HOMEWORKS® interactive

Technical Reference Guide
International Edition (220-240V)

LUTRON

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Introduction to HomeWorks® Interactive

The Most Powerful and Most Flexible Control System in the World

HomeWorks Interactive, the world's leading whole-house lighting control system, provides simple, convenient control of all home lighting, as well as the ability to control audio, video, and many other sub-systems in a home. HomeWorks Interactive provides homeowners with many benefits including:

- increased security
- added convenience
- improved aesthetics in the home

ADD SECURITY

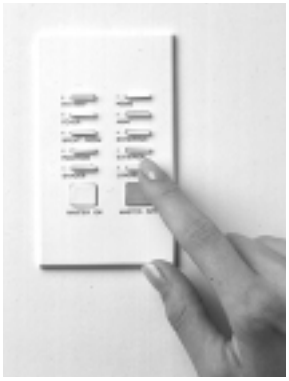
HomeWorks Interactive can make a home safer by automatically turning on landscape and security lighting each night. A built-in timeclock automatically adjusts for changing seasons, as well as for daylight savings time.

HomeWorks Interactive also increases peace of mind by providing homeowners with the ability to turn all lights on instantly using a single button on a Keypad.

Every day, a HomeWorks Interactive system automatically memorizes a home's actual lighting usage patterns, which can be replayed when the homeowner is away. This unique feature allows for a realistic appearance of activity that standard timers cannot achieve.

HomeWorks Interactive can also be linked to a home's security system. In the event of an alarm, interior lights can turn on, illuminating a safe exit, while exterior lights can flash, drawing immediate attention.

Replace large banks of switches with one elegant Keypad



ADD CONVENIENCE

Each light in a home can be controlled from any HomeWorks Interactive Keypad, providing instant access to all areas of the home and landscape. This eliminates the tedious task of setting the home lighting just right for daily activities, bedtime, or special occasions.

When most lights are off, one button on a Keypad can create a "path of light" to softly light the way to another room, allowing for late-night trips to the bathroom or kitchen without fumbling for switches in a dark hallway. And monitoring lighting in individual rooms or areas throughout a home requires no more than a quick glance at a Keypad's discreet status LEDs.

IMPROVE AESTHETICS

HomeWorks Interactive gives homeowners the power to enhance the beauty of their home and decor with an endless variety of customized room and whole-house lighting scenes. One button dims the lights for a soft romantic dinner while another button lights the house for a festive party.

Keypads provide a clean, elegant look on the wall by combining the functions of many standard switches and dimmers into a single control. Contrast the elegant simplicity of a single Keypad to the large bank of switches often found at the front door. Whole-house audio and video control can also be integrated into HomeWorks Interactive Keypads to further reduce wall clutter and provide a consistent look.

Wall controls from most other systems in a home can also be integrated under one seamless, customized wallplate to maintain aesthetic consistency. Keypads can even be matched to a home's paint colors, wallpaper, or decor.

Lutron combines the industry's largest selection of controls and matching accessories with an extensive array of colors and commercial finishes. Custom engraving of all HomeWorks Interactive Keypads is provided at no charge to the homeowner.

Features Overview

LUTRON QUALITY

Lutron has been the world leader in lighting controls since inventing the solid-state dimmer more than 35 years ago. All Lutron products are designed and manufactured to the highest quality standards, minimizing the likelihood of damage caused by power surges, lightning strikes, or static electricity.

INTERACTIVITY

HomeWorks® Interactive has been designed to directly interact with audio, video, and other sub-systems in a home. A typical application would be to control a multi-room audio system from buttons on a HomeWorks Interactive Keypad. The system can interface to other equipment using contact closure inputs and outputs, infrared, and RS-232/485 serial communication.

FAIL-SAFE OPERATION

In the unlikely event of Processor failure, GRAFIK Eye® Local Lighting Controls remain fully functional. Dimming Panels also have manual override capabilities, which can be activated from a designated location anywhere in the house.

CONDITIONAL LOGIC

HomeWorks Interactive provides the capability to make system events conditional. For example, driveway sensors can be programmed to turn on exterior lighting if, and only if, it is dark. As another example, a single "Dining" button on a Keypad might set different lighting and music, based on the time of day, for breakfast, lunch, and dinner.

AESTHETIC CONSISTENCY

All HomeWorks Interactive Keypads and GRAFIK Eye Local Lighting Controls complement each other with matching colors, styles and finishes. Controls can also be customized to match a home's paint colors, wallcoverings, or decor.

ASTRONOMIC TIMECLOCK

HomeWorks Interactive allows events to occur automatically at a specific time of day or at a time relative to sunrise or sunset. Multiple schedules can be programmed, allowing for different timeclock events on weekdays, weekends, holidays, etc. Timeclock schedules can also be enabled or disabled from Keypads. Additionally, any timeclock event can be programmed using conditional logic, so the event will occur only if a specified condition is met.

SECURITY MODE

HomeWorks Interactive can be connected to a security system to activate lights in case of an alarm. Selected lights will turn on to a predetermined security level, or flash repeatedly to attract attention. Security Mode may also be activated manually from a Keypad.

VACATION MODE

HomeWorks Interactive constantly monitors and records the state of all system devices in a home. When Vacation Mode is activated, the system plays back these events, providing a realistic appearance of activity while the home is unoccupied. The system can be programmed to record either the last day's, the last week's, or the last two weeks' activities.

POWER-FAILURE MEMORY

All HomeWorks Interactive components are designed with 10-year power-failure memory. If power is interrupted and restored, lights will automatically return to the levels to which they were set prior to the power outage. HomeWorks Interactive system programming is retained in non-volatile memory and not affected by loss of power.

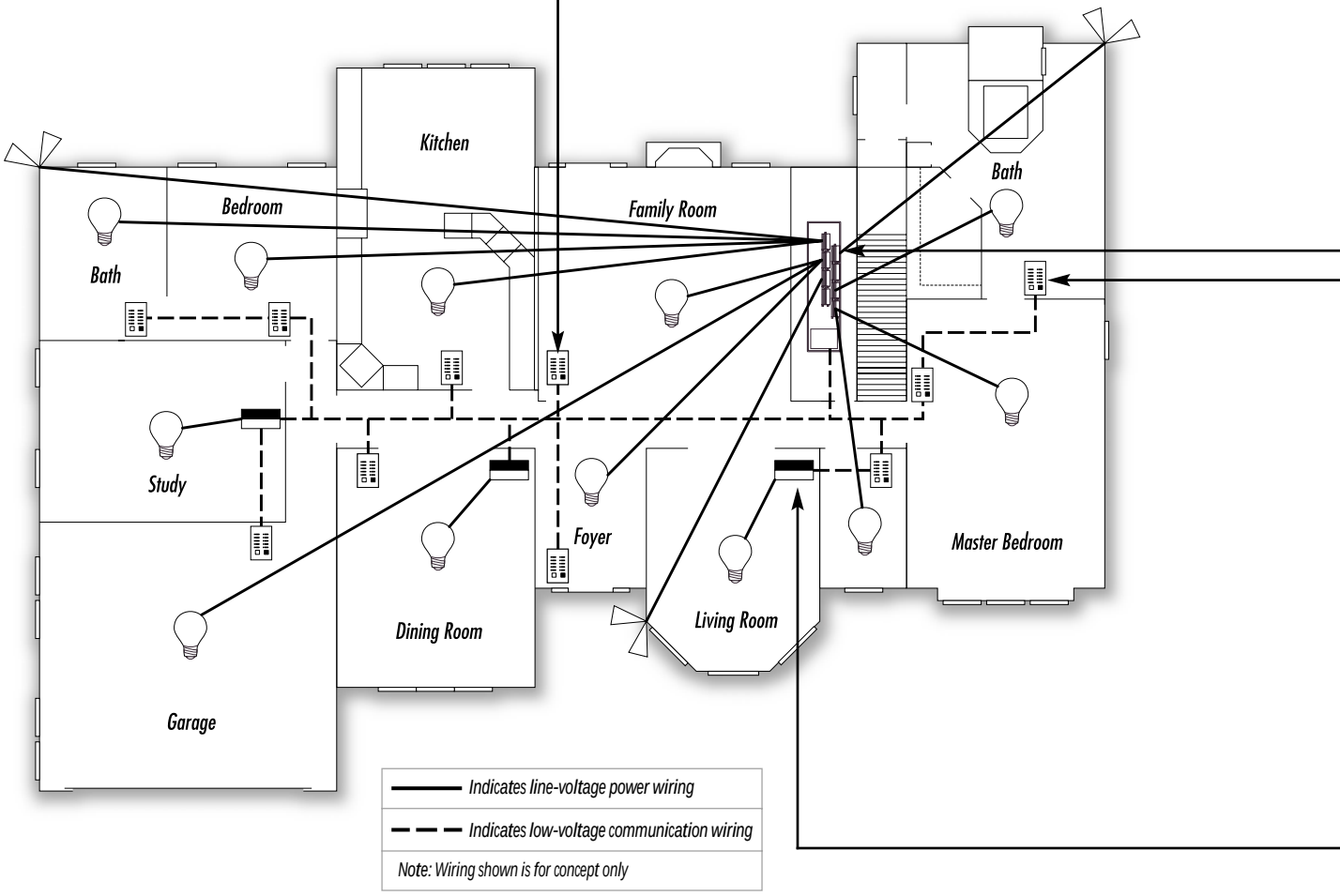
DESIGN AND PROGRAMMING EASE

HomeWorks Interactive design and programming software makes it easy to design and layout a system and program the individual Keypad button functions using any Windows® 95-, Windows® 98-, or Windows® NT-based computer. Since all information is stored in a single database, system design changes are easily accommodated and automatically incorporated into design documents.

System Overview

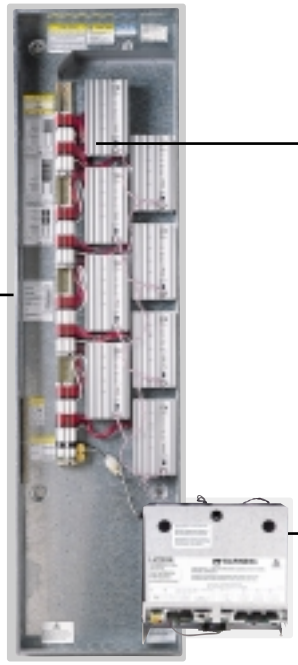
KEYPADS (pg. 15)

- Provide simple, convenient low-voltage control of lighting loads, as well as control of other systems in a home
- Each button can be programmed to perform numerous functions, including controlling lights in one room or selecting preset scenes throughout the home and landscape



INTEGRATED KEYPADS (pg. 23)

- Other manufacturers' controls can also be combined with HomeWorks® Interactive Keypads using custom, seamless wallplates



REMOTE POWER MODULES (pg. 12)

- Designed for direct control of lighting loads and motors using Keypads to replace the local controls in a room or area
- RPMs help reduce or eliminate wall clutter because they allow lighting loads to be controlled without dimmers or switches on the walls

PROCESSOR (pg. 19)

- Communication hub for HomeWorks® Interactive system
- Each HomeWorks Interactive Processor is capable of controlling up to 256 zones
- Each Processor has six communication links
- Three of the six communication links can be individually configured to control:
  - up to 32 Keypads or contact closure input/output boards
  - up to eight GRAFIK Eye® Preset Local Lighting Controls
- Up to 16 HomeWorks Interactive Processors can be linked within one system

GRAFIK EYE PRESET LOCAL LIGHTING CONTROLS (pg. 10)

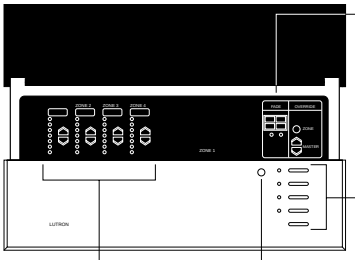
- Provides local preset scene control of up to six zones of lighting
- Typically used to control lights in one room or area, where control of other parts of the home is not needed
- Integral microprocessor allows GRAFIK Eye Preset Local Lighting Controls to be controlled locally at the control unit, centrally by Keypads, or automatically by the system's timeclock
- Optional infrared remote control available

Notes:

Component Overview

GRAFIK Eye® Preset Local Lighting Controls

GRAFIK Eye Preset Local Lighting Controls allow you to easily create and recall multiple lighting scenes ideal for the changing activities that occur in a room. Up to 16 preset scenes can be stored in each GRAFIK Eye, making them ideal for home theaters, living rooms, and dining rooms. GRAFIK Eye preset scenes can easily be manually adjusted at the Control Unit at any time. GRAFIK Eye Controls are available to dim or switch two, three, four, or six zones of incandescent, magnetic low-voltage, or neon/cold cathode lighting loads.



Fade – *Set ramp times for the activation of each scene. LEDs display rates of change from immediate (0 seconds), to virtually imperceptible (60 minutes).*

Scenes – *Press buttons 1-4 to recall lighting scenes. Fifth button turns all lights off. Scenes 5-16 can be activated from GRAFIK Eye Accessory Controls from HomeWorks Interactive Keypads.*

Zones – *Buttons control integral GRAFIK Eye dimmers to raise or lower each group of lights (zone). LEDs display intensities incrementally. Presets are automatically saved.*

Built-In Infrared Receiver

(4-Zone, 4-Gang Control Unit shown)

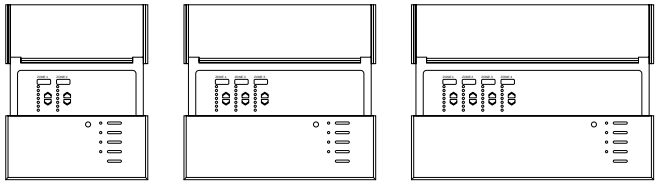
GRAFIK EYE ACCESSORY CONTROLS

GRAFIK Eye Accessory Controls provide the ability to activate scenes on a GRAFIK Eye Preset Lighting Control Unit from a remote location. Up to eight GRAFIK Eye Control Units and 15 GRAFIK Eye Accessory Controls may reside on a HomeWorks® Interactive configurable link. GRAFIK Eye Accessory Controls can be programmed to activate scenes on any of the eight GRAFIK Eye Control Units. GRAFIK Eye Accessory Controls derive power from the GRAFIK Eye Control Units. Up to three GRAFIK Eye Accessory Controls can be powered from a single Main Unit.

CONNECTION TO PROCESSOR

Each HomeWorks Interactive Processor has three configurable links (see pg. 19 for Processor details), each capable of controlling up to eight GRAFIK Eye Control Units and up to 15 GRAFIK Eye Accessory Controls. This connection requires two pair [one pair 1.0 mm^2 (#18 AWG), one pair 0.5-1.0 mm^2 (#18-22 AWG) twisted shielded] Class 2/PELV wire. Lutron wire, model # GRX-CBL-346S-500, may be used. The maximum cable length is 610m (2,000 ft.) and this link must be wired in a daisy-chain configuration.

GRAFIK EYE MAIN CONTROL UNIT INSTALLATION NOTES



2-Zone
136mm x 117mm (5 5/16" x 4 9/16") (non-CE only)

3-Zone
182mm x 117mm (7 1/8" x 4 9/16") (non-CE only)

4-Zone (pictured) and 6-Zone
229mm x 117mm (8 15/16" x 4 9/16") (Note: All CE-compliant units are this size)

Use 89mm (3 1/2") deep masonry boxes for ease of installation of GRAFIK Eye Control Units. (Lutron part # 241-400)

For technical specifications, see page 31.

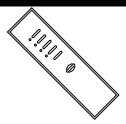
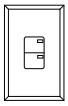
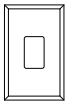
GRAFIK Eye® Preset Local Lighting Controls (cont.)

GRAFIK EYE PRESET LIGHTING CONTROLS (CONTROL UNITS) CAPACITIES

GRAFIK Eye Model	Voltage	Maxium watts per zone CE	Maxium watts per zone non-CE	Maximum watts per Main Unit CE	Maximum watts per Main Unit non-CE	Gang Size CE	Gang Size non-CE
2 Zone	*220-240V*	*800*	*1200*	*1600*	*1600*	*4*	*2*
3 Zone	*220-240V*	*800*	*1200*	*2300*	*2400*	*4*	*3*
4 Zone	*220-240V*	*800*	*1200*	*2300*	*3000*	*4*	*4*
6 Zone	*220-240V*	*800*	*1200*	*2300*	*3000*	*4*	*4*

Note: The sum of the wattages of the individual zones cannot exceed the total capacity of the Control Unit. For wattages exceeding those listed above, or for load types other than those previously stated, a Power Booster or Interface is required. See pg. 14 for more information.

GRAFIK Eye Accessory Controls

	DESCRIPTION	STANDARD FUNCTION ("AS SHIPPED")	ADVANCED FUNCTION (FIELD CONFIGURED)	MOUNTING
	**Hand-held Infrared Wireless Remote Control Transmitters GRX-IT, GRX-8IT**	Controls 4 (or 8) scenes plus master raise/lower and off. Recalls or fine tunes light levels. Turns lighting on or off.	N/A	Hand-held
	**Two-Button Entrance Control NTGRX-2B-SL**	Turns lighting (scene 1) on or off.	Selects either of 2 scenes (1/off, 9/10 or 13/14), partition opened/closed, panic station, sequencing, raise/lower.	Wall
	**Scene Selection Control NTGRX-4S/NTGRX-4S-IR**	Activates scenes 1-4; master raise/lower and off or infrared. Recalls or fine-tunes light levels.	Activates scenes 5-8, 9-12, or 13-16; operates one or more GRAFIK Eye main units.	Wall
	**European-Style Scene Selection Control EGRX-2S/EGRX-4S/EGRX-8S**	Activates 2-8 scenes and off by touch-buttons or infrared transmitters (optional). Recalls or fine-tunes light levels.	Activates 2-8 scenes; operates one or more GRAFIK Eye main units.	Wall
	**Architrave™ Door Jamb Control, GRX-4S-DW**	Activates scenes 1-4; master raise/lower and off. Recalls or fine-tunes light levels.	Activates scenes 5-8, 9-12, or 13-16; operates one or more GRAFIK Eye main units.	Wall or Door Jamb
	**Master Control NTGRX-4M**	Activates scene 1 or off for up to eight GRAFIK Eye main units, or all on/all off.	N/A	Wall
	**On/Off Doorway Control NTGRX-1S**	Line/mains voltage control. Switches lighting on or off from a remote wall location (functions as 3-way switch.)	N/A	Wall

Note: GRAFIK Eye Accessory Controls can only activate scenes on GRAFIK Eye Control Units.

Remote Power Modules (RPMs)

HomeWorks® Interactive Remote Power Modules (RPMs) are used in both centralized and optimized lighting control system designs to control lighting and motor loads. There are several different models of RPMs; each model controls specific load types, as noted below. The RPMs are mounted in one of two Remote Power Panels: model # HWI-PNL-8, which can house up to eight RPMs, or model # HWI-PNL-5, which can house up to five RPMs.

DIMMING MODULE (MODEL # HW-RPM-4U-230-CE)

Each of the four outputs of the Dimming Module can directly dim or switch incandescent, magnetic low-voltage, electronic low-voltage[1], neon/cold cathode, or fluorescent (switch only) lighting. The total capacity of a Dimming Module is 13A @ 220-240V, comprised of any combination of load types. Any single zone output can be a maximum of 10A @ 220-240VAC.

MOTOR MODULE (MODEL # HW-RPM-4M-230)

Each Motor Module can control four three-wire 220-240VAC motors for applications such as shades, drapes, and hurricane shutters. Individual control outputs use two electrically-interlocked relays for directional control that prevent simultaneous operation of both outputs. Maximum relay contact rating is 1/2HP, 5A @ 220-240VAC for inductive loads, and 1.5A @ 220-240VAC for resistive loads.

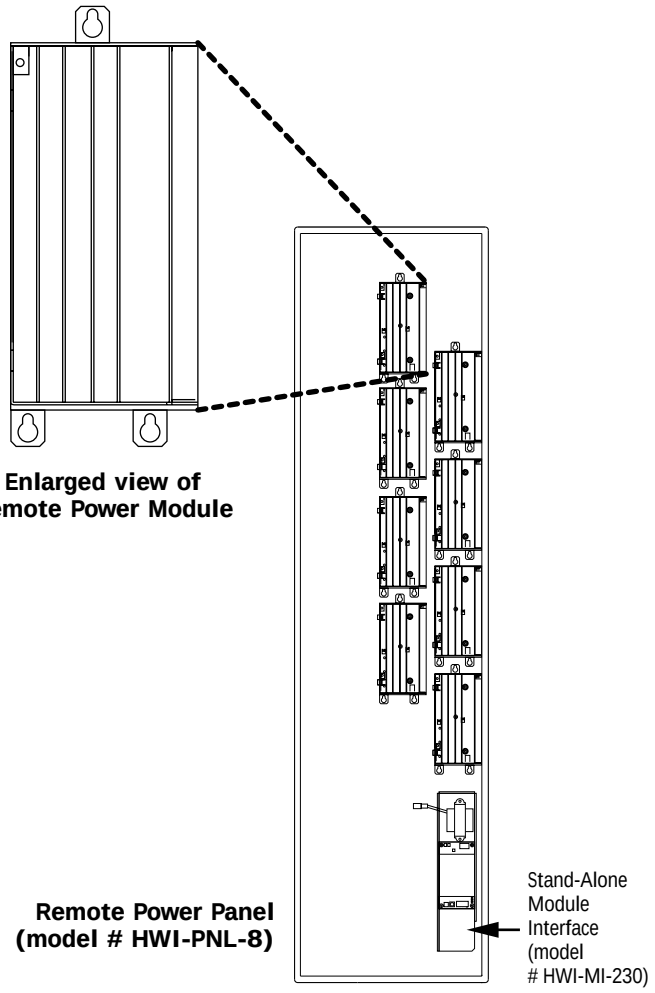
POWER RELAY MODULE (MODEL # HW-RPM-4R)

Each of the four outputs of the Power Relay Module can directly switch 16A of incandescent, neon, cold cathode, magnetic low-voltage, electronic low-voltage, fluorescent, or high intensity discharge (HID) making this module ideal for high-wattage applications, such as landscape and security lighting. The total capacity of a Power Relay Module is 64A @ 220-240VAC, 1/3 HP per output.

CONNECTION TO MODULE INTERFACE

All RPMs must be connected to a Module Interface that is housed within the same enclosure. If a Processor is to be located in the same enclosure as RPMs, a Processor with an integral Module Interface must be used (# HWI-P**M**-230). RPMs within an enclosure are connected to the Module Interface using a Lutron-provided harness. Each RPM is powered by its own internal power supply circuitry.

For technical specifications, see page 35.

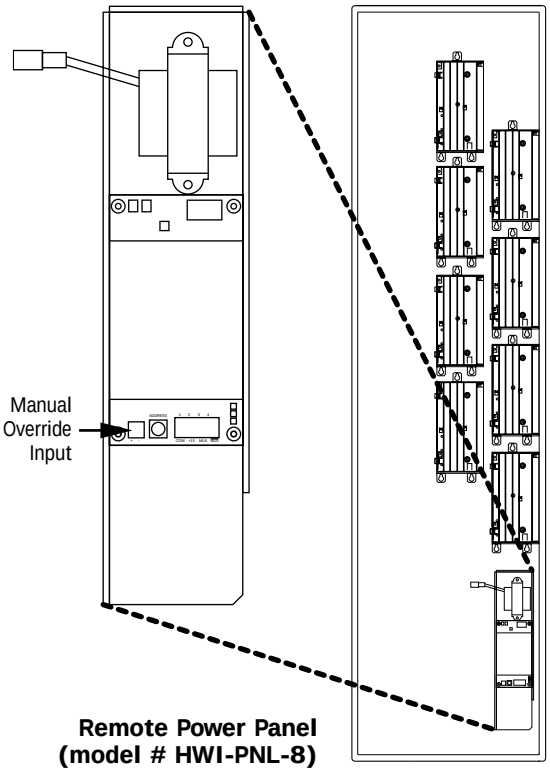


[1] In rare cases, some incandescent lamps and transformers in electronic low-voltage light fixtures will "buzz" or "hum." The HW-HIFC-10-2 Filter Choke Assembly reduces this hum. The Filter Choke Assembly can be installed in place of the top RPM in an HWI-PNL-8 Remote Power Panel.

Module Interface (MI)

Module Interfaces can control up to eight RPMs and are available in two configurations: either integral to a HomeWorks® Interactive Processor or as a stand-alone component. Each HomeWorks Interactive Processor can control up to 16 Module Interfaces (one of which may be integral to the Processor).

Enlarged View of Stand-Alone Module Interface (Model # HWI-MI-230)



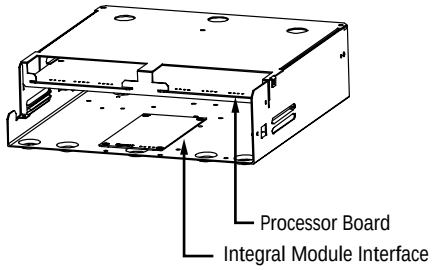
STAND-ALONE MODULE INTERFACE (MODEL # HWI-MI-230)

A stand-alone Module Interface (model # HWI-MI-230) can control up to eight RPMs in a Remote Power Panel enclosure that does not contain a Processor. In this configuration, the Module Interface manages communication between the RPMs and a Processor located in a separate enclosure. A stand-alone Module Interface derives power from its own internal power transformer. A stand-alone Module Interface can be installed in a 150cm (59") Remote Power Panel (model # HWI-PNL-8) with up to eight RPMs or in a 81cm (32") Remote Power Panel (model # HWI-PNL-5) with up to five RPMs.

INTEGRAL MODULE INTERFACE

Processor model number HWI-PM-230 contains an integral Module Interface, allowing up to eight RPMs to be installed in the same enclosure as a Processor. Integral Module Interfaces receive power from the Processor's internal power supply. These Processors with integral Module Interfaces must always be installed in a 150cm (59") Remote Power Panel (model # HWI-PNL-8).

Processor Model # HWI-PM-230 (Bottom View)



MANUAL OVERRIDE CAPABILITIES

A manual override input is provided on each Module Interface, allowing a pre-determined lighting scene to be activated from a designated override switch that can be installed anywhere in the home. For additional information, see pg. 38.

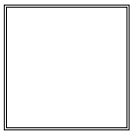
CONNECTION TO PROCESSOR

Each HomeWorks Interactive Processor has one communication link (link1) dedicated to the control of up to 16 MIs. This connection must be daisy-chained and requires two pair [one pair 1.0mm^2 (#18 AWG), one pair 0.5-1.0mm^2 (#18-22 AWG) twisted shielded] Class 2/PELV wire. Lutron wire, model # GRX-CBL-346S-500, may be used.

For technical specifications, see page 38.

Power Boosters and 220-240VAC Interfaces

Power Boosters and 220-240VAC Interfaces can be used to interface to specific load types and to increase the zone capacity of GRAFIK Eye® Preset Local Lighting Controls, and Remote Power Modules. Power Boosters and 220-240VAC Interfaces are typically installed in electrical closets or other hidden locations, since they do not need to be accessed during operation of the HomeWorks Interactive system.

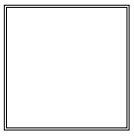


W = 114mm (4.5")

L = 114mm (4.5")

POWER BOOSTER
MODEL # NGRX-PB-AU (NON-CE)
MODEL # NGRX-PB-CE

Single zone interface to dim incandescent, magnetic low-voltage, and neon/cold-cathode (low/normal power factor transformers) sources. Maximum power capacity 10A @ 220-240VAC (non-CE) or 7.6A @ 220-240VAC (CE compliant). Power Booster is designed to be mounted in a two-gang US backbox.

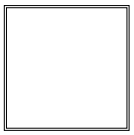


W = 114mm (4.5")

L = 114mm (4.5")

FLUORESCENT INTERFACE
MODEL # NGRX-FDBI-AU (NON-CE)

Single-zone interface to dim or switch Lutron Hi-lume® fluorescent ballasts. Maximum capacity 10A @ 220-240VAC (non-CE only). Fluorescent Interface is designed to be mounted in a two-gang US backbox.

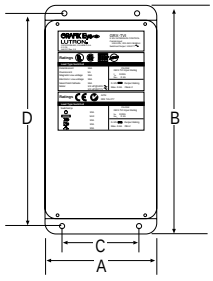


W = 114mm (4.5")

L = 114mm (4.5")

ELECTRONIC LOW-VOLTAGE INTERFACE
MODEL # NGRX-ELVI-AU (NON-CE)
MODEL # NGRX-ELVI-CE

Single-zone interface to control electronic transformer-supplied low-voltage lighting. Maximum capacity 5A @ 220-240VAC (non-CE) or 4.3A @ 220-240 VAC (CE-compliant). Electronic Low-Voltage Interface is designed to be mounted in a two-gang US backbox.



A = 155mm (6.1")

B = 318mm (12.5")

C = 102mm (4.0")

D = 298mm (11.75")

PHASE CONTROL TO 0-10V INTERFACE CONTROL
MODEL # GRX-TVI

Provides 0-10V contron and ballast switching capabilities in one enclosure. Switches 5A of fluorescent at 220-240VAC. 0-10V output signal conforms to EN60929 and IEC 929.

Keypads

HomeWorks® Interactive Keypads, available in many styles, colors, and finishes, provide homeowners with a simple and elegant way to operate lights, shades, motorized screens, pumps, thermostats, and many other devices. Keypads have LEDs that provide real-time status indication. At no additional cost, Lutron provides custom engraving in a choice of several fonts and fill colors to clearly identify each button's function.

Keypads are available in a variety of button styles and button configurations. Since any Keypad button on any Keypad model can be programmed to control any lighting load or device on the HomeWorks Interactive system, choosing a Keypad for a particular location requires no more than choosing the desired style and number of buttons.

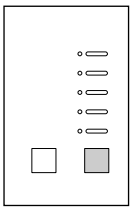
Each HomeWorks Interactive Processor has three configurable links (see pg. 19 for Processor details), each capable of directly controlling up to 32 Keypads.

CONNECTION TO PROCESSOR

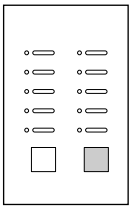
Up to 32 Keypads can be directly connected to a configurable link on a HomeWorks Interactive Processor using two pair [one pair 1.0mm^2 (#18 AWG), one pair 0.5-1.0mm^2 (#18-22 AWG) twisted shielded] Class 2/PELV cable. Keypads may be wired in a home run, T-tap, or daisy-chain configuration. The maximum total cable length of any home run is 305m (1,000 ft.).

FINISHES AND COLORS

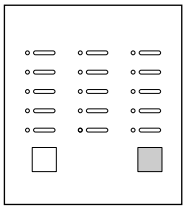
All Keypads are available in seven matte-finish plastic colors: white, beige, ivory, black, gray, brown, and taupe. Keypads are also available in 10 metallic finishes: anodized, bright satin, bright or antique brass, bright or satin chrome, satin nickel, bright, satin, or antique bronze, and 24-karat gold plate. Custom finishes and paint matching are also available.



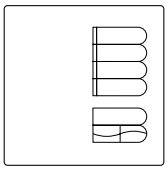
HWI-KP5
Slim Button Style 5-button Keypad



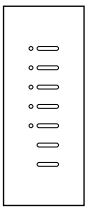
HWI-KP10
Slim Button Style 10-button Keypad



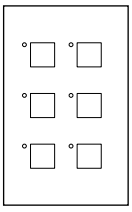
HWI-KP15
Slim Button Style 15-button Keypad



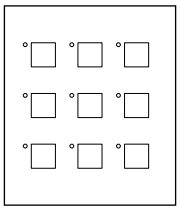
European Style
2-button, 4-button and 8-button Keypads available. European-size wallbox supplied



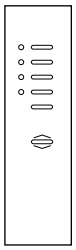
HWI-KP5-DN/DW
Architrave™ Style 5-button Keypad (available in two widths)



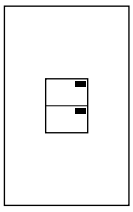
HWI-KP-LB6
Large Button Style 6-button Keypad



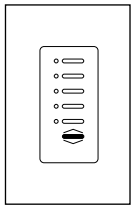
HWI-KP-LB9
Large Button Style 9-button Keypad



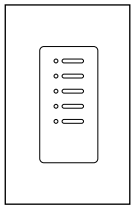
GRX-IT- *4-button*
GRX-8IT- *8-button*
Hand-held infrared transmitter



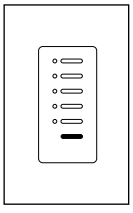
HWI-2B
2-Button Keypad with two contact closure inputs



HWI-5S-M
Designer Style 5-button Keypad with Master raise/lower



HWI-5S-NM
Designer Style 5-button Keypad



HWI-5S-IR
Designer Style 5-button Keypad, with IR receiver for remote control

Note: *Keypads are also available in additional button configurations. Contact Lutron for more information.*

For technical specifications, see page 55.

Contact Closure Input and Output Boards (HWI-CCI-8, HWI-CCO-8)

Contact Closure Boards allow simple integration of the HomeWorks® Interactive system and other equipment throughout the house in two ways. Equipment such as driveway sensors, photocells, and security systems are able to activate lighting scenes and other HomeWorks Interactive system events through the use of Contact Closure Input (HWI-CCI-8) Boards. Also, equipment such as shades, screens, gates, spas, and thermostats can be controlled by the HomeWorks Interactive system through the use of Contact Closure Output (HWI-CCO-8) Boards. In addition, both the HWI-CCI-8 and the HWI-CCO-8 provide an infrared (IR) input that can be used to initiate HomeWorks Interactive system events using Lutron IR codes.

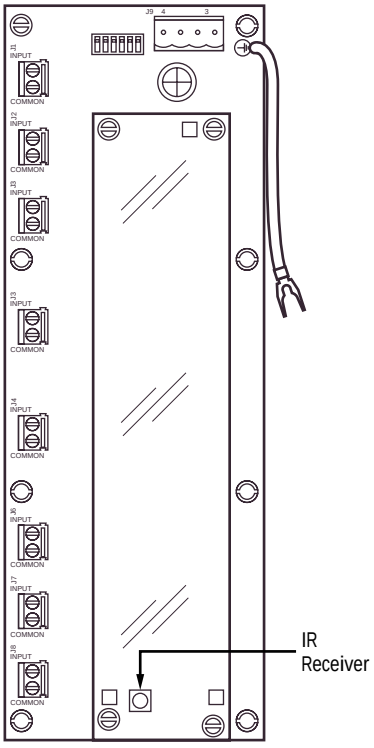
Contact Closure Boards can be mounted in any of three different enclosures, the HWI-ENC-LV32-CE, the HWI-ENC-LV17-230, and the HWI-ENC-CC.

CONTACT CLOSURE INPUT BOARD (MODEL # HWI-CCI-8)

Many electronic systems and devices have the capability to provide status or control in the form of dry contact closure outputs. Each individual device output can be connected to one of eight contact closure inputs on the Contact Closure Input Board. These contact closure inputs are programmed in the same fashion as the buttons on a HomeWorks Interactive Keypad. For example, a driveway sensor can be connected to a Contact Closure Input board and programmed to activate a “Welcome Home” scene. For systems in which only two contact closure inputs are needed, a HWI-2B Keypad can be used.

Each of the eight contact closure inputs can be individually programmed as normally open or normally closed. Each input has an LED indicator that shows the state of the connected device. The Contact Closure Input board has an IR receiver that is programmed independently of the contact closure inputs. This receiver allows Lutron handheld IR remote controls (GRX-IT and GRX-8IT) to function as “wireless keypads” when used in conjunction with standard IR repeater systems. The Lutron IR codes can be learned by most learning remotes, allowing audio/video remotes to control the lighting control system.

For technical specifications, see page 43.



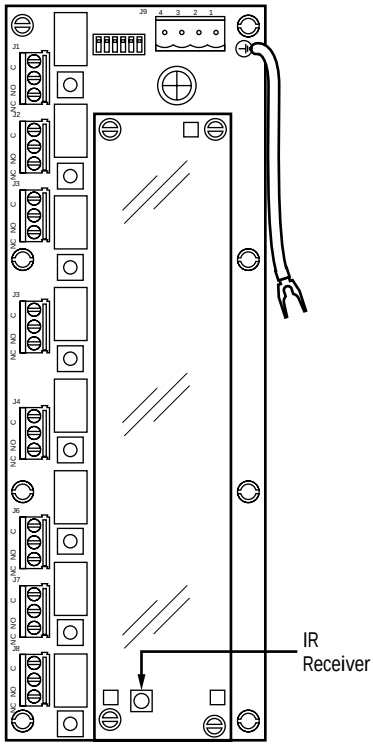
Contact Closure Input Board (HWI-CCI-8)

Contact Closure Boards (cont.)

CONTACT CLOSURE OUTPUT BOARD (MODEL # HWI-CCO-8)

Most electronic devices provide dry contact closure inputs, allowing the device to be controlled by an external system. The HomeWorks® Interactive system uses the Contact Closure Output board to control pumps, thermostats, audio/video, and other equipment that are supplied with dry contact closure inputs. Each Contact Closure Output board has eight individually-controlled contact closure outputs, and eight corresponding pushbuttons with LED indicators. When placed in "manual control mode", the pushbuttons on the board are used to change the state of each relay, allowing functional testing of the devices that are being controlled. Both normally-open and normally-closed relay contacts are provided for each contact closure output, and each output can be programmed to provide either momentary (pulsed) or maintained (latching) functionality.

These low-voltage contact closure outputs can be assigned to any Keypad button or timeclock event in the same manner as any lighting load. In a typical application, a HomeWorks Interactive Keypad button can be programmed to activate an output on a Contact Closure Output Board that is connected to a motorized window treatment. In addition to the contact closure outputs, the Contact Closure Output Board has an IR receiver that is programmed independently of the contact closure outputs. This receiver allows Lutron hand-held IR remote controls (GRX-IT and GRX-8IT) to function as "wireless keypads" when used in conjunction with standard IR repeater systems. The Lutron IR codes can be learned by most learning remotes, allowing audio/video remotes to control the lighting control system.



Contact Closure Output Board (HWI-CCO-8)

CONNECTION TO PROCESSOR

Since each Contact Closure Board uses one Keypad address, up to 32 Contact Closure Boards can be directly connected to a configurable link on a HomeWorks Interactive Processor using two pair [one pair 1.0mm² (#18 AWG), one pair 0.5-1.0mm² (#18-22 AWG) twisted shielded] Class 2/PELV cable. Contact Closure Boards must reside on a link that has been configured for Keypads, and may be wired in a home run, T-tap, or daisy-chain configuration. The maximum total cable length of any home run is 305m (1,000 feet).

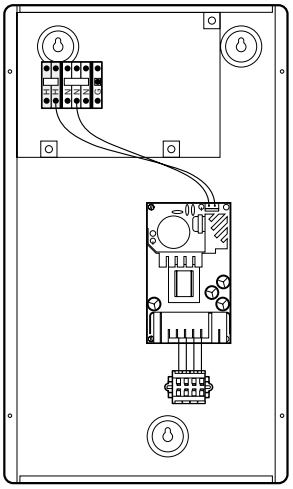
For technical specifications, see page 44.

Power Supply Enclosure & Wire Landing Board

POWER SUPPLY ENCLOSURE (MODEL # HWI-PS)

The Power Supply Enclosure provides additional +15VDC power that can be used to power Keypads and Contact Closure Boards when the power supply capacity of the Processor is exceeded. The Processor alone can power a maximum of 300 LEDs; the HWI-PS can power a maximum of 350 LEDs. (For example, the Processor can power 30 HWI-KP10 Keypads before a HWI-PS is required.)

Model	Rules for Determining LED Count
HWI-KP5, HWI-KP10, HWI-KP15,HWI-KP-LB6, HWI-KP-LB9, HWI-5S-M, HWI-5S-NM, HWI-5S-IR	LED Count = Number of LEDs on Keypad
HWI-2B, HWI-CCI-8, HWI-CCO-8	LED Count = 10 per device
HWI-TEL9	LED Count = 15



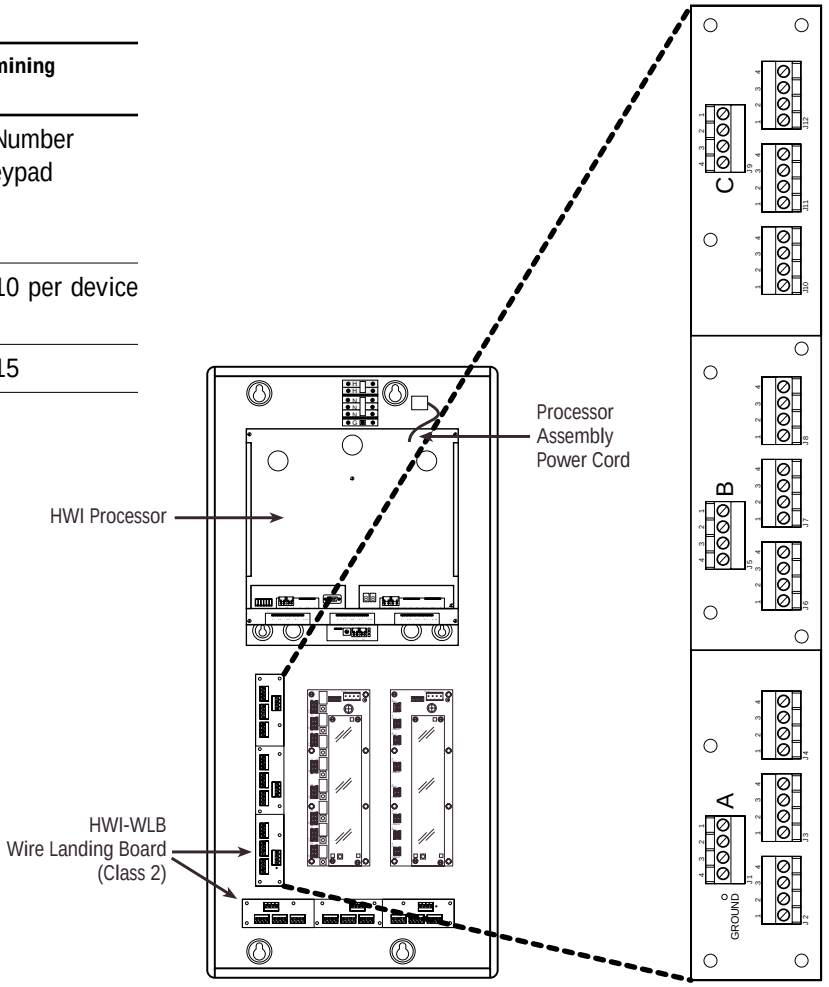
Power Supply Enclosure (model # HWI-PS)

For technical specifications, see page 45.

WIRE LANDING BOARD (MODEL # HWI-WLB)

The Wire Landing Board is a wiring aid consisting of a printed circuit board with three sets of four terminal blocks. Each of these sets of terminal blocks is connected pin-to-pin, simplifying home run wiring. The Wire Landing Board is installed in a Low-Voltage Enclosure (see pg. 22 for more information).

For technical specifications, see page 46.



Low-Voltage Control Enclosure (model # HWI-ENC-LV32-CE)

Enlarged View of Wire Landing Board (model # HWI-WLB)

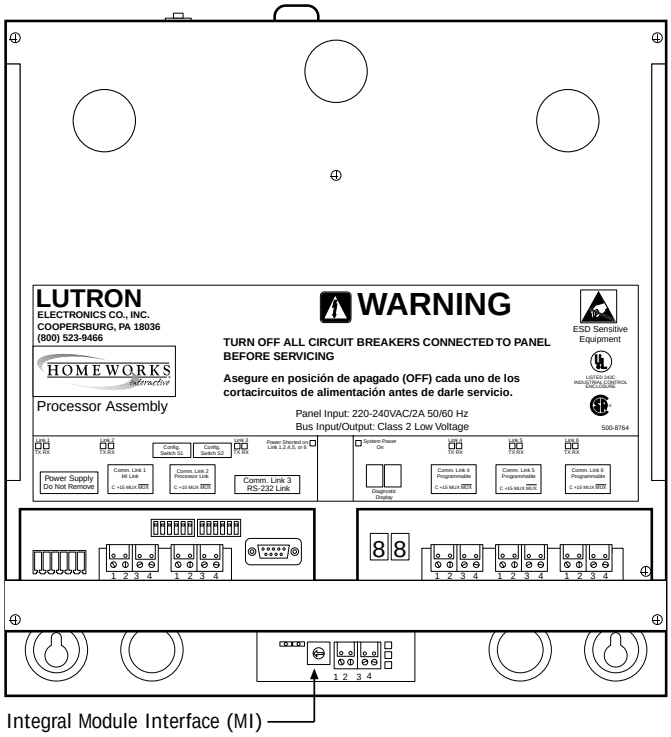
Processors

Together, one or more HomeWorks® Interactive Processors comprise the major communication hub of a HomeWorks Interactive system. Each Processor has six communication links, which allow the Processor to interact with various HomeWorks Interactive system components, including: Remote Power Modules, GRAFIK Eye® Preset Local Lighting Controls, Keypads, and Contact Closure Devices.

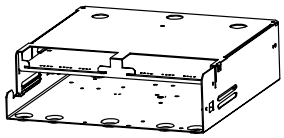
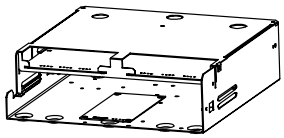
All of these components can be connected directly to the Processor, with the exception of Remote Power Modules, which require interfaces. Remote Power Modules require a Module Interface (MI). These interfaces are available as stand-alone components, or as built-in components in specific models of Processors, as shown in the chart below.

Each Processor supports the control of up to 256 lighting zones, which may be controlled by a combination of GRAFIK Eye Preset Local Lighting Controls and Remote Power Modules. Up to 16 Processors can be used in a HomeWorks Interactive system, for a total of 4,096 lighting zones.

HomeWorks Interactive Processor (HWI-PM-230)



HomeWorks Interactive Processor Models

Processor Model #	Integral Module Interface (MI)	Installs in Remote Power Panel or Low-Voltage Enclosure Model #	Bottom View
HWI-PO-230 (Processor only)	No	HWI-ENC-LV32	
HWI-PM-230 (Processor with MI)	Yes	HWI-PNL-8	

For technical specifications, see page 48.

Processor Communication Links

PROCESSOR LINKS

Each Processor has six communication links, which allow the Processor to interact with other equipment. Three of the six links are designated for specific equipment connections, and three of the links are configurable through the HomeWorks Interactive programming software, allowing the system to be tailored to meet the needs of the installation.

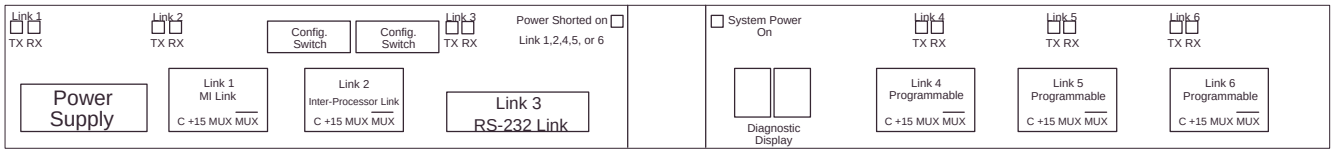
Communication Link 1: This link is designated for communication with Module Interfaces. It must be wired in a daisy-chain configuration and requires a link terminator at the last Module Interface when the total cable length exceeds 50 feet (15m).

Communication Link 2: This link is designated for communication between Processors. It must be wired in a daisy-chain configuration and requires terminators at both ends of the link whenever the total cable length exceeds 50 feet (15m).

Communication Link 3: This link is a multi-purpose RS-232 port used for uploading programming information to the Processor. A modem may be connected to this port, allowing for simple remote programming. When it is not being used for programming, the RS-232 port can be used for two-way serial communications with A/V equipment, security systems, HVAC, and home automation controls. Maximum cable length is 50 feet (15m).

Communication Links 4, 5, 6: Each of these links can be configured to perform either of two different functions: to communicate with Keypads or GRAFIK Eye® Preset Local Lighting Controls. See chart below for wiring information.

Enlarged View of Processor Label (showing Communication Links)



Communication Link Information

Non-Configurable	Function	Maximum Link Capacity	Configuration	Terminators?	Max. Wire Length & Type
Link 1	Link to Remote Power Modules	16 Module Interfaces, each controlling up to 8 RPMs	Daisy-Chain	At last Module Interface[1]	305m (1,000 ft.) total, Type A
Link 2	Link to Other Processors	16 Processors	Daisy-Chain	At first & last Processor[1]	305m (1,000 ft.) total, Type A
Link 3	RS-232 port	N/A	Point-to-Point	No	15m (50 ft.) max., Type B
Configurable	**Possible Function**	**Maximum Link Capacity**	**Configuration**	**Terminators?**	**Max. Wire Length & Type**
Links 4, 5, 6 (each link may be programmed to communicate with either Keypads or GRAFIK Eye Controls)	Link to Keypads	32 devices (Keypads/ Contact Closure Interfaces)	Any (Daisy-Chain, Star, T-tap, etc.)	No	305m (1,000 ft.) per home run, Type A[2]
	Link to GRAFIK Eye	8 GRAFIK Eye main units	Daisy-Chain	No	610m (2,000 ft.) total, Type A

Type A = Two pair [one pair 1.0mm² (#18 AWG), one pair 0.5-1.0mm² (#18-22 AWG) twisted shielded] Class 2/PELV. Lutron wire, model # GRX-CBL-346S-500, may be used.

Type B = Standard RS-232 cable.

1 Terminators required if total cable length exceeds 15m (50 ft.).

2 Maximum 10 Keypads recommended per 310m (1,000 ft.) home run; maximum 1220m (4,000 ft.) total wire length.

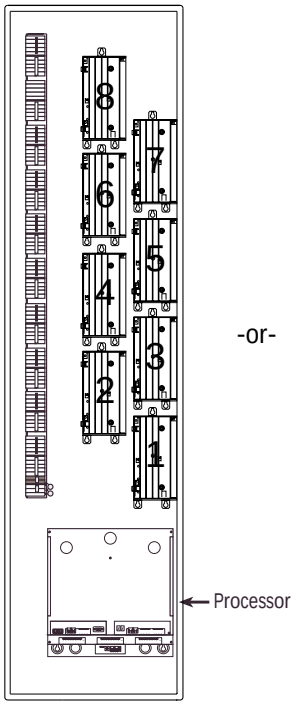
Remote Power Panels

Remote Power Panels are available in two different sizes, each of which may be either surface-mounted or recess-mounted in an electrical closet or other equipment room. Both the number of Remote Power Panels and the types of components within them are customized to fit the size, lighting plan, and design of a home. Remote Power Panels may contain HomeWorks® Interactive Processors, Remote Power Modules, or Module Interfaces. Shown below are a few of the possible configurations.

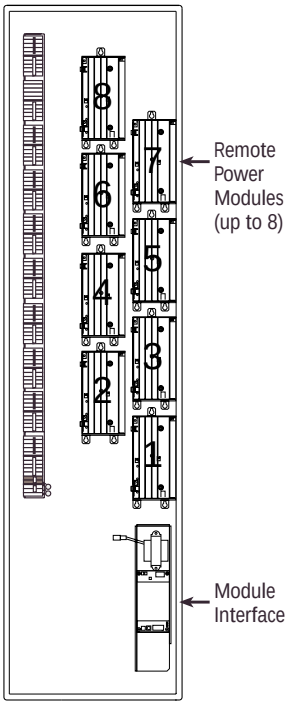
For technical specifications, see pages 50-53.

EIGHT-MODULE REMOTE POWER PANEL (MODEL # HWI-PNL-8-CE)

Accommodates one of the following combinations of components:



-or-



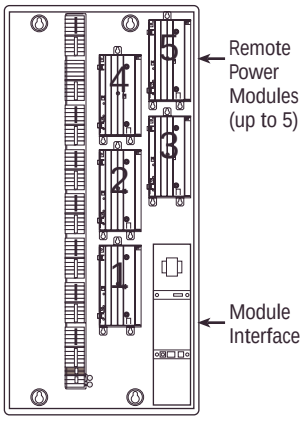
- 1 Processor
- Up to 8 Remote Power Modules*

- 1 Module Interface
- Up to 8 Remote Power Modules*

* 1 HW-HIFC-10-2 Filter Choke may be installed in place of module 8.

FIVE-MODULE REMOTE POWER PANEL (MODEL # HWI-PNL-5-CE)

Accommodates the following combination of components:



- 1 Module Interface
- Up to 5 Remote Power Modules

Note: HWI-PNL-5 ***cannot*** *house a HomeWorks Interactive Processor*

Low-Voltage Enclosures

Low-Voltage Enclosures are available in three different sizes, each of which may be either surface-mounted or flush-mounted in an electrical closet or equipment room. Both the number of Enclosures and the types of components within them are customized to fit the size, lighting plan, and design of a home. Low-Voltage Enclosures can be distributed throughout the home near the rooms they are controlling to provide maximum flexibility during installation of the low-voltage wiring.

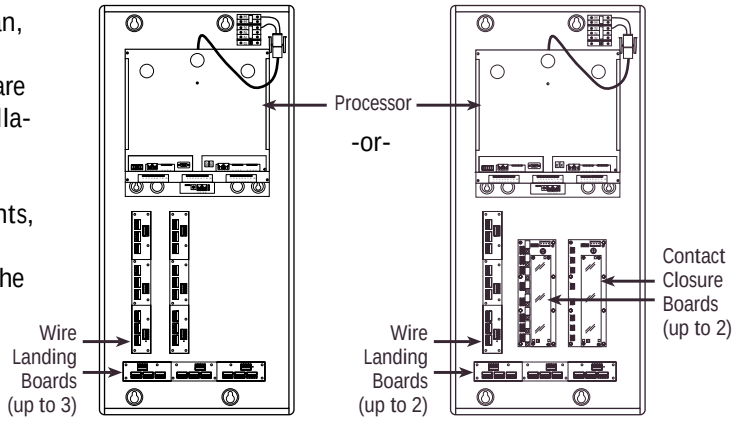
Low-Voltage Enclosures accommodate several components, including Processors, Contact Closure Input or Output Boards, and Wire Landing Boards. Shown are a few of the possible configurations.

*Note: Low-Voltage Enclosures **cannot** house Remote Power Modules (RPMs).*

For technical specifications, see pages 54-57.

32" LOW-VOLTAGE ENCLOSURE (MODEL # HWI-ENC-LV32-CE)

Accommodates one of the following combinations:

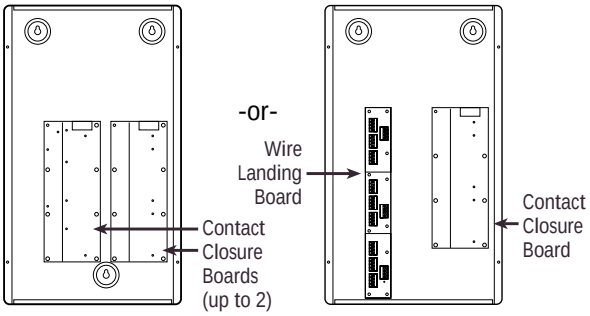


- 1 Processor
- Up to 3 Wire Landing Boards

- 1 Processor
- Up to 2 Wire Landing Boards
- Up to 2 Contact Closure Boards

17" LOW-VOLTAGE ENCLOSURE (MODEL # HWI-ENC-LV17-230)

Accommodates one of the following combinations:

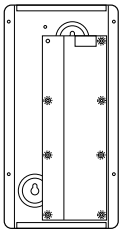


- Up to 2 Contact Closure Boards

- 1 Contact Closure Board
- 1 Wire Landing Board

CONTACT CLOSURE ENCLOSURE (MODEL # HWI-ENC-CC)

Accommodates:



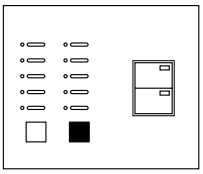
- 1 Contact Closure Board

Available Finishes & Integrated Keypads

Finishes and Colors

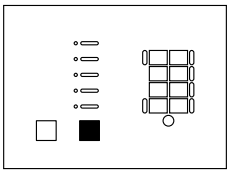
All HomeWorks® Interactive Controls are available in seven standard matte-finish plastic colors: white, beige, ivory, black, gray, brown, and taupe. Controls are also available in 10 metallic finishes: anodized, bright satin, bright or antique brass, bright or satin chrome, satin nickel, bright, satin, or antique bronze, and 24-karat gold plate. Custom paint matching is also available.

Integrating Multiple Controls



For a seamless look, multiple Keypads can be combined behind a common, custom-made wallplate. Custom controlsare available in all HomeWorks Interactive finishes and colors.

Integrating Other Controls

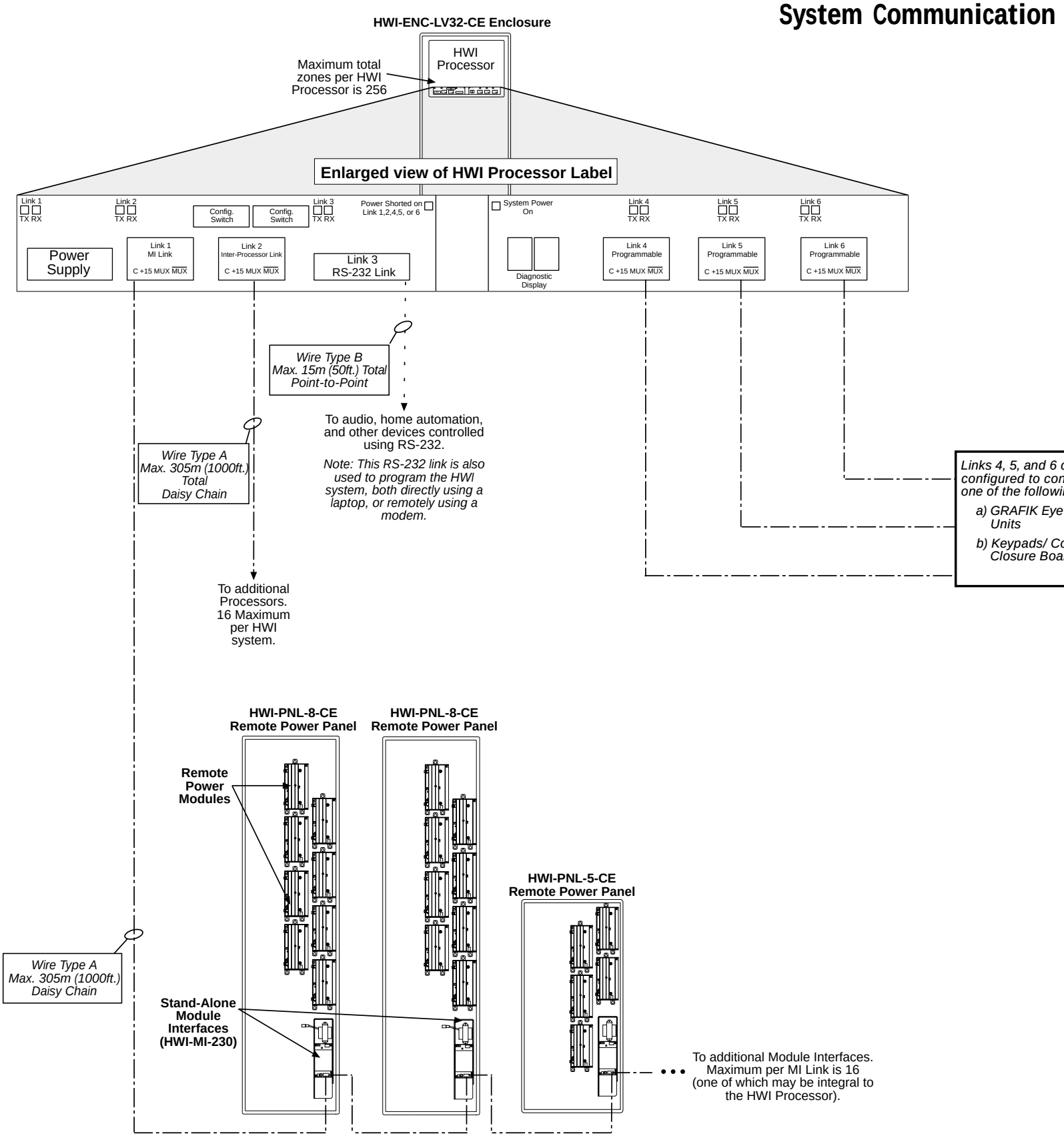


Other manufacturers' controls can be integrated with HomeWorks Interactive Keypads using a custom wallplate. Examples include AMX, Audio Access, Elan, Linn, and B&W. All color and finish choices are available. Contact Lutron for more details on custom wallplates.

Notes:

System Communication Wiring Overview

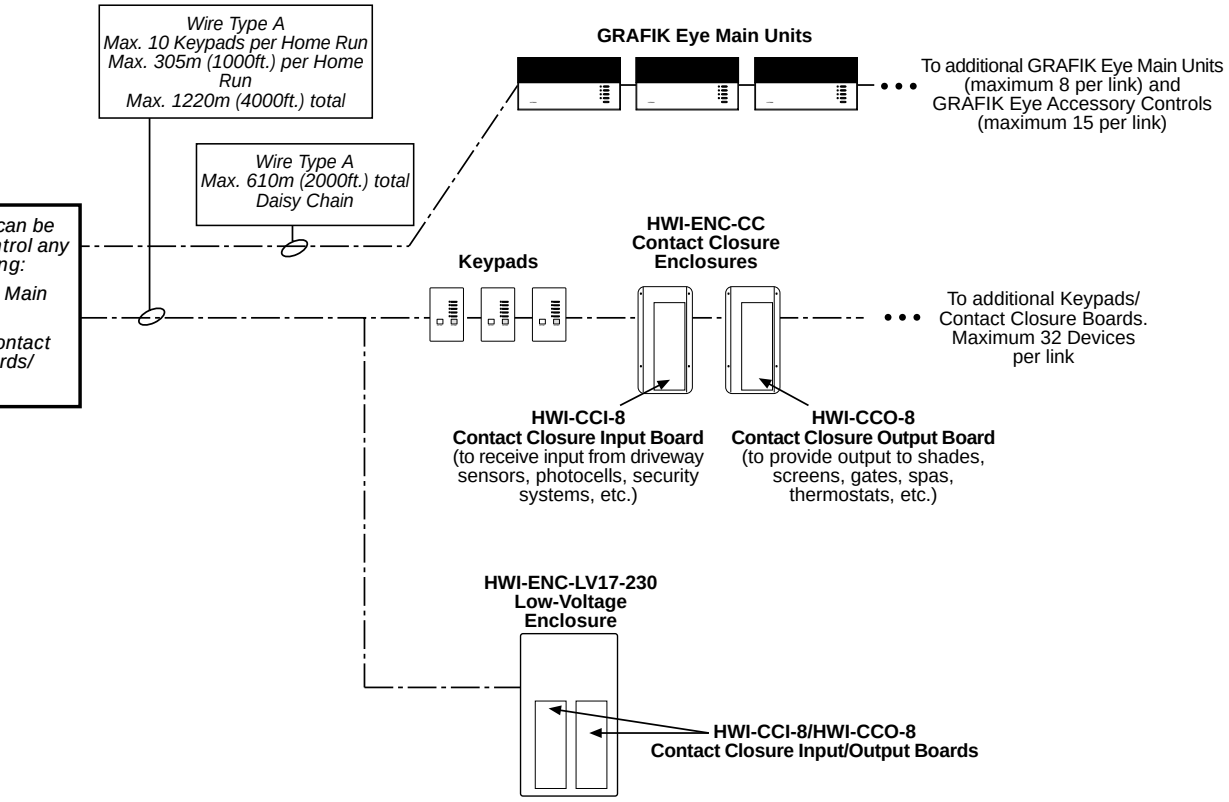
System Communication



Wiring Overview

Wire Type Key

—·—·—	*Type A:*	*Two pair [one pair 1.0mm² (#18 AWG), one pair 0.5-1.0mm² (#18-22 AWG) twisted shielded] Class 2 wire. Lutron wire model #GRX-CBL-346S-500 may be used.*
- - - -	*Type B:*	*Standard RS-232 Cable (all pins straight through)*



Notes:

Technical Specifications

System Specifications

Remote Power Module (RPM) Capacities

Number of zones per RPM	4
Max. number of RPMs per Module Interface (MI) link	8
Max. number of MIs per MI link	16
Max. number of MI links per Processor	1
Max. number of RPMs per Processor	128
Max. number of RPM zones per Processor	256
Max. number of Processors per system	16
Max. number of RPMs per system	2,048
Max. number of RPM zones per system	4,096

GRAFIK Eye® Capacities

Max. number of GRAFIK Eye Main Units per GRAFIK Eye link	8
Max. number of GRAFIK Eye Accessory Controls per GRAFIK Eye link	15
Max. number of GRAFIK Eye links per Processor	3
Max. number of GRAFIK Eye Main Units per Processor	24
Max. number of GRAFIK Eye Accessory Controls per Processor	48
Max. number of Processors per system	16
Max. number of GRAFIK Eye Main Units per system	384
Max. number of GRAFIK Eye Accessory Controls per system	720

Keypad Capacities

Max. number of devices per Keypad link	32
Max. number of Keypad links per Processor	3
Max. number of Keypads per Processor	96
Max. number of Processors per system	16
Max. number of Keypads per system	1,536

Processor Communication Link Specifications

Link Type	Max Per Processor	Baud Rates	Wiring Configuration	Termination Required
Module Interface	1	125K	Daisy-Chain	Yes, at last MI on link[1]
Inter-Processor	1	125K	Daisy-Chain	Yes, at both ends of link[1]
GRAFIK Eye®	3	31.25K	Daisy-Chain	No
RS-232	1	9600-115.2K	Point-to-Point	No
Keypad	3	10.42K-41.67K	Any	No

Note

(1) Terminators required if total cable length exceeds 15m (50 ft.).

GRAFIK Eye® Specifications

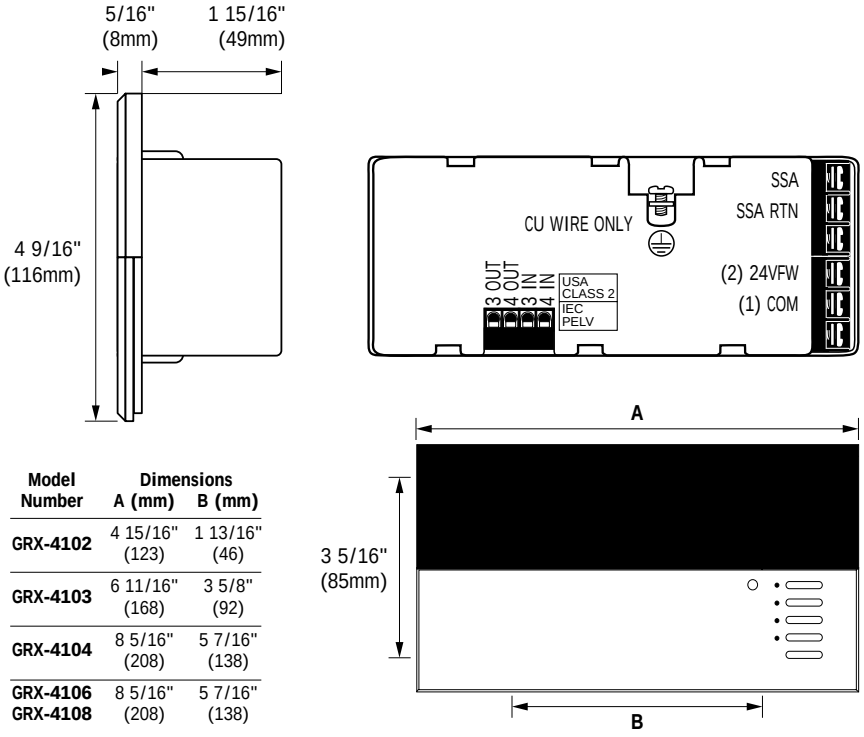
Control Units

Load Types	Incandescent, magnetic low-voltage, neon/cold cathode, fluorescent (requires NGRX-FDBI-WH), electronic low-voltage (requires NGRX-ELVI-WH)
Dimensions	*See Fig. 1 (pg. 32)*
Line-Voltage Wiring	*See Fig. 2 (pg. 32)*
Low-Voltage Wiring	Maximum of 610m (2,000 ft.) total. Must be wired in a daisy-chain configuration. *See Figs. 3-6, (pgs. 33-34).*Terminals will accept up to two 1.0mm² (#18 AWG) wires.
Low-Voltage Wire Type	Two pair [one pair 0.5mm² (#18 AWG), one pair 0.5-1.0mm² (#18-22 AWG) twisted shielded] class 2/PELV wire. Lutron wire model # GRX-CBL-346S-500 may be used.
Environment	Ambient operating temperature: 0-40° C, 32-104° F. Ambient operating humidity: 0-90% humidity, non-condensing. Indoor use only.
Lighting Control	Scenes: 16. Fade Time : 0-59 seconds or 1-60 minutes.
GRAFIK Eye System Capacities	Up to eight GRAFIK Eye Control Units per HWI Processor communication link that has been configured for GRAFIK Eye Controls. Up to 15 Accessory Controls per HWI Processor communication link that has been configured for GRAFIK Eye Controls. Up to three Accessory Controls can be powered from a GRAFIK Eye Control Unit.
Input Voltage	220-240VAC
Minimum Load	25W/VA per zone
Maximum Load (CE)	2-zone: 1600W/VA; 3-zone: 2300W/VA; 4-zone: 3000W/VA; 6-zone: 3000W/VA
Maximum Load (non-CE)	2-zone: 1600W/VA; 3-zone: 2400W/VA; 4-zone: 2300W/VA; 6-zone: 2300W/VA
Zone Capacity (CE)	800W/VA per zone
Zone Capacity (non-CE)	1200W/VA per zone
Mounting (CE)	All CE-compliant units mount in 4-gang US wallbox 7.0cm (2 3/4") deep minimum, 8.9cm (3 1/2") deep recommended for ease of wiring.
Mounting (non-CE)	2-zone: 2-gang US wallbox, 3-zone: 3-gang US wallbox; 4-zone: 4-gang US wallbox; 6-zone: 4-gang US wallbox 7.0cm (2 3/4") deep minimum, 8.9cm (3 1/2") deep recommended for ease of wiring.

Accessory Controls

Input Voltage	12VDC provided by GRAFIK Eye Control Unit. Each Control Unit can power up to three Accessory Controls.
Wire Type	Two pair [one pair 1.0mm² (#18 AWG), one pair 0.5-1.0 mm² (#18-22 AWG) twisted shielded] Class 2/PELV wire. Lutron wire, model # GRX-CBL-346S-500, may be used.
Low Voltage Wiring	Maximum of 610m (2,000 ft.) total. Must be daisy-chained. *See Figs. 3-6 (pgs. 33-34)*
Terminals	Terminals will accept up to two 1.0 mm² (#18 AWG) wires.
Mounting	1-gang US wallbox. (except GRX-4S-DW)
Environment	Ambient operating temperature: 0-40° C, 32-104° F. Ambient operating humidity: 0-90% humidity, non-condensing. Indoor use only.

GRAFIK Eye® Specifications (cont.)



Model Number	Dimensions A (mm)	B (mm)
GRX-4102	4 15/16" (123)	1 13/16" (46)
GRX-4103	6 11/16" (168)	3 5/8" (92)
GRX-4104	8 5/16" (208)	5 7/16" (138)
GRX-4106 **GRX-4108**	8 5/16" (208)	5 7/16" (138)

Figure 1: GRAFIK Eye Control Unit Dimensions

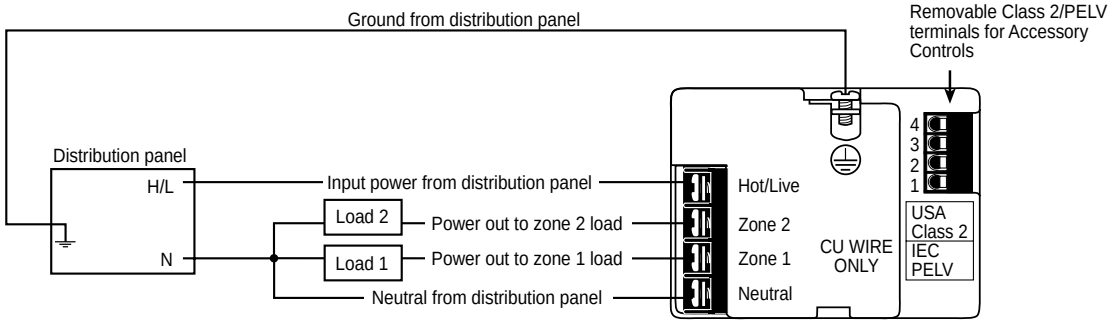


Figure 2: Line-Voltage Wiring Diagram

Wiring Connections Between GRAFIK Eye® Controls and HomeWorks® Interactive Processor

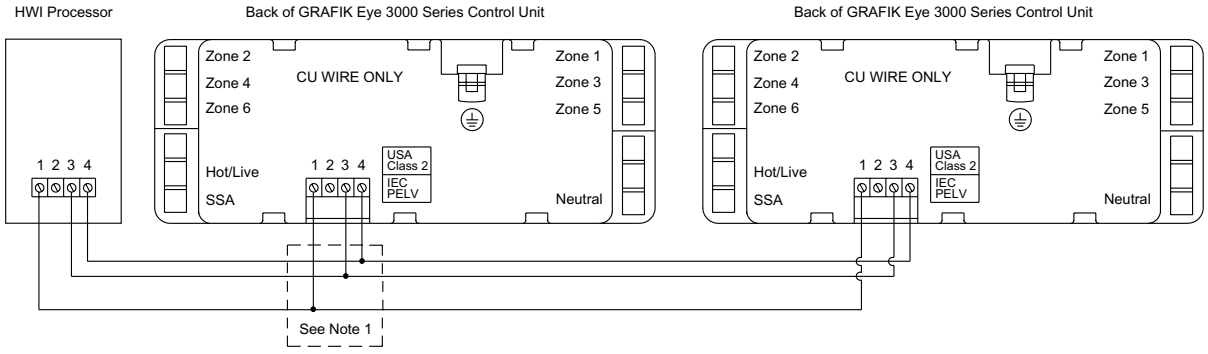


Figure 3 – Wiring between two GRAFIK Eye Control Units *See Notes 1, 4 (pg. 34)*

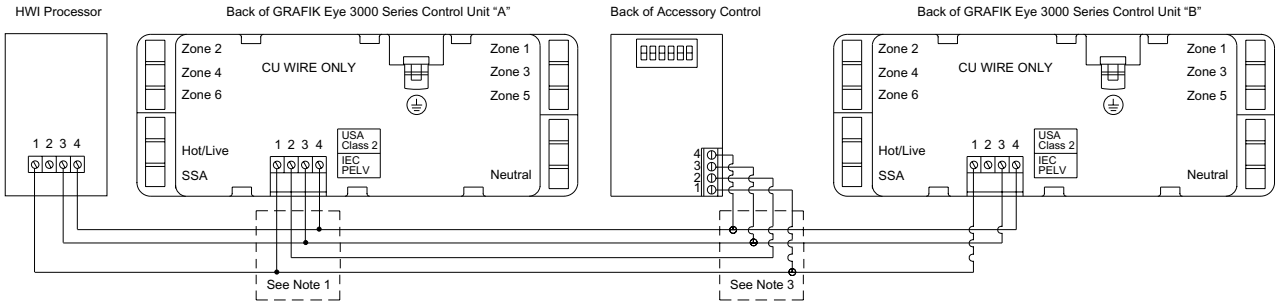


Figure 4 – Wiring of two GRAFIK Eye Control Units with an Accessory Control between them
See Notes 2, 3 (pg. 34)

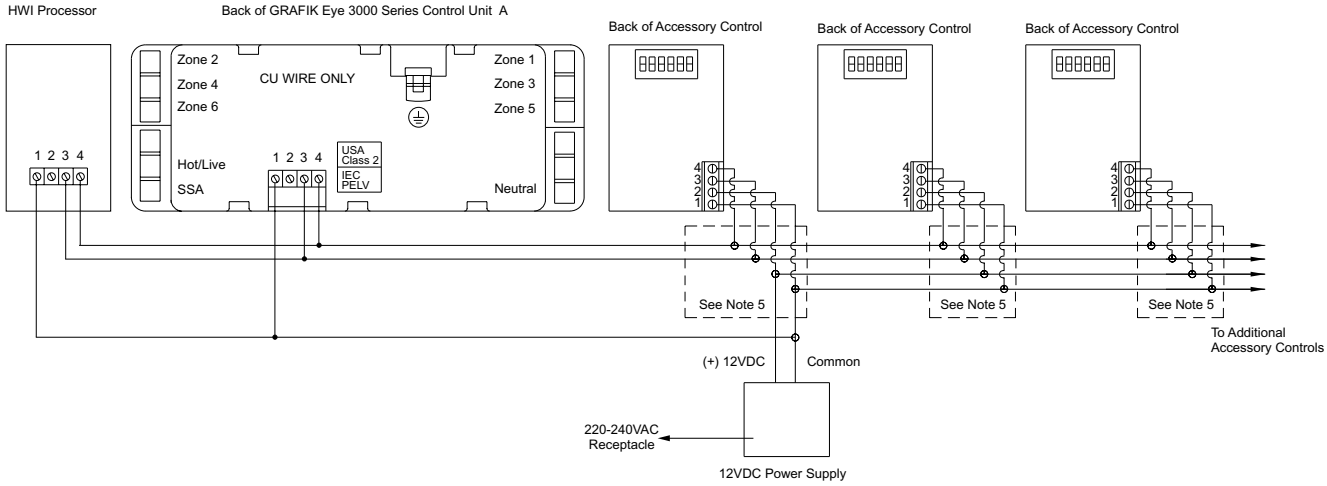


Figure 5 – Wiring if using an external power supply. The external power supply provides power to all of the GRAFIK Eye Accessory Controls *See Notes 2, 5 (pg. 34)*

GRAFIK Eye® Specifications (cont.)

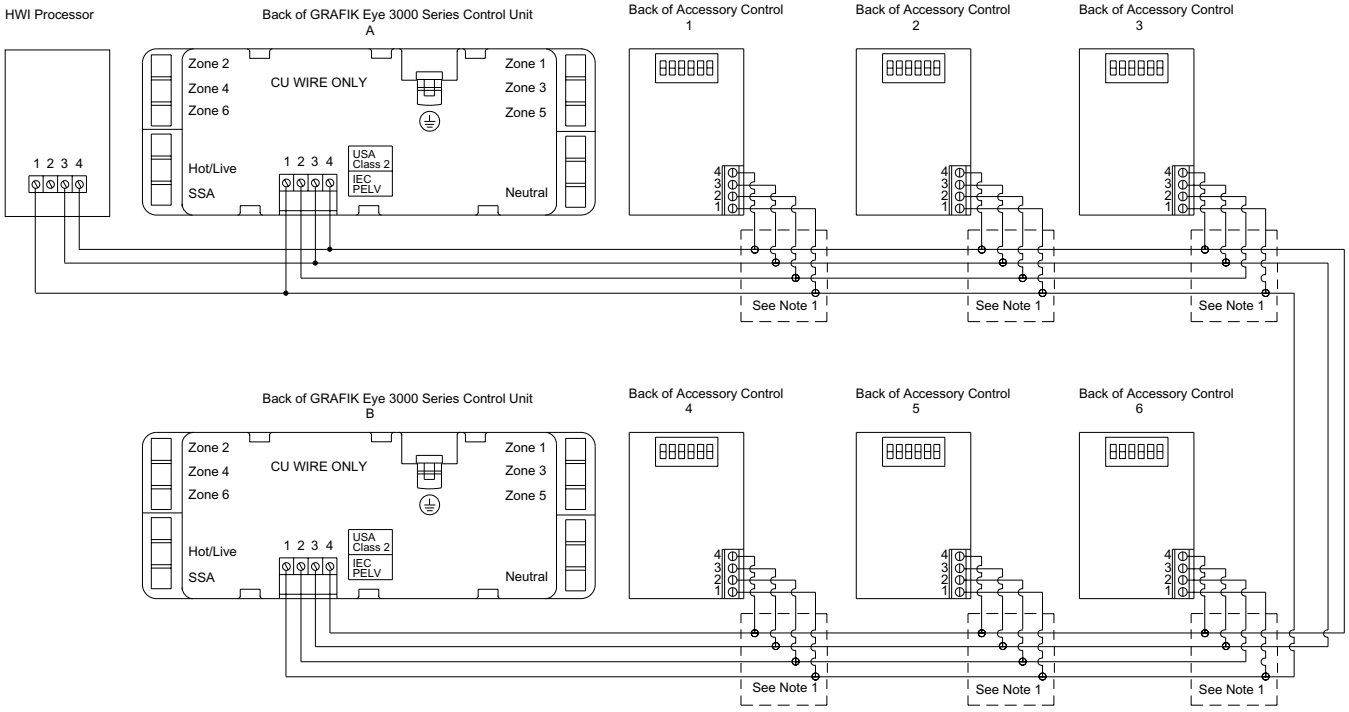


Figure 6 – Wiring of two GRAFIK Eye Control Units with six Accessory Controls between them (this is the maximum that can be powered from a Control Unit without an external power supply)
See Notes 2, 6

Notes

(1) Connection between #2 terminals is not made between GRAFIK Eye Control Units and the HWI Processor.

(2) Connections to link are made inside of wallstation wallboxes or in a junction box (provided by others) located no more than 8 feet from the wallstation.

(3) Connection between #2 terminals is not made between Control Unit 'B' and Accessory Control. Control Unit 'A' provides power for Accessory Control.

(4) Connection between #2 terminals is not made between two GRAFIK Eye Control Units.

(5) Connection between #2 terminals is not made between Control Unit 'A' and Accessory Control. External power supply provides power for all Accessory Controls.

(6) Connection between #2 terminals is not made between Accessory Controls when powered from separate Control Units. Control Unit 'A' provides power for Accessory Controls 1, 2, and 3. Control Unit 'B' provides power for Accessory Controls 4, 5, and 6.

Remote Power Module (RPM) Specifications

All Remote Power Modules

Input Voltage	RPM-4U, RPM-4S, RPM-4M: 220-240VAC 50/60Hz RPM-4R: 220-240VAC 50/60Hz
Number of Outputs	4
Regulatory Approvals	CE, C-tick
Communications	Via Lutron-provided communication harness.
Addressing	Via rotary switch on the RPM.
Diagnostics	LED provided to indicate proper communications with Module Interface.
Terminal Blocks	All terminal blocks are shipped with bypass jumpers installed. After verifying that each circuit is wired correctly, remove the bypass jumpers for system operation.
Mounting	HWI-PNL-8 Remote Power Panel will hold up to 8 RPMs. HWI-PNL-5 Remote Power Panel will hold up to 5 RPMs. *(See Note 1, pg. 37)*
Environment	Ambient operating temperature: 0-40°C, 32-104°F. Ambient operating humidity: 0-90% humidity, non-condensing. Indoor use only.
Reducing Lamp Buzz	Lamp Debuzzing Coils are available from Lutron to reduce lamp filament buzzing. (Lutron models # HW-HIFC-10-2, LDC-10-TCP, or LDC-16-TCP).
Shipping Weight	2.18 lbs. (1.0kg)
Cooling Method	Passive cooling.
Minimum Load Required	5W for all load types.

HW-RPM-4U-230-CE • Dimming Module

Load Types	Incandescent, magnetic low-voltage, electronic low-voltage[1], neon/cold cathode, Lutron Fluorescent Dimming Ballasts (using NGRX-FDBI-WH Interface). Outputs are compatible with Lutron NGRX-PB-WH
Maximum Current Draw	13A total per module 10A total per switch leg
Air Gap	Provided when all four circuits are off
Dimming Technology	Triac dimming
Wiring	*See Fig. 1. (pg. 37)* Terminal blocks will accept the following number and sizes of wires: one 1-2.5mm^2 (#18-10 AWG) wires or two 1-1.5mm^2 (#18-16 AWG) wires.
Interference Suppression	EMI/RFI suppression circuitry

Note

(1) Some electronic low-voltage transformers require an interface (model # NGRX-ELVI-CE) for optimal performance. Consult Lutron for more information about your application.

Remote Power Module (RPM) Specifications (cont.)

HW-RPM-4M-230 • Motor Module

Load Types	Bi-directional three-wire 220-240VAC motor loads, or incandescent/tungsten non-dim. Outputs are not rated for switching electronic low-voltage or electronic ballasts.
Maximum Current Draw	1/2 HP per circuit. 5A maximum per circuit for motor loads, 1.5A maximum per circuit for tungsten loads.
Motor Control Technology	Relay switching, electrically-interlocked relays guarantee motor protection.
Wiring	*See Fig. 2 (pg. 37)* Terminal blocks will accept the following number and sizes of wires: one 1-2.5mm^2 (#18-10 AWG) wires or two 1-1.5mm^2 (#18-16 AWG) wires. Requires that four additional terminal blocks be mounted onto the DIN rail assembly. *See Fig. 2 (pg. 37)*
Interference Suppression	EMI/RFI suppression circuitry.

HW-RPM-4R • Power Relay Module

Load Types	Non-dim loads
Maximum Current Draw	Total load per RPM: 64A continuous, 1/3 hp/circuit Total load per switch leg: 16A continuous.
Technology	Patented triac arc suppression technology used to extend relay life.
Wiring	*See Fig. 3 (pg. 37)* Terminal blocks will accept the following number and sizes of wires: one 1-2.5mm^2 (#18-10 AWG) wires or two 1-1.5mm^2 (#18-16 AWG) wires. Requires that four additional gray terminal blocks, which accept one .75-10mm^2 (#18-8) or two 1.5-4mm^2 (#16-12AWG) and three additional black terminal blocks, be mounted onto the DIN rail assembly.
RPM Power	RPM is powered from Hot input #1. Removing power to input #1 will power down the entire RPM.

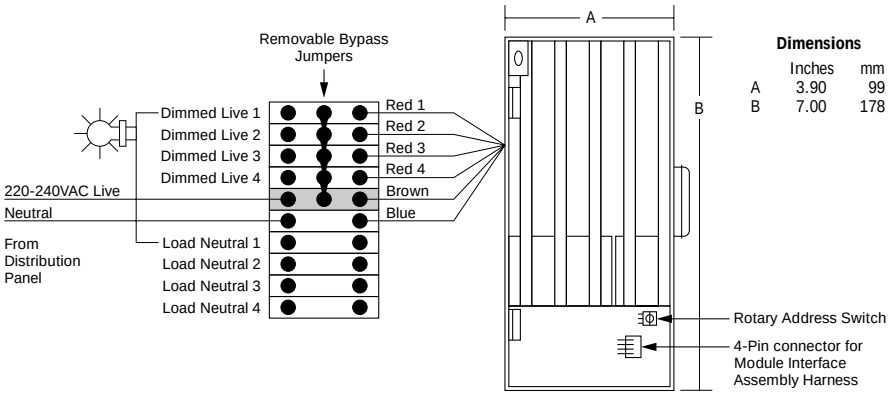


Figure 1 – HW-RPM-4U-230-CE

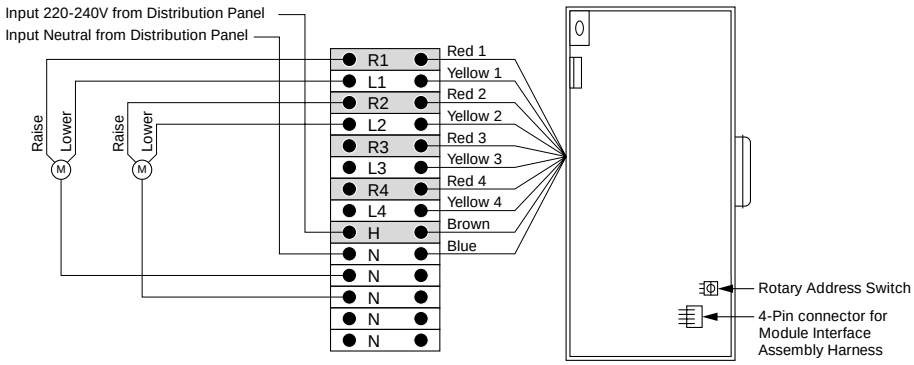


Figure 2 – HW-RPM-4M-120

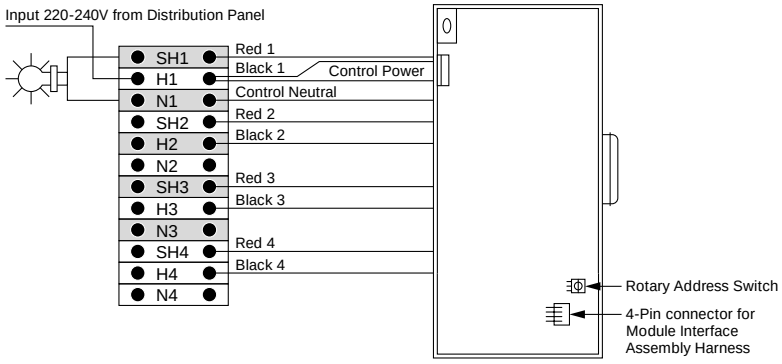


Figure 3 – HW-RPM-4R

Notes

(1) RPMs may hum slightly and internal relays will click when in use. Mount where such noise is acceptable. Locate at least 6 feet away from sensitive electronic equipment.

(2) In rare cases, some incandescent lamps and transformers in electronic low-voltage light fixtures will "buzz" or "hum." The HW-HIFC-10-2 Filter Choke Assembly reduces this hum. The Filter Choke Assembly can be installed in place of the top RPM in an HWI-PNL-8 Remote Power Panel.

Module Interface (MI) Specifications

Specifications apply to HWI-MI-230 Stand-Alone Module Interfaces and to Module Interfaces integral to HWI Processors

Supply Voltage	When integral to a Processor, the MI is powered by 15VDC provided by terminals 1 and 2 on the Processor communications link connector. When a Stand-Alone MI is used, it is powered by a separate line-voltage feed at the DIN rail terminal blocks.
Regulatory Approvals	UL, CSA, CE, C-tick
Wiring Configuration	Maximum wire length of 305m (1,000 ft.). Must be wired in a daisy-chain configuration. Terminators required if total cable length exceeds 15m (50 ft.).
Low-Voltage Pre-Wiring	When using a Stand-Alone MI, the following low-voltage wire is required for Processor communications. Two pair [one pair 1.0mm^2 (#18 AWG), one pair 0.5-1.0mm^2 (#18-22 AWG) twisted shielded] class 2/PELV wire. Lutron wire, model # GRX-CBL-346S-500, may be used.
Output	Compatible with HW-RPM-4U Dimming Module, HW-RPM-4M Motor Module, HW-RPM-4R Power Relay Module.
Dimensions	*See Fig. 1*
Mounting	*See Fig. 2* An integral MI is mounted within the Processor (HWI-PM-230). A stand-alone MI mounts in the lower right-hand corner of a HWI-PNL-8-CE. A stand-alone MI mounts in lower right-hand corner of a HWI-PNL-5-CE.
Shipping Weight	1.8kg (4 lbs.)
Addressing Method	Rotary switch located on the bottom portion of the MI board.
Manual Override	For cable runs less than 305m (1,000 ft.), 1.5-.2mm^2 (#16-24 AWG) wiring can be used. For cable runs exceeding 305m (1,000 ft.), 1.5-1mm^2 (#16-18 AWG) wire must be used. The manual override scene is activated for all RPMs connected to the MI by closing a switch that is wired between the two manual override terminals. The switch (or relay) contacts must be rated for switching 50 milliamps at 30VDC. A single switch can be used for multiple MIs wired in parallel, but proper polarity must be maintained across all units. In this configuration the switch must be rated to switch the sum of the current for all of the MIs connected (e.g. 6 MIs wired to a single manual override switch requires a switch rated for 300 milliamps at 30VDC).
Diagnostics	3 LEDs for troubleshooting communications with the Processor and the RPMs.

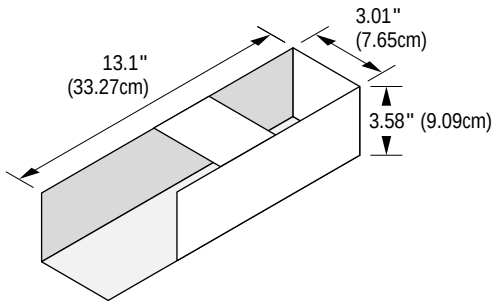


Figure 1 – MI Enclosure Dimensions

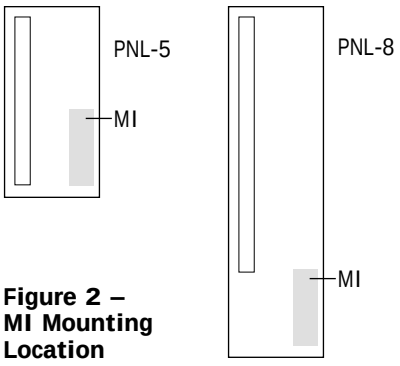


Figure 2 – MI Mounting Location

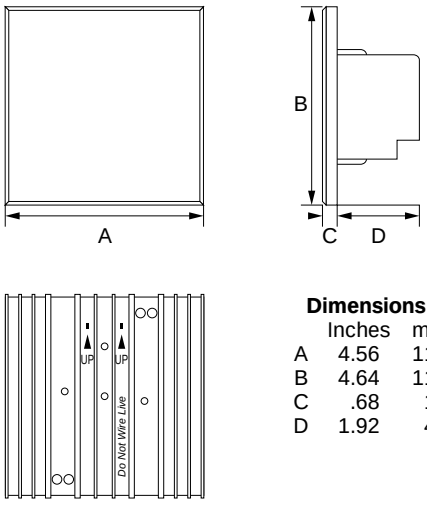
Power Booster & 220-240VAC Interface Specifications

NGRX-PB-AU/NGRX-PB-CE Power Booster
NGRX-ELVI-AU/NGRX-ELVI-CE Electronic Low-Voltage Interface
NGRX-FDBI-AU Fluorescent Dimming Ballast Interface
GRX-TVI Phase Control to 0-10V Interface Control

Input Voltage	220-240VAC, 50/60Hz
NGRX Load Types	Incandescent/tungsten, magnetic low-voltage, neon/cold-cathode. Max. 2400W/VA (non-CE); 1920W/VA (CE-compliant)
ELVI Load Types	Electronic low-voltage (*see Note 1*), Max 1200W/VA (non-CE and CE-compliant models)
FDBI Load Types	Lutron Eco-10™ or Hi-lume® Fluorescent Dimming Ballasts. Max 10A (non-CE only)
TVI Load Types	Lutron Eco-10 (TVE series) Electronic Dimming Ballasts, fluorescent non-dim, Max. 5A
Mounting	2-gang US wallbox, 7.0cm (2 3/4") deep minimum, 8.9cm (3 1/2") deep recommended for easier wiring
Dimensions	*See Fig.s 1,2*
Wiring	*See Figs. 3-5*
Terminals	Each terminal will accept two 2.5mm² (AWG) wires
Environment	Ambient operating temperature: 0-40°C, 32-104°F Ambient operating humidity: 0-90% humidity, non-condensing, indoor use only
Design	Units come with molded white plastic wallplate
Regulatory approval	UL, CSA, NOM, CE, C-TICK

Note

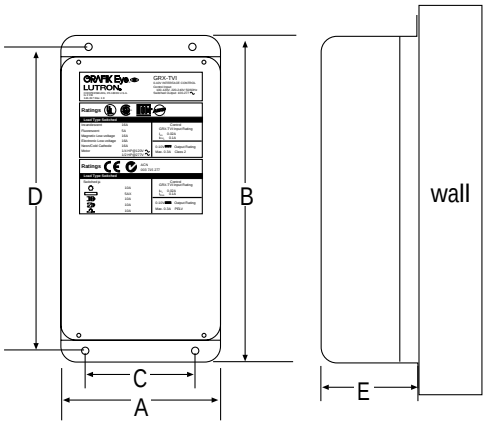
(1) It is permissible to power both incandescent and electronic low-voltage loads together on the same zone through the NGRX-ELVI-WH. Up to 300W of the interface's 1000W capacity can be incandescent.



Dimensions

	Inches	mm
A	4.56	114
B	4.64	116
C	.68	17
D	1.92	48

Figure 1 - Power Booster Dimensions



Dimensions

	Inches	mm
A	6.10	155
B	12.50	318
C	4.0	102
D	11.75	298
E	3.30	84

Figure 2 - GRX-TVI Dimensions

Power Booster Specifications (cont.)

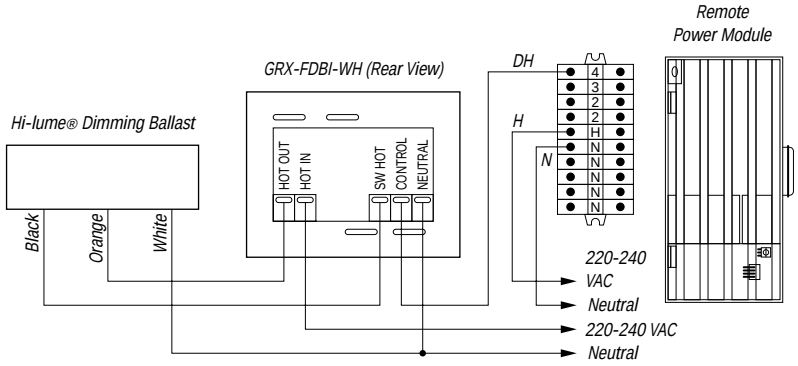


Figure 3 – NGRX-FDBI-WH for Remote Power Modules

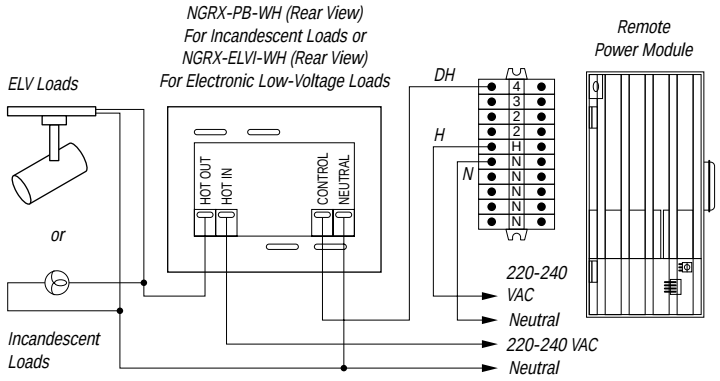


Figure 4 – NGRX-PB-WH or NGRX-ELVI-WH Wiring for a Remote Power Module

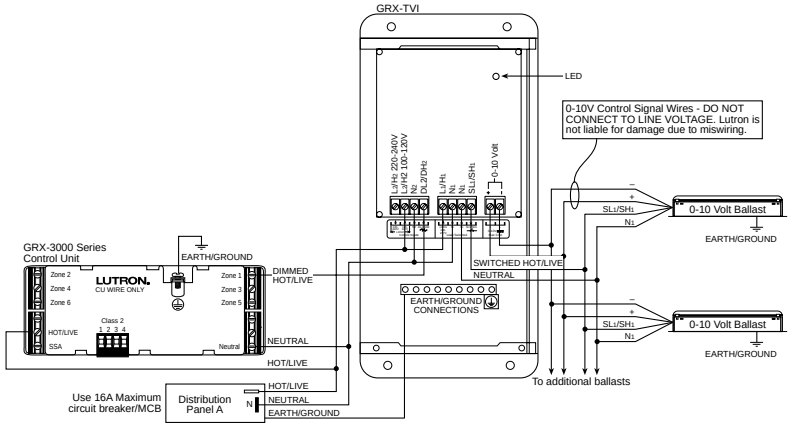


Figure 5 – GRX-TVI Wiring for a Fluorescent Ballasts

Keypad Specifications

Input voltage	15VDC Class 2/PELV
ESD protection	All Keypad inputs are tested to meet or exceed the IEC 61000-4-2 standard.
Miswire protection	All terminal block inputs are over-voltage and miswire-protected against wire reversals and shorts.
Wiring	Daisy-chain, star, T-tap. Termination not required. Total length of wire on any link cannot exceed 305m (1,000 ft.) Maximum of 32 devices per Processor link that has been configured for Keypads
Wire type	Two pair [one pair 1.0 mm^2 (#18 AWG), one pair 0.5-1.0mm^2 (#18-22 AWG) twisted shielded] Class 2/PELV. Lutron wire, model # GRX-CBL-346S-500, may be used.
Connections	One 4-pin removable terminal block. Terminal block will accept up to four 1.0mm^2 (#18 AWG) wires.
Wallplates	All Keypads include a wallplate for a single-gang installation. Multiple-gang installations require a custom wallplate. Contact Lutron for more information. Custom wallplates can also be made for ganging Keypads with other manufacturers' A/V controls. Contact Lutron for details.
Colors	Keypads are provided with molded plastic wallplates and are available in the following colors: white(WH), beige(BE), ivory(IV), gray(GR), black(BL), taupe(TP), and brown(BR) Additional custom colors can be matched from Sherwin-Williams paint chip numbers.
Metal Finishes	Wallplates are available in: anodized brass, bright brass, satin brass, antique brass, bright chrome, satin chrome, satin nickel, satin bronze, antique bronze, 24-karat gold, as well as custom finishes.
Engraving	Custom engraving of Keypads and/or Keypad Buttons available at no additional charge.
Environment	Ambient operating temperature : 0-40°C, 32-104°F Ambient operating humidity : 0-90% humidity, non-condensing, Indoor use only
Addressing	Addressing is done via DIP switch located on back of unit Units should be addressed before mounting in wall
LED colors	All visible LEDs are amber
Diagnostics	LEDs provide diagnostics for troubleshooting communication with the Processor
HWI-5S-IR IR receiver	Compatible with Lutron IR transmitters only, GRX-IT, GRX-8IT, and Spacer® Hand Transmitter
HWI-2B	Provides two contact closure inputs that duplicate the functionality of the buttons on the face of the Keypad
Wallboxes Required	HWI-KP5 1-gang US wallbox HWI-KP10 1-gang US wallbox HWI-KP15 2-gang US wallbox HWI-KP-LB6 1-gang US wallbox HWI-KP-LB9 2-gang US wallbox HWI-KP5-DN wallbox not required HWI-KP5-DW special wallbox provided (Lutron part # 241-399) HWI-2SE special wallbox required (Lutron part #241-683) HWI-4SE-M special wallbox required (Lutron part #241-683) HWI-4SE-IR special wallbox required (Lutron part #241-683) HWI-8SE-M special wallbox required (Lutron part #241-683) HWI-8SE-IR special wallbox required (Lutron part #241-683)	HWI-5S-M 1-gang US wallbox HWI-5S-NM 1-gang US wallbox HWI-5S-IR 1-gang US wallbox HWI-2B 1-gang US wallbox

Keypad Specifications (cont.)

Shipping weights

HWI-KP5	0.11kg (0.28 lbs)	HWI-5S-M	0.11kg (0.28 lbs)
HWI-KP10	0.11kg (0.28 lbs)	HWI-5S-NM	0.11kg (0.28 lbs)
HWI-KP15	0.14kg (0.31 lbs)	HWI-5S-IR	0.11kg (0.28 lbs)
HWI-LB6	0.11kg (0.28 lbs)	HWI-2B	0.11kg (0.28 lbs)
HWI-LB9	0.14kg (0.31 lbs)	HWI-2SE	0.18kg (0.46 lbs)
HWI-KP5-DN	0.11kg (0.28 lbs)	HWI-4SE-M/IR	0.18kg (0.46 lbs)
HWI-KP5-DW	0.11kg (0.28 lbs)	HWI-8SE-M/IR	0.18kg (0.46 lbs)

Model #	**LED Count**
HWI-KP5	5
HWI-KP10	10
HWI-KP15	15
HWI-LB6	6
HWI-LB9	9
HWI-KP5-DN	5
HWI-KP5-DW	5
HWI-5S-M	5
HWI-5S-NM	5
HWI-5S-IR	5
HWI-2B	10
HWI-CCO-8	10
HWI-CCI-8	10
HWI-2SE	2
HWI-4SE-M/IR	4
HWI-8SE-M/IR	8

A single HWI Processor can support 300 Keypad LEDs. This includes all Keypads on the three configurable links (link 4 + link 5 + link 6) .If more than 300 LEDs are placed on a single Processor, an HWI-PS Power Supply must be used to power the additional units (above 300). Each HWI-PS Power Supply can support an additional 350 LEDs. See HWI-PS Power Supply Specifications (pg. 45) for more information.

Table 1 – Rules for Determining LED Count

Address #	Switch Setting	Address #	Switch Setting	Address #	Switch Setting	Address #	Switch Setting
1		9		17		25	
2		10		18		26	
3		11		19		27	
4		12		20		28	
5		13		21		29	
6		14		22		30	
7		15		23		31	
8		16		24		32	

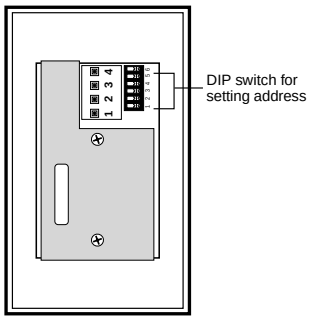


Figure 1 – Keypad and Contact Closure Board Addressing DIP Switches

Contact Closure Input Board (HWI-CCI-8) Specifications

Input Types	Inputs can be used with ground-referenced, solid-state outputs if the outputs have an on-state saturation voltage of less than 2VDC at 10 milliamps and an off-state leakage of less than 50 microamps. Dry contact or solid-state outputs must be capable of switching 15VDC at 10 milliamps. If there is any question as to whether a device is compatible with these specifications, contact the manufacturer of the device.
Current Draw	Maximum 60 milliamps at 15VDC (from HWI Processor Keypad link).
Keypad Link LED Count	When calculating Keypad link LED count, the HWI-CCI-8 counts as 10 LEDs
Contact Closure Input Connections	Eight 2-terminal removable connectors, one per input. Each terminal will accept up to four 1.0mm^2 (#18 AWG) wires.
HWI Processor connections	One 4-pin removable terminal block for power and communications. Each terminal will accept up to four 1.0mm^2 (#18 AWG) wires.
Mounting	Mounts in the following enclosures: HWI-ENC-LV32-CE, HWI-ENC-LV17-230, HWI-ENC-CC. For mounting hole locations. *See Fig. 1.*
IR Receiver	Compatible with Lutron IR transmitters only: GRX-IT, GRX-8IT, and Spacer® Remote Controls.
IR Mounting Hole Location	An IR flasher can be mounted directly to the clear plastic shield over the IR receiver. *See Fig. 1.*
Diagnostics	Link LED for troubleshooting communications with HWI Processor. IR receiver has a talk-back LED that flashes when IR is received. IR receiver also has an LED that flashes when a valid Lutron IR command has been received. Each input has a feedback LED that turns on when the input is shorted.
Environment	0-40°C, 32-104°F, 0-90% humidity, non-condensing. Indoor use only.
Addressing	Address via DIP switch located on front of unit. *See Fig. 1.*

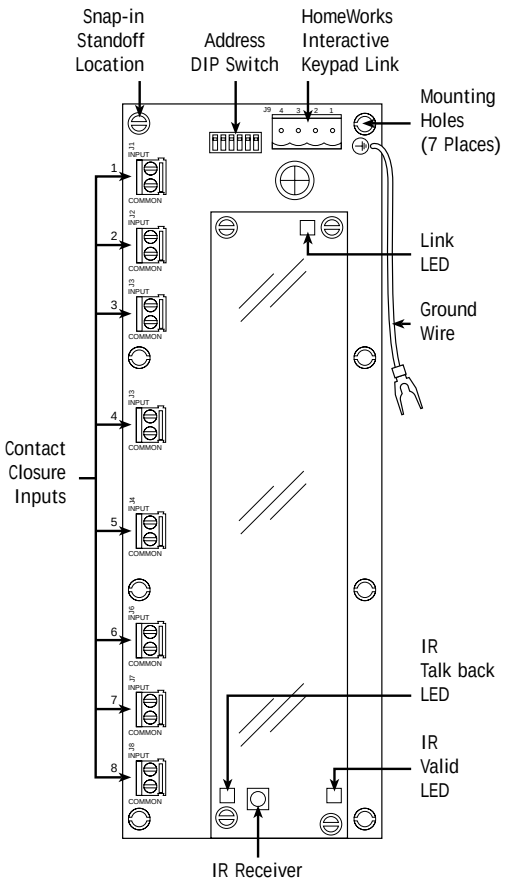


Figure 1 – HWI-CCI-8

Contact Closure Output Board (HWI-CCO-8) Specifications

Relay Contact Ratings	*See Table 1*
Relay Outputs	Normally-open and normally-closed outputs provided. Each output can be programmed to provide either momentary (pulsed) or maintained (latching) functionality.
Current Draw	Maximum 60 milliamps at 15VDC (from HWI Processor Keypad link).
Keypad Link Unit Load (LED Count)	When calculating Keypad link LED count, the HWI-CCI-8 counts as 10 LEDs.
Output Connections	Eight 3-terminal non-removable connectors, one per output (normally closed, normally open, and common). Each terminal will accept up to four 1.0mm^2 (#18 AWG) wires.
HWI Processor Connections	One 4-pin removable terminal block for power and communications. Each terminal will accept up to four 1.0mm^2 (#18 AWG) wires.
Mounting	Mounts in the following enclosures: HWI-ENC-LV32-CE, HWI-ENC-LV17-230, HWI-ENC-CC. For mounting hole locations, *See Fig. 1.*
IR Receiver	Compatible with Lutron IR transmitters only: GRX-IT, GRX-8IT, and Spacer® Remote Controls.
IR Mounting Hole Location	An IR flasher can be mounted directly to the clear plastic shield over the IR receiver. *See Fig. 1.*
Diagnostics	Link LED for troubleshooting communications with processor, IR receiver has a talk back led that flashes when IR is received and a valid IR LED that flashes when a valid Lutron IR command has been received. Each output has a feedback LED that turns on when the normally-open contact is connected to common. Using one of the DIP switches, the HWI-CCO-8 can be placed into manual control mode. While in manual control mode, the state of each relay can be toggled by pressing the corresponding button.
Environment	0-40°C, 32-104°F, 0-90% humidity, non-condensing. Indoor use only.
Addressing	Address via DIP switch located on front of unit. *See Fig. 1.*

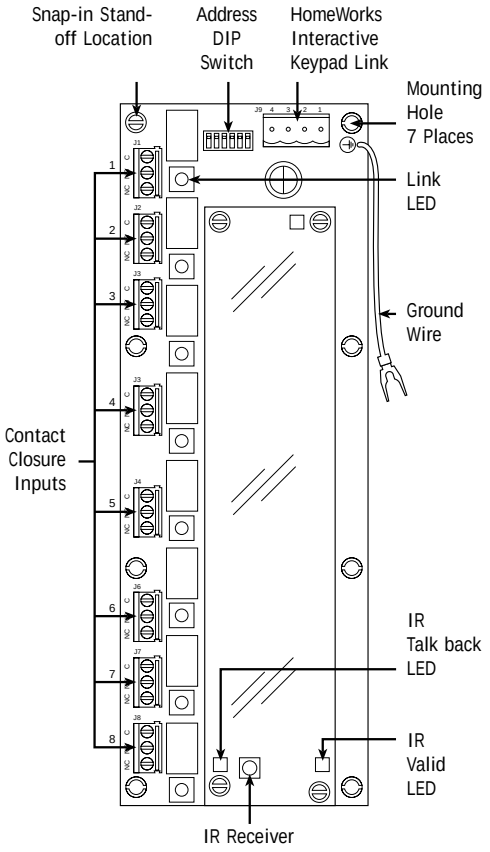


Figure 1 – HWI-CCO-8

Voltage	Resistive Load	Inductive Load
Up to 30 VDC	1A	ø.2A
Up to 30 VDC	ø.5A	ø.1A
Up to 60 VDC	1A	Do not use HWI-CCO-8
Up to 42.4 VAC	ø.5A	Do not use HWI-CCO-8

Table 1 – Relay Contact Ratings

HWI-PS Power Supply Enclosure Specifications

Enclosure Capacity	One power supply, used to support additional LEDs on a Keypad link
Line-Voltage Wiring	Use copper wire only, supply conductors 60/75°C. DIN rail-mounted terminal blocks for power supply feed located at top left corner of panel. 110-130VAC input. *See Fig. 1*
DIN Rail Terminal Blocks	Terminal blocks will accept one 1-2.5mm^2 (#18-10AWG) wire or two 1-1.5mm^2 (#18-16AWG) wires. Terminal blocks should be tightened to .40-.57nM (3.5-5.0 in-lbs.)
Output Voltage	15V DC
Output Current	2A Max.
Shipping weight	5.9 kg (13 lbs)
Mounting	surface or flush-mount
Required Flush Mount Opening	23cm (9 1/4") x 44cm (17 1/4") x 9.8cm (3 7/8") *See Fig. 1*
Construction (enclosure)	16 gauge galvanized sheet metal (unpainted)
Construction (cover)	Painted (beige) metal cover w/ ventilation holes attached using 4 phillips head screws
Regulatory Approvals	UL, CSA, NOM, CE, C-TICK

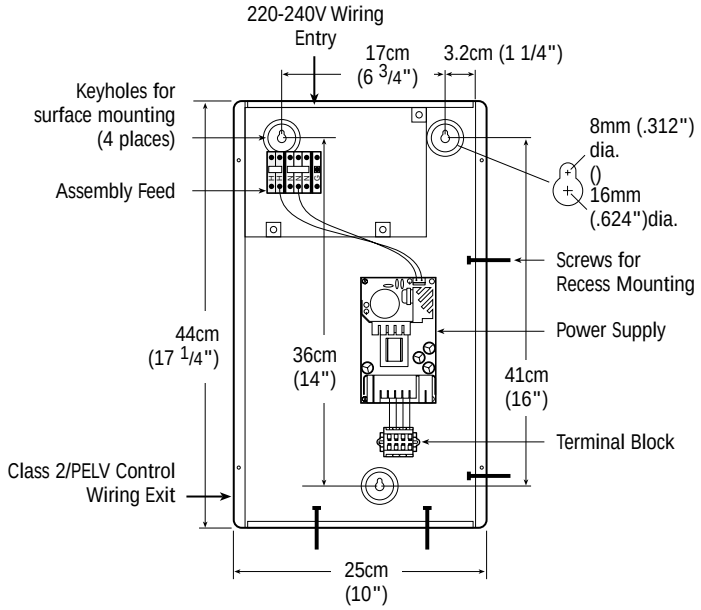


Figure 1 – HWI-PS Power Supply Enclosure

HWI-WLB Wire Landing Board Specifications

Connections	Three groups of 4-position removable terminal blocks. Terminal blocks will accept up to four 1.0mm² (#18 AWG) wires. *See Fig. 1.*
Environment	Indoor use only.
Mounting	Mounts in the following Enclosures: HWI-ENC-LV32-CE, HWI-ENC-LV17-230.

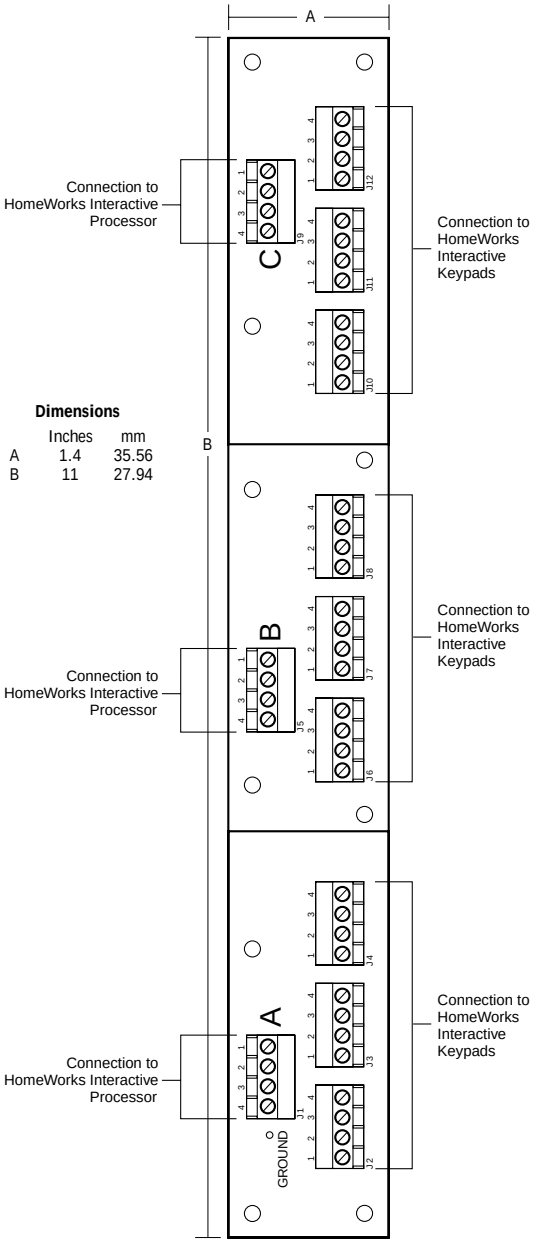


Figure 1 – Wire Landing Board

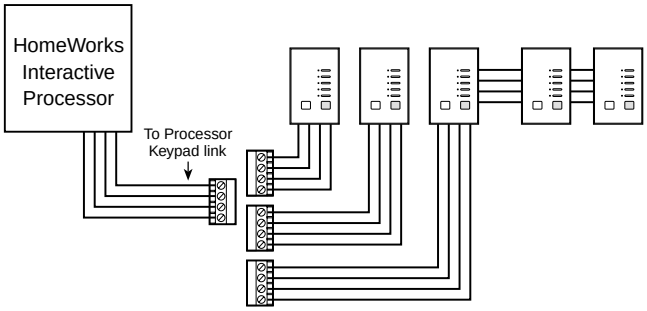


Figure 2 – Wiring Diagram

Filter Choke Specifications

HW-HIFC-10-2 High Inductance Filter Chokes

Chokes Per Assembly	2
Max Number of Assemblies Per Panel	1
Current Capacity	10A, 2 chokes may be connected in parallel for up to 20A capacity
Mounting	Mounts in upper portion of HWI-PNL8, IMPORTANT: RPM number 8 cannot be used in panels where HW-HIFC-10-2.
Environment	Ambient operating temperature: 0-40°C, 32-104°F Ambient operating humidity: 0-90% humidity, non-condensing. Indoor use only.
Current Rise Time	320 microseconds or greater, measured from 10% to 90% of total current rise for a 1250W load at 90% conduction. Current rise time shall be 315 microseconds or greater for a 650W load at 90% conduction. At any point on the waveform, the current rise time shall not exceed 45 milliamps per second with a 650W load.
Regulatory approval	UL, CSA

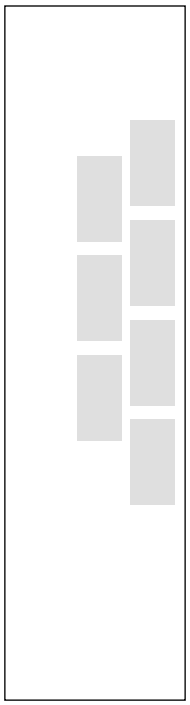


Figure 1 – Mounting Location for HW-HIFC-10-2

Processor Specifications

Model Number Descriptions	HWI-PO-230: HWI Processor only HWI-PM-230: HWI Processor with one integral Module Interface (MI)
Input Voltage	220-240VAC
Environment	Ambient operating temperature : 0-40°C, 32-104°F Ambient operating humidity : 0-90% humidity, non-condensing Passive cooling, Indoor Use Only
Line-Voltage Connections	Mates with Lutron provided 2-pin pigtail on DIN-rail terminal block Power switch provided on top left of enclosure
Low-Voltage Connections	5 4-pin removable terminal blocks. Each terminal will accept up to 4 1.0mm^2 (#18 AWG) wires. 1 standard female DB-9 serial connector.
RS-232 Port	Supports full handshaking and modem indicator lines. DB-9 pinout: Pin 1 - DCD Pin 2 - TX Pin 3 - RX Pin 4 - DSR Pin 5 - GND Pin 6 - DTR Pin 7 - CTS Pin 8 - RTS Pin 9 - RI
ESD Protection	All terminal block inputs are tested to meet or exceed the IEC 61000-4-2 standard
Miswire Protection	15V communications link power is short-circuit protected An LED indicates a shorted communication power link.
Regulatory Approvals	UL, CSA, CE, C-TICK
Dimensions	*See Fig. 1*
Mounting Hole Locations	*See Fig. 1*
Mounting	HWI-PNL-8-CE: Processor mounts at bottom of Panel. Processor is powered with 220-240VAC from DIN rail terminal block (provided). *See Fig. 2.* HWI-ENC-LV32-CE: Processor mounts at top of Enclosure. Processor is powered with 220-240VAC from DIN rail terminal block (provided). *See Fig. 3.*
Power-Failure Memory	Lithium battery provides 10 years of data retention.
Internal Timeclock	Accuracy +/- 1 minute per month (specified as during data retention time).
Main Processor	32-bit, 25MHz Processor
Main Processor Memory	3MB battery-backed RAM, 1MB non-volatile flash memory
Diagnostics	Two 7-segment LED displays used for diagnostics. Various discreet LED indicators used for diagnostics: Power LED; Communication link power short circuit LED; Links 1-6 Tx and Rx LEDs.
Shipping Weight (all model numbers)	4.1kg (9 lbs.)

Processor Specifications (cont.)

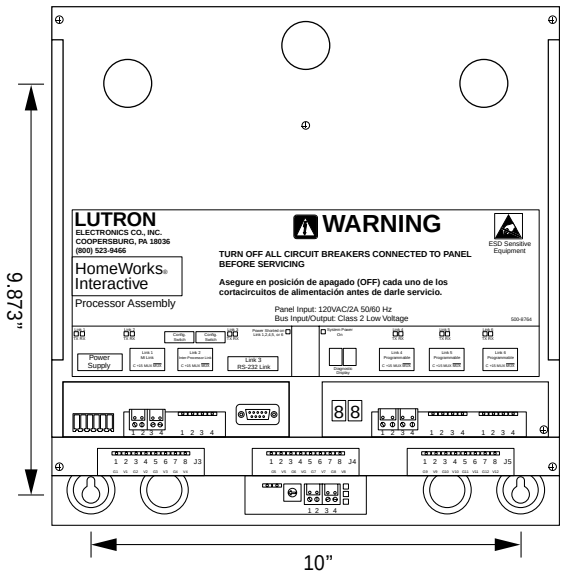


Figure 1 – Dimensions and Mounting Hole Locations
Note: All four HomeWorks® Interactive Processor models have the same dimensions.

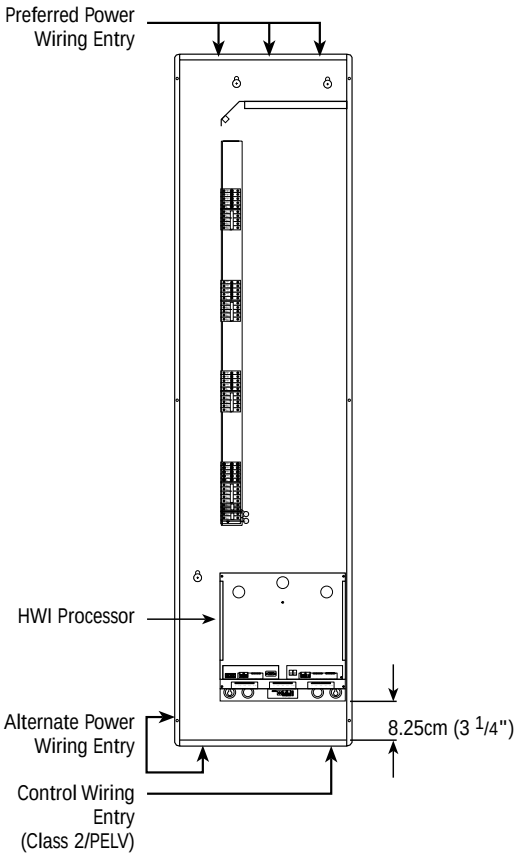


Figure 2 – HWI-PNL-8-CE

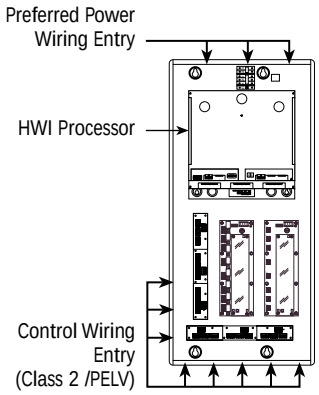
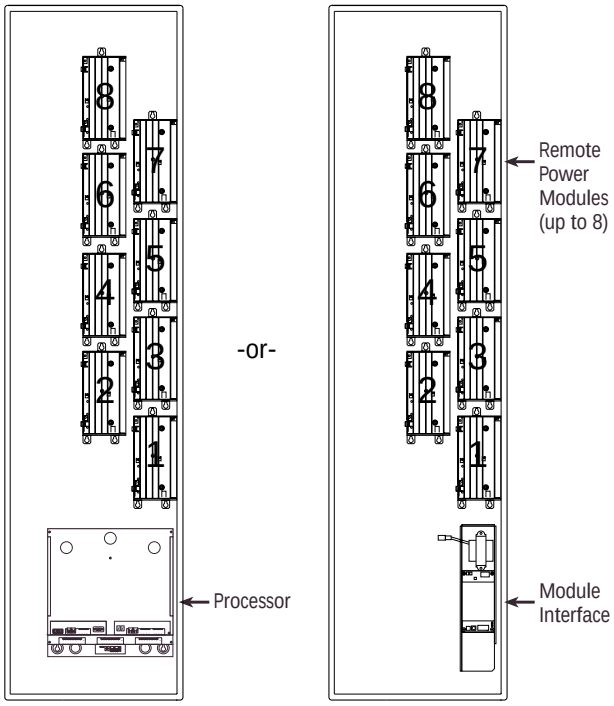


Figure 3 – HWI-ENC-LV32-CE

Remote Power Panel (HWI-PNL-8-CE) Specifications

Panel Capcity and Configurations	*See Fig. 1*
Line-Voltage Wiring	Use copper wire only, supply conductors 60/75˚C DIN rail-mounted terminal blocks provided for line-voltage Remote Power Module (RPM) wiring and Processor/MI power. *See Fig. 2.*
DIN Rail Terminal Blocks	Terminal blocks will accept one 1-2.5mm^2 (#18-10AWG) wire or two 1-1.5mm^2 (#18-16AWG) wires. Terminal blocks should be tightened to .40-.57 nM (3.5-5.0 in.-lbs.) All terminal blocks are shipped with bypass jumpers installed. After verifying that each circuit is wired correctly, remove the bypass jumpers for system operation.
Shipping Weight	11.4kg. (25 lb.)
Mounting	May be surface-mounted or flush-mounted. Panel fits between standard 40.64cm (16") on-center stud framing. Panel must be mounted vertically (+/- 7 degrees from vertical).
Required Flush Mount Opening Size	36.5cm (14 3/8") x 150cm (59") x 9.8cm (3 7/8"). *See Fig. 3*
Mounting Considerations	Remote Power Panels will hum slightly and internal relays will click while in use. Mount where such noise is acceptable. This equipment is air cooled. Mount in a place where the vented cover will not be blocked. Mount the panel so that line-voltage wiring will be at least 1.8m (6 ft.) from audio or electronic equipment and its wiring.
Cooling	Panel is convection cooled. Allow at least 30cm (12") air space at top and bottom and a minimum of 30cm (12") clearance in front of Panel. Or allow air space as required by local codes (whichever is greater).
Heat Generated by Fully-Loaded Panel	600 BTUs per hour maximum
Construction (Enclosure)	16-gauge galvanized sheet metal (unpainted)
Construction (Cover)	Painted (black) metal cover with ventilation holes. Cover is attached using four phillips-head screws.
Regulatory Approvals	UL, CSA, CE, C-TICK
Ground Bar Terminals	13 ground termination points



- 1 Processor
- Up to 8 Remote Power Modules*

- 1 Module Interface
- Up to 8 Remote Power Modules*

* One HW-HIFC-10-2 filter choke may be installed in place of module 8.

Figure 1 – Panel Content Configurations

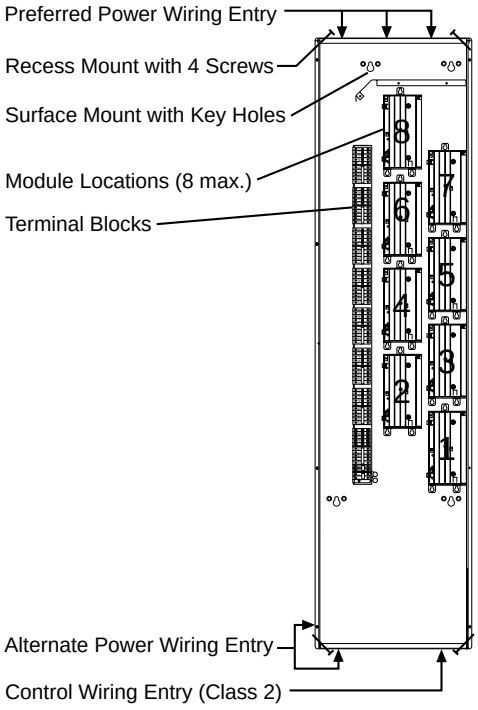


Figure 2 – Wiring and Mounting

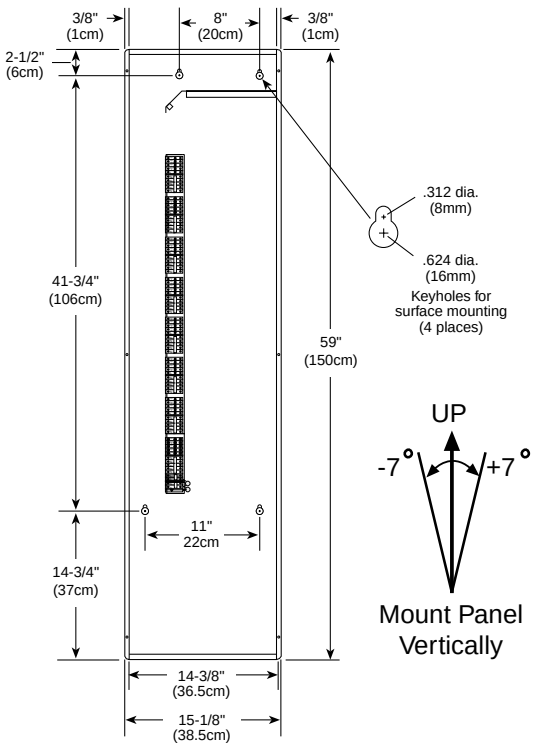


Figure 3 – Panel Dimensions
Note: the Panel is 9.8cm (3 7/8") deep past cover mounting tabs.

Remote Power Panel (HWI-PNL-5-CE) Specifications

Panel Capacity	Five RPMs, one Module Interface (MI). *See Fig. 2*
Line-Voltage Wiring	Use copper wire only, supply conductors 60/75˚C, DIN rail mounted terminal blocks provided for high voltage module wiring and Processor/MI power *See Fig. 1*
DIN Rail Terminal Blocks	Terminal blocks will accept one 1-2.5mm^2 (18-10AWG) wire or two 1-1.5mm^2 (18-16AWG) wires. Terminal blocks should be tightened to .40-.57 nM (3.5-5.0 in.-lbs.). All terminal blocks are shipped with bypass jumpers installed. After verifying that each circuit is wired correctly, remove the bypass jumpers for system operation.
Shipping Weight	40kg (18 lbs.)
Mounting	Panel may be surface-mounted or flush-mounted. Panel fits between standard 40.64cm (16") on-center stud framing and must be mounted vertically (+- 7 degrees from vertical)
Required Flush Mount Opening Size	36.5cm (14 3/8") x 81cm (32") x 9.8cm (3 7/8")
Mounting Considerations	Remote Power Panels will hum slightly and internal relays will click while in use. Mount where such noise is acceptable, this equipment is air-cooled. Mount in a place where the vented cover will not be blocked. Mount the panel so that line-voltage wiring will be at least 1.8m (6 ft.) from audio or electronic equipment and its wiring.
Cooling	Panel is convection-cooled. Allow at least 30cm (12") air space at top and bottom and a minimum of 30cm (12") clearance in front of Panel. Or allow air space as required by local codes (whichever is greater).
Heat Generated by Fully-Loaded Panel	420 BTUs per hour maximum
Construction (Enclosure)	16 gauge galvanized sheet metal (unpainted)
Construction (Cover)	Painted (black) metal cover with ventilation holes. Cover is attached using four phillips-head screws.
Regulatory approvals	UL, CSA, CE, C-TICK, NOM
Ground bar terminals	13 ground termination points

Remote Power Panel (HWI-PNL-5) Specifications (cont.)

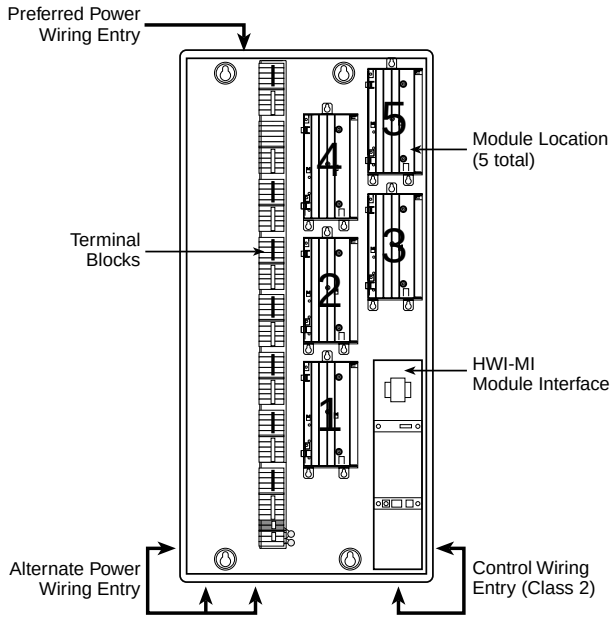


Figure 1 – Wiring and Mounting

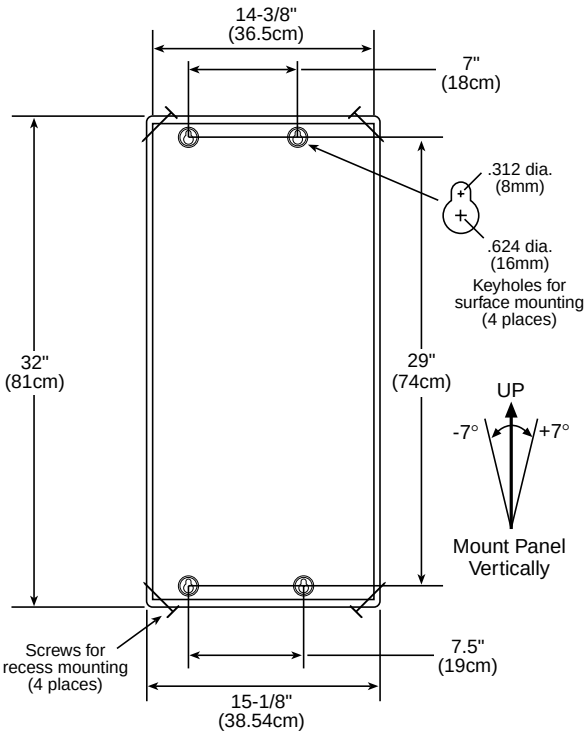


Figure 2 – Panel Dimensions
Note: the Panel is 9.8cm (3 7/8") deep past cover mounting tabs.

Low-Voltage Enclosure (HWI-ENC-LV32-CE) Specifications

Enclosure Capacity	One HWI Processor, two Contact Closure Boards (HWI-CCI-8/HWI-CCO-8), two Wire Landing Boards (HWI-WLB) *See Fig. 1*
Line-Voltage Wiring	Use copper wire only, supply conductors 60/75°C, DIN rail-mounted terminal blocks for power feed for HWI Processor (located at top left corner of panel). *See Fig. 2*
DIN Rail Terminal	Terminal blocks will accept one 1-2.5mm² (#18-10AWG) wire or two 1-1.5mm² (#18-16AWG) wires. Terminal blocks should be tightened to .40-.57nM (3.5-5.0 in.-lbs.).
Shipping Weight	8.2kgs. (18 lbs.)
Mounting	Enclosure can be surface-mounted or flush-mounted. Enclosure fits between standard 40.64cm (16") on-center stud framing.
Required Flush Mount Opening	36.5cm (14 3/8") x 81cm (33") x 9.8 m (3 7/8"). *See Fig. 2*
Mounting Considerations	Mount the Enclosure so that line-voltage wiring will be at least 1.8m (6 ft.) from audio or electronic equipment and its wiring.
Construction (Enclosure)	16-gauge galvanized sheet metal (unpainted)
Construction (Cover)	Painted (black) metal cover with ventilation holes. Cover is attached using four phillips-head screws.
Regulatory approvals	UL, CSA, NOM, CE, C-TICK

Low-Voltage Enclosure (HWI-ENC-LV32-CE) Specifications (cont.)

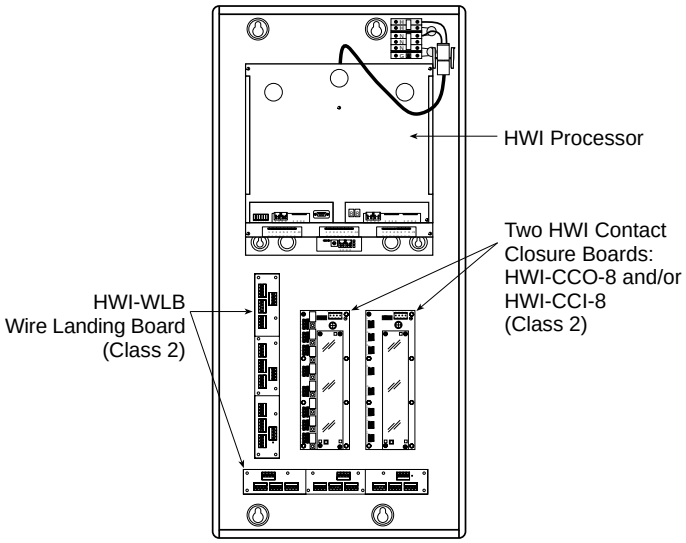


Figure 1 – Contact Closure Board Configuration

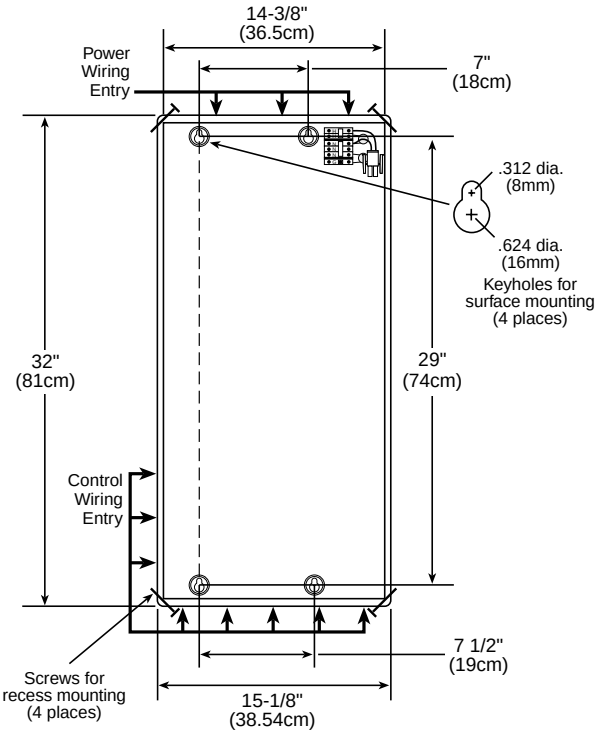


Figure 2 – Enclosure Dimensions

Low-Voltage Enclosure (HWI-ENC-LV17-230) Specifications

Enclosure Capacity	Two Contact Closure Boards (HWI-CCI-8/HWI-CCO-8), *see Fig. 1.*
Shipping Weight	4.5kg (10 lbs.)
Mounting	Enclosure may be surface-mounted or flush-mounted.
Required Flush Mount Opening	23cm (9 1/4") x 44cm (17 1/4") x 9.8cm (3 7/8"). *See Fig. 2*
Mounting Considerations	Mount the Enclosure so that line-voltage wiring will be at least 1.8m (6 ft.) from audio or electronic equipment and its wiring.
Construction (Enclosure)	16 gauge galvanized sheet metal (unpainted).
Construction (Cover)	Painted (black) metal cover with ventilation holes. Cover is attached using four phillips-head screws.
Regulatory Approvals	UL, CSA, NOM, CE, C-TICK

Low-Voltage Enclosure (HWI-ENC-LV17-230) Specifications (cont.)

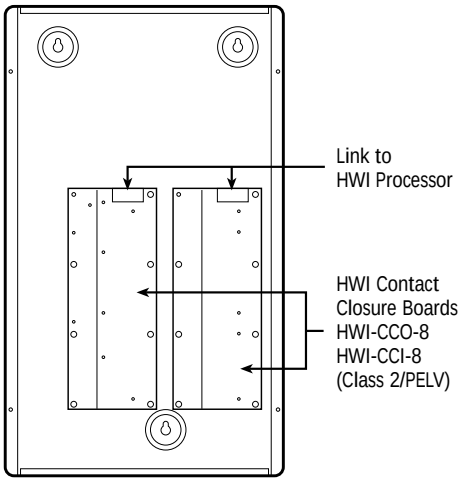


Figure 1 – 2 Contact Closure Board Configuration

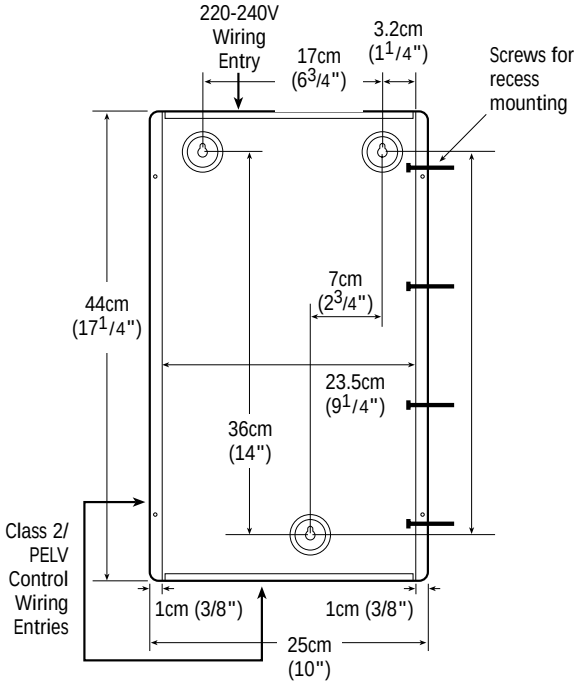


Figure 2 – Enclosure Dimensions

HWI-ENC-CC Contact Closure Enclosure Specifications

Enclosure Capacity	1 HWI-CCO-8, or 1 HWI-CCI-8.
Line-Voltage Wiring	None
Shipping Weight	2.7kg (6 lb)
Mounting	May be surface-mounted or flush-mounted
Required Flush Mount Opening	23cm (9 1/4") x 44cm (17 1/4") x 9.8cm (3 7/8"). *See Fig. 2*
Construction (enclosure)	16 gauge galvanized sheet metal (unpainted)
Construction (cover)	Painted (black) metal cover with ventilation holes. Cover is attached using four philips-head screws
Regulatory approvals	UL, CSA, NOM, CE, C-TICK

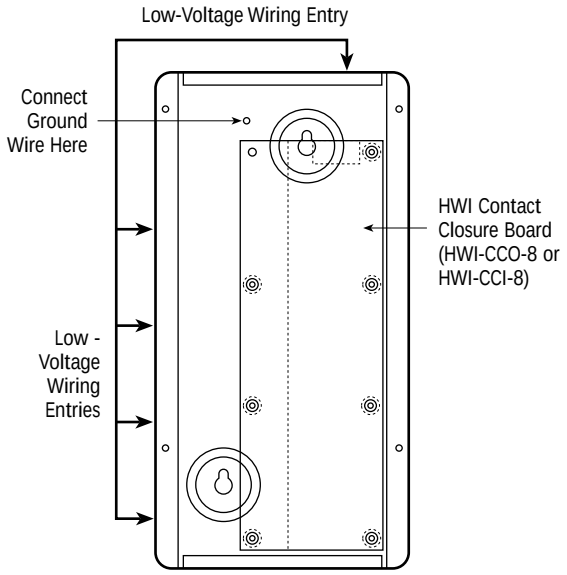


Figure 1 – Wiring Entry

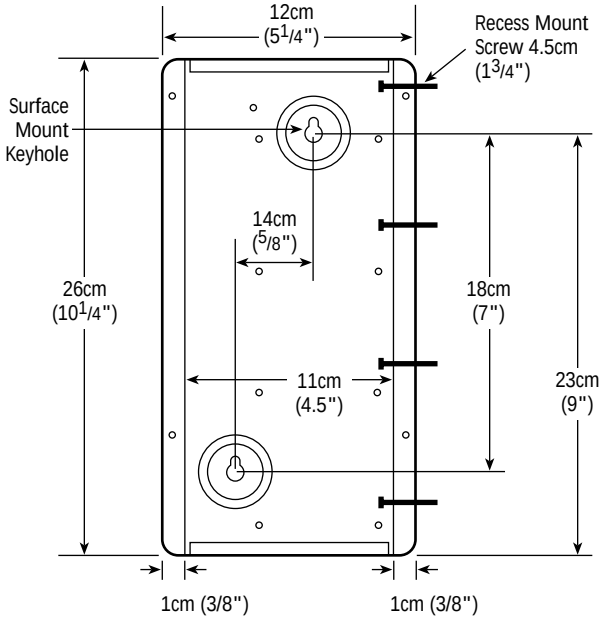


Figure 2 – Mounting Dimensions

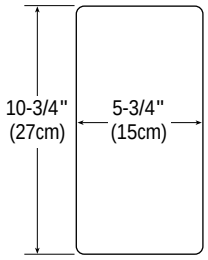


Figure 3 – Cover Dimensions

Short Form Specifications & Benefits

Lutron HomeWorks® Interactive Lighting Controls Specification

GENERAL

1. Manufacturer shall have a minimum of 10 years continuous experience in the manufacturing of lighting controls.
2. Lighting controls shall be UL listed, or meet CSA, NOM, CE, and C-TICK standards (where appropriate) specifically for the required loads (i.e. incandescent, or magnetic and electronic low-voltage, fluorescent, etc.). Manufacturer shall provide evidence of compliance on request.
3. Manufacturer shall have quality systems registered to ISO 9001 Quality Standard, comprised of in-house engineering for all product design and field support.
4. Manufacturer shall have a component quality program in place to reduce defective levels to less than 100ppm and provide documentation on request.
5. Lighting controls shall be tested per IEC801-2 to withstand a 15kV electrostatic discharge without damage or loss of memory.
6. Manufacturer shall provide software to simplify the design and installation of all lighting controls.
7. Lighting controls shall operate in an ambient temperature range of 0°C (32°F) to 40°C (104°F)
8. Manufacturer shall provide a minimum of a one-year warranty.

PRODUCT

1. Manufacturer shall be Lutron Electronics Co., Inc.
2. Lighting controls shall meet applicable requirements of UL 20 and UL 1472 regarding the inclusion of a visible, accessible air gap off switch and the limited short circuit test.
3. Controls for magnetic low-voltage fixtures shall be end-of-line tested to ensure that any operating condition (including an unloaded transformer) does not overheat the transformer.
4. Controls and electronic dimming ballasts for fluorescent fixtures shall be manufactured and supplied by the same manufacturer or as an approved system by both ballast and control manufacturer.
5. Lighting controls shall provide power failure memory. Should power be interrupted, and subsequently returned, the lights will come back on to the level set before the power interruption. Restoration to a default level shall not be acceptable. Additionally, lighting controls storing presets will retain the preset levels in memory.
6. Manufacturer shall ensure the following items regarding product color:
   - Product color matches NEMA standard WD1, Section 2 and the maximum color deviation from this standard shall not exceed $\Delta E=1$, CIE L*a*b color space units. For non-NEMA colors, color match coordinated shall be provided on request.
   - Color variation of any control in the same product family shall not exceed $\Delta E=1$, CIE L*a*b color units.
   - Visible parts shall exhibit ultraviolet color stability when tested with multiple actinic light sources as defined in ASTM D4674-89 Manufacturer to submit proof of testing on request.
7. Lighting controls shall be 100% end-of-line tested for proper electrical, functional and tactile operation before shipment from factory. Manufacturers who end-of-line test by sampling shall not be acceptable.
8. Lighting Control System (LCS) shall be Lutron HomeWorks Interactive.

For full CSI format specifications, visit www.lutron.com/specs.

9. LCS shall consist of:

   a. A *seamless network* of up to 16 Processors for communication and data storage, each capable of up to 256 zones, for a total system capacity of up to 4096 zones.

   b. Up to 96 wall-mounted Keypads or system interfaces per Processor for a total of up to 1536 keypads per system.

   c. Remote Power Modules (RPM) (including dimming, switching, and motor control modules) located in lighting control panels in order to *reduce wall clutter.*

   d. Local wall-mounted, *multi-zone, preset scene Dimming Modules* with user interface to allow simple programming changes without the need for a personal computer.

10. LCS shall provide control of up to 4096 zones, 30,000 scenes, and up to 1,536 keypads/interfaces. System shall be programmable with a Windows®-based PC. Light levels shall fade smoothly between scenes at time intervals of 0 seconds to 99 minutes and 99 seconds including individual fade and delay per zone. System shall provide the following capabilities: astronomic time clock, vacation mode programming, security mode programming, bi-directional RS-232, conditional logic, keypad/interface enable and disable, manual sequencing, automatic sequencing, and central monitoring. System shall be capable of remote programming and diagnostics via a modem connection.

11. Keypads/interfaces shall provide the following capabilities: button-by-button programming, conditional logic programming, timeclock enable/disable, single action, toggle, advanced toggle, manual sequencing, automatic sequencing, raise/lower, bi-directional RS-232, infrared inputs, contact closure inputs and outputs. Keypads with LEDs shall include confirmed status feedback, with room, scene, or pathway logic, ensuring that LEDs represent actual confirmation of events. LED status that mimics button presses shall not be acceptable.

12. LCS shall provide *fail-safe operation*. In the event that one or more of the lighting control Processors is not present or is disabled, the following shall be possible:

    a. All circuits controlled by the LCS that were on prior to the power disruption shall remain on at the same intensity, and all circuits controlled by the LCS that were off prior to the power disruption shall remain off.

    b. Where remote Dimming Modules are used, it shall be possible to turn on to any preset level, including off, any lights controlled by these modules by installing and using a low-voltage dry-contact override switch, or by cycling the breaker feeding the module.

    c. During the power disruption, it shall be possible to turn on, off, or dim to any level, any local dimming or switching control directly from the face of the control.

    d. During the power disruption, it shall be possible to select a preset lighting scene, turn on, off, or dim each circuit to any level on any local wall-mounted, multi-zone, preset scene dimming module, directly from the face of the module.

13. All local wall-mounted, multi-zone, preset scene Dimming Modules, Remote Power Modules (RPMs), and Processors shall have independent power supplies so that failure of an individual part or subassembly shall not result in loss of control of all loads controlled by the LCS.

14. All line-voltage connections to RPMs and processors must be made with a *visible positive mechanical connection*. No pin and socket or stab-in connectors shall be accepted.

15. All components of the LCS, including the Processors and Keypads, shall not be damaged in the event of any *miswires* or shorts between any two low-voltage wires.

Lutron HomeWorks® Interactive Lighting Controls Specification continued

16. Remote power motor control modules shall be capable of controlling up to 4 independent 3-wire motors. Each Motor Module relay output shall be *electronically-interlocked* to ensure positive protection, so that both "direction 1" and "direction 2" motor windings can not be energized at the same time. Module shall have a programmable maximum time that either "direction 1" or "direction 2" motor windings can be left in the energized state.
17. LCS shall be capable of *real time control* of light levels. LCS shall be capable of sending zones to specific light levels, flashing zones, enacting scenes, and capturing light levels, from a Windows®-based software utility.
18. LCS shall be capable of providing diagnostics via LEDs on the system's processor, keypads, and power modules, as well as device verification tests in the Windows-based software utility. LCS provides diagnostics indicating: positive communications between components and existence of properly addressed components.

EXECUTION

1. Equipment shall be installed utilizing manufacturer's cut sheets and installation instructions and in accordance with these specifications.
2. Lighting controls shall be distributed by an ISO 9001.
3. Manufacturer shall provide a toll-free technical support hotline 24-hours per day, 365 days per year.
4. Manufacturer shall be capable of providing *Factory Commissioning* for LCS. Factory Commissioning shall consist of three job-site visits by a Factory Field Service Technician in order to check wiring and connections, program the LCS, and train end-users on the operation of the system.

For full CSI format specifications, visit www.lutron.com/specs.

SPECIFICATION BENEFITS (GENERAL SECTION)

Experience	Manufacturers with at least ten years of continuous experience in lighting control have seen virtually every issue that may arise in the manufacturing and application of these controls. They have also responded with time-tested solutions to these issues. Lutron Electronics not only has ten years, but 38 years of experience dedicated solely to the field of lighting controls. You can be assured that for the life of your dimming system, you will reap the benefits of 38 years of staying power, 38 years of innovations and solutions, and 38 years of superior customer service.
Standards	Underwriters Laboratories, Inc. is the leading U.S. independent product safety testing and certification organization. A UL trademark means UL found that samples of this product met UL's safety requirements and are periodically checked by UL at the manufacturing facility. In 2001, a new UL safety standard will become effective for dimmers. This standard introduces new test loads to address the proliferation of transformer and electronic ballast based low-voltage, incandescent, and fluorescent light sources. Unlike some manufacturers, Lutron dimmers have always been designed to control these types of loads. In fact, Lutron actually started UL listing dimmers to these new safety standards in 1996, five years prior to UL's requirement. In addition to meeting UL safety standards, Lutron dimmers meet the most demanding international standards including CSA, NOM, MITI, VDE, and IEC, including the latest IEC Electromagnetic Compatibility standards.
ISO 9001	Lutron's ISO9001 certification ensures that our quality is consistent throughout all aspects of the company and across all product families. ISO 9001 certification transcends the individual or the department by ensuring that the engineering, design, manufacturing and servicing of the company's products is consistent regardless of personnel changes within the organization.
Quality Programs	Lutron's extensive component quality programs result in a more reliable product. When you turn on your dimmer or power up your Lutron system, it's going to work, and it will keep working for years of maintenance-free operation.
Static Protection	The most common occurrence of electrostatic discharge occurs when you walk across a carpet and shock the lighting control. Products that are not designed to withstand this shock may reset or short out completely. Lutron products are designed to withstand a 15kV electrostatic discharge, a jolt similar to that of a person in slippers shuffling across a plush carpet in a dry house on a cold winter day.
Design Software	Lutron's automated design software eliminates errors during the project design process, and improves the quality of the corresponding project documentation. Well-specified, well-documented projects are easier to install, easier to service, and result in more satisfied customers with fewer callbacks.
Ambient Temperature	Lighting controls must be capable of working within the typical temperature range of a home or office, with allowances for reasonable temperature variations. This ensures reliable operation under any normal circumstance.

PRODUCT SECTION

Lutron	The benefit of specifying and/or installing a Lutron product is that you have chosen a product that is supported by 38 years of dedicated, proven experience in the manufacturing, sales, and service of lighting controls. Lutron is the number one choice of contractors around the world, and the recognized leader in the field of lighting control.

Air-Gap Switch

Ideally, when you change a burned out light bulb or lamp, there should be no electrical current running to the fixture. The best way to ensure this is to have a physical disconnection from the power source. Lutron lighting controls provide this feature by means of an air-gap off switch that is either:

- Integral to the product or
- Visible and easily accessible from the front of the product.

To change a light bulb, simply turn the product off if the switch is integral; otherwise move the air-gap off switch to the "off" position from the front of the unit. If a product does not incorporate an air-gap off, the only way to achieve a physical disconnect from the power source is to turn off the power at the breaker, something which almost no one will do.

Transformer Life

If a light bulb fails or is removed from the low-voltage transformer, Lutron lighting controls will not overheat your transformer. This is critical because an overheated transformer may not fail immediately, but its life span will be severely compromised.

One Manufacturer for the Entire System

Lutron manufactures both the ballasts and lighting controls that comprise our fluorescent systems. In the unlikely event that there is a problem on a job, Lutron will also solve the problem without question. In situations where the controls and ballasts are manufactured by different companies, customers may experience a great deal of frustration when they try to establish which product is at fault; and therefore which company needs to help them solve the problem.

Power Failure Memory

Most lighting controls can store information about preset lighting levels for up to ten years. Power failure memory is about more than storing preset information, it's about remembering the state of the lighting before the power failed, and duplicating it when the power is restored. If your power fails in the middle of the night when the lights are off, and is then restored, the lights will not jump to full on. Conversely, if you are working in a brightly lighted building and you experience momentary power failure, the lights will not stay off when power is restored. Lutron won't leave you in the dark. Consumers purchase battery backed-up alarm clocks to avoid just this type of problem...your lighting should give you the same peace of mind.

Color Matching

Lutron products of the same product family and color designation will match when you buy them today, and will still match when you add to the job several months or years down the road.

End of Line Testing

100% End-of-line testing ensures that when your Lutron product left the factory it was 100% operational, and will work when properly installed.

Seamless Network

The HomeWorks® Interactive Processor can control up to 256 zones of light and work in conjunction with up to 15 additional Processors to provide seamless control of up of 4096 zones of light.

Reduce Wall Clutter

HomeWorks® Interactive Remote Power Modules provide the ability to clean up walls in rooms such as dining rooms, great rooms, family rooms, and other prominent areas. Lights in the space can be wired to a Remote Power Panel, allowing elegant, wall-mounted Keypads to replace several dimmers or switches on the wall. Keypads include custom engraving to clearly identify each button's function.

Multi-Zone Preset

Multi-Zone Preset Local Lighting Controls, called GRAFIK Eye Controls, give homeowners the ability to quickly and easily adjust light levels and fade rates from the face of the GRAFIK Eye Control Unit that will be retained by the system. Additionally, GRAFIK Eye Preset Local Lighting Controls have the unique ability to continue to operate as local scene controls if the HomeWorks Interactive Processor is disabled.

Fail-Safe Operation

HomeWorks Interactive is the only lighting control system that combines the benefits of centralized dimming systems (using remotely-mounted power modules with wall-mounted Keypads in the space in order to reduce wall clutter) with the benefits of localized dimming systems (fail-safe operation).

In the unlikely event that the Processor(s) are disabled, the Keypads will no longer be able to communicate with the system. However, the homeowner will still have control over the lights in the home. GRAFIK Eye Preset Local Lighting Controls will continue to operate locally, exactly as they did when the Processor was on-line. Additionally, by installing and using a manual override switch, the homeowner can turn all the lights in remotely-mounted power panels on to a preset override scene. Unlike many other systems, this manual override can activate a preset level other than all lights on to full intensity.

Independent Power Supplies

Independent internal power supplies permit GRAFIK Eye Preset Local Lighting Controls to continue to operate locally in the unlikely event that the main Processor is disabled.

Visible Positive Mechanical Connections

Since lighting loads wired to remote power modules and Processors can turn off if a positive connection to these devices is not maintained, HomeWorks Interactive systems employ mechanical connections that are visible to the installer, ensuring a positive connection. Pin and socket connections that are made behind the devices and not visible to the installer cannot ensure a positive connection.

Miswire Protection

Accidental shorting of the low-voltage communication wires during installation of the system is quite common. Whether or not the main Processors in a HomeWorks Interactive system are powered at the time of the short, no damage to the Processors or any of the other components will occur.

Interlocked Motor Module

The HomeWorks Interactive motor control module supplies four bi-directional outputs for the control of drapes, window treatments, hurricane shutters, projection screens, and other motor loads. Since energizing both the “raise” and the “lower” contacts simultaneously can cause a motor to fail after a short period of time, protection against this occurrence is provided. The HomeWorks Interactive motor module uses two electrically-interlocked relays per output, rather than relying on software to ensure that the raise and lower contacts will not be simultaneously energized (even if either relay contact fails or welds together).

Real-Time Control

The HomeWorks Interactive system is capable of real-time control from Windows®-based software. The real-time control options include the ability to set light levels for any presets in the system from a personal computer. Additionally, the system has the ability to flash any zones individually, to assist in locating which fixtures are included in the zone. The system can also send any given zone to any level instantly. Once a Keypad button has been programmed, the button can be activated from the software for testing purposes.

Diagnostics

The HomeWorks Interactive system provides diagnostic features to assist in commissioning a system, programming light levels, and troubleshooting any installation problems. A device verification test can be run to verify the operation of all system components, and list for the installer any devices that are misadressed, and any devices not responding to the central processor. This test greatly assists in pinpointing any installation problems to

specific components so that a technician can troubleshoot problems efficiently.

EXECUTION SECTION

Instruction Sheets	Thorough information on how to install each product is included with your Lutron lighting control or system.
Personal Technical Support	The benefit of toll-free help, 24 hours a day, 7 days a week, 365 days a year is that we are always available to support you, and to support our products.
Factory Commissioning	Lutron has the capability to provide factory commissioning for HomeWorks Interactive systems. This will consist of a direct Lutron factory technician conducting three job site visits, as well as installing a modem on the job site so that additional programming changes and troubleshooting can be conducted by Lutron at a later date.

Notes:

HOMEWORKS interactive

Technical Reference Guide International Edition (220-240V)

For technical support, please call:

1-800-523-9466 (US/Canada; 24 hours/7days in English)

1-610-282-3800 (24 hours/7days in English; translations available in 140 languages)

1-610-282-6701 (8am-5pm EST in Spanish)

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