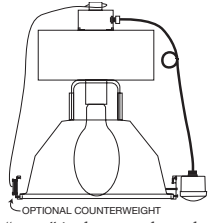


# PIP-201/202 Fiber Optic Motion Sensor Installation Notes

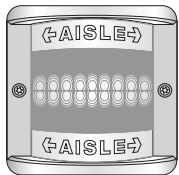
## CAUTION

- Read and understand these instructions prior to starting installation.
- **TURN THE POWER OFF** before installation. Live installation is hazardous to you and can damage the motion sensor.
- Capacitor charge storage in a de-powered light fixture can be lethal. Only qualified personnel familiar with high voltage should install this motion sensor.
- This product must be installed in accordance with applicable electrical codes and regulations pertinent to the city of installation.

### MOUNTING SENSOR TO FIXTURE:

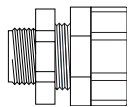


The PIP motion sensor is intended to mount on the rim of the reflector using the pinch bracket included in the shipping carton. This bracket holds the sensor in the shadow of the reflector, thus shielding it from the effects of heat and UV light from the hot lamp. Bundle any excess STOW cable with the wire tie provided and "store" it close to where the wire enters the ballast housing.



The motion sensor's cover is marked with **← AISLE →** to indicate the correct orientation of the Fresnel lens relative to the walkway below. If the **← AISLE →** arrows do not align with the walkway the effective range of the sensor is reduced and it may false-trigger on adjacent aisles.

### ATTACHING HARNESS TO BALLAST HOUSING:



**UL Requirement for Strain Relief.** The Underwriters Laboratories listing for this product requires that the wire harness be strain relieved where it enters the ballast housing. The following cord grips are approved for this application:

**www.remke.com** (877)438-8833  
Part No. RSR5-107 (metallic)  
Part No. RSP-107 (non-metallic)  
**www.sealconusa.com** (303)699-1135  
Part No. CD16NR-BK (non-metallic)

Bushings intended for use with metallic flexible conduit are not suitable for this application, nor are connectors intended for Type NM "Romex" wire.

**DayBrite and Widelite Fixtures:** Die-cast aluminum ballast housings from DayBrite and Wide-Lite feature an internal wiring compartment covered by a detachable access door. The motion sensor's wire harness should pass through this door using an approved cord grip.

Alternatively, motion sensors with part numbers suffixed -D are shipped from Viewpoint with a DayBrite access door and strain relief pre-installed.

DayBrite's EHO Series fixtures with sheet metal ballast housings are wired through the concentric knock-outs of the top-mounted wiring box using a cord grip.

**Hubbell Fixtures:** Hubbell's die-cast ballast housings are offered with a Slick-ON pendant mounting box suffixed -SO. Located above the ballast clamshell, the SO box has knock-outs that accept a cord grip and the sensor's wire harness.



**Cooper Fixtures.** Cooper's die-cast ballast housings are offered with a -QD suffixed mounting box that will accept a cord grip and the sensor's wire harness. Cooper's "Steeler" fixtures with sheet metal ballast housings are wired through knock-outs in the top-mounted wiring box.

**Lithonia Fixtures.** Lithonia's die-cast ballast housings are offered with a -TOB Thru-Wire Outlet Box that will accept a cord grip and the sensor's wire harness.

**Why so many screws on the pinch bracket claw?** The pinch bracket claw can be flipped upside down depending on the reflector design. Choose the claw width that best fits the thickness of your reflector rim. The longer screws in the claw can provide a tighter pinch to the upper edge of the reflector or better vertical alignment of the motion sensor.

**Acrylic Refractors - CAUTION:** Over-tightening the pinch bracket screws on an acrylic refractor can cause stress cracks to form in the refractor months after installation.

**Wire Harness Options:** The wire harness for PIP motion sensors is available with either wire leads (-H suffix on the part number) or terminated with an access plate and Molex connector (-D suffix on the part number).

The access plate and Molex connector are plug 'n' play compatible with bi-level HID fixtures manufactured by Genlyte's DayBrite and Widelite divisions.

**Fixture Compatibility:** PIP-201/202 is compatible only with HID fixtures shipped with a dual-section capacitor or field-retrofitted with one. This capacitor must be sized (voltage and capac-

itance) in accordance with recommendations of the fixture or ballast manufacturer. Consult schematic on ballast transformer.

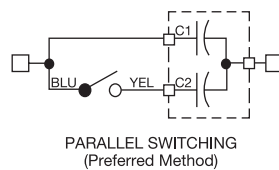
**Why is the fixture's dim step nearly full brightness?** When the capacitor is properly sized the dim step is 50% of the full-brightness power level. However, the human eye's logarithmic response sees this as only a modest reduction in lamp brightness. Deeper dimming is possible with alternate cap values but this is operation is not recommended due to shortened lamp life.

**Where can I purchase dual-section capacitors?** From the fixture's manufacturer or Parallax Power Capacitor (formerly MagneTek Capacitors) [www.parallaxpowercap.com](http://www.parallaxpowercap.com)

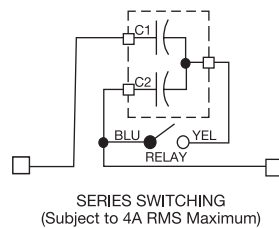
Viewpoint Electronics does not sell HID capacitors and they are generally not stocked by local electrical distributors.

**Can I use two single-section caps instead of one dual-section cap?** Yes, but determine whether the ballast housing has sufficient room and hold-down clamps for two caps.

### Parallel vs. series cap switching methods.



PARALLEL SWITCHING  
(Preferred Method)



SERIES SWITCHING  
(Subject to 4A RMS Maximum)

The choice of microfarads and voltage rating for the dual cap is based on whether it is used in the series or parallel configuration. Cap values, voltages, and physical sizes are different for each method even though they yield the same lamp dimming. Your cap vendor may stock both cap styles for a given fixture type.

The PIP motion sensor will work with either method (4 amps maximum relay switching current) but parallel connection is preferred. Parallel

connection results in lower switching currents and (usually) physically smaller capacitors. Determine whether your choice of cap fits in the ballast housing!

The series switching method shorts one of the two capacitor sections with a relay closure in the sensor, resulting in maximum microfarads and full brightness mode. The parallel switching method parallels two capacitor sections via a relay closure in the sensor, resulting in maximum microfarads and full brightness mode.

**What are the indications that my dual-section cap is sized incorrectly?** The lamp may extinguish when the dimmed step is selected. Damage to the ballast transformer, capacitor, and/or motion sensor may result from wrong capacitor choice. The lamp life may be shortened. Poor power factor may result in little or no energy savings despite dimmed lamp operation.

**TEST SWITCH HERE dot.** The motion sensor contains a manual override switch that is activated by placing a strong permanent magnet near the red TEST SWITCH HERE dot on the enclosure. A pocket magnet is usually sufficiently strong but a flexible refrigerator magnet is not. The override magnet causes the relay to change state with an audible "click". Using the override magnet zeroes-out whatever time remains in the lamp warm up and TIME timer intervals.

**Blinking Red Diagnostic Lamp.** The sensor contains a red LED behind the Fresnel lens that "blinks" three diagnostic patterns. The triple-blink pattern indicates observed motion.

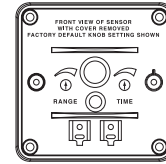
Pattern	Motion Observed	Fixture State
Single	No	Low Brightness
Double	No	High Brightness
Triple	Yes	High Brightness

**Lamp Warm-up Interval.** When power is first applied to the fixture the sensor's relay is closed for 15 minutes, even in the absence of observed motion. This period is unaffected by the setting of the TIME adjustment and can be terminated only with the TEST SWITCH HERE magnet.

The lamp warm-up interval forces the high brightness mode for 15 minutes in accordance with the manufacturer's recommendations for achieving rated lamp life. For this reason, operation of a dimmable HID fixture without its sensor connected is not recommended and may shorten lamp life.



**Range Adjustment.** As shipped from the factory, the RANGE setting is preset for half scale and is appropriate for most applications. Sensor range is influenced by the temperature of the floor below the sensor. A warm floor reduces IR contrast and range. A lower RANGE setting is indicated if motion in adjacent aisles false-triggers the sensor. Higher RANGE settings give better IR sensitivity but may result in false-triggering from moving air blown from ceiling-mounted HVAC equipment.



**Can I obtain a different Fresnel lens pattern?** No, the PIP sensors are shipped with a Aisle and Area Lens that should accommodate most applications.

**What if the sensor's weight tilts my high bay fixtures slightly?** Some fixture hook configurations allow slight tilting to occur. Contact Viewpoint Electronics to obtain counterweight part number PCW.

### FIBER OPTIC NETWORKING NOTES

**What features are offered by the fiber optic versions of PIP?** Some members of the PIP family of motion sensors are available with connectors that accept industry-standard jacketed plastic optical fiber with 1.0mm core. The fiber allows sensors to communicate with each other and with the PSP-101/102 Fiber Optic Switch Packs to create control zones within aisles.

**Why is plastic optical fiber better than low-voltage copper wiring used in control systems offered by other manufacturers?** Fiber can be used in retrofit jobsites without conduit. The optical fiber can be secured to the outside of conduit using ordinary wire ties. Optical fiber is non-conductive and provides a safe method for interconnecting high voltage fixtures wired to different AC phases

**Why are PIP's fiber connectors color coded?** The black connector receives signals from upstream devices. The blue connector transmits signals to downstream devices. Simply stated, blue connectors "talk" to black connectors.

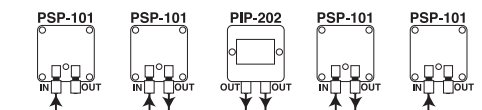
Two blue connectors or two black connectors should never be fibered to each other.

**What is the white dummy plug inserted in the black fiber connector?** As shipped from the factory, the black connector is plugged with a removable white plastic pin to facilitate testing. Without a fiber or pin inserted in the black connector, the PIP device may give erratic behavior due to stray light.

**Is there a limitation on the maximum number of PIP fiber devices in each aisle?** No. Each fiber optic zone must have at least one motion sensor. A zone may include any number of switch packs—even zero. The signal emitted by a blue connector is regenerated at full intensity and clarity compared to the attenuated signal arriving on the black connector, hence there is no maximum aisle length.

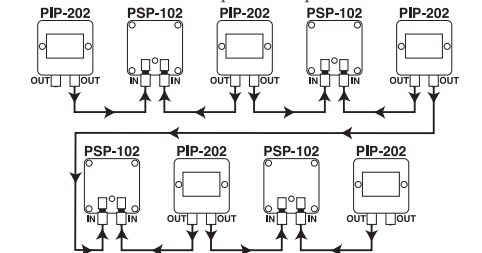
However, the spacing between PIP devices is limited to 200 feet—possibly less if you are a sloppy fiber terminator. (See comments on next page about clean fiber termination.)

**Why does the PIP-202 motion sensor have two blue connectors but no black one?** The PIP-202 is intended for creating motion sensor-centric aisle zones that look like this:



PIP-202 IN A FIVE-FIXTURE ZONE WITH SINGLE-INPUT SWITCH PACKS

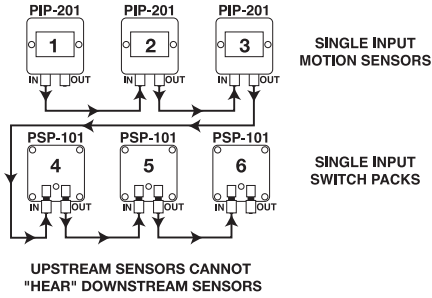
Or interleaved with dual-input switch packs like this:



TWO-OUTPUT SENSORS INTERLEAVED WITH TWO-INPUT SWITCH PACKS

# PIP-201/202 Installation Notes Continued

**Can I "fiber" the sensors and switch packs in any order in the aisle?** No, at least not with the analog versions of the PIP devices introduced in early 2003. (Second-generation products to be introduced in late 2003 are digital and can be fibered in any order.) This limitation of the first-generation analog products results from the fiber connectors' uni-directional data transmission characteristics. Upstream PIP devices cannot "hear" signals from downstream devices:



In the example network shown above, upstream motion sensor #1 cannot go "high" as a result of motion under sensors #2 or #3. However, downstream devices #3 through #6 will go high if motion occurs under sensors #1 or #2.

**What happens if I create a fiber loop connecting the last device in the aisle to the first one?** First-generation PIP-201/202 motion sensors and PSP-101/102 switch packs cannot be fibered in this way. They lock up and remain on the high brightness step. Second generation digital devices introduced in late 2003 encourage the use of fiber loops.

**Do PIP devices have diagnostic features to assist debugging the fiber network?** Yes. Your eye and an ordinary flashlight make excellent fiber testers. The light emitted by the blue fiber connector is ordinary 638 nm red light. Even tens of meters away from the blue transmit connector, red light exiting a plastic fiber is visible to the naked eye.

**The "polarity" of the fiber signal is:**

Red fiber light ON:  
downstream PIPs go to high brightness

Red fiber light OFF:  
downstream PIPs go to dimmed step

The black receiving connector of a PIP device has a broad spectral response. It treats the white light from a flashlight the same as red light from the blue fiber connector.

Shining a flashlight into an open fiber segment will cause downstream PIP devices to go to the high-brightness step. Covering the open fiber segment with your thumb (assuring that no stray light gets into the fiber) forces downstream PIP devices to the dimmed step.

**Lamp Protective Timer Mode:** The lamp protective time interval is the exception to the above. For 15 minutes after the HID fixture is first powered, a PIP 201/202 will ignore all signals on the fiber and remain in the high brightness step.

If you swipe the manual override sensor with a pocket magnet, the PIP 201/202 will exit the lamp protective timer mode and resume responding to signals on the fiber.

## OBTAINING PLASTIC OPTICAL FIBER

**Where can I purchase plastic optical fiber? What are its characteristics?** The plastic optical fiber is manufactured by Mitsubishi Rayon under the trade names SUPER ESKA and PREMIER ESKA:

[www.pofeska.com/pofeskae/pofe/pofe.htm](http://www.pofeska.com/pofeskae/pofe/pofe.htm)

As of early 2003, the cheapest version of ESKA suitable for PIP applications is Mitsubishi part number SH4001 with an attenuation of 0.2 db per meter. It comes on 500 and 1000 meter reels.

### Mitsubishi's most visible distributor is:

Industrial Fiber Optics, Inc.  
627 South 48th Street Suite 100  
Tempe, AZ 85281  
(480)804-1227 • [www.i-fiberoptics.com](http://www.i-fiberoptics.com)

Industrial Fiber Optics (IFO) sells low-cost hand tools that provide a clean cleave of plastic fiber without special training. IFO's polishing pucks are handheld, fine grit abrasive disks that allow you to clean up carelessly chopped fibers to give low attenuation.

PIP devices employ the jacketed version of Mitsubishi fiber with a core diameter of 1.0mm (1000 um). Mitsubishi data sheets refer to jacketed fiber as optical cable in contrast to bare clear fiber which has no protective jacket. Do not purchase bare fiber: PIP devices require "simplex" single-strand jacketed fiber.

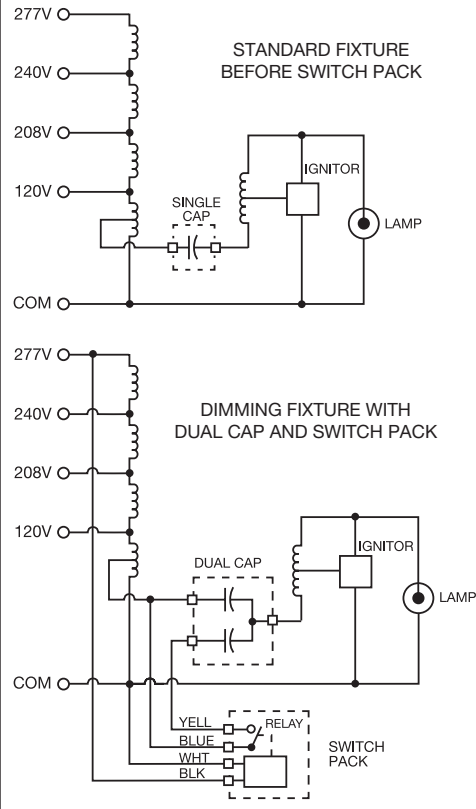
The lowest-cost optical cable has a black polyethylene jacket. The polyvinyl chloride jacketed GHV4001 is more expensive but features Underwriters Labs VW-1 flame rating for plenum-rated installations.

The essential differences between Super ESKA and Premier ESKA fiber relate to data rate and attenuation. The data rate for PIP devices is slow and typical signal levels are high. If your tools and skills permit you to make fiber cuts with clean cleaves, feel free to purchase the least expensive versions of optical fiber.

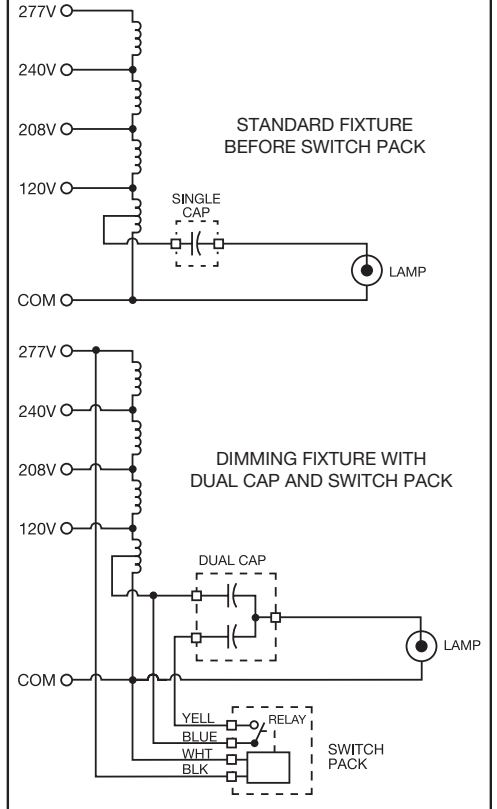
**Can plastic optical fiber be spliced?** Yes. You can find splicing connectors and tools on IFO's website at [www.i-fiberoptics.com](http://www.i-fiberoptics.com).

**Can I use my overstock PIP-201/202 motion sensors on a non-fiber optic jobsite?** Yes, the internal architecture of the PIP-201/202 sensors and their behaviors correspond to the non-fiber optic PIP-001 motion sensor.

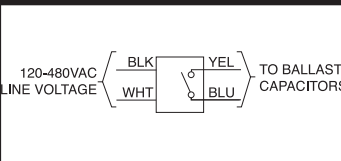
## High Pressure Sodium or Pulse Start Halide



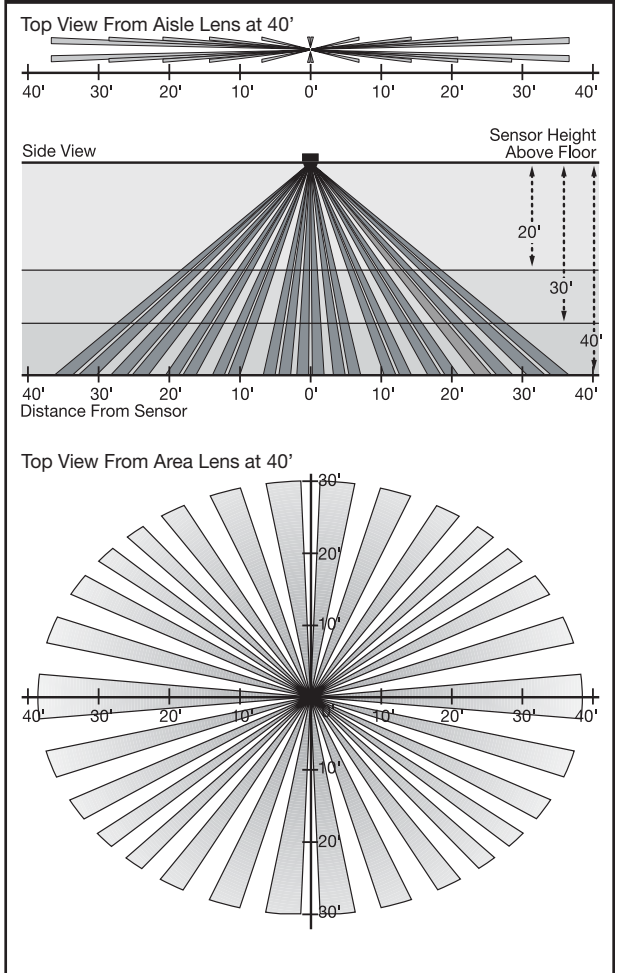
## Metal Halide Fixture Without Pulse Start



## Wiring Schematic to Ballast



## Fresnel Lens Floor Pattern



## SPECIFICATIONS

Fixture Compatibility	HID with constant wattage autotransformer ballast
Step Dimming Method	Relay-switched dual-section capacitor
Switching Configurations	Parallel (preferred) or series capacitors
Relay Current Rating	4 amperes RMS maximum
Maximum Fixture Wattage	1000 watts parallel mode/400 watts series mode
AC Line Voltage (white and black wires)	208/240/277/480VAC
Sensor Power Consumption	3 watts maximum
Usable PIR range (@25 degrees C floor temp)	60 feet on axis
Maximum Fiber Spacing Between Nodes	200 feet
Fresnel Lens Pattern	Aisle
Ambient Temperature Range	0-50° C non-condensing
Observed Motion ON time	0-15 minutes (user adjustable)
Lamp Warm-up Interval	15 minutes (not adjustable)
Installation Assists	Magnetic Test Switch and Blinking LED
Mounting Options	1/2" NPT nipple or adjustable pinch bracket
Wire Harness	4 Conductor 18AWG stranded copper STOW
Wire Harness Length	36 inches
Harness Termination	Bare wire or DayBrite/Widelite-compatible Molex connector
Off-center Weight	10 ounces without optional counterweight
Dimensions (including mounting nipple)	3.25" x 3.25" x 3.25"
UL File Number	Category FNFT File No. E234927