SMART LINE VOLTAGE OCCUPANCY SENSORS
CALIFORNIA TITLE 24 COMPLIANT

1-Zone Multi-Tech Cat. Nos. ACS05-DMW, ACS10-DMW, ACS20-DMW
2-Zone Multi-Tech Cat. Nos. AC205-DMW, AC220-DMW
1-Zone PIR Only Cat. No. ACS15-DIW

Rating: 120VAC, 50/60Hz, 8A LED/Ballast, 800VA Tungsten, 1/4 Hp **/ Current Consumption:** 60mA
Rating: 277VAC, 50/60Hz, 5A LED/Ballast, 1200VA Tungsten, 1/3 Hp **/ Current Consumption:** 30mA
Operating Temperature: 32˚ to 104˚F (0˚ to 40˚C) / **Operating Humidity:** 10 to 90%, non-condensing

WARNINGS:
- **READ AND FOLLOW ALL SAFETY INSTRUCTIONS.**
- **TO AVOID FIRE, SHOCK, OR DEATH; TURN OFF POWER AT CIRCUIT BREAKER OR FUSE AND TEST THAT POWER IS OFF BEFORE WIRING!**
- To be installed and/or used in accordance with appropriate electrical codes and regulations.
- If you are unsure about any part of these instructions, consult an electrician.
- Use this device **with copper or copper clad wire only.**
- Installation and servicing should be performed by qualified personnel.
- DO NOT use outdoors.
- DO NOT mount near gas or electric heaters.
- Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.

WARNINGS:
- The use of accessory equipment not recommended by manufacturer may cause an unsafe condition.
- DO NOT use this equipment for other than the intended use.

CAUTIONS:
- Sensors must be mounted on a vibration free surface.
- Do not terminate using data type wire, such as Cat 5/5E.
- Do not mount sensors closer than 15 feet to each other.
- All units must be mounted at least 6 feet away from air vents, air handlers, and reflective surfaces (windows/mirrors).
- Do not touch the surface of the lens. Clean outer surface with a damp cloth only.
- **SAVE THESE INSTRUCTIONS.**

PK-A3475-10-00-2A

INSTALLATION INSTRUCTIONS

ENGLISH

DESCRIPTION

The next generation of line voltage occupancy sensors is here with the new Smart Ceiling Sensors with Bluetooth® Technology. The Smart Sensor app is required to configure the sensor settings per installment application and energy code requirements. Multiple Smart Sensors can be joined together wirelessly as a group to share behaviors and field-of-view (FOV). Local control to each sensor or zone can be added when wired to PLVSW low-voltage keypads. For best results, avoid adding switching and dimming sensors to same group.

The Leviton Smart Sensor app can be easily downloaded to mobile devices and is compatible with Android and iOS smartphones or tablets. The Smart Sensor app is easy to use with simple, intuitive on-screen menu options to control a Smart Sensor.

The ACS05-DMW, ACS10-DMW, ACS20-DMW, AC205-DMW, and AC220-DMW models are multi-tech (PIR and Ultrasonic) sensors where the ACS15-DIW is single tech (PIR only). All models include a photocell sensor for natural ambient light detection. Multiple sensors and technology work together to provide room lighting automatically and efficiently. Occupancy sensors turn the lights ON and keep them ON, and will turn them OFF when room is vacant and delayed-off timer expires. Photocell detects natural light and will hold lights from turning ON regardless of occupancy detection if sufficient ambient light is present to help provide additional energy savings.

The sensors can be used in Vacancy (Manual-ON) applications when used with PLVSW low-voltage keypads. The lights can be turned ON manually by pressing the low-voltage/momentary toggle switch or PLVSW 1, 2, or 4 button switch. The sensor turns the lights OFF when vacancy is detected and the delayed-off time has expired.

NOTES:
- Multiple PLVSW switches can be used with a single sensor. Multiple 2 and 4 button switches OR multiple 1 button or low-voltage momentary or toggle switches.
- For dual relay models, AC205-DMW / AC220-DMW, two PLVSWs can be connected for manual control of each zone.

The combination of ultrasonic (doppler shift) motion detection which gives maximum sensitivity and infrared motion detection which gives higher false triggering immunity yields a sensor with excellent performance.

Infrared motion detection gives higher false triggering immunity that yields a sensor with excellent performance.

TOOLS NEEDED

- Slotted/Phillips Screwdriver
- Small Slotted Screwdriver
- Wire stripper
- Cutters

PARTS INCLUDED LIST

- Sensor (1)
- 4" x 4" Mounting Plate (1)
- #6-32 x 1-1/2" Screw (2)
- Mid-Range Lens [red frame] (1)
- Extended Range Lens [black frame] (1) (assembled)
- High voltage terminal covers (1)
- Angled Light Pipe (1)
- Flat Light Pipe (1) (assembled)
- 360˚ Perforated Mask (1)
- Low-voltage Connector (1)
- Half Mask (1)
- Tubing Barrier (1)

INSTALLING YOUR SENSOR

1. WARNING: TO AVOID FIRE, SHOCK, OR DEATH; TURN OFF POWER at circuit breaker or fuse and TEST that power is OFF before wiring!

2. PREPARING AND CONNECTING WIRES:
Connect wires per appropriate WIRING DIAGRAM as follows:
- Make sure that the ends of the wires from the electrical box are straight
- Remove insulation from each wire in electrical box as shown.
- Wire per specifications:

Strip Gauge | ← 3/4 in. →
Wire

Line, Neutral, Load Wires (Copper)
Wire range: #12-18 AWG, 3.3 - 0.75 mm square
Torque rating: 20 lb-in, 23 kgf-cm.
Control Wires (External Input 1 & 2))
Wire range: #16-26 AWG, 4.0 - 0.12 mm square
Torque rating: 2.5 lb-in, 2.88 kgf-cm.
NOTE: Maximum system low-voltage wire length must be limited to 800 ft.

3. INSTALLING YOUR SMART SENSOR:
Insert wires into proper terminals. Use a screwdriver to turn terminal screws clockwise and secure wires.
NOTE: Wires need to be inserted from the top through the wire holes provided on the sensor and clamped down using the washer to the terminals. Cover terminals with provided high voltage terminals covers.

a) Load wire(s) to Load terminal(s).
b) Neutral wire to Neutral terminal.
c) Line wire(s) to Line terminal(s).
d) External 1 & 2 inputs to their respective terminals.

NOTES:
- Both loads of the 2-zone units **MUST** be fed from the same phase.
- When installing Class 2 wiring, use the provided tubing for insulation inside the junction box.

To mount inside 4 in. octagon 2.125 in. deep ceiling electrical box:

- Dress line voltage wires to provide enough clearance in electrical box when device is installed.
- Partially thread two #8-32 screws (not included) into the mounting holes of the electrical box.
- Pull out the two coasters that align with the two screws.
- Align sensor so that it fits between the mounting holes of the electrical box and insert over mounting screws.
- Push in the two coasters that align with the two screws.
- Tighten mounting screws firmly.
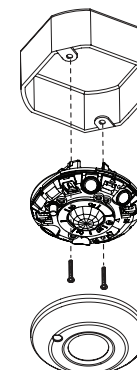
To mount inside 4 in. square 1.5 in. deep ceiling electrical box with mud ring


- Ensure that conduit/cable entry clamp is located in corner of electrical box.
- Dress line voltage wires to provide enough clearance in electrical box when device is installed.
- Install a two-gang mud ring (not included) on electrical box.
- Partially thread the two #6-32 screws provided into the mounting holes of the electrical box.
- Pull out the two coasters that align with the two screws.
- Align sensor so that it fits between the mounting holes of the electrical box and insert over mounting screws.
- Push in the two coasters that align with the two screws.
- Tighten mounting screws firmly.
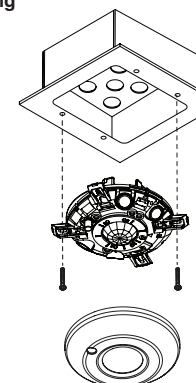
Wiring Diagram 1 ACS05-DMW, ACS10-DMW, ACS20-DMW & ACS15-DIW (1-Zone)
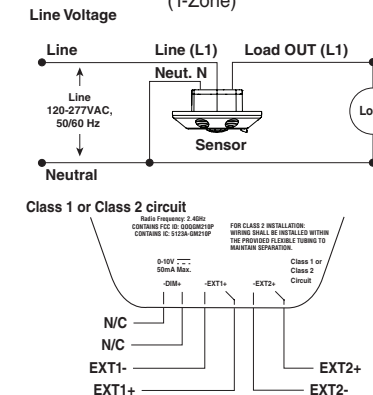
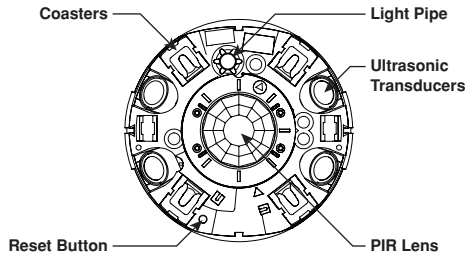
Wiring Diagram 2 AC205-DMW & AC220-DMW (2-Zone)
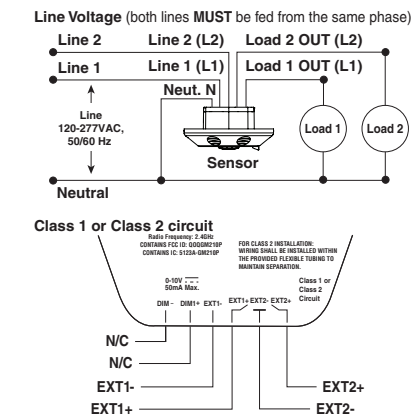
NOTE: External inputs are configurable using the Smart Sensor App as a Manual Switch, Demand Response, and/or Emergency. If in a system with 0-10V Smart Sensor devices, Demand Response will be relayed to other devices in the wireless group that support dimming.
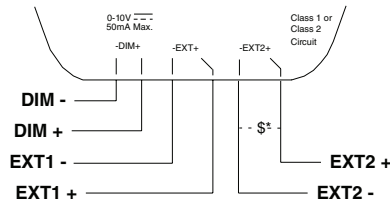
SENSOR OPERATION

Complete explanation of the sensors modes of operation and factory default settings is available in the Smart Sensor app on your mobile device.

- **Delayed-Off time:** The sensor is designed to turn the lights OFF if no motion is detected after a specified time. This length of time is called the Timeout and is set using the Smart Sensor app on your mobile device.

- **Walk-through mode:** The walk-through mode is useful when a room is momentarily occupied. The walk-through mode works as follows: When a person enters the room, the lights turn ON. If the person leaves the room before the default walk-through timeout of 2.5 minutes, the sensor turns the lights OFF 2.5 minutes later. If the person stays in the room for longer than 2.5 minutes, the sensor proceeds with the standard operation.

- **Sensitivity:** Both PIR and Ultrasonic sensor sensitivities can be adjusted in the Smart Sensor app based on room size and to help avoid false-ONs and false-OFFs.

- **Reset Device State:** There are three methods to trigger a factory reset; each of these can be used to reset the sensor.
  - Via the Smart Sensor app.
  - Press the ON or OFF button on the PLVSW keypad (if connected to sensor) for 20-25 seconds until the sensor's LED is flashing RED then release within five seconds.
  - Remove cover from sensor, press the PCB switch for five seconds (see diagram below).

- **Walk Test:** This mode is for field-of-view test purposes only, and sets the sensor timeout to 4 seconds.

- **Manual ON/OFF Switch:** Use to override occupancy and manually turn the lights ON or OFF by pressing the low-voltage momentary/toggle switch or PLVSW 1, 2, or 4 button switch.

- **Demand Response Interface:** Demand Response is a feature for dimming units. When used alone, these non-dimming sensor models will not change the light status due to Demand Response. However, if grouped with other dimming Smart Sensor devices, they will share the signal to the group for the other devices that include dimming, if any.

- **Emergency Interface:** this input is intended for use with BMS (Building Management System) or any contact closure to force the lights full ON in case of emergency. Any commands through the manual switch or Smart Sensor App will be ignored while the emergency signal is active. Lights will stay ON until emergency signal is cleared.

- **Plug Load:** inputs identified as plug load will turn ON upon occupancy and OFF when space becomes vacant and the timeout expires. Lighting can be manually turned OFF, but plug load will remain ON as long as the space is occupied.
  CAUTION: If plug load is powered from Load 1 or Load 2 outputs, max load rating is 8A where a typical power breaker typically permits 15A or 20A. For a full 20A output rating, use with a Leviton 20A power pack such as the OPP20 or OSP20 to control the plug load.

Coasters — Light Pipe
Ultrasonic Transducers
Reset Button — PIR Lens

PHOTOCELL OPERATION

Complete explanation of the Photocell operation and calibration is available in the Smart Sensor app on your mobile device.

Switching only models are able to provide ambient light hold off. If incoming ambient light meets or exceeds the target light level, the lights will stay off regardless of occupancy detection. Dual zone models can have each zone custom configured using the Smart Sensor app.

LED INDICATORS

LED ACTION	RED	GRN	BLU	YEL	Description
Normal Operation					
Alternating	R			Y	Sensor is booting up.
(2 sec) Blinking	R				Indicates PIR detection.
(2 sec) Blinking		G			Indicates ultrasonic detection.
(1s every 30s) Alternating	R	G			When Demand Response signal is active.
(1s every 30s) Alternating		G	B		Device is in Daylighting mode.
(1s every 30s) Blinking			B		User Override mode is active.
Configuration / Setup					
Alternating	R	G	B		Device is in Identify Mode
Alternating		G	B		Device is in 24-Hour Daylight Auto-Calibration mode
Alternating			B	Y	Device is part of mesh network; Network is open for other devices.
Blinking				Y	Device in mesh joining mode.
Blinking			B		BLE connected to phone/tablet
(1 sec) Blinking	R				When device is leaving group (continues to blink until it leaves group).
Emergency					
Solid			B		Emergency mode is active.

Emergency Self-Test: NFPA 101 Life Safety Code and NEC (Article 700.3(B)) requires regular testing of all emergency equipment. To perform a test of these products, a Test Switch that is a single pole, momentary, push button switch, that returns the equipment to normal status when released can be installed locally to interrupt normal power and perform emergency system test.

NOTE: The diagram below depicts a "Single Pole Momentary Push Button Switch" ($) on one of the low voltage inputs to trigger the emergency systems test. The input must be defined as "emergency" in the Leviton Smart Sensor App. Clarify requirements with all local authorities.

```
                0-10V ⎓           Class 1 or
                50mA Max.         Class 2
              -DIM+  -EXT+  -EXT2+ Circuit

  DIM -
  DIM +                    - $* -
  EXT1 -                         EXT2 +
  EXT1 +                         EXT2 -
```

FIELD-OF-VIEW

ACS05-DMW & AC205-DMW: 500 sq. ft.
ACS10-DMW: 1,000 sq. ft.
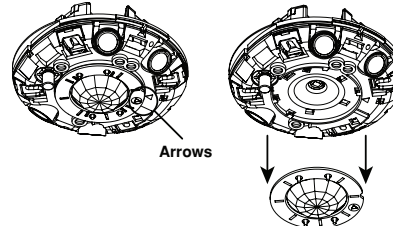**ACS15-DIW:** 450-1,500 sq. ft.
ACS20-DMW & AC220-DMW: 2,000 sq. ft.
- **Mid-range lens (red frame):** mounting height (13-20 ft)
- **Extended range lens (black frame):** mounting height (8-12 ft)

CHANGING PIR LENS
Turn lens and line up arrows, then pull lens from sensor.

Arrows

NOTE: To expand Field-of-View, multiple Smart Sensors and/or Room Controllers can be paired together to operate as a group and expand coverage (up to 5 devices can be grouped together). Grouping of devices is done through the Leviton Smart Sensor App.

MOUNTING LOCATION DIAGRAM
By masking two sections, hallway traffic can be blocked.

Mask
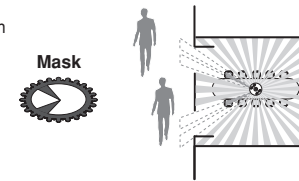
SETTINGS

CONTROLLING YOUR SENSOR WITH BLUETOOTH® TECHNOLOGY

Download the Leviton Smart Sensor app for your mobile device.

Android: Tap the Google Play Store icon on your phone or go to http://play.google.com on your computer and follow the instructions to obtain the Smart Sensor app.

iOS: Tap the App Store icon on your phone or access the Smart Sensor app through your iTunes account on your computer.

Once you have downloaded the Smart Sensor app, follow the on screen instructions to connect to the device(s).

BLUETOOTH® TECHNOLOGY RANGE

Programming or adjustments made using the Smart Sensor app on your mobile device should be made when standing under the device for best communication. Maximum recommended distance is 50 feet.

WHAT TO DO IF...

- **Lights do not turn ON**
  - Circuit breaker or fuse has tripped.
  - Check if daylight harvesting is active and forcing lights OFF.
- **Lights stay ON**
  - Constant motion. To Test: Reduce PIR and/or US sensitivity in the Smart Sensor app on your mobile device by 25%; remove motion source. If unsatisfactory, move sensor location.
- **Light stays ON too long**
  - Primary and/or secondary timeout is set for too long. To Test: Check configuration settings within the Smart Sensor app on your mobile device. Typical setting is 10 minutes.

FCC COMPLIANCE STATEMENT

Any changes or modifications not expressly approved by Leviton Manufacturing Co., could void the user's authority to operate the equipment

FCC Statement:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

FCC Suppliers Declaration of Conformity (sDoC):
This product manufactured by Leviton Manufacturing, Inc., 201 N Service Road, Melville, NY, http://www.Leviton.com. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IC COMPLIANCE STATEMENT

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

CLASS 2 INSTALLATION NOTE

The EXT1 and EXT2 wires for manual control, emergency control, or demand response, can be installed as Class 1 or Class 2. If installed as Class 2, all devices in the circuit must be Class 2 rated and this switch must be wired per instructions below, which are in accordance with NEC Code NFPA 70, paragraph 725.136 (d).

For Class 2 Installation: The low-voltage control wires must be mechanically separated from Class 1, line, neutral and ground power lines. This can be accomplished by performing the following:

1) Installing a mechanical barrier, in the form of silicone tubing or other non-conducting sleeve, over the length of the individual low voltaghe control wires contained within the electrical box and to the point where they extend out of the electrical box.[1 3]

2) Use of approved wire connectors shall be used to join the low-voltage wires to building control wires. [2 3]

3) When CL3, CL3R or CL3P rated control cables (or permitted substitute) are used to connect devices within the building silicone tubing, or other non-conducting sleeve, shall be installed over the cable starting from the switch to the point where they extend out of the electrical box. [1 2 3]

1 Silicone tubing shall be NRTL (UL/CSA/ETL) recognized or equivalent to provide mechanical separation equal to .25" in air.

2 Connectors joining low-voltage control wires shall be approved LISTED connectors.

3 Wire connectors and wire tubing shall be provided by the installation contractor.

FOR CANADA ONLY

For warranty information and/or product returns, residents of Canada should contact **Leviton in writing at Leviton Manufacturing of Canada ULC** to the attention of the **Quality Assurance Department, 165 Hymus Blvd, Pointe-Claire (Quebec), Canada H9R 1E9 or by telephone at 1-800-405-5320.**