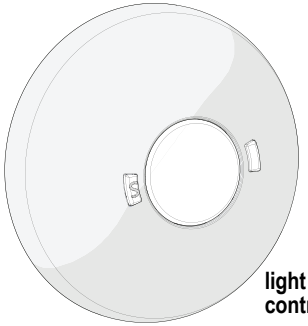
ETC Installation Guide

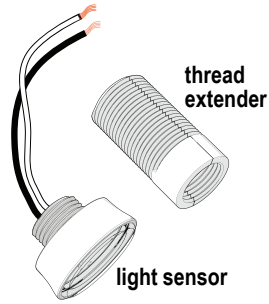
Unison Paradigm® Light Sensor

Overview

The Unison Paradigm® Light Sensor provides light level measurement to the connected Paradigm control system. The control system receives the measurements to maintain a programmed lighting output in both dimmed and switched lighting systems.



light sensor with controller



The Paradigm Light Sensors are available in three models:

- **P-LS** - Light Sensor with Controller
- **P-LSC** - Light Sensor Controller Only
- **P-LSH** - Light Sensor Only

Each controller supports an individual pair of Light Sensors and is available in neutral white or black finish.

A light sensor may be installed within the controller or installed remotely, using up to 1,000 feet (304m) of 16 AWG wire per controller. When using a pair of light sensors, both sensors transmit their light readings to a single controller which provides an averaged reading to the connected Paradigm control system.

Wire Specification

Controller

The Paradigm Light Sensor utilizes LinkConnect to power the sensor and to provide data to and from the connected Paradigm control system.

LinkConnect is topology-free and polarity independent. You can install your data runs in any desired combination of bus, star, loop, and home-run. ETC recommends using Belden 8471 (or equivalent) wire. The total combined length of a LinkConnect wire run may not exceed 1,640 feet (500m), with a maximum distance of 1,312 feet (400m) between any two devices.

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All control wiring should be installed and terminated by a qualified installer, should follow standard wiring installation practices, and meet local codes. Leave approximately 10 inches (254mm) of wiring in the junction box or tied back in the ceiling to allow for wiring connections and future service needs.

Note: *ETC requires that all stations be grounded by using a 14 AWG (2.5mm^2) ESD drain wire.*

Remoting the Light Sensor

The Paradigm Light Sensor Controller provides termination for up to two light sensors. Each light sensor must be separately wired to the controller using no more than 1000 feet (304m) of 16 AWG wire total per controller. These wire runs must remain separate from LinkConnect wiring. ETC recommends using Belden 8471 (or equivalent) wire.

Installation Environment

The Paradigm Light Sensor Controller is intended for installation to a finished ceiling surface, soft ceiling tile, attached to a round fixture junction box or single-gang RACO switch box. The controller operates in ambient temperatures of 0°C to 40°C, non-condensing humidity.

The Paradigm Light Sensor can be mounted directly in the controller, installed to a 1/2" conduit knockout or installed into a soft ceiling tile using the provided light sensor thread extender. The light sensor can be installed outdoors when mounted to a weatherproof enclosure. The sensor in this weatherproof installation scenario operates in ambient temperatures of -25°C to 70°C.

Parts and Supplies

The following parts and supplies are included with the specific Paradigm Light Sensor assembly ordered:

Parts and Supplies	Light Sensor complete unit (P-LS)	Light Sensor only (P-LSH)	Light Sensor Controller only (P-LSC)
soft ceiling tile adaptor	X		X
LinkConnect and ground wire pigtails	X		X
light sensor thread extender	X	X	
3 position WAGO connectors	X		X
2 position WAGO connectors		X	
1 each nuts and washers 3/4" and 1"	X	X	
2 each screws 6-32 x 3/4" and 1 3/4"	X		X
blank sensor head	X		X

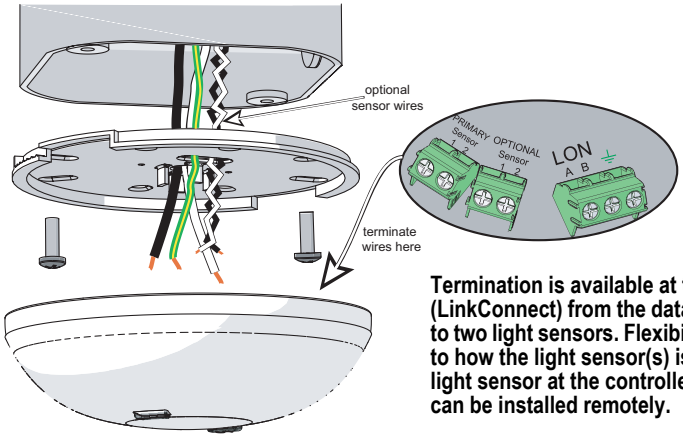
Installation

The Paradigm Light Sensor is provided with a twist-lock mounting plate that can be mounted to a finished ceiling, junction box, or soft ceiling tile. Determine the installation method and follow the specific instructions detailed.

- *"Junction Box Installation"* on page 3
- *"Soft Ceiling Tile Installation"* on page 5
- *"Installing the Light Sensors Remotely (optional)"* on page 6

Note: *The LinkConnect pigtail and WAGO connectors provided are only required when the sensor and controller are installed in series with other sensors. If you are not continuing the data run, direct termination is recommended on the sensor control board.*

Junction Box Installation

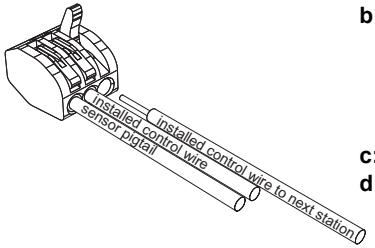


Termination is available at the controller for LON (LinkConnect) from the data source (Paradigm), and up to two light sensors. Flexibility is provided with regards to how the light sensor(s) is installed. You can install a light sensor at the controller or up to two light sensors can be installed remotely.

Step 1: Pull Belden 8471 (or equivalent) and 14 AWG (2.5mm^2) ground wire to the junction box.

Step 2: **If you are installing the controller in series** with other sensors, sensor controllers, or stations (continuing the data run), use the provided LinkConnect pigtail, ESD ground pigtail and WAGO connectors to make the terminations. **If you are not continuing the data run**, proceed to step 4.

Note: *Primary Sensor and Optional Sensor wires should terminate directly to the terminals located on the controller. See "Installing the Light Sensors Remotely (optional)" on page 6.*



a: Strip 3/16" (5mm) of insulation from each installed LON wire.

b: Open the three terminal levers on a WAGO connector and insert the installed (typically black) Belden 8471 LinkConnect wire, the black lead from the sensor pigtail, and the continuing Belden 8471 (typically black) wire into the terminals.

c: Close the levers onto the wires.

d: Repeat the above for the installed (typically white) Belden 8471 LinkConnect wire and the remaining pigtail from the sensor, as well as the ESD ground wires using a new WAGO connector and the ground pigtail for each termination type.

Step 3: **If you are installing the primary and/or optional second light sensor remotely** from the controller, reference *"Installing the Light Sensors Remotely (optional)"* on page 6, then return to these instructions. If you are not remoting a light sensor, proceed to step 4.

Step 4: Orient the smooth side of the mounting plate to the junction box and pull each run of Belden 8471 (LON and remote sensor wires) and the 14 AWG (2.5mm^2) ESD drain wire from the junction box through the provided holes near the center of the mounting plate.

Step 5: Secure the mounting plate to the junction box using the screws provided (both short and long screws are included for convenience).

Step 6: Strip each wire 5/16" (8mm) and terminate the white, black, and green (ground) wires to the LON terminal block located on the sensor control board. Torque each termination to 3.1-3.5 in-lb.

a: Terminate the white incoming wire to terminal A.

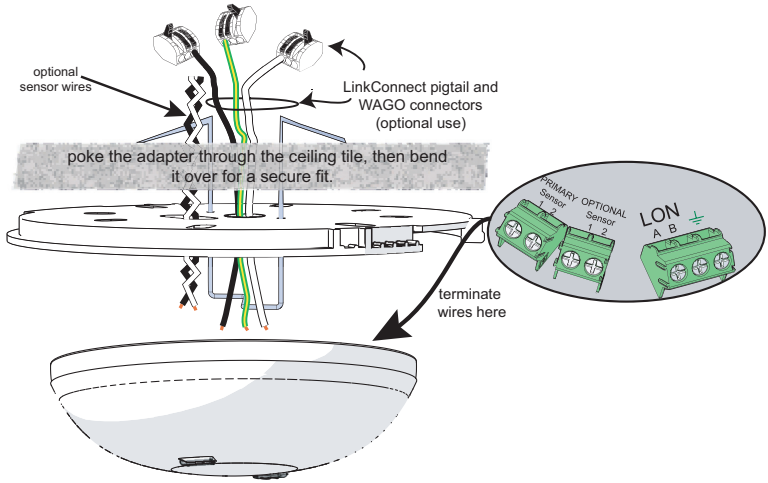
b: Terminate the black incoming wire to terminal B.

c: Terminate the green wire to the labeled ground terminal.

Step 7: **If the primary or an optional second light sensor is installed remotely** from the controller, reference *"Installing the Light Sensors Remotely (optional)"* on page 6 for termination instructions, then return to these instructions. Otherwise, proceed to step 8.

Step 8: Attach the sensor to the mounting plate by aligning the tabs on the sensor with the slots on the mounting plate, then twist clockwise until the two are locked into place.

Soft Ceiling Tile Installation

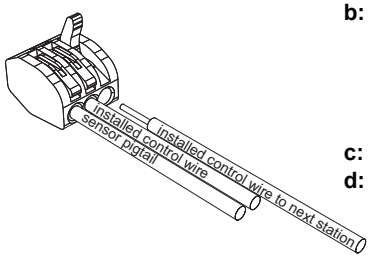


Step 1: Pull the Belden 8471 (or equivalent) and 14 AWG (2.5mm^2) ground wire to the installation location.

Step 2: Orient the smooth side of the mounting plate to the ceiling tile and insert the soft ceiling tile adaptor through the two small holes near the center of the mounting plate.

Step 3: Poke the tines through the ceiling tile, then bend each tine over in opposite directions for a secure fit.

Step 4: **If you are installing the sensor in series** with other sensors or stations (continuing the data run), use the provided LinkConnect pigtail, ESD ground pigtail and WAGO connectors to make the terminations. **If you are not continuing the data run**, proceed to step 5.



a: Strip 3/16” (5mm) of insulation from each installed wire.

b: Open the three terminal levers on a WAGO connector and insert the installed (typically black) Belden 8471 LinkConnect wire, the black lead from the sensor pigtail, and the continuing Belden 8471 (typically black) wire into the terminals.

c: Close the levers onto the wires.

d: Repeat the above for the installed (typically white) Belden 8471 LinkConnect wire and the remaining pigtail from the sensor, as well as the ESD ground wires using a new WAGO connector for each termination type.

Step 5: **If you are installing the primary and/or optional second light sensor remotely** from the controller, reference *"Installing the Light Sensors Remotely (optional)"* on page 6, then return to these instructions. If you are not remoting a light sensor, proceed to step 6.

Step 6: Create a hole for wire pass-through in the ceiling tile by poking through the center hole or oblong hole of the mounting plate, then pull the wires through.

Step 7: Strip each wire 5/16" (8mm) and terminate the white, black, and green (ground) wires to the **LON** terminal block located on the controller board. Torque each termination to 3.1-3.5 in-lb.

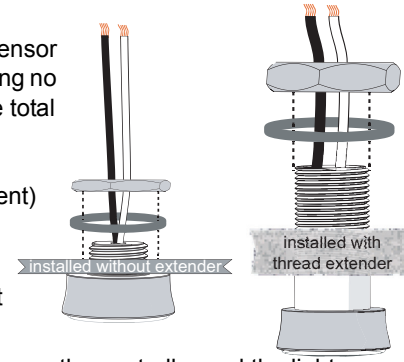
- **a:** Terminate the white incoming wire to terminal A.
- **b:** Terminate the black incoming wire to terminal B.
- **c:** Terminate the green wire to the labeled ground terminal.

Step 8: **If you are installing the primary and/or optional second light sensor remotely** from the controller, reference *"Terminating Remote Light Sensor Control Wiring"* on page 7, then return to these instructions. If you are not remoting a light sensor, proceed to step 9.

Step 9: Attach the controller to the mounting plate by aligning the tabs on the controller with the slots on the mounting plate, then twist clockwise until the two are locked into place.

Installing the Light Sensors Remotely (optional)

Two light sensors may be connected to the controller and installed remotely. Each light sensor must be separately wired to the controller using no more than 1000 feet (304m) of 16 AWG wire total per controller. These wire runs must remain separate from LinkConnect wiring. ETC recommends using Belden 8471 (or equivalent) wire.



Step 1: Prepare a hole in the sensor installation location (3/4" hole without adapter or 1" with adapter).

Step 2: Run Belden 8471 (or equivalent) between the controller and the light sensor installation location.

Step 3: **For a soft ceiling tile installation**, pull the light sensor wire leads through the thread extender, then attach the thread extender onto the light sensor.

Step 4: Insert the light sensor through the prepared installation location. This should be done from the finished side of the installation location to the unfinished side (ceiling).

Step 5: Thread the appropriate washer and nut (two sizes included) onto either the light sensor or extension adaptor (if used), securing it in place.

Terminating Remote Light Sensor Control Wiring

Termination is available at the controller for up to two light sensors (labeled “Primary Sensor” and “Optional Sensor”). When remote light sensors are installed, follow these instructions to terminate the control wiring at both the light sensor and the controller. Torque each termination to 3.1-3.5 in-lb.

Step 1: Terminate the incoming wire **from the controller to the light sensor leads** using the WAGO cage clamp connectors (provided).

- **a:** Strip 3/8” (9-10mm) from the ends of each wire (both light sensor lead and the and wires from the controller).
- **b:** Open the terminal levers on the WAGO connector and insert the installed (typically black) Belden 8471 incoming wire and the black lead from the light sensor.
- **c:** Close the levers onto the wires.
- **d:** Repeat for the installed (typically white) Belden 8471 wire and remaining wire lead using another WAGO connector.

Step 2: Terminate the incoming wire pairs **from the remote light sensors to the controller**.

- **a:** At the controller, strip 3/16” (5mm) of insulation from the ends of each installed light sensor wire.
- **b:** Using a small 1/8” (3,35mm) flat blade or #1 Phillips screwdriver, loosen the terminals on the ‘Primary Sensor” and ‘Secondary Sensor’ connectors found on the underside of the controller.
- **c:** Insert the black (typical) wire from the first light sensor wire pair into terminal ‘1’ of the ‘Primary Sensor’ connector.
- **d:** Insert the white (typical) wire from the first light sensor wire pair into terminal ‘2’ of the ‘Primary Sensor’ connector.
- **e:** Repeat this process for the second wire pair to the ‘Optional Sensor’ connector.

Power Up and Test

Power Up

For power to be applied to the Paradigm Light Sensor, any additional LinkConnect terminations for the system must also be made. In addition, the Paradigm Architectural Control Processor (P-ACP) and Station Power Module (P-SPM) must be installed in the host DRd or ERn rack enclosure.

Identify Number of Connected Remote Sensors

The controller termination board includes an LED, labeled ‘Sensor Count’ that blinks according to the number of remote sensors installed. As needed, refer to this LED to ensure the system has been wired properly and the controller has properly detected the correct number of connected light sensors.

Binding Sensors to Paradigm

The Paradigm Architectural Control Processor (P-ACP) to which this sensor is physically wired to must learn, or be told, the station hardware address (known as a neuron ID). When the sensor is unbound from the connected P-ACP, the service pin LED blinks.

The neuron ID is labeled on the sensor control board and can be manually entered into the configuration using LightDesigner software. Alternatively, the sensor can be identified using the service pin button (designated with “S” on the button) and by the connected Paradigm ACP using its [LonWorks Connections] menu. Reference the related source documentation, either the *LightDesigner Online Help System* or the *Unison Paradigm Architectural Control Processor Configuration Manual*; specifically the section on Arch Setup Menu, LonWorks Connections.

Record a Target Lighting Value

The Paradigm Light Sensor includes a button that by default provides recording of target lighting values for its dimming daylight harvesting feature. Pressing the record button enables a five second timer and illuminates the LED red. When the timer expires, the measured light level is stored as the amount of desired light that the connected Paradigm control system should maintain, and the red LED blinks twice to confirm.