unit's serial and model numbers available when making the call. If Lutron, in its sole discretion, determines that an on-site visit or other remedial action is necessary, Lutron may send a Lutron Services Co. representative or coordinate the dispatch of a representative from a Lutron approved vendor to Customer's site, and/or coordinate a warranty service call between Customer and a Lutron approved vendor.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

These products may be covered under one or more of the following U.S. patents: 4,797,599; 4,803,380; and corresponding foreign patents.

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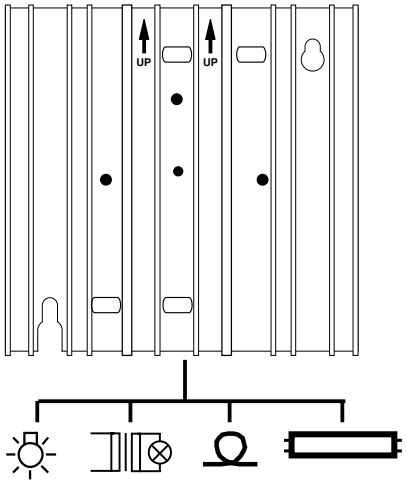
Lutron Electronics Co., Inc.
Made and printed in U.S.A.
P/N 030-852 Rev. A 01/07

GRAFIK Eye® Power Interfaces

Power Booster (PB)
Electronic Low Voltage Interface (ELVI)
Fluorescent Dimming Ballast Interface (FDBI)

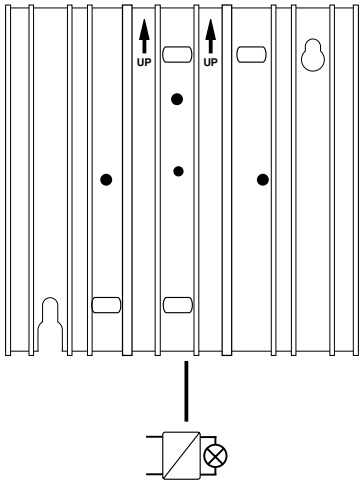
Installation Instructions — Please Read

PB



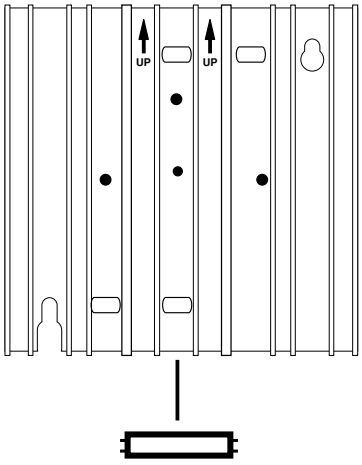
Incandescent
Magnetic Low Voltage
Neon/Cold Cathode
Lutron *Tu-Wire*® Dimming Ballast

ELVI



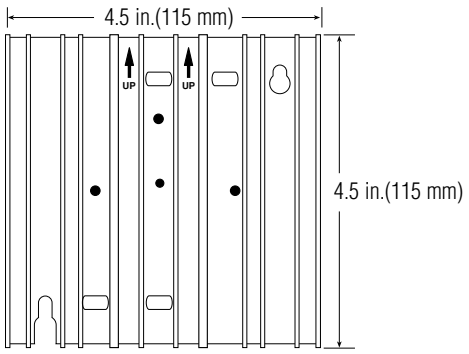
Electronic Low Voltage

FDBI



Lutron *Hi-lume*® or *Eco-10*™ Fluorescent Dimming Ballast

LUTRON®



Interface shown with faceplate removed

This "load-side" equipment installs on the zone wiring between the Control Unit* and the lighting load.

The **PB** increases a Control Unit's zone load capacity for Incandescent/Halogen (Tungsten), Magnetic Low Voltage, Neon/Cold Cathode, and Lutron *Tu-Wire* load types.

The **ELVI** enables a zone of the Control Unit to control Electronic Low-Voltage loads.

The **FDBI** enables a zone of the Control Unit to control fluorescent loads with Lutron *Hi-lume or Eco-10* phase-controlled dimming ballasts.

The maximum load capacity for each Interface is shown in the table that follows.

Unit	120V	220-240V (AU)	230V (CE)
PB	1920W/VA 16A	2400W/VA 10A	1840W/VA† 8A†
ELVI	1000W/VA 8.3A	1200W/VA 5A	1200W/VA 5.2A
FDBI	1920W/VA 16A	2400W/VA 10A	— —

† 1200W/VA and 5.2A for flush mount (as shown on pg. 6).

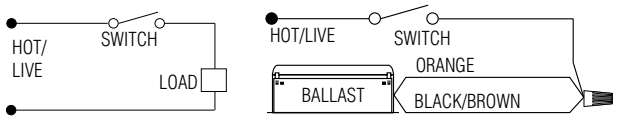
Danger! Always turn OFF the circuit breakers/MCB or remove the main fuses from the power line before doing any work. Failure to do so can result in serious personal injury. More than one MCB can power this device. **Disconnect all power sources before servicing unit.**

1. This Interface must be installed by a qualified electrician in accordance with all applicable regulations.
2. Improper wiring can result in personal injury, damage to the Interface, or damage to other equipment.
3. Up to two **PB/ELVI/FDBIs** per zone.
4. The **PB/ELVI/FDBI** must be mounted with arrows facing upward to ensure adequate cooling.
5. **PB:** If using low-voltage incandescent fixtures, use only with iron core (magnetic) transformers.
6. **ELVI:** Use only with solid-state (electronic) low-voltage transformers that are manufacturer approved to be dimmed by reverse phase control.
7. **CAUTION!** Dimmed magnetic low-voltage transformers: To avoid excessively high current flow that can cause transformer overheating and failure, observe the following:
   (a) Do not operate the Interface with all of the lamps removed or with any lamps inoperative.
   (b) Replace any burned out lamps immediately.
   (c) Use only transformers that incorporate thermal protection or fused primary windings.
8. **ELVI/FDBI:** These Interfaces contain a thermal device that turns Off the Interface if overloaded. The Interface will turn On when it cools.

* See Page 5 for other Lutron products that can be used to control your PB/ELVI/FDBI.

Test load for short circuits

- Turn power Off.
- **PB/ELVI:** Connect standard switch between Hot/Live lead and the load wire to test circuit.
- **FDBI:** Connect standard switch between Hot/Live lead and the Dimmed Hot/Live and switched Hot/Live leads of the ballast.
- Turn power On and check for short or open circuits.



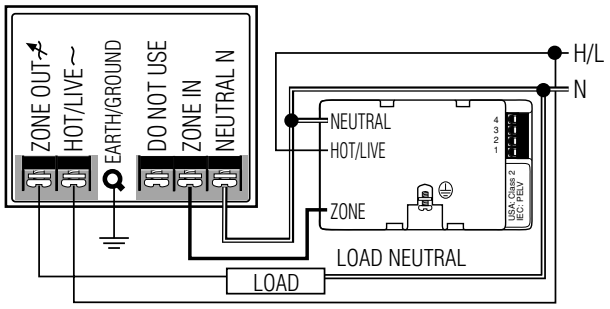
PB/ELVI FDBI

Wiring Instructions

1. Turn power Off to the Control Unit *and* the feed to the **PB**, **ELVI**, or **FDBI**!
2. Mount standard U.S. 2-gang wallbox* (available from Lutron, P/N 241-641), 3 1/2 in. (87 mm) deep is strongly recommended, 2 3/4 in. (68 mm) minimum. Allow at least 4 1/2 in. (110 mm) clearance above/below Interfaces to ensure proper heat dissipation.
3. Strip 1/2 in. (12 mm) insulation from all wires in wallbox and wire as shown. All connections are made using #12 AWG (2.5 mm²) wire. Power terminals can accept up to two #12 AWG (2.5 mm²) wires. The NEUTRAL N terminal is for the Control neutral, **not** the load neutral! The recommended installation torque is 9.0 in.•lbs. (1.0 N•m) for line voltage connections.

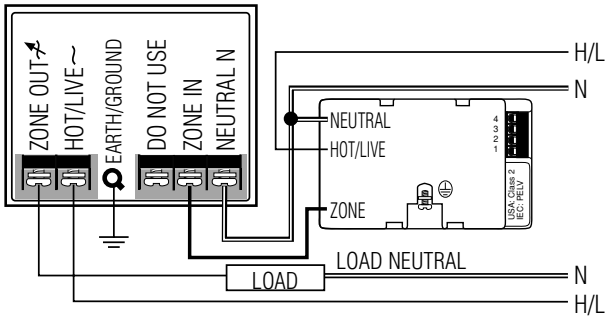
Single-Feed Wiring for PB/ELVI 120V and 220-240V

The **PB/ELVI** may be on the same circuit as the Control Unit *only if* the total load does not exceed the rating of the breaker.



Dual-Feed Wiring for PB/ELVI 120V and 220-240V

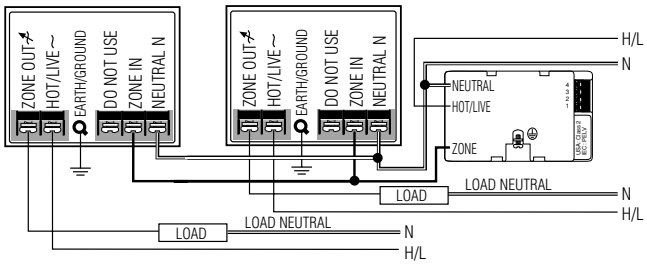
The load breaker/MCB can be on a different phase than the control breaker/MCB.



* Wallbox may be flush mounted or surface mounted. If mounting Interface in a panel, please refer to Panel Mounting section for important information.

Dual-Feed Wiring for Two (2) PB/ELVI Interfaces on One Zone - 120V and 220-240V

The load breaker/MCB can be on a different phase than the control breaker/MCB.

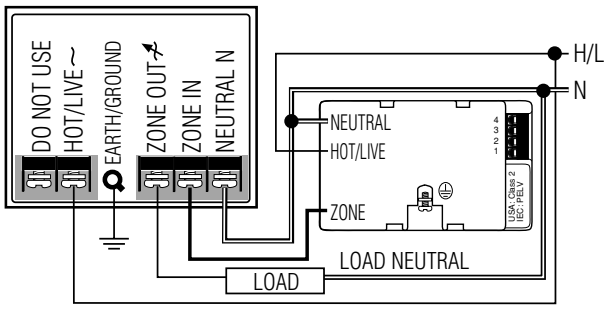


Tu-Wire Dimming Ballast

- When using a **PB** to control a Lutron *Tu-Wire* dimming ballast, the associated zone on the GRAFIK Eye® 3000 Series Control Unit must be set to the *Tu-Wire* load type. Please see the *GRAFIK Eye* 3000 Series Installer's Guide for more details.
- The **PB 230V** must not be used with *Tu-Wire* ballasts because the *Tu-Wire* load type is not available on 230V CE models of the *GRAFIK Eye* Control Unit.

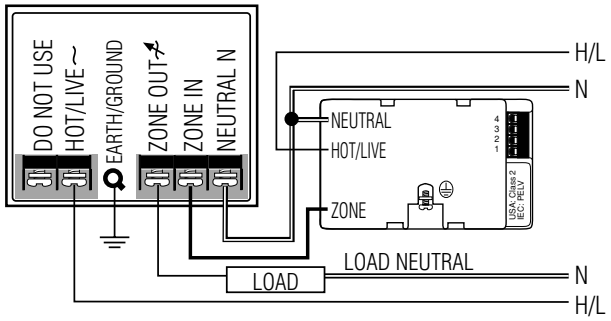
Single-Feed Wiring for PB/ELVI 230V

The **PB/ELVI** may be on the same circuit as the Control Unit *only if* the total load does not exceed the rating of the breaker.



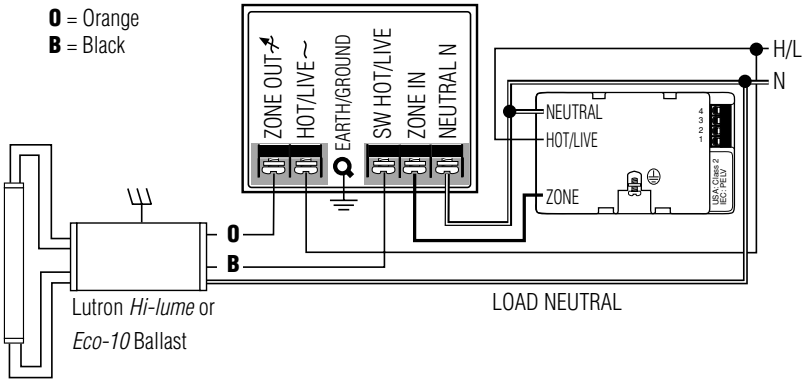
Dual-Feed Wiring for PB/ELVI 230V

The load breaker/MCB can be on a different phase than the control breaker/MCB.



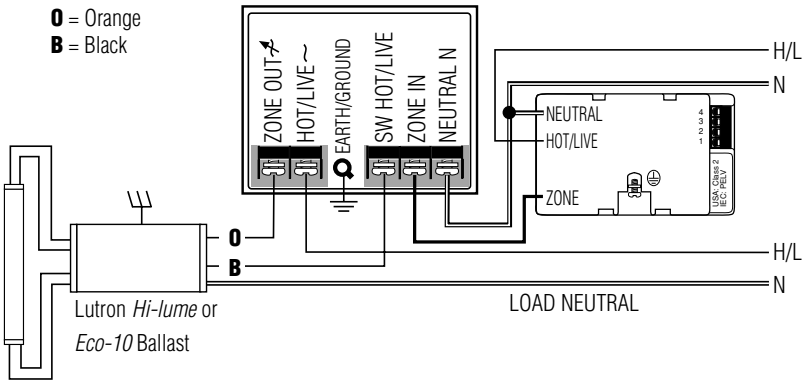
Single-Feed Wiring for FDBI 120V and 220-240V

The **FDBI** may be on the same circuit as the Control Unit if, and only if, the total load does not exceed the rating of the breaker. Connect ZONE OUT only to Lutron *Hi-lume* or *Eco-10* Electronic Dimming Ballasts.



Dual-Feed Wiring for FDBI 120V and 220-240V

The load breaker/MCB can be on a different phase than the control breaker/MCB. Connect ZONE OUT only to Lutron *Hi-lume* or *Eco-10* Electronic Dimming Ballasts.



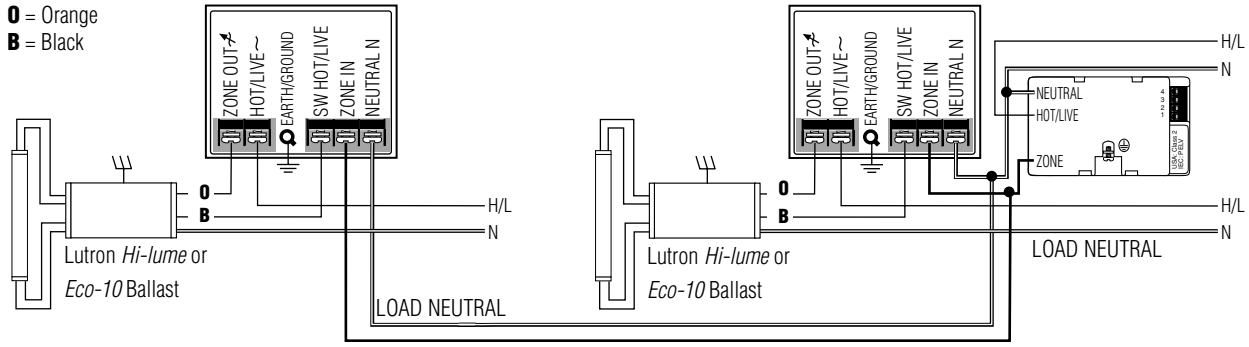
Lutron Products

The following Lutron products can also be used to control your **PB/ELVI/FDBI**:

- *GRAFIK Eye* GP Dimming Panels.
- *GRAFIK Eye* LP Dimming Panels.
- Homeworks Interactive™ Remote Power Panels.
- Lutron fluorescent wallbox dimmers.
- Please contact Lutron for use with other *Homeworks Interactive* or RadioRA® dimmers.

Dual-Feed Wiring for Two (2) FDBI Interfaces on One Zone
120V and 220-240V

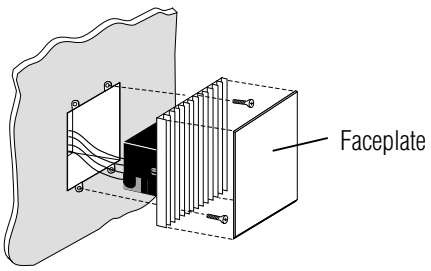
The load breaker/MCB can be on a different phase than the control breaker/MCB. Connect ZONE OUT only to Lutron *Hi-lume* or *Eco-10* Electronic Dimming Ballasts.



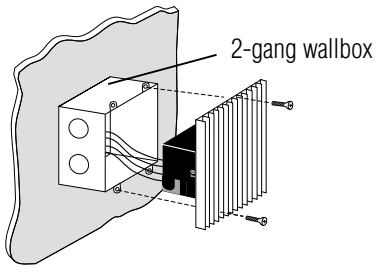
Mounting: Interface must be mounted *vertically*!

1. Confirm all connections and mount the Interface using the screws provided.
2. Restore power to the system.

Flush Mount



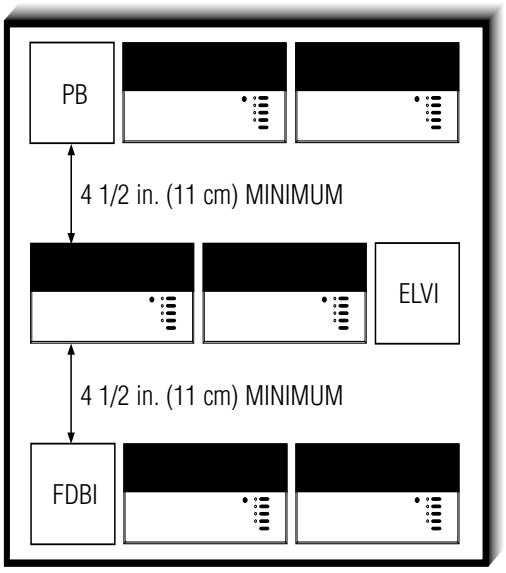
Surface Mount



Panel Mounting

- The enclosure must be in accordance with all local and national electrical codes.
- Lutron does not recommend using a door to enclose the front of a panel, since this restricts airflow to the *GRAFIK Eye* Control Units and Interfaces.
- If mounting multiple Control Units or Interfaces in an enclosure:
  1. Ambient temperature within an enclosure **must remain between 32°—104° F (0°—40° C)**.
  2. If not mounting in a metal enclosure, all units **must** be mounted in a wallbox.
- To improve heat dissipation of Power Interfaces, remove the faceplate from the unit.

GRAFIK Eye Control Units and Interface Units dissipate heat when operating. Obstructing these units can cause malfunction to both the Control Unit and the Interface if ambient temperature does not remain between 32°—104° F (0°—40° C).



Troubleshooting Guide

Symptom	Causes	Solution
Lights do not come on.	Power is off	Restore power to the **PB/ELVI/FDBI**. Restore power to the Control Unit.
	Miswire	Confirm wiring per wiring diagrams.
	Bulb(s)/lamp(s) burned out	Replace bulb(s)/lamp(s).
	GRAFIK Eye 3000 Control Unit	Refer to troubleshooting section of *GRAFIK Eye* Control Unit Installer's Guide.
	Interface is overloaded	Check for excess load, proper mounting, and adequate air convection. Allow unit to cool.
Lights turn on/off unexpectedly.	Load Type	Confirm that the load type being switched/dimmed is compatible with the **PB/ELVI/FDBI**.
	GRAFIK Eye 3000 Control Unit	Refer to the troubleshooting section of *GRAFIK Eye* Control Unit Installation Guide.

Internet: **www.lutron.com**
E-mail: **product@lutron.com**

WORLD HEADQUARTERS
Lutron Electronics Co. Inc.,
TOLL FREE: (800) 523-9466
(U.S.A., Canada, Caribbean)
Tel: (610) 282-3800;
International 1- 610-282-3800
Fax: (610) 282-3090;
International 1-610-282-3090

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International 81-3-5405-7333
Fax: (03) 5405-7496;
International 81-3-5405-7496

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International 44-207-702-0657
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HONG KONG SALES OFFICE
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Tel: 2104-7733;
International 852-2104-7733
Fax: 2104-7633;
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Lutron GL (Singapore)
Tel: 65 220 4666
Fax: 65 220 4333

LIMITED WARRANTY
Lutron will, at its option, repair or replace any unit that is defective in materials or manufacture within one year after purchase. For warranty service, return unit to place of purchase or mail to Lutron at 7200 Suter Rd., Coopersburg, PA 18036-1299, postage pre-paid.
This warranty is in lieu of all other express warranties, and the implied warranty of merchantability is limited to one year from purchase. This warranty does not cover the cost of installation, removal, or reinstallation, or damage resulting from misuse, abuse, or improper or incorrect repair, or damage from improper wiring or installation. This warranty does not cover incidental or consequential damages. Lutron's liability on any claim for damages arising out of or in connection with the manufacture, sale, installation, delivery, or use of the unit shall never exceed the purchase price of the unit.
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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P/N 030-739 Rev. A 2/02

GRAFIK Eye®

Power Modules

Installation Instructions

Please Read

English

Español

Français

Phase-Adaptive
Power Module

3-Wire Fluorescent
Power Module

Switching
Power Module

Models and Capacities

Module Type	Control	Load	Load Capacity	Model Number
Phase-Adaptive	120 V~ 50 / 60 Hz	120 - 277 V~ 50 / 60 Hz	16 A	PHPM-PA-DV-WH
Phase-Adaptive	120 V~ 50 / 60 Hz	120 V~ 50 / 60 Hz	16 A	PHPM-PA-120-WH
3-Wire Fluorescent	120 V~ 50 / 60 Hz	120 - 277 V~ 50 / 60 Hz	16 A	PHPM-3F-DV-WH
3-Wire Fluorescent	120 V~ 50 / 60 Hz	120 V~ 50 / 60 Hz	16 A	PHPM-3F-120-WH
Switching	120 V~ 50 / 60 Hz	120 - 277 V~ 50 / 60 Hz	16 A	PHPM-SW-DV-WH

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General Notes

Danger! Always turn OFF the circuit breakers or remove the main fuses from the power line before doing any work. Failure to do so can result in serious personal injury. More than one disconnect may be required to de-energize this device. Disconnect all power sources before servicing unit.

- This power module must be installed by a qualified electrician in accordance with all applicable regulations.
- Improper wiring can result in personal injury, damage to the interface, or damage to other equipment.
- Up to three power modules per zone.
- The power module must be mounted with arrow facing upward to ensure adequate cooling.
- CAUTION! Dimmed magnetic low-voltage transformers: To avoid excessively high current flow that can cause transformer overheating and failure, observe the following:
  (a) Do not operate the power module with all of the lamps removed or with any lamps inoperative.
  (b) Replace any burned out lamps immediately.
  (c) Use only transformers that incorporate thermal protection or fused primary windings.
- Phase-Adaptive/Fluorescent: These power modules contain circuitry that will shut down the output if it is overloaded. To correct the problem, turn off power and reduce the load to the specified rating before re-applying power.

Note! Plastic faceplate must be installed on module for normal operation (all models).

Load Type Capability

Switching Power Module:

- Incandescent (tungsten)
- Halogen
- Magnetic low-voltage transformer (iron core)
- Electronic (solid-state) low-voltage transformer.
- Magnetic and electronic fluorescent lamp ballasts
- Neon/cold-cathode
- HID
- Motor
  - 1/2 HP at 277 V~
  - 1/3 HP at 120 V~

Phase-Adaptive Power Module:

- Incandescent (tungsten)
- Halogen
- Magnetic low-voltage transformer (iron core)
- Electronic (solid-state) low-voltage transformer
- Lutron Tu-Wire™ electronic fluorescent dimming ballast
- Neon/cold-cathode

3-Wire Fluorescent Power Module:

- Lutron *Hi-Lume* and *Eco-10* (Eco Series) line-voltage control electronic dimming ballasts

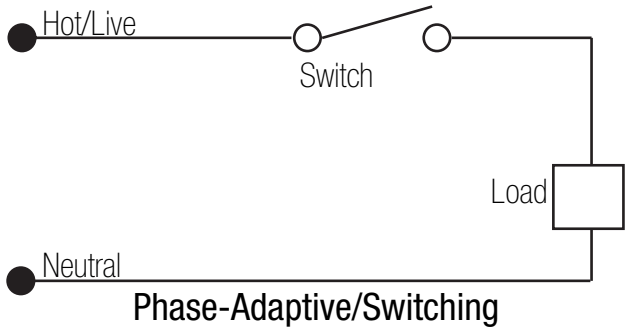
Product Compatibility

The following Lutron products may be used to control these power modules:

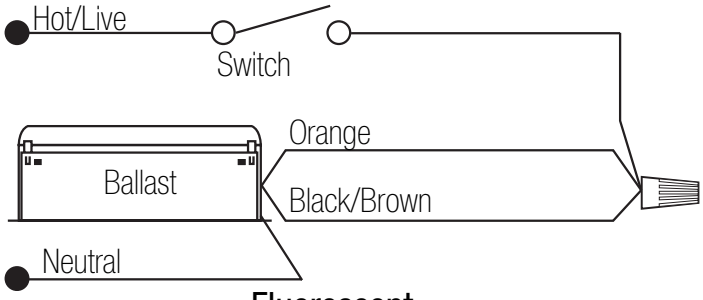
- *GRAFIK Eye* QS control units
- *GRAFIK Eye* 3000 Series control units
- LP, LCP, GP dimming panels
- *HomeWorks* remote power panels

Test Load for Short-Circuit

- Turn power Off.
- Phase-Adaptive/Switching: Connect standard switch between Hot/Live lead and the load wire to test circuit.
- Fluorescent: Connect standard switch between Hot/Live lead and the Dimmed Hot/Live and switched Hot/Live leads of the ballast.
- Turn power On and check for short or open circuits.



Phase-Adaptive/Switching



Fluorescent

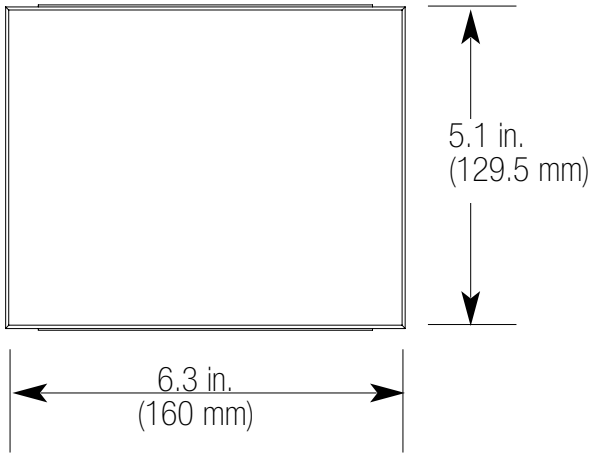
Wiring

- Mount in 2-gang U.S. wallbox 3.5 in. (89 mm) deep or 4 x 4 in. (102 mm) junction box 2.1 in. deep (53 mm). Indoors only.
- This device generates heat; mount only where ambient temperature is 32 - 104 °F (0 - 40 °C).
- Mount with arrows facing up to ensure adequate cooling.
- Allow 4.5 in. (114 mm) above and below unit and between faceplates when mounting several in a vertical layout.
- Mount so line (mains) voltage wiring is at least 6 ft. (1.8 m) from sound or electronic equipment and wiring.
- Mount within 7° of true vertical.
- Provide #12 AWG (2.5 mm^2) copper (Cu) wires (75 °C minimum) for input power and load circuit.
- Strip 1/2 in. (12 mm) insulation from wires before connecting.
- Run separate neutral for load circuit - no common neutrals.

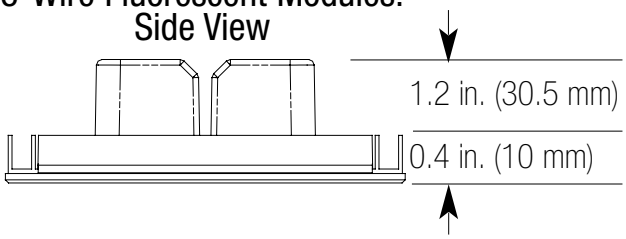
Note! Plastic faceplate must be installed on module for normal operation (all models).

Dimensions

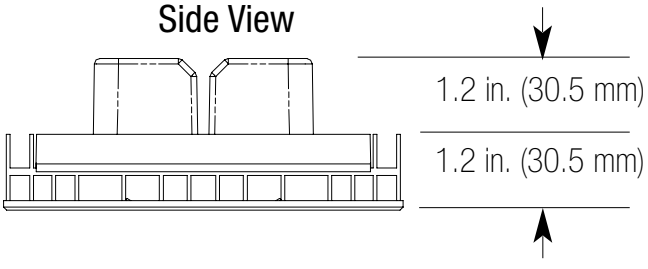
All Modules: Front View



Switching and
3-Wire Fluorescent Modules:
Side View

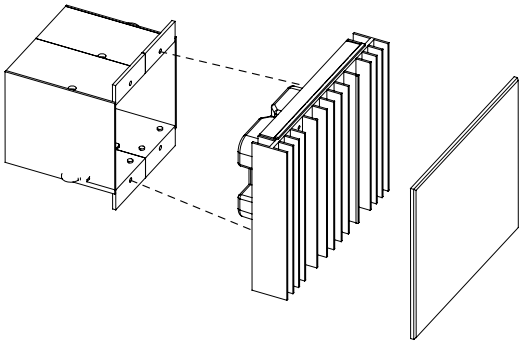


Phase-Adaptive Module:
Side View

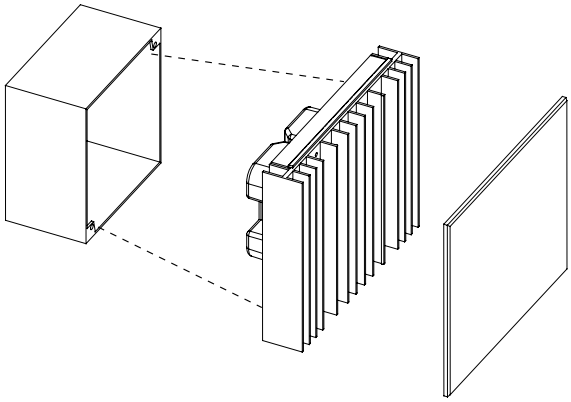


Mounting Methods

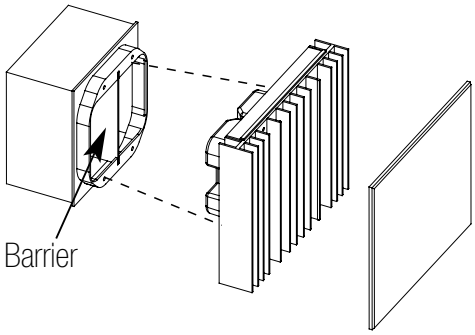
Mount to 2-gang U.S. wallbox



Mount to 4 x 4 in. (102 mm), 2.1 in. (53 mm) deep U.S. junction box



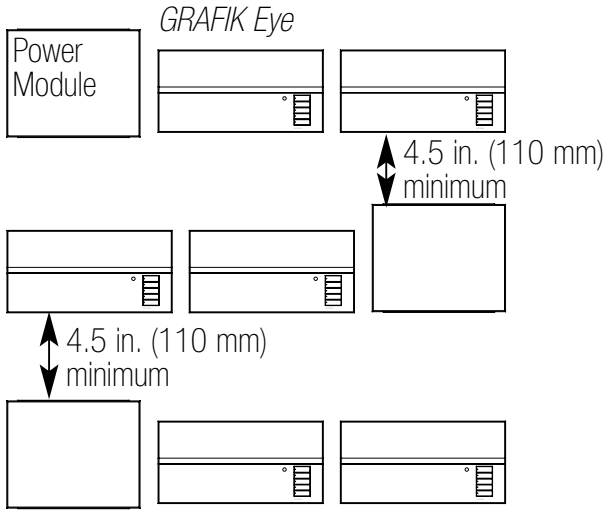
Mount to 4 x 4 in. (102 mm), 2.1 in. (53 mm) deep U.S. junction box with barrier (for 277 V~ loads if required by local electrical code)



Mounting Inside an Enclosure with *GRAFIK Eye* Control Units

- Mount in accordance with all local and national electrical codes.
- Proper ventilation is required. Ambient temperature inside enclosure must remain between 32 - 104 °F (0 - 40 °C) when GRAFIK Eye control units and power modules are operating.
- See diagram below for required spacing between units.

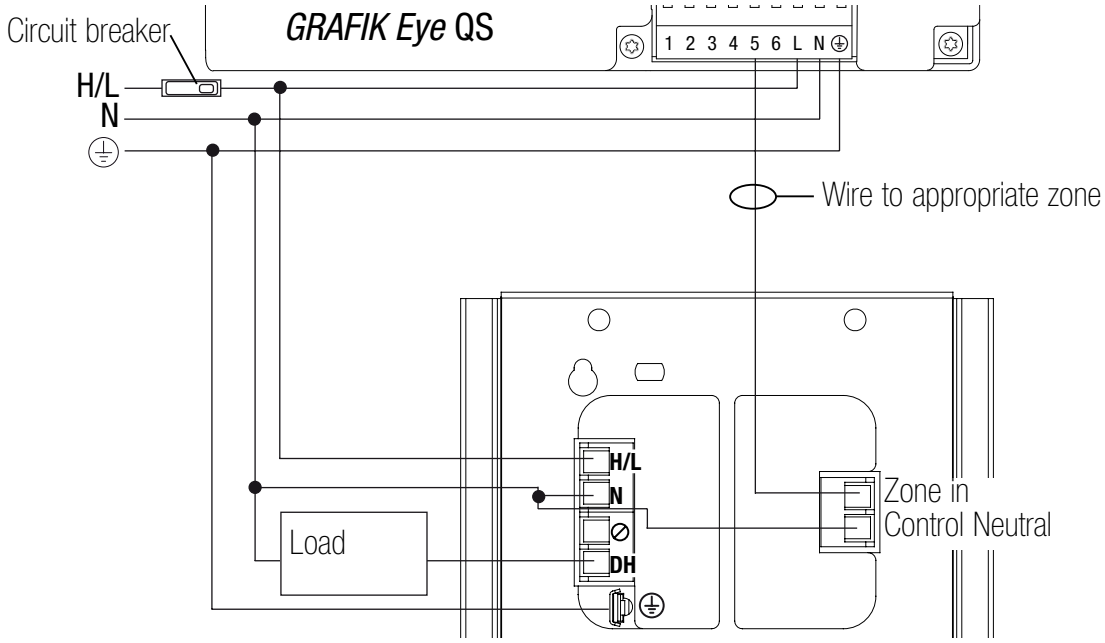
Note! Plastic faceplate must be installed on module for normal operation (all models).



Single-Feed Wiring

The power module may be on the same circuit as the control unit only if the total load does not exceed the rating of the branch circuit breaker in accordance with local and national electrical codes.

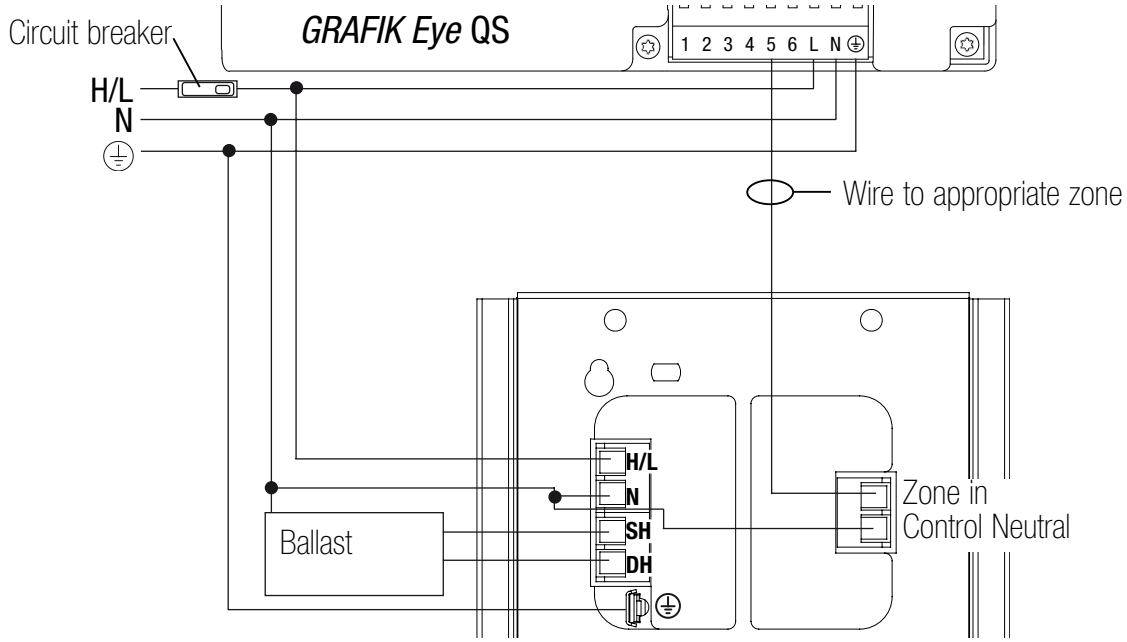
Phase-Adaptive Module Wiring



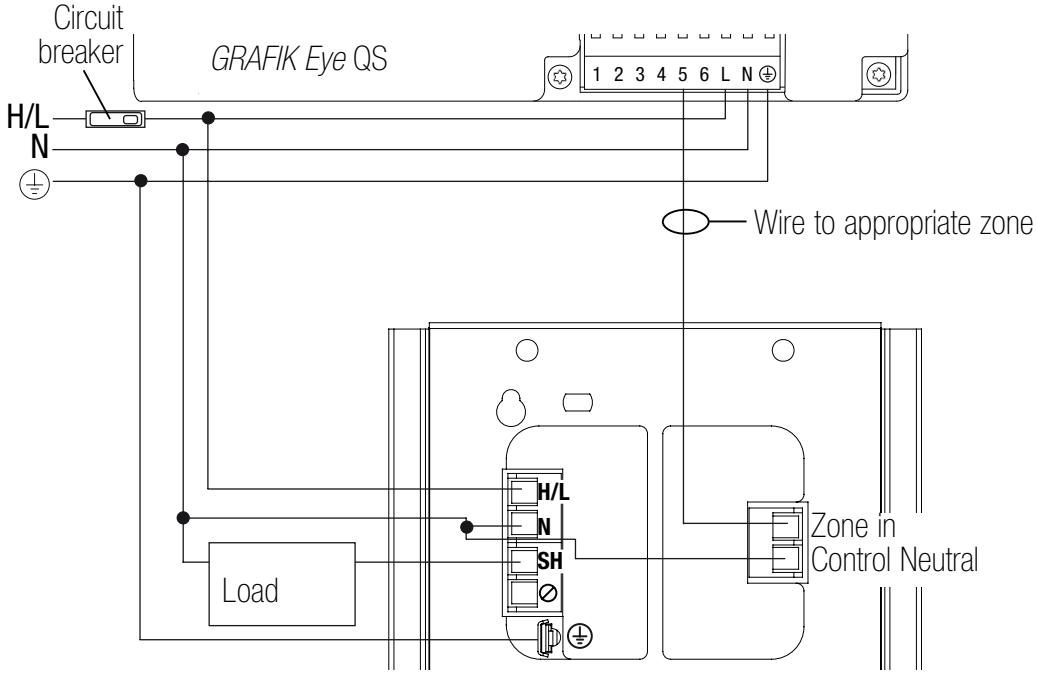
Legend

H/L	Hot/Live
N	Neutral
SH	Switched Hot
DH	Dimmed Hot
⏚	Ground
⊘	Not Used

Fluorescent 3-Wire Module Wiring



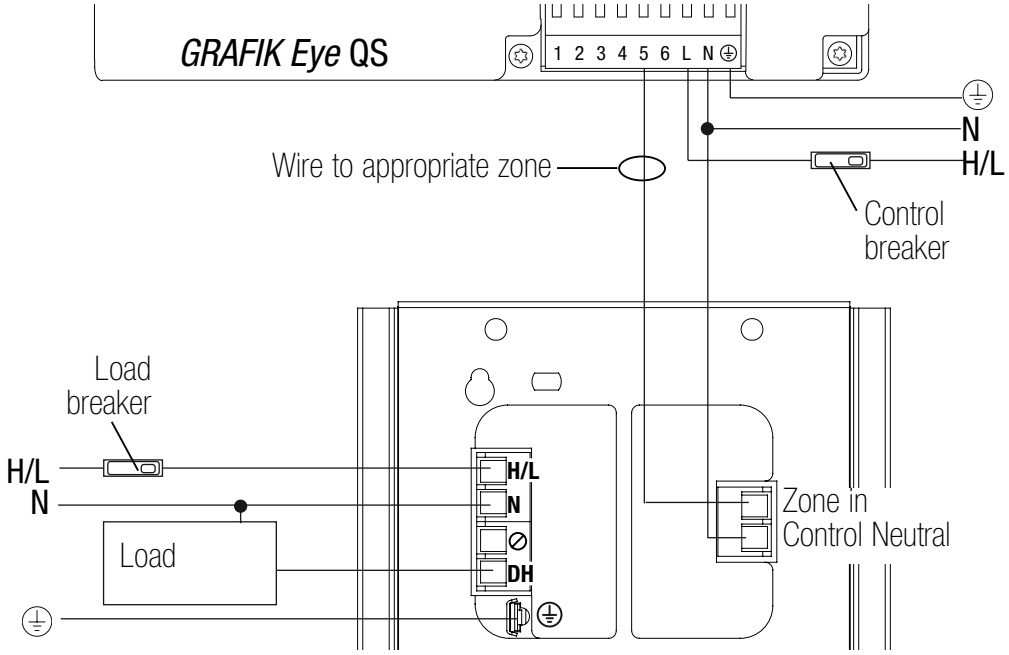
Switching Module Wiring



Dual-Feed Wiring

The load breaker can be on a different phase than the control breaker. Both breakers must be turned off prior to installing or servicing the module.

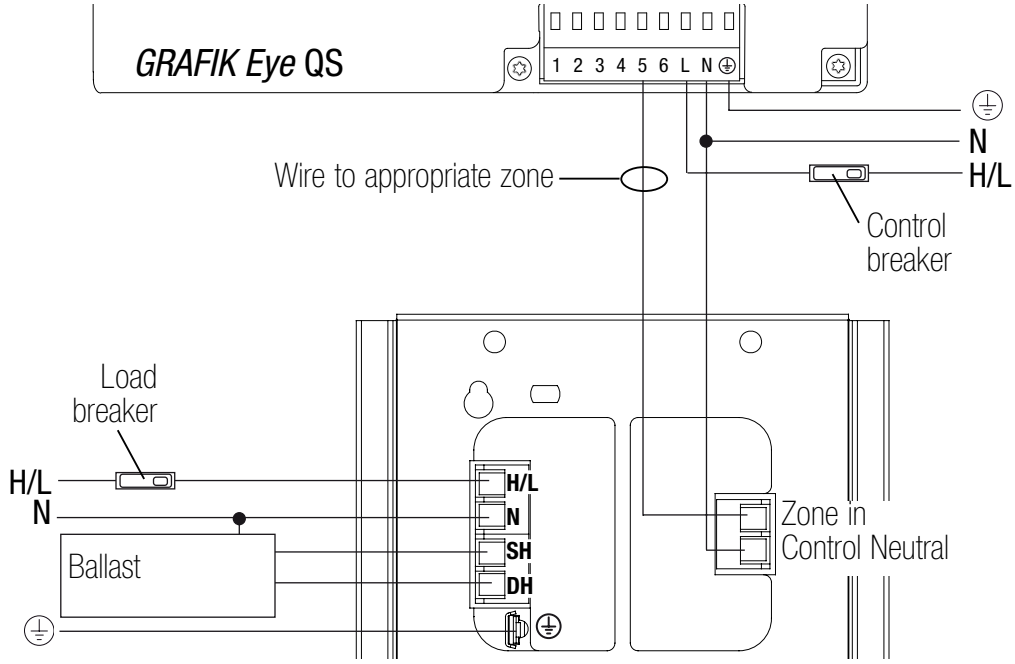
Phase-Adaptive Module Wiring



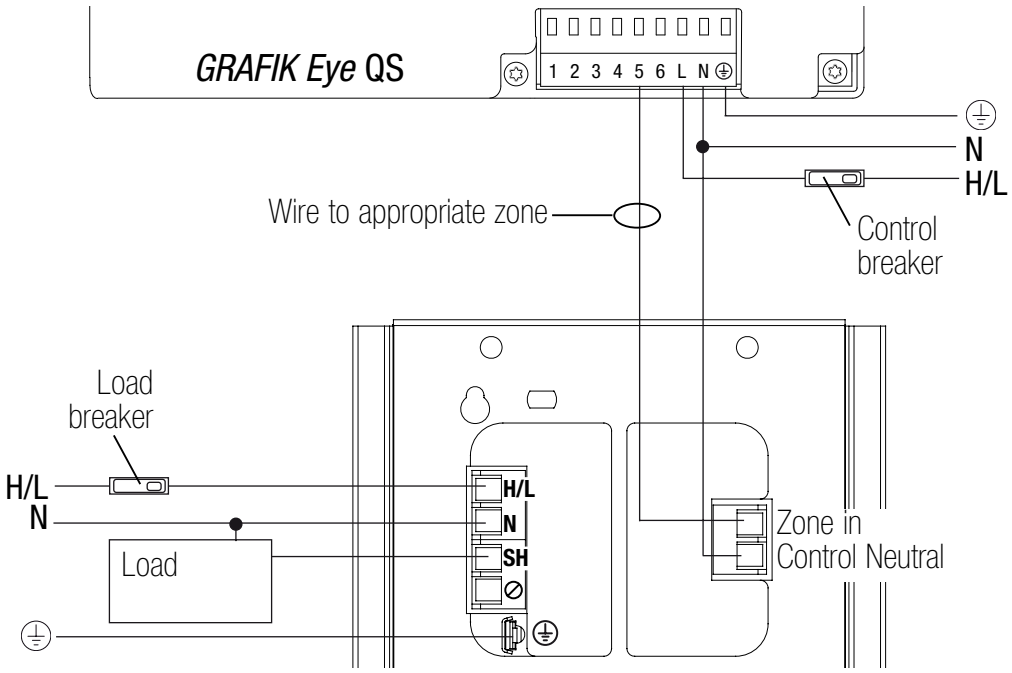
Legend

H/L	Hot/Live
N	Neutral
SH	Switched Hot
DH	Dimmed Hot
⏚	Ground
⊘	Not Used

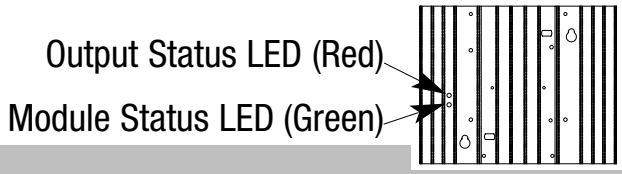
Fluorescent 3-Wire Module Wiring



Switching Module Wiring



PHASE-ADAPTIVE POWER MODULE DIAGNOSTICS AND TROUBLESHOOTING



Module Status LED (green)

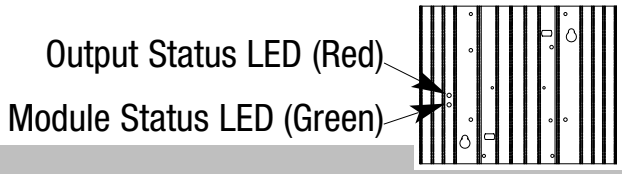
LED Action	Comments
Off	Module not powered. **Caution:** Control input may still be powered. Turn off all breakers before removing unit.
1 blink/second (“heartbeat”)	Module powered; normal operation

Output Status LED (red)

LED Action	Control Input Status	Load Status	Comments
Off	Input signal off or disconnected	Off	Load off
Continuously on	On	On	Incandescent/electronic dimming
1 blink/second (“heartbeat”)	On	On	Magnetic dimming
1 blink, pause, repeat	On	Off	Load short-circuit/overload[1]
2 blinks, pause, repeat	On	Off	Over-voltage error[2]
3 blinks, pause, repeat	On	On full	Shorted component[3]
4 blinks, pause, repeat	On	Off	DC detection[4]

[1]Remove power; repair fault; re-apply power.
[2]Verify proper load on output.
[3]Replace power module; internal device is damaged.
[4]Possible faulty MLV load.

3-WIRE FLUORESCENT POWER MODULE DIAGNOSTICS AND TROUBLESHOOTING



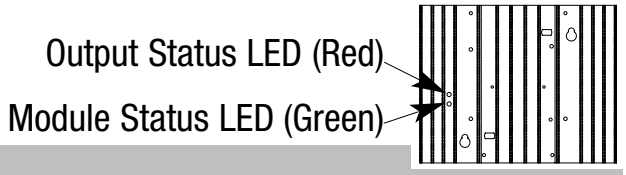
Module Status LED (green)

LED Action	Comments
Off	Module not powered. **Caution:** Control input may still be powered. Turn off all breakers before removing unit.
1 blink/second (“heartbeat”)	Module powered; normal operation

Output Status LED (red)

LED Action	Control Input Status	Load Status	Comments
Off	Input signal off or disconnected	Off	Load off
Continuously on	On	On	Load on. **Note:** Output may repeatedly turn on and off if DH is overloaded or if DH and SH are miswired.

SWITCHING POWER MODULE DIAGNOSTICS AND TROUBLESHOOTING



Module Status LED (green)

LED Action	Comments
Off	Module not powered. **Caution:** Control input may still be powered. Turn off all breakers before removing unit.
1 blink/second (“heartbeat”)	Module powered; normal operation

Output Status LED (red)

LED Action	Control Input Status	Load Status	Comments
Off	Input signal off or disconnected	Off	Load off
Continuously on	On	On	Load on

Internet: www.lutron.com
E-mail: product@lutron.com

WORLD HEADQUARTERS
Lutron Electronics Co., Inc.
7200 Suter Road, Coopersburg, PA
18036-1299 USA
TEL +1.610.282.3800
FAX +1.610.282.1243
Technical Support 1.800.523.9466
Toll-Free 1.888.LUTRON1

EUROPEAN HEADQUARTERS
United Kingdom
Lutron EA Ltd.
6 Sovereign Close, London, E1W 3JF UK
TEL +44.(0)20.7702.0657
FAX +44.(0)20.7480.6899
Technical support +44.(0)20.7680.4481
FREEPHONE 0800.282.107

ASIAN HEADQUARTERS
Singapore
Lutron GL Ltd.
15 Hoe Chiang Road,
#07-03 Euro Asia Centre,
Singapore 089316
TEL +65.6220.4666
FAX +65.6220.4333

Asia Technical Hotlines
Northern China: 10.800.712.1536
Southern China: 10.800.120.1536
Hong Kong: 800.901.849
Indonesia : 001.803.011.3994
Japan: +81.3.5575.8411
Macau : 0800.401
Singapore: 800.120.4491
Taiwan: 00.801.137.737
Thailand: 001.800.120.665853
Other Areas: +65.6220.4666

Lutron Electronics Co., Inc.
One Year Limited Warranty

For a period of one year from the date of purchase, and subject to the exclusions and restrictions described below, Lutron warrants each new unit to be free from manufacturing defects. Lutron will, at its option, either repair the defective unit or issue a credit equal to the purchase price of the defective unit to the Customer against the purchase price of comparable replacement part purchased from Lutron. Replacements for the unit provided by Lutron or, at its sole discretion, an approved vendor may be new, used, repaired, reconditioned, and/or made by a different manufacturer.

If the unit is commissioned by Lutron or a Lutron approved third party as part of a Lutron commissioned lighting control system, the term of this warranty will be extended, and any credits against the cost of replacement parts will be prorated, in accordance with the warranty issued with the commissioned system, except that the term of the unit's warranty term will be measured from the date of its commissioning.

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover, and Lutron and its suppliers are not responsible for:

1. Damage, malfunction or inoperability diagnosed by Lutron or a Lutron approved third party as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as (a) use of incorrect line voltages, fuses or circuit breakers; (b) failure to install, maintain and operate the unit pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriter's Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; or (g) an act of God, such as fire, lightning, flooding, tornado, earthquake, hurricane or other problems beyond Lutron's control.
2. On-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the unit or any of its components.
3. Equipment and parts external to the unit, including those sold or supplied by Lutron (which may be covered by a separate warranty).
4. The cost of repairing or replacing other property that is damaged when the unit does not work properly, even if the damage was caused by the unit.

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TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify Lutron within the warranty period described above by calling the Lutron Technical Support Center at (800) 523-9466. Lutron, in its sole discretion, will determine what action, if any, is required under this warranty. To better enable Lutron to address a warranty claim, have the unit's serial and model numbers available when making the call. If Lutron, in its sole discretion, determines that an on-site visit or other remedial action is necessary, Lutron may send a Lutron Services Co. representative or coordinate the dispatch of a representative from a Lutron approved vendor to Customer's site, and/or coordinate a warranty service call between Customer and a Lutron approved vendor.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

These products may be covered under one or more of the following U.S. patents: 4,797,599; 5,309,068; 5,633,540; 6,091,205; 6,380,692; and corresponding foreign patents. U.S. and foreign patents pending.

Lutron Electronics Co., Inc.
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LUTRON®

Worldwide headquarters
Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299
USA
TEL: +1.610.282.3800
FAX: +1.610.282.1243
Toll-free: 1.888.LUTRON1
intsales@lutron.com

Asian headquarters
Lutron GL Ltd.
15 Hoe Chiang Road
#07-03 Euro Asia Centre
Singapore 089316
TEL: +65.6220.4666
FAX: +65.6220.4333
lutronsea@lutron.com

European headquarters
Lutron EA Ltd.
6 Sovereign Close
London, E1W 3JF
UK
TEL: +44.(0)20.7702.0657
FAX: +44.(0)20.7480.6899
FREEPHONE: 0800.282.107
lutronlondon@lutron.com

Brazil
Lutron BZ do Brasil, Ltda.
Avenida Brasil, 239
Jardim América
São Paulo - SP
CEP: 01431-001
Brazil
TEL: +55.11.3885.5152
FAX: +55.11.3887.7138
brasilsales@lutron.com

China, Beijing
Lutron GL Ltd.,
Beijing Representative Office
5th Floor, China Life Tower
No. 16 Chaowai St.
Chaoyang District
Beijing 100020, China
TEL: +86.10.5877.1818
FAX: +86.10.5877.1816
lutronchina@lutron.com

China, Guangzhou
Lutron GL Ltd.,
Guangzhou Representative Office
Suite A09
23/F Tower A, Centre Plaza
161 Lin He Xi Lu, Tian He District
Guangzhou 510620, China
TEL: +86.20.2885.8266
FAX: +86.20.2885.8366
lutronchina@lutron.com

China, Hong Kong
Lutron GL Ltd.,
Unit 2808, 28/F
248 Queen's Road East
Wanchai, Hong Kong, China
TEL: +852.2104.7733
FAX: +852.2104.7633
lutronhk@lutron.com

China, Shanghai
Lutron GL Ltd.,
Shanghai Representative Office
Suite 07, 39th Floor
Plaza 66
1266 Nan Jing West Road
Shanghai, 200040, China
TEL: +86.21.6288.1473
FAX: +86.21.6288.1751
lutronchina@lutron.com

France
Lutron LTC, S.A.R.L.
90 rue de Villiers
92300 Levallois-Perret, France
TEL: +33.(0)1.41.05.42.80
FAX: +33.(0)1.41.05.01.80
FREEPHONE: 0800.90.12.18
lutronfrance@lutron.com

Germany
Lutron Electronics GmbH
Landsberger Allee 201
13055 Berlin, Germany
TEL: +49.(0)30.9710.4590
FAX: +49.(0)30.9710.4591
FREEPHONE: 00800.5887.6635
lutrongermany@lutron.com

Italy
Lutron LDV S.r.l.
FREEPHONE: 800.979.208
lutronitalia@lutron.com

Japan
Lutron Asuka Co., Ltd.
No. 16 Kowa Building, 4F
1-9-20, Akasaka, Minato-ku
Tokyo 107-0052 Japan
TEL: +81.3.5575.8411
FAX: +81.3.5575.8420
FREEPHONE: 0120.083.417
asuka@lutron.com

Spain, Barcelona
Lutron CC, S.R.L.
Gran Vía Carlos III, 84, planta 3ª
08028 Barcelona, Spain
TEL: +34.93.496.57.42
FAX: +34.93.496.57.01
FREEPHONE: 0900.948.944
lutroniberia@lutron.com

Spain, Madrid
Lutron CC, S.R.L.
Calle Orense, 85
28020 Madrid, Spain
TEL: +34.91.567.84.79
FAX: +34.91.567.84.78
FREEPHONE: 0900.948.944
lutroniberia@lutron.com

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www.lutron.com

Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299

World Headquarters 1.610.282.3800
Technical Support Center 1.800.523.9466
Customer Service 1.888.LUTRON1