Energi TriPak System

Wireless energy saving solutions at an affordable price

- **Simple retrofit—installs 70% faster than wired systems**

  - Minimise disruption to people in space
  - Easy set up and adjustment—no knobs or dials

- **Superior Clear Connect wireless communication**

  - Proven, patented technology that works

- **Minimise callbacks—sensors use XCT Technology**

  - More sensitive to fine motion than other sensors
  - Recognises the difference between fine human motion and background noise

☀️LUTRON

This is the Lutron difference...

1959

Joel Spira submits paperwork to the United States Patent Office for his "Dimming Device"

1961

The Spiras set up their business as an affiliate of Rodale Manufacturing Company in Emmaus, PA

1963

The UL issues its certification to Lutron's dimmer type snap switch

1967

Tu-Wire, the first fluorescent dimming system

1970

Lutron relocates from Emmaus, PA to Coopersburg, PA

1971

Nova, the first linear slide dimmer

1982

Skylark wallbox dimmer, one of Lutron's most successful products

one million sold

LUTRON

1962

Dimming Device patent issued to Joel Spira (patent #3,032,688)

1964

Certificate of Incorporation issued by the Commonwealth of Pennsylvania to Lutron Electronics Co., Inc.

1968

On September 30, 1968, Lutron produced its 1,000,000th dimmer

1974

Hi-lume, the world's first electronic solid state dimming ballast; Versaplex and Pre Pack Systems, the company's first commercial dimming systems

1987

GRAFIK Eye, the first customizable dimming system for different light sources

1989
RanaX, the first infrared, remote control dimmer

1990
NeTwork, the first whole-home lighting control system

1997
RadioRA, the first two-way, radio frequency, whole-home lighting control system

2006
EcoSystem, Lutron's first line of digitally addressable dimming ballasts

2007
Vierti single-touch dimmer

2010
Lutron donates objects to the Smithsonian National Museum of American History

2011 & beyond
Affordable energy-saving products

expandable systems

70% energy savings

1993
Serena, the first quiet, digital, low-voltage shading system

2003
Sivoia QED, a quiet, automated window shade system

2006
Quantum total light management

2009
Lutron introduces Radio Powr Savr wireless sensors and Pico wireless controls

Expand your expertise. Grow your business.

The Lutron Opportunity

Lutron's position as the world leader in lighting controls is defined by our commitment to innovation and reliable technology.

Innovation

Architectural controls

- Designed to save energy while enhancing your surrounding environment to achieve the best possible quality of light

Energi TriPak

- Combine occupancy/vacancy sensing, daylight harvesting, and personal control to optimise energy savings

Scalability and interoperability

- Lutron wireless controls are designed to work together across product families; Radio Powr Savr wireless sensors and Pico wireless controls work with multiple systems
- Designed to grow as needs and budgets allow

Blinds

- New Sivoia QS and Serena battery-powered wireless blinds work with Pico wireless controls and feature a long battery life and affordable price point

> 40% of Lutron sales come from products we didn't have 4 years ago!

Technology

Real-time Illumination Stablity Systems

- Stable light output for phase control dimmers in the presence of poor power quality
- Maximum lighting consistency for uncertain power supplies

Clear Connect RF Technology

- Ensures reliable communication between wireless devices
- Quiet 868 MHz band reduces interference

XCT technology

- Enables Lutron occupancy/vacancy sensors to reliably detect fine motions
- Ensures lights stay on when a space is occupied

QS communication link

- Easy integration of wireless sensors and controls into Lutron light and blind control systems
- Power QS Sensor Module – no line voltage connections required

Triathlon power technology

- Used in Lutron wireless battery-operated honeycomb blinds
- Ensures at least 3-year blind battery life

"Take care of the customer" is the first Lutron principle. Our high-quality solutions and outstanding sales support lead the industry in exceeding customer expectations.

Quality

Continuous improvements

- One of Lutron's guiding principles is to "innovate with high quality products"
- Lutron implements improvement activities to meet this guiding principle:
  — Integrated quality systems
  — Strict engineering guidelines
  — World-class quality and manufacturing processes
  — All products must pass the Lutron "ACE" test for Aesthetics, Cognition, and Ergonomics to ensure the products look, operate, and feel like the highest quality

End-of-line testing

- 100% of Lutron products are tested when they come off the manufacturing line to ensure the products will work properly, every time
- Lutron's defective rate is less than ½%

ISO 9001

- Lutron was one of the first 20 companies in the United States to earn the ISO 9001 international quality certification

Market expansion

Lutron advertising and public relation efforts reach tens of millions of contractors, industry professionals, homeowners, and end users each year. Lutron is a member of CIBSE and UKGBC. Also, our new website is available at lutron.com/europe.

Sales & Specification Support

Field sales and specification support

- Lutron utilises a Lutron direct sales force to work with the channel, conduct market expansion activities, and participate in training and sales events
- Lutron Specification team is focused on writing one-name Lutron specifications throughout the world
- Lutron Services Company is available to help field-commission and startup projects
- Continuous services available for after installation — extended warranties and service contracts, system training and optimisation, product upgrades, etc.

Brand recognition

- Lutron has integrated marketing, advertising, and public relations plans to increase brand awareness and have your customers asking for Lutron by name
- Lutron continues to be the #1 brand with specifiers for lighting controls

Technical support

- Lutron offers full technical support on freephone number: 0800 282 107
- One-on-one personal consultation with Lutron product expert
- Ensures your contractors and end users can get information and support all the time

Why Lutron?

Lutron is a global organisation committed to delivering value to its customers. Our founder, Joel Spira, developed the first solid state dimmer. Today, we continue to develop innovative, energy-saving lighting control solutions that provide flexibility, ambiance, and comfort in residential and commercial applications.

The company offers:

· Proven technology — 2,500 active patents

· 10% of sales invested in research & development

· Upfront project service support

· After-sales support

· Value added — globally recognised and respected lighting control brand

· Reduced end user callbacks

· Products designed and manufactured for reliability with 100% pre-shipment inspection

· Significant portfolio to cover all your project requirements — +15,000 SKU's

· Integration with third-party systems, such as Amazon Alexa, Android, Apple, Nest, and Sonos devices, universal remote contents, and more.

Why Invest in Lighting Controls?

Comply with legislation—Evolving rules are requiring stricter requirements for energy efficiency, while allowances are also being made for lighting controls

Meet demand—Lighting controls are growing in popularity due to legislation, improving the aesthetics and functionality of a space, and the value added to rental/sales

Increase revenue—Lighting controls provide an additional revenue opportunity for the contractor

Meet the challenges of LED dimming—Learn how Lutron solutions can eliminate compatibility issues

Android is a trademark of Google Inc. Apple is a trademark of Apple Inc; registered in the U.S. and other countries.
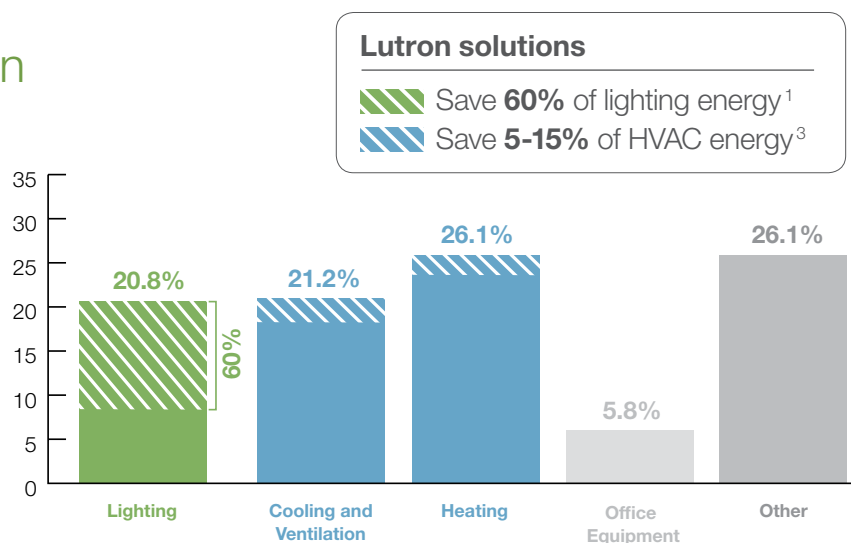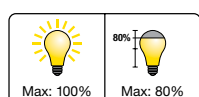
Energy-Saving Light Control Strategies

The Lutron Opportunity can help your clients save energy

Annual electricity use in commercial buildings[1]

- Save up to 60%[2] of lighting electricity usage
- Existing and new buildings need to comply with codes and standards
- Increase occupant comfort and productivity
- Control virtually all loads
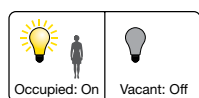- Reduce installation and programming costs

Lutron solutions
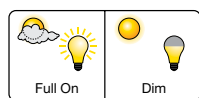
Save **60%** of lighting energy [1]
Save **5-15%** of HVAC energy [3]

	Lighting	Cooling and Ventilation	Heating	Office Equipment	Other
	20.8%	21.2%	26.1%	5.8%	26.1%

60%

Potential savings

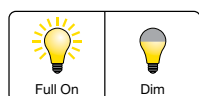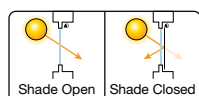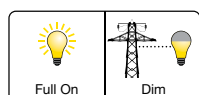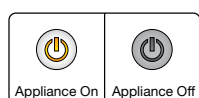| Strategy	Description	Savings
High-end trim	Sets the maximum light level based on customer requirements in each space.	10-30% Lighting[4]
Occupancy/vacancy sensing	Turns lights on when occupants are in a space and off when they vacate a space.	20-60% Lighting[5]
Daylight harvesting	Dims electric lights when daylight is available to light the space.	25-60% Lighting[6]
Personal dimming control	Gives occupants the ability to set the light level.	10-20% Lighting[7]
Controllable window shading	Adjusts blinds to reduce glare and solar heat gain.	10-20% Cooling[8]
Scheduling	Provides pre-programmed changes in light levels based on time of day.	10-20% Lighting[9]
Demand response	Automatically reduces lighting loads during peak electricity usage times.	30-50% Peak Period[10]
Plug load control	Automatically turns off loads after occupants leave a space.	15-50% Controlled Loads[11]
HVAC integration	Controls heating, ventilation, and air conditioning systems through contact closure or BACnet protocol.	5-15% HVAC[12]
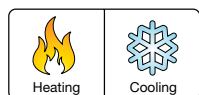
Icon labels:
- Max: 100% / Max: 80% (80%)
- Occupied: On / Vacant: Off
- Full On / Dim
- Full On / Dim
- Shade Open / Shade Closed
- 7am: Dim / 7pm: Off
- Full On / Dim
- Appliance On / Appliance Off
- Heating / Cooling

Energi TriPak overview

What is Energi TriPak?

Energi TriPak consists of transmitting devices that send out radio frequency (RF) commands to the load controllers. The load controllers receive the RF command and perform the appropriate action based on the information received.

Transmitting devices

Radio Powr Savr wireless sensors

Occupancy/vacancy

Daylight

Pico wireless remotes

Wall-mount

Tabletop   Hand-held

Receiving devices (load controllers)

Switch

Relay module   Rania RF switch

Dim
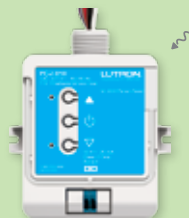
Dimming module   Dimming module
with 0-10V control   with EcoSystem

Integrate

Contact closure
output module

Lutron Clear Connect
Wireless Signal **Sent**

Lutron Clear Connect
Wireless Signal **Received**

Reliable technologies

XCT technology with cross-correlation—won't leave you in the dark

Lutron sensors detect fine motion better than other passive infrared (PIR) sensors

- Provides exceptional prevention of false-ons and false-offs
- Superior sensitivity—recognises the difference between fine human motion and background noise

✅ **Major Motion**

Person walking 3 feet

✅ **Minor Motion**

Movements like extending your arms

✅ **Fine Motion**

Small movements like flipping pages of a book

✅ **No False-on**

Lights stay off when room is unoccupied

Exclusive, reliable technologies—no callbacks

Clear Connect wireless communication technology— wireless that works!

Proven technology

- Lutron invented its first wireless lighting control system in 1993
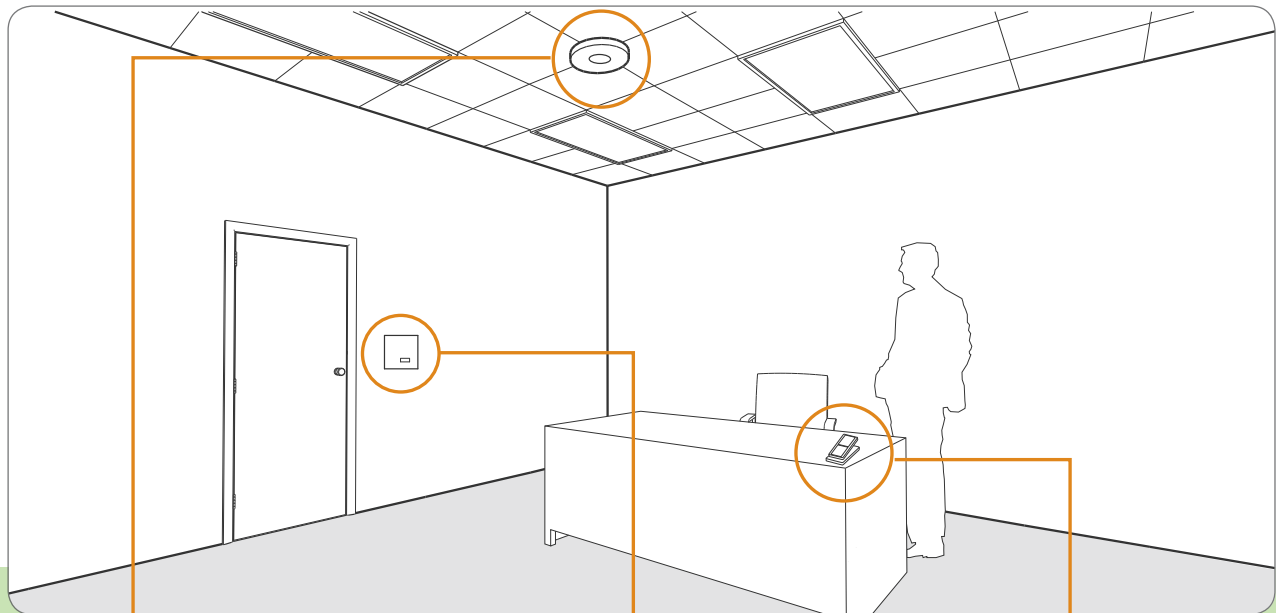- Highest quality—best communications reliability of any system on the market

Proven reliability

- Case studies
  - Marriott Hotel, Frankfurt, Germany
  - Business Academy, Bexley, England

Simple solution — three basic parts

Sensor, switch, and Pico wireless remote cover most applications

Save up to 60%[3] lighting energy

Wireless occupancy sensor
ceiling mount

- XCT Technology with cross-correlation— won't leave you in the dark
- No wires—easily mount it anywhere
- Vacancy-only models available
- Wall- and corner-mount models also available

Wireless switch
wallbox mount

- Replaces existing switch
- Mistake-proof wiring
  — No neutral
  — Polarity-free

Pico wireless remote
tabletop

- No wires—put it where it's most accessible
- Pedestal mount for tabletop use
- Surface mount anywhere with Pico wallplate
- 10-year battery life

1 **Replace the existing switch in a few minutes or less— works with existing wires**

Wireless switch

Mistake-proof wiring

- No neutral required
- No polarity for line or load wiring

2 **Add a sensor or wall control—no wiring**

Wireless occupancy/ vacancy sensor

Sensor profile view

Wireless remote

Wireless

- No wires required
- Easy to mount and adjust location
- 10-year battery life

3 **Simple button-press set up—no commissioning**

1. Press and hold **6 seconds**

2. Press and hold **6 seconds**

3. Press and hold **6 seconds**

It works!
Sensor and Pico wireless remote now talk to the switch

Energi TriPak — How to design a system

Define your space

The appropriate control solution is defined by the needs of the space and its occupants.
Use the following steps to plan and design an ideal energy-saving solution.

Step ① Is control of overhead lighting required?

When switching is desired —
Select the control(s) required based on style and load capacity . . . . .**pgs. 13-14**

When dimming is preferred —
Select the PowPak dimming module with 0-10V control. . . . . **pg. 15**
Select the PowPak dimming module with EcoSystem . . . . **pg. 16**

Step ② Is occupancy/vacancy sensing required?

Select the style of the Radio Powr Savr occupancy/vacancy
sensor based on mounting and coverage requirements . . . . **pg. 17**

Step ③ Is daylight harvesting required?

Select the Radio Powr Savr daylight sensor..**pg. 18**

Step ④ Are personal or additional points of control required?

Select the style of the Pico wireless control required ....**pg. 19**

Step ⑤ Is third-party equipment integration required?

Select the PowPak contact closure output module . . . . **pg. 20**

System design rules

Use the chart below to determine the number of wireless devices that can be assigned to a load controller (Rania RF switch or PowPak).

Receiving devices – load controls

Load controller	Occupancy/Vacancy sensor	Daylight sensor	Pico remote
PowPak	6	1	9
Rania RF switch	Up to a total of 10 (only one can be a daylight sensor)		

Transmitting devices – sensors & Pico remotes

These devices can be 'paired' to as many devices as are within the 9 metre range

Distance

Lutron guarantee a 9 metre range through typical building materials between the paired 'transmitting' and 'receiving' devices. However in many installations the signal will be transmitted further. The system is 'point to point' and not a 'mesh style' network.

Step ① Overhead light control selection

PowPak relay module

Design statement: The PowPak relay model is designed for spaces where local control is not currently available, but is required.

PowPak relay module dimensions
W: 72 mm
H: 87 mm
D: 32 mm

Features
- 5 A or 16 A general purpose switch
- Receives input from up to 9 Pico wireless controls, 6 Radio Powr Savr occupancy/vacancy sensors, and 1 Radio Powr Savr daylight sensor via Lutron reliable Clear Connect RF technology
- 16 A model features patented Softswitch technology— extends relay life to an average of 1,000,000 cycles
- 220-240V$\sim$ input

Benefits
- Save energy with the addition of occupancy sensing, daylight harvesting and personal control without the need for additional wires
- Button-press programming to associate the module with the Radio Powr Savr sensors and Pico wireless controls

Mounting
- Module should be installed using the mounting tabs on the enclosure (screws not provided). Module can also be installed in a junction or marshalling box using the conduit nut provided. Consult local and national electrical codes for proper installation.

Models
RMK-5R-DV-B – 5 A general purpose switch
RMK-16R-DV-B – 16 A general purpose switch

Lutron Clear Connect
Wireless Signal **Received**

Rania RF switch

Design statement: Specify a Rania RF switch for applications in which a local switch already exists and dimming is not required.

Rania RF switch dimensions
W: 86 mm
H: 86 mm
D: 28 mm

Features
- Digital on/off two-wire tap switch – no neutral required
- Controls up to 5 A lighting or 4 A motor loads
- Utilises Lutron reliable Clear Connect RF technology to communicate wirelessly with up to 9 transmitting devices (Radio Powr Savr sensors and/or Pico wireless controls)
- Controls always operate locally, do not require system control

Benefits
- Save energy with the addition of occupancy sensing and daylight harvesting without the need for additional wires
- Button-press programming to associate the control with Radio Powr Savr sensors and Pico wireless controls

Mounting
- Mountable in round or square back boxes with a minimum depth of 35 mm
- Trim ring is available for 25 mm back boxes

Models
RS-SA05-B-FXX-M – Rania RF switch, frameless
RS-SA05-B-IXX-M – Rania RF switch with frame/insert faceplate
RS-SA05-B-BXX-M – Rania RF switch with black frame/metal insert faceplate
RRF-SA05-B-FXX-M – Rania RF switch, frameless package
RRF-SA05-B-IXX-M – Rania RF switch with frame/insert faceplate package

Lutron Clear Connect
Wireless Signal **Received**

PowPak dimming module with 0-10 V control

Design statement: Specify the PowPak dimming module with EcoSystem for the application that requires dimming of fluorescent and LED fixtures and simple reconfiguration of lighting zones.

PowPak dimming module with 0-10 V dimensions

W: 72 mm
H: 87 mm
D: 32 mm

Features
- Controls 0-10 V controlled fixtures together
- Receives input from up to 9 Pico wireless controls, 6 Radio Powr Savr occupancy/vacancy sensors, and 1 Radio Powr Savr daylight sensor via Lutron reliable Clear Connect RF technology
- Switches up to 5 A total
- 220-240 V∼ input

Benefits
- Facilitates simple reconfiguration of the space without having to move a single wire
- Dimming saves money and energy—for every percentage reduction in lighting levels, there is a nearly equal reduction in the energy usage of the dimmed light source
- Additional savings can be achieved through high-end trim, occupancy sensing, daylight harvesting, and personal control without the need for additional wires
- Button-press programming means no commissioning required

Mounting
- Module should be installed using the mounting tabs on the enclosure (screws not provided). Module can also be installed in a junction or marshalling box using the conduit nut provided. Consult local and national electrical codes for proper installation.

Models
RMK-5T-DV-B – controls up to 5 A of 0-10 V controlled fixtures together

Lutron Clear Connect
Wireless Signal **Received**

PowPak dimming module with EcoSystem

Design statement: Specify the PowPak dimming module with EcoSystem for the application that requires dimming of fluorescent and LED fixtures and simple reconfiguration of lighting zones.

PowPak dimming module with EcoSystem dimensions

W: 72 mm
H: 87 mm
D: 32 mm

Features
- Controls up to 32 EcoSystem H-Series ballasts, EcoSystem LED drivers, and/or EcoSystem 5-Series LED drivers
- Receives input from up to 9 Pico. wireless controls, 6 Radio Powr Savr occupancy/vacancy sensors, and 1 Radio Powr Savr daylight sensor via Lutron reliable Clear Connect RF technology
- Lutron EcoSystem technology facilitates individual ballasts addressing, connection of multiple control devices, and control of ballasts individually or in groups
- 220-240V∼ input

Benefits
- Facilitates simple reconfiguration of the space without having to move a single wire
- Dimming saves money and energy—for every percentage reduction in lighting levels, there is a nearly equal reduction in the energy usage of the dimmed light source
- Additional savings can be achieved through high-end trim, occupancy sensing, daylight harvesting, and personal control without the need for additional wires
- Button-press programming means no commissioning required

Mounting
- Module should be installed using the mounting tabs on the enclosure (screws not provided). Module can also be installed in a junction or marshalling box using the conduit nut provided. Consult local and national electrical codes for proper installation.

Models
RMK-ECO32-DV-B – controls up to 32 EcoSystem H-Series ballasts, EcoSystem LED drivers, and/or EcoSystem 5-Series LED driver

For more information on EcoSystem H-Series ballasts, EcoSystem LED drivers, and 5-Series LED drivers, please visit **www.lutron.com/europe**

Lutron Clear Connect
Wireless Signal **Received**

Energi TriPak components —
How to design a system

Step ② Occupancy/vacancy sensor selection

Radio Powr Savr wireless occupancy/vacancy sensors

Design statement: Specify a wireless occupancy/vacancy sensor
to turn lights on and/or off based on the space occupancy.

**Radio Powr Savr
wireless ceiling mount
occupancy/vacancy
sensor dimensions**
W: 90 mm
H: 90 mm
D: 28 mm

**Radio Powr Savr wireless
wall/corner mount
occupancy/vacancy
sensor dimensions**
W: 46mm
H: 110mm
D: 34mm

Lutron Clear Connect
Wireless Signal **Sent**

Features
- Available in ceiling-mount, wall-mount, corner-mount
  and hallway options
- Lutron XCT signal processing technology greatly
  enhances the performance of PIR sensors, enabling them
  to "see" fine motions
- Utilises Lutron reliable Clear Connect RF technology to
  communicate wirelessly with wireless load controllers
- RF range: 9 m through walls
- 10-year battery life design

Benefits
- Front-accessible buttons make setup easy
- Sensors have simple test modes to verify ideal locations
  during installation

Models
Ceiling-mount
LRF3-OCR2B-P-WH—occupancy/vacancy sensor
Wall-mount
LRF3-OWLB-P-WH—occupancy/vacancy sensor
Corner-mount
LRF3-OKLB-P-WH—occupancy/vacancy sensor
Hallway
LRF3-OHLB-P-WH—occupancy/vacancy sensor
Accessories
L-CMDPIRKIT—ceiling-mount sensor lens masking kit

Step ③ Daylight sensor selection

Radio Powr Savr wireless daylight sensor

Design statement: Specify a wireless daylight sensor to dim or switch zones of light in response to available daylight.

Radio Powr Savr wireless daylight sensor dimensions
W: 41 mm
H: 41 mm
D: 17 mm

Features
• Utilises Lutron reliable Clear Connect RF technology to communicate wirelessly with wireless load controllers (remote-mount modules); a load controller can communicate with only 1 daylight sensor
• RF range: 9 m through walls
• Features Lutron reliable proportional daylight open loop control
• Has a light range (0-100,000 lux) and photopic response matches human eye
• Designed to give a linear response to changes in viewed light level
• 1 sensor is capable of switching and continuous dimming of multiple zones
• 10-year battery life

Benefits
• Simple calibration
• Multiple ceiling-mount methods available for different ceiling materials
• Front accessible test buttons make setup easy

Models
LRF3-DCRB-WH – daylight sensor

Lutron Clear Connect
Wireless Signal **Sent**

Step ④ Wireless control selection

Pico wireless controls

Design statement: Use a Pico wireless control anywhere in the space to control loads with a touch of a button.

Handheld

Pico wireless control dimensions
W: 66 mm
H: 33 mm
D: 8 mm

Tabletop

Single pedestal   **Double pedestal**

Wall-mount

Single-gang faceplate   **Double-gang faceplate**

Lutron Clear Connect
Wireless Signal **Sent**

Features
- Utilises Lutron reliable Clear Connect RF technology to communicate wirelessly with wireless load controllers
- RF range: 9 m through wall
- Available in multiple button configurations with options for preset and raise/lower buttons
- 10-year battery life

Benefits
- Easily add a new and/or additional point of control without the need for new wires
- Easy configuration for use as a handheld control, wall-mount control, or table top control with use of the optional pedestal

Models
Pico wireless controls
PK-2B-TXX-L01 – 2-button
PK-2BRL-TXX-L01 – 2-button with Raise/Lower
PK-3B-TXX-L01 – 3-button
PK-3BRL-TXX-L01 – 3-button with Raise/Lower
Pedestals
L-PED1-XX – Single pedestal
L-PED2-XX – Double pedestal
L-PED3-XX – Triple pedestal
L-PED4-XX – Quadruple pedestal
Accessories
LPFP-S1-TXX – Single-gang faceplate (plastic)
LPFP-S1-XX – Single-gang faceplate (metal)
LFGP-S1-XX – Single-gang faceplate (glass)
LPFP-S2-TXX – Double-gang faceplate (plastic)
LPFP-S2-XX – Double-gang faceplate (metal)
LFGP-S2-XX – Double-gang faceplate (glass)

XX in the model number represents colour/finish code

Visit**lutron.com/europe**

Step ⑤ Third-party integration control selection

PowPak contact closure output module

Design statement: A PowPak CCO module is designed for spaces where integration with third-party equipment through contact closures is desired.

PowPak contact closure output module dimensions
W: 72 mm
H: 87 mm
D: 32 mm

Features
- Single dry contact closure device
- Receives input from up to 9 Pico wireless controls, 6 Radio Powr Savr occupancy/vacancy sensors, and 1 Radio Powr Savr daylight sensor via Lutron reliable Clear Connect RF technology
- Voltage: 24 V AC/DC
- Maximum load of 1 A @ 24 VAC or 0.5 A @ 24 VDC; no minimum load required

Benefits
- Button-press programming to associate the module with the Radio Powr Savr sensors and Pico wireless controls

Mounting
- Module should be installed using the mounting tabs on the enclosure (screws not provided). Module can also be installed in a junction or marshalling box using the conduit nut provided. Consult local and national electrical codes for proper installation.
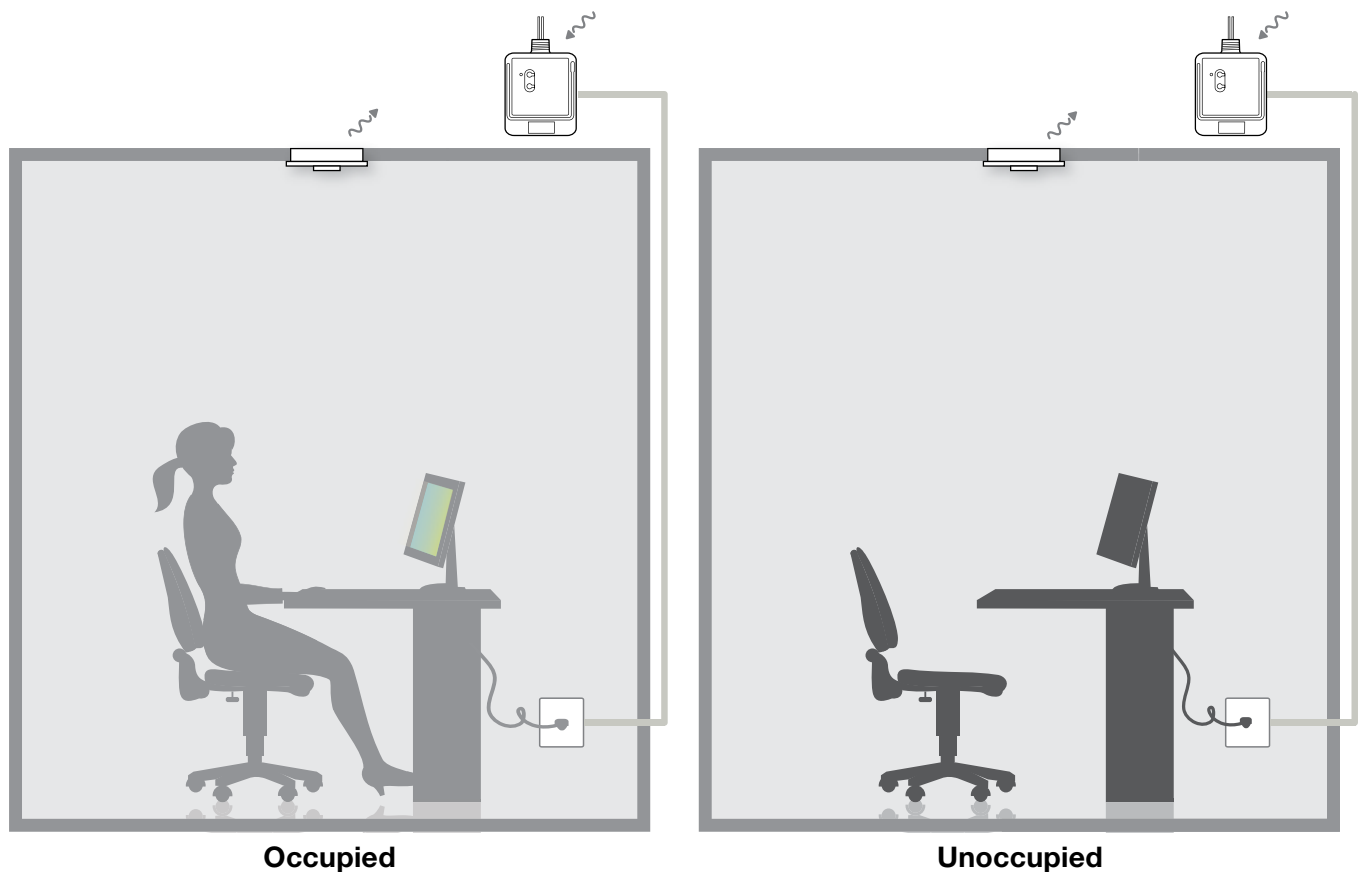
Models
RMK-CCO1-24-B – 1 contact closure output

Lutron Clear Connect
Wireless Signal **Received**

Energi TriPak — How it works

Plug load control by switching sockets

Plug loads, such as task lighting, computer monitors and printers, account for greater than 5% of commercial electricity usage[2]. By utilising the PowPak relay module with Softswitch and a Radio Powr Savr occupancy/vacancy sensor to switch receptacles, energy savings can be obtained. The occupancy/vacancy sensor communicates room occupancy wirelessly to the relay module. Based on the occupancy status received, the relay module switches the power on or off to the receptacles, reducing the amount of energy consumed.

Occupied　　　　　　　　　　　　　　　**Unoccupied**

Radio Powr Savr occupancy/vacancy sensor (ceiling-mount)

PowPak relay module with Softswitch

	Lutron Clear Connect
⌇➚	Wireless Signal **Sent**

	Lutron Clear Connect
⌇	Wireless Signal **Received**
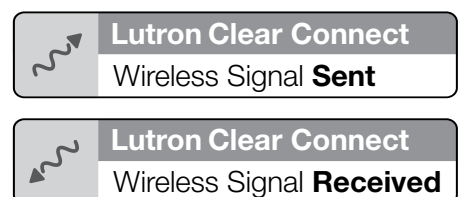
Energi TriPak — Concept drawings

Public bathroom – **switching, 1 zone**

Energy-saving strategies: Occupancy/vacancy sensing

Line Voltage
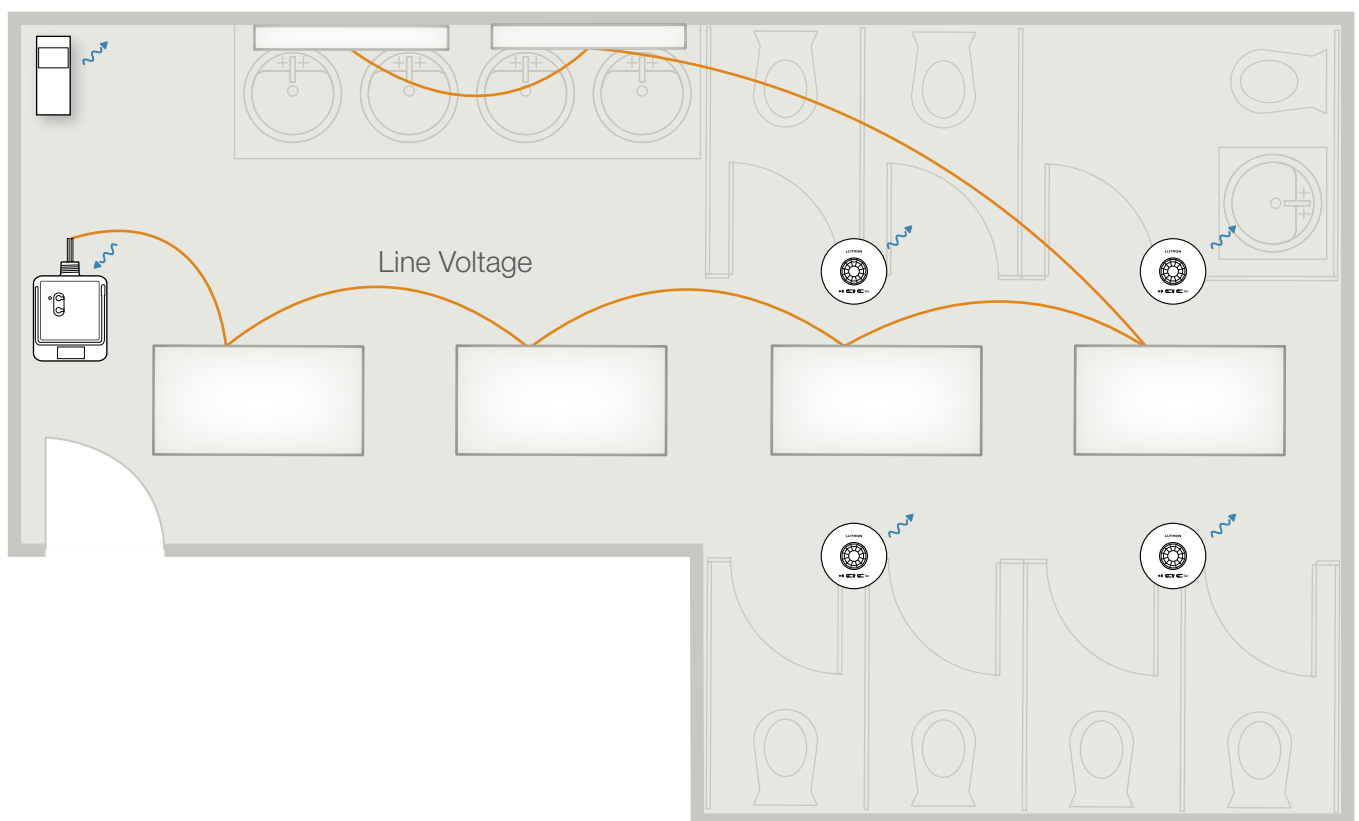
**PowPak relay module
with Softswitch**

**Radio Powr Savr
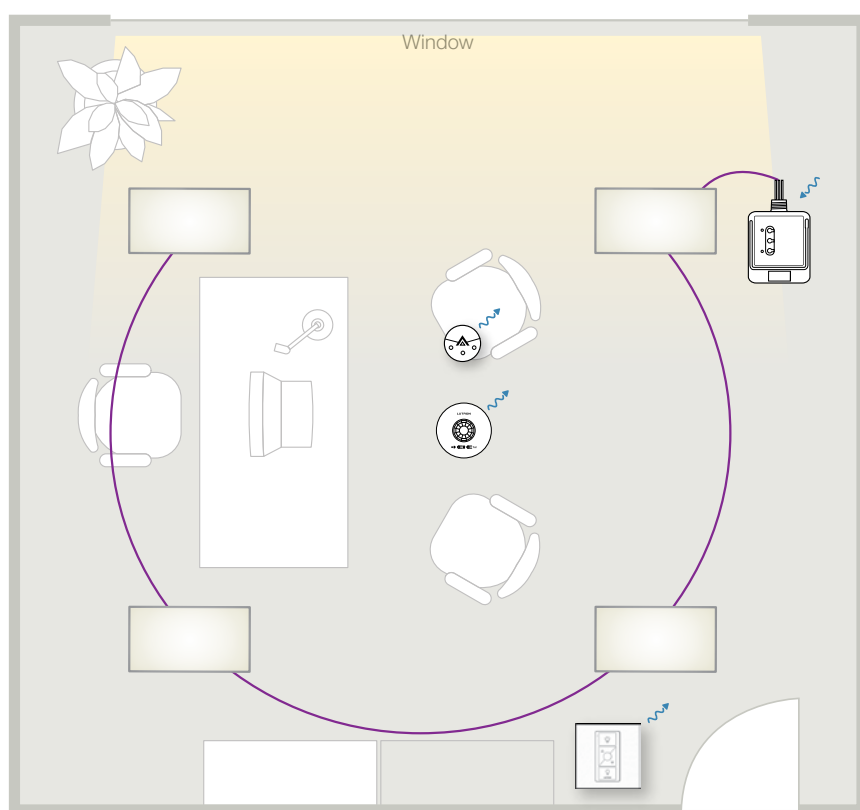occupancy/vacancy
sensor (corner-mount)**

**Radio Powr Savr
occupancy/vacancy sensor
(ceiling-mount)**

Private office – **dimming, 1 zone**

Energy-saving strategies: Occupancy/vacancy sensing, daylight harvesting, high-end trim, and personal dimming control

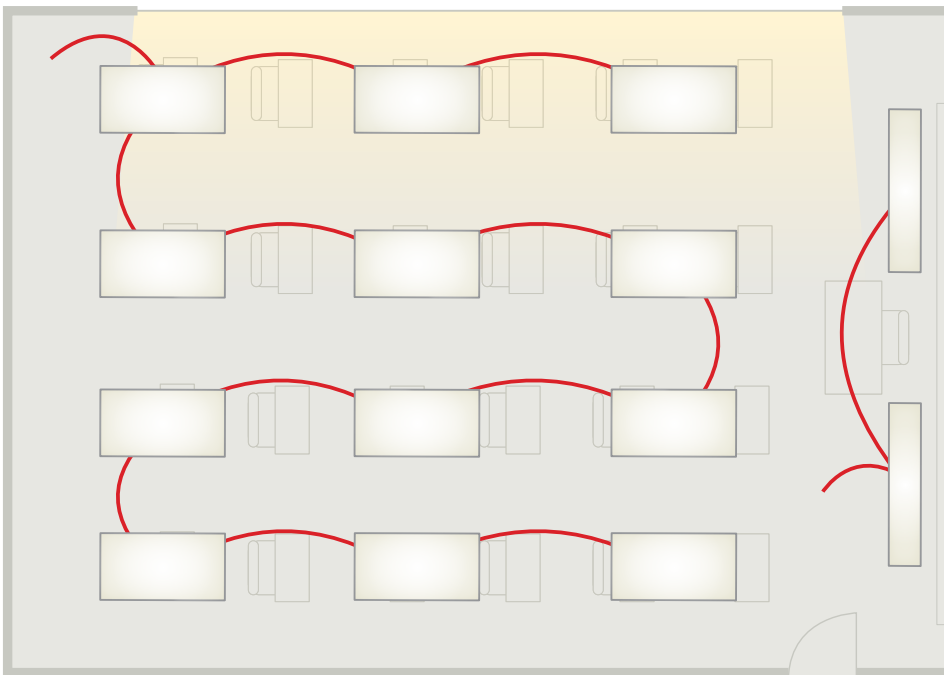**PowPak dimming module with 0-10V control**

Pico wireless control

Radio Powr Savr occupancy/vacancy sensor (ceiling-mount)

Radio Powr Savr daylight sensor

Classroom – **dimming, 2 zones**

Energy-saving strategies: Occupancy/vacancy sensing, daylight harvesting, high-end trim, and personal dimming control

Pico wireless controls

PowPak contact closure output module

PowPak 0-10V

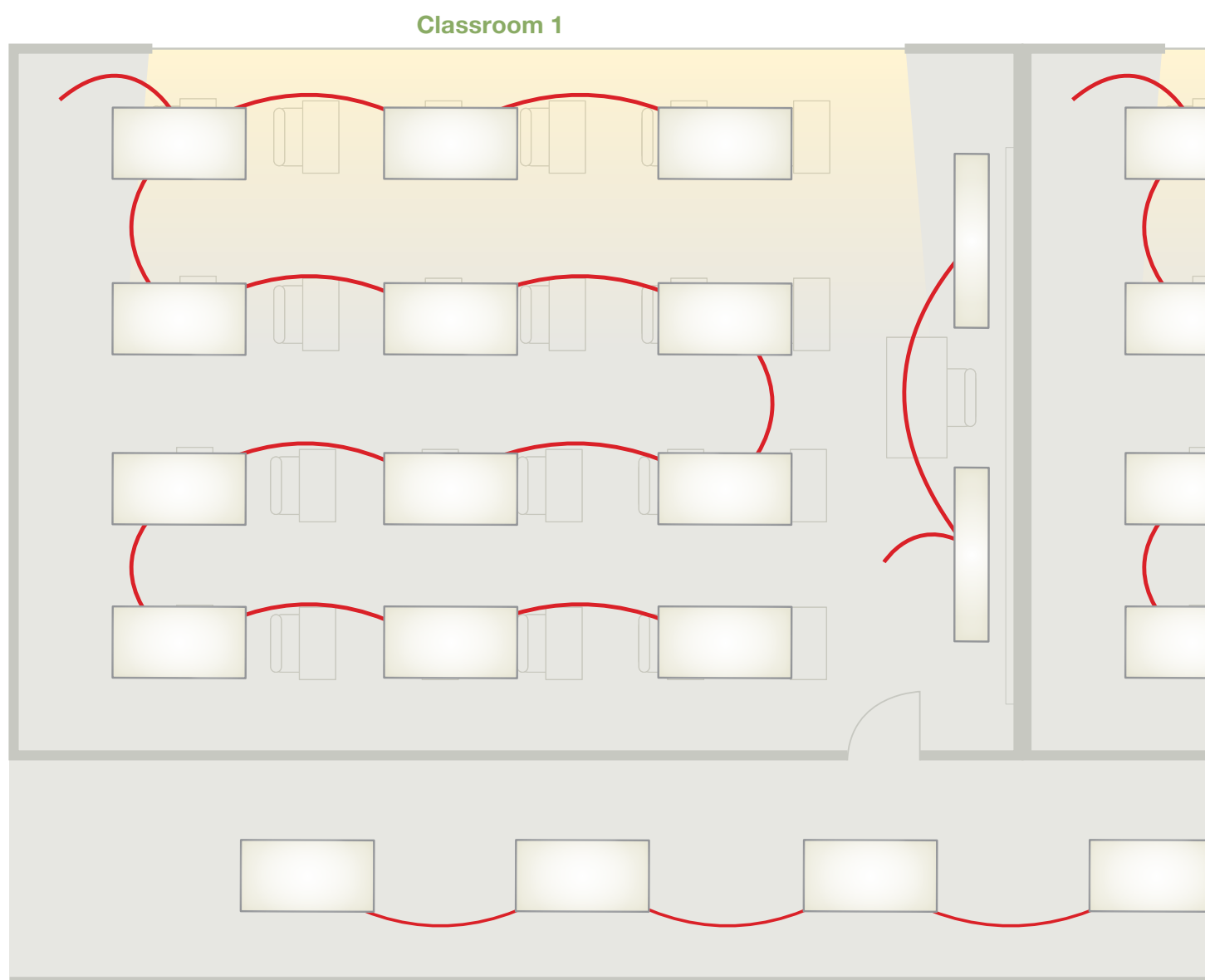**Radio Powr Savr occupancy/vacancy sensor (corner-mount)**

Radio Powr Savr daylight sensor

School: Classroom/hallway – **dimming, 4 zones**

Classroom energy-saving strategies: Occupancy/vacancy sensing, daylight harvesting, high-end trim, and personal dimming control
Hallway energy-saving strategies: Occupancy/vacancy sensing, and high-end trim
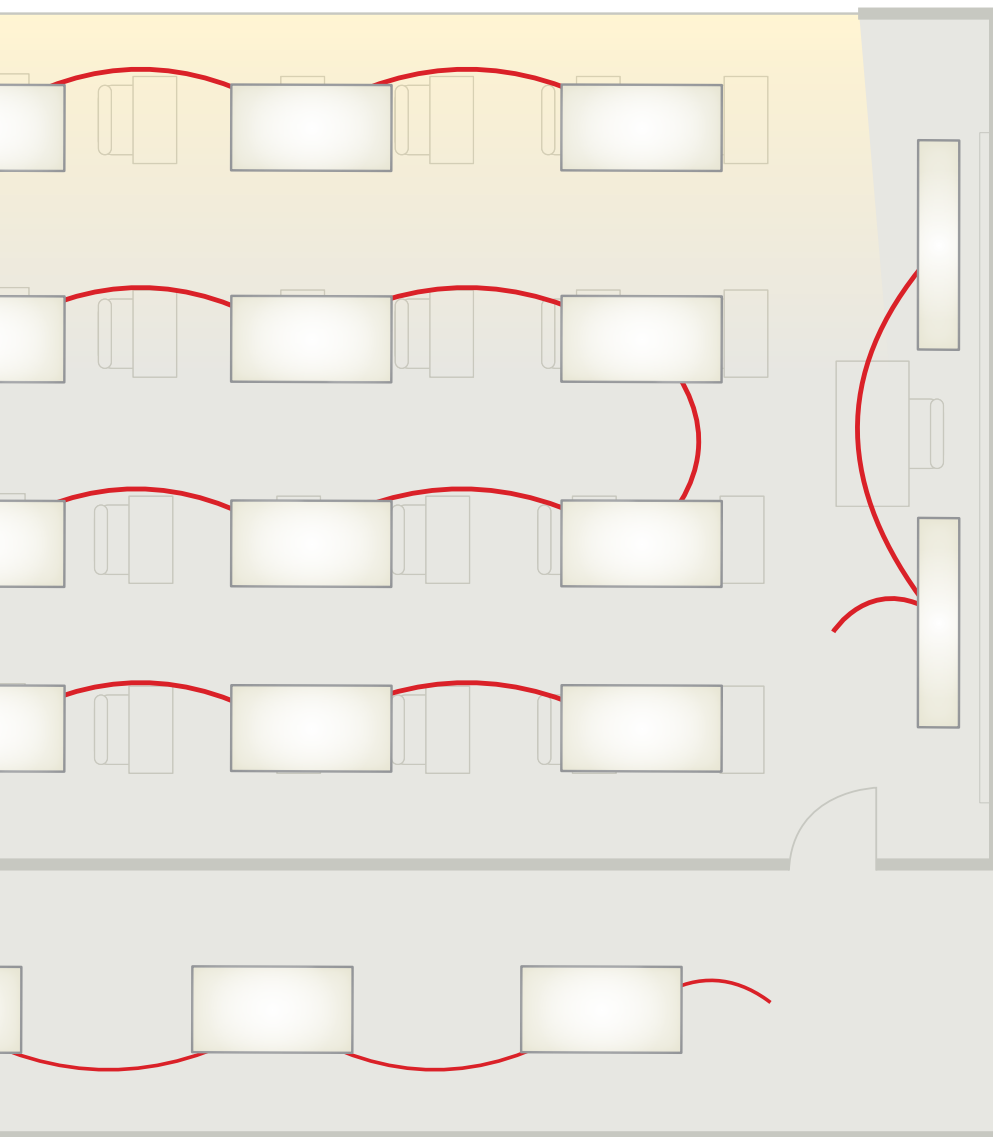
Classroom 1

Note: The occupancy sensors in the classroom also communicate with the hallway PowPak, ensuring that the corridor lighting remains on when the classrooms are in use.

PowPak contact closure output module

Classroom 2

Pico wireless controls

Radio Powr Savr occupancy/vacancy sensors (corner-mount and hallway)
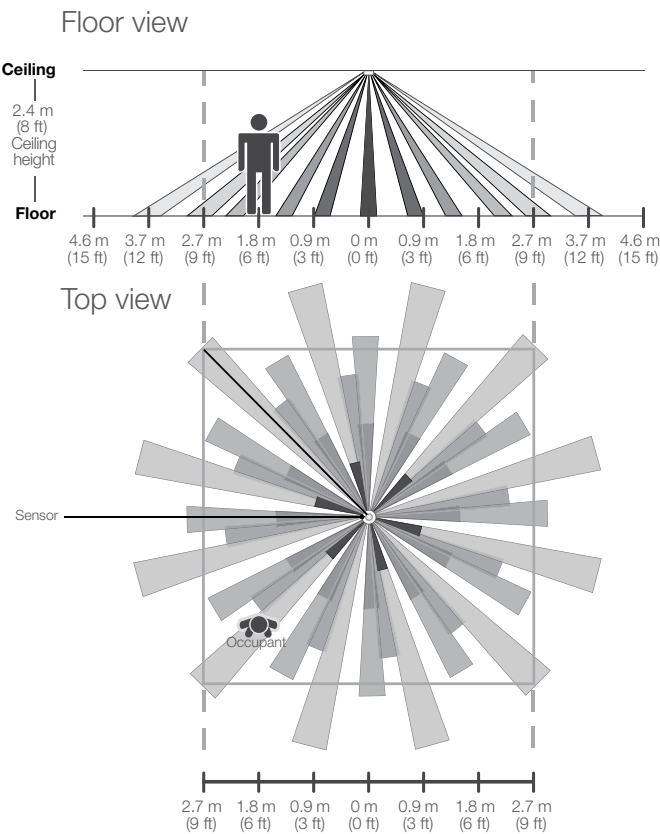
Radio Powr Savr daylight sensor

PowPak dimming 0-10V
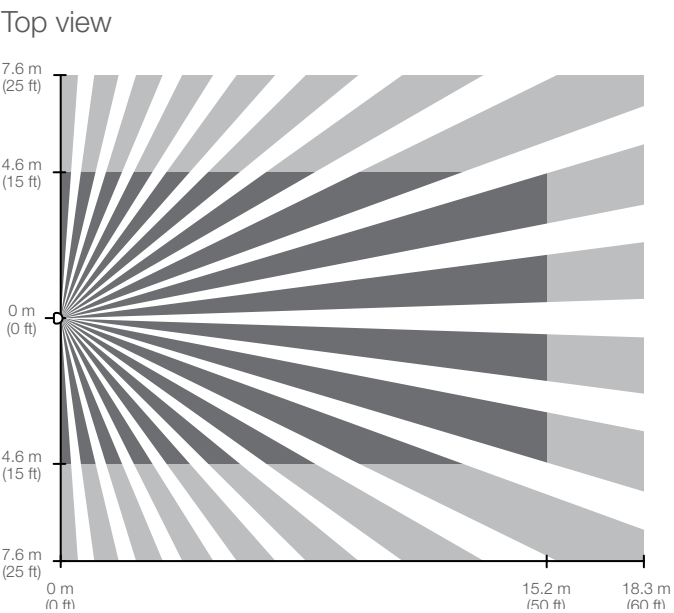
Energi TriPak — Sensor coverage diagrams

Ceiling-mount, 360°

Coverage varies by ceiling height

Floor view

Ceiling
2.4 m (8 ft) Ceiling height
Floor

4.6 m (15 ft) 3.7 m (12 ft) 2.7 m (9 ft) 1.8 m (6 ft) 0.9 m (3 ft) 0 m (0 ft) 0.9 m (3 ft) 1.8 m (6 ft) 2.7 m (9 ft) 3.7 m (12 ft) 4.6 m (15 ft)

Top view

Sensor

Occupant

2.7 m (9 ft) 1.8 m (6 ft) 0.9 m (3 ft) 0 m (0 ft) 0.9 m (3 ft) 1.8 m (6 ft) 2.7 m (9 ft)

Wall-mount*, 180°

139 m² (1,500 ft²)—minor motion;
279 m² (3,000 ft²)—major motion

Top view

7.6 m (25 ft)
4.6 m (15 ft)
0 m (0 ft)
4.6 m (15 ft)
7.6 m (25 ft)

0 m (0 ft) 15.2 m (50 ft) 18.3 m (60 ft)

Key:

  Minor motions

  Major motion

Ceiling-mount sensor coverage chart (for sensor mounted in center of room)

| Ceiling height	Max. room dimensions for complete floor coverage	Radius of coverage at floor
2.4 m (8 ft)	5.5 x 5.5 m (18 x 18 ft)	4.0 m (13 ft)
2.7 m (9 ft)	6.1 x 6.1 m (20 x 20 ft)	4.4 m (14.5 ft)
3.0 m (10 ft)	6.7 x 6.7 m (22 x 22 ft)	4.9 m (16 ft)
3.7 m** (12 ft)	7.9 x 7.9 m (26 x 26 ft)	5.8 m (19 ft)

* Sensor mounting shown at 2.1 m (7 ft) mounting height should be between 1.6 and 2.4 m (6 and 8 ft)
** 3.7 m (12 ft) is the maximum mounting height allowed

Corner-mount*, 90°

114 m² (1,225 ft²)—minor motion;
232 m² (2,500 ft²)—major motion
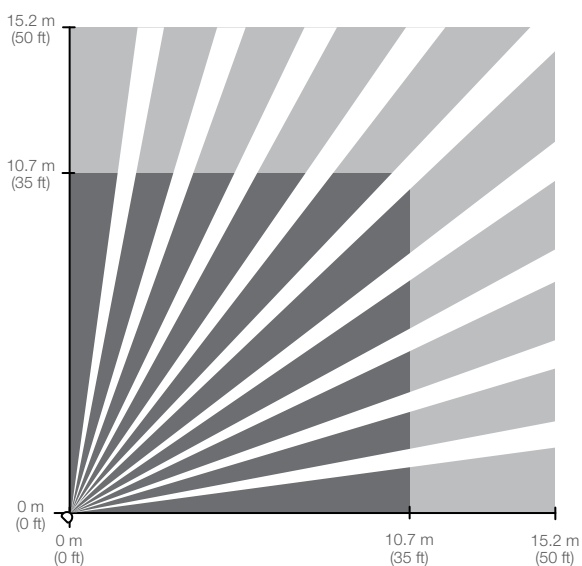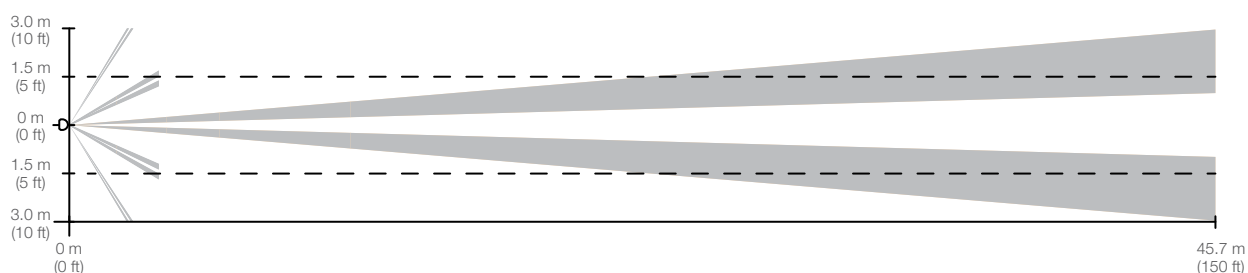
Top view

Hallway*, long narrow field of view

Coverage varies by hallway width and length

Top view

Hallway sensor maximum recommended length chart (sensor centered within hallway)

Width of hallway	Length of hallway
1.6 m or less (6 ft)	15.2 m (50 ft)
2.4 m (8 ft)	30.5 m (100 ft)
3.0 m or more (10 ft)	45.7 m (150 ft)

* Sensor mounting shown at 2.1 m (7 ft) mounting height should be between 1.6 and 2.4 m (6 and 8 ft)

Energi TriPak – Ordering information

Step ① Is control of overhead lighting required?

Model Number	Description
PowPak relay module	
RMK-5R-DV-B	5 A general purpose switch
RMK-16R-DV-B	16 A general purpose switch with Softswitch
PowPak dimming module with 0-10V control	
RMK-5T-DV	Controls up to 5A of 0-10V ballasts, LED drivers, or fixtures
PowPak dimming module with EcoSystem	
RMK-ECO32-DV-B	Controls up to 32 EcoSystem H-Series ballasts, EcoSystem LED drivers, and/or EcoSystem 5-Series LED drivers
Rania RF switch	
RS-SA05-B-FXX-M	Rania, RF switch, frameless
RS-SA05-B-IXX-M	Rania, RF switch, frame and insert faceplate
RS-SA05-B-BXX-M	Rania, RF switch, black frame/metal insert faceplate
Rania RF switch package	
RRF-SA05-B-FXX-M	(1) Rania RF switch (frameless) and (1) Radio Powr Savr ceiling-mount occupancy/vacancy sensor
RRF-SA05-B-IXX-M	(1) Rania RF switch (frame/insert faceplate) and (1) Radio Powr Savr ceiling-mount occupancy/vacancy sensor

Step ② Is occupancy/vacancy sensing required?

Model Number	Description
Radio Powr Savr occupancy/vacancy sensors	
LRF3-OCR2B-P-WH	Ceiling-mount, 360° field of view, occupancy/vacancy sensor
LRF3-OWLB-P-WH	Wall-mount, 180° field of view, occupancy/vacancy sensor
LRF3-OKLB-P-WH	Corner-mount, 90° field of view, occupancy/vacancy sensor
LRF3-OHLB-P-WH	Hallway occupancy/vacancy sensor
Accessories	
L-CMDPIRKIT	Ceiling-mount sensor lens masking kit

Step ③ Is daylight harvesting required?

Model Number	Description
Radio Powr Savr daylight sensor	
LRF3-DCRB-WH	Ceiling-mount daylight sensor

Step 4 Are personal or additional points of control required?

Model Number	Description
Pico wireless controls	
PK-2B-TXX-L01	2 Button
PK-2BRL-TXX-L01	2 Button with Raise/Lower
PK-3B-TXX-L01	3 Button
PK-3BRL-TXX-L01	3 Button with Raise/Lower

Accessories

LPFP-S1-TXX	Single-gang faceplate (plastic)	LPFP-S2-TXX	Double-gang faceplate (plastic)
LPFP-S1-XX	Single-gang faceplate (metal)	LPFP-S2-XX	Double-gang faceplate (metal)
LFGP-S1-XX	Single-gang faceplate (glass)	LFGP-S2-XX	Double-gang faceplate (glass)

L-PED1-XX	Pico wireless control single pedestal
L-PED2-XX	Pico wireless control double pedestal
L-PED3-XX	Pico wireless control triple pedestal
L-PED4-XX	Pico wireless control quadruple pedestal

Step 5 Is third-party equipment integration required?

Model Number	Description
PowPak contact closure module	
RMK-CCO1-24-B	(1) contact closure output

XX in the model number represents colour/finish code:
Pico wireless remotes texture colours — AW = Arctic White, BL = Black
Pedestal gloss colours — WH = White, BL = Black
Faceplate colours and metal finishes —
AW = Arctic White, MN = Midnight
BN = Bright Nickel, SN = Satin Nickel, BB = Bright Brass, SB = Satin Brass
CHW = Clear Glass, GWH = Green Glass

Rania RF switch and Rania RF switch packages matte and metallic colours – AW = Arctic White,
MC = Mica, AR = Argentum
Rania RF switch metal finishes — BB = Bright Brass, BC = Bright Chrome, BN = Bright Nickel,
AU = Gold, SB = Satin Brass, SC = Satin Chrome, SN = Satin Nickel,
QB = Antique Brass, QZ =Antique Bronze

For the full range of LED drivers, please refer to brochure:
5-Series LED driver with EcoSystem P/N 368-3390/EA

Sources

1 Bertoldi, P. et al. 2012. Energy Efficiency Status Report 2012. Joint Research Centre.

2 Compared with manual (non-automated) controls, up to 60% lighting energy savings is possible on projects that utilise all of the lighting control strategies (occupancy sensing, high-end trim, personal control, and daylight harvesting). Actual energy savings may vary, depending on prior occupant usage, among other factors.

3 Lutron study based on reduction in heating (base 60°) and cooling (base 55°) degree days with a 2° thermostat setback and 60% space un-occupancy. EnergyPlus modeling simulations were conducted and predicted similar savings.

4 Williams A, et al. 2012. Lighting Controls in Commercial Buildings. Leukos. 8(3) pgs. 161-180.

5 VonNieda B, Maniccia D, & Tweed A. 2000. An analysis of the energy and cost savings potential of occupancy sensors for commercial lighting systems. Proceedings of the illumination Engineering Society. Paper #43.

6 Reinhart CF. 2002. Effects of interior design on the daylight availability in open plan offices. Study of the American Commission for an Energy Efficient Environment (ACE) Conference Proceedings. To achieve maximum lighting savings, automated blinds are utilised.

7 Galasiu AD, et al. 2007 Energy saving lighting control systems for open-plan offices: A field study. Leukos. 4(1) pgs. 7-29.

8 Lutron commissioned study by Herrick Laboratories. University of Purdue. 2011.

9 Energy savings estimated based on 50% reduction of after-hours lighting energy waste. Source: VonNieda B, Maniccia D, & Tweed A. 2000. An analysis of the energy and cost savings potential of occupancy sensors for commercial lighting systems. Proceedings of the Illuminating Engineering Society. Paper #43.

10 Newsham GR & Birt B. 2010. Demand-responsive lighting: a field study. Leukos. 6(3) pgs. 203-225.

11 Ecos. 2011. Commercial office plug load savings assessment. California Energy Commission PIER Program.

12 Lutron study based on reduction in heating (base 60°) and cooling (base 55°) degree days with a 2° thermostat setback and 60% space un-occupancy. EnergyPlus modeling simulations were conducted and predicted similar savings.

UNITED KINGDOM — LONDON

Lutron EA Ltd.
Lutron House
6 Sovereign Close
London, England E1W 3JF
Phone: +44.207.702.0657
Toll Free (In-country only): 0800.282.107
Fax: +44.207.480.6899

GERMANY — BERLIN

Lutron Electronics GMBH
Phone: +49.309.710.4590
Toll Free (In-country only): 0800.181.5134

SPAIN — BARCELONA

Lutron CC, SRL
c/ Herzegovina, 3. Local 2
Barcelona, Spain 08021
Phone: +34.93.222.1180
Toll Free (In-country only): 900.948944

RUSSIA — MOSCOW

Lutron Electronika
Ul. Pravdy, 8-13
125040
Moscow, Russia
Phone: +7.495.649.6094

FRANCE — PARIS

Lutron LTC.
10, rue du Colisée
75008 Paris, France
Phone: +33.1.56.59.16.64
Toll Free (In-country only): 0800.901218

ITALY — MILAN

Lutron LDV S.r.l
Phone: +39.800.979.208
Toll Free (In-country only): 800.979.208

SPAIN — MADRID

Lutron CC, ltc
Calle Orense 85,
Madrid, Spain 28020
Phone: +34.915.678479
Toll Free (In-country only): 900.948944

☀LUTRON®

www.lutron.com/energitripak