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Extron OCS 100W Occupancy Sensor User Guide

Extron OCS 100W Occupancy Sensor

Product Information

The OCS 100W is a device designed to detect occupancy using both PIR (Infrared) and US (Ultrasonic) sensors. It features various front panel features and controls to ensure accurate detection and avoid false detections. The device has LED status indicators for both the PIR and US sensors, as well as a removable front cover for easy access to the controls.

Front Panel Features

- **DIP Switches (A):** Used for various settings related to occupancy detection.
- **DIP Switches (B):** Used for timer and sensitivity adjustments.
- **Ultrasonic Sensors:** Detects occupancy using ultrasonic waves.
- **Ultrasonic (US) Green LED:** A status indicator for the ultrasonic sensor.
- **Infrared/Photocell Sensor and Lens:** Detects occupancy using infrared technology.
- **Infrared (PIR) Red LED:** A status indicator for the infrared sensor.
- **Removable Front Cover:** Provides easy access to the controls.

Controls

Figure 2 shows the controls of the OCS 100W:

- A Switch Function:
    - **OFF:** Not used.
    - **ON:** Occupancy detection is mutually exclusive (either PIR or US detection).
- B Switch Function:
    - *Default and recommended settings.

- Timer Setting (B1 and B2 switches must be set together):
    - 8 minutes: OFF, OFF
    - 4 minutes: OFF, ON
    - 15 minutes: ON, OFF
    - 30 minutes: ON, ON
- Timer adjust: Manual or Automatic mode.
- Sensitivity adjust: Manual or Automatic mode.

Product Usage Instructions

Occupancy Detection Mode

The OCS 100W is designed to detect occupancy using both the PIR and US sensors with their default settings to avoid false detections. By default, the A switch function is set to ON, enabling occupancy detection based on either PIR or US sensor triggering.

Adjusting Sensor Sensitivity and Timer Settings

To adjust the sensor sensitivity and timer settings, follow these steps:

1. Ensure the B switch function is set to ON for Manual mode.
2. Adjust the timer switches (B1 and B2) according to your desired time duration. Refer to the recommended settings for different durations.
3. Adjust the infrared sensitivity dial (Red) and ultrasonic sensitivity dial (Green) based on the desired sensitivity level. For Manual mode, ensure B4 is set to ON.

Visual LED Indicators

The A3 switch function can be used to enable or disable the visual LED indicators. Setting A3 to OFF provides a visual notification whenever the PIR or US sensors are triggered. If the flashing LEDs are distracting or need to be disabled, set A3 to ON.

Automatic Adjustments and Reset

The A4 switch function allows for automatic adjustments and reset. When toggled ON, the device retains all learned sensor settings. Toggling A4 OFF will erase all learned adjustments. This function is only applicable when the Timer (B3) or Sensitivity adjust (B4) switches are set to Automatic mode (OFF).

Timer and Occupancy Behavior

The timer settings determine how long the sensor remains active after occupancy is no longer detected. In Manual mode (B3 set to ON), adjust the timer switches to set the desired time duration. In Automatic mode (B3 set to OFF), the timer settings are ignored, and the sensor triggers OFF immediately when there is no occupancy detected.
Note: If it takes too long for the OCS to turn off when the room is unoccupied, adjust the timer to 8 or 4 minutes and extend the timer via the configuration of the connected control processor. This setup helps reduce false detection. Refer to Figure 3 for an overview of the front panel features and controls. The OCS 100W is a dual technology occupancy sensor that can be used to automate meeting and presentation spaces when used with Extron control products. The OCS is equipped with ultrasonic (US), infrared (PIR), and photocell sensors that can

be used together to report ambient light conditions and room occupancy. Sensors can be wired directly to Extron controller products equipped with Digital I/Os ports or via eBUS, when using optional eBUS interface accessories. The OCS requires 24 VDC for operation. If local 24 V power is not available, use the included 12 V to 24 V, USB 5 V to 24 V power converter.

NOTE: The OCS 100W is designed to detect occupancy using both the PIR and US sensors with their default settings to avoid false detections.
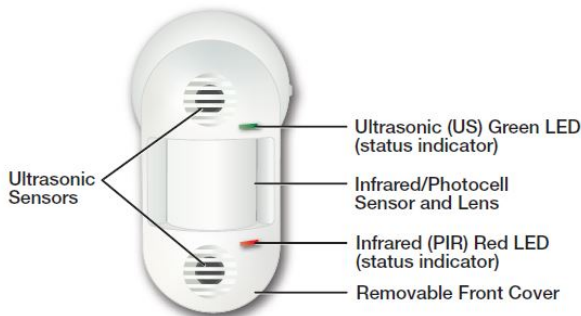
Front Panel Features and Control

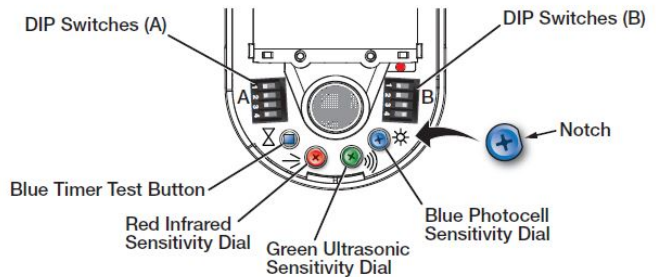Figure 1.   OCS 100W Front Panel Features

Figure 2.   OCS 100W Controls

- Ultrasonic Sensors (2) — Detect movement in the room, based on ultrasonic sound waves. The US sensor emits ultrasonic sound waves into an area and measures the speed of their return to detect the presence of people. Frequency changes are caused by the movement of people, which is detected by the US waves.
- Ultrasonic (US) Green LED status indicator — Flashes when the ultrasonic sensors detect occupancy.
- Infrared/Photocell Sensor and Fresnel Lens —
- The Fresnel lens diffracts the incoming light and directs the light to the infrared sensor behind it.
- The Infrared (PIR) sensor detects the presence of people based on the difference between the heat generated by moving people versus the ambient room temperature.
- Infrared (PIR) Red LED status indicator — Flashes when the infrared sensor detects occupancy.
- Removable Front Cover — Conceals all controls and DIP switches.
- DIP Switches (A) —

A	Switch Function	OFF	ON	Note
1	Not used	*Not used	Not used	Switch is not used.
2	Occupancy detection behavior – Dual Technology Mode	*Mutually exclusive (requires both PIR and US detection)	Independent (either PIR or US detection)	If A2 is set to OFF, both the PIR and US sensors must be triggered (simultaneously) before the OCS reports an occupancy signal. If A2 is set to ON, the OCS reports occupancy based on only one of the sensors being triggered. When only one sensor is desired, set A2 to ON and adjust the dials accordingly. If A2 is ON, false detection when the room is not occupied increases.
3	Sensor status indicators	*LEDs enabled	LEDs disabled	Setting A3 to OFF provides a visual notification whenever the PIR or US sensors are triggered. When the visual LED indicators are a distraction or you want to disable the flashing LEDs, A3 should be set to ON.
4	Automatic adjust reset	*Retain learned sensor adjustments	Erase all learned settings (toggle ON, then OFF)	Only applicable when Timer (B3) or Sensitivity adjust (B4) or both are set to Automatic mode (OFF). Toggling A4 ON then OFF will reset any stored learned adjustments.

Default and recommended settings
DIP Switches (B) — (see figure 2 on the previous page)

B	Switch Function	Settings				Note
1	Timer Setting (B1 and B2 switches must be set together)	*8 minutes: OFF	4 minutes: OFF	15 minutes: ON	30 minutes: ON	In manual mode only (B3 set to ON), set the amount of time before the sensor triggers **OFF** when there is no occupancy detected. In automatic mode (B3 set to **OFF**) the timer settings are ignored.
2		*OFF	ON	OFF	ON	

B	Switch Function	OFF	ON	
3	Timer adjust	Automatic	*Manual	Applies to the Timer (blue), Infrared sensitivity (red), and Ultrasonic sensitivity (green) adjustment dials. • Setting to Manual mode allows for more predicted behavior and is better suited for automating AV applications. • Setting to Automatic mode allows the sensor to learn over time the ideal timer and sensitivity adjustments for the space and usage trends. This is better suited for automating lighting applications. • All adjustment dials are disabled when set to Automatic (**OFF**).
4	Sensitivity adjust	Automatic	*Manual	

Default and recommended
NOTE: B3 must be set to ON for Manual mode, in order to adjust the timer switches manually. B4 must be set to ON for Manual mode, in order to adjust the infrared sensitivity and US sensitivity dials manually.

- Timer Setting (B1 and B2) — The occupancy sensor has a built-in timer feature. In Manual mode (B3 set to ON), set the B1 and B2 DIP Switches together, as shown in the table above, to set the amount of time before the sensor triggers OFF.
- When the sensor detects motion, it instantly triggers ON.
- Once occupancy is no longer detected, the timer begins. If no motion is detected and the timer expires, then the sensor triggers OFF.

NOTE: If it takes too long for the OCS to turn off when the room is unoccupied, adjust the timer to 8 or 4 minutes and extend the timer via the configuration of the connected control processor. This setup reduces false detection.

- **Blue Timer Test Button —**
  - To enable an 8 second timer test mode, push the blue button once. The test mode lasts for 1 hour, and then automatically resets to the dip switch settings.
  - To cancel the 8 second test mode, push and hold the blue button until the red LED flashes, returning the OCS to the settings defined by the dip switches.
- **Red Infrared Sensitivity Dial —** Adjust this dial to increase or decrease infrared sensitivity.
  - Turn counter-clockwise (CCW) to decrease sensitivity. Major movements are needed to detect

occupancy.

- Turn clockwise (CW) to increase sensitivity. Minor movements are detected as occupancy.
- The factory default setting is at 75%.

- **Green Ultrasonic Sensitivity Dial —** Adjust this dial to increase or decrease ultrasonic sensitivity.
  - Turn counterclockwise (CCW) to decrease sensitivity. Major movements are needed to detect occupancy.
  - Turn clockwise (CW) to increase sensitivity. Minor movements are detected as occupancy.
  - The factory default setting is at 100%.
- **Blue Photocell Sensitivity Dial —** Photocell prevents the sensor from triggering on when the area is adequately lit with natural light and when motion is detected. The sensor must be mounted directly over an area that is representative of the average, natural room lighting. Before setting the photocell control, wait until the natural light is brightest (optional). Adjust this dial to increase or decrease photocell sensitivity.
  - Turn counterclockwise to decrease photocell sensitivity, causing it to activate with less light.
  - Turn clockwise to increase photocell sensitivity, requiring brighter light to activate the sensor.
  - Factory default is 100% (full clockwise) — Photocell sensor is disabled.
  - Range — 10 to 1000 lux

Recommended Setup
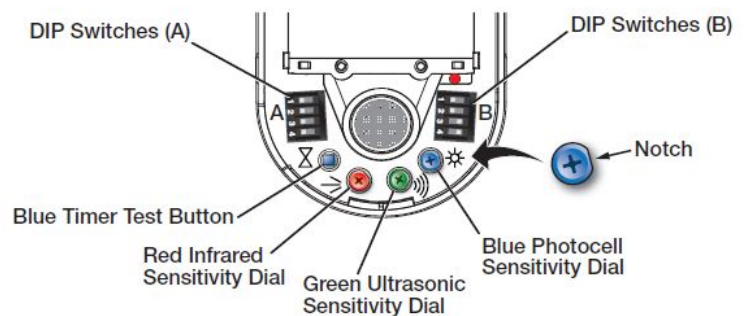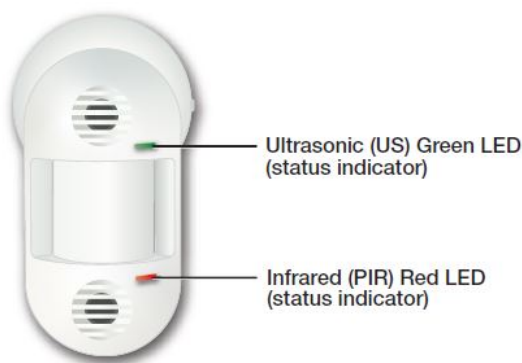
With the OCS in the default or recommended settings (A2 OFF), the OCS requires both the IR sensor AND the US sensor to detect occupancy to turn ON. Only one sensor (PIR or US) needs to trigger to reset the timer for the OCS to remain ON while the room is still occupied. When the OCS is in the OFF state, no occupancy is detected. Follow these steps to set up the OCS to detect occupancy with minimal false detection:
NOTE: We recommend using the OCS 100W in the default settings when beginning the setup or the test mode. If needed, adjust slightly from the default sensitivity settings.

1. Keep all the DIP switches and rotary dials in the default positions.
2. Set the OCS in Test Mode.
3. Enter the room several times to verify if the IR detector is detecting movement (red LED flashes).
   - If the red LED flashes when entering the room, the default red infrared sensitivity dial is set correctly.
   - Verify the red LED flashes with movement throughout the room.
   - Turn the red infrared sensitivity dial to decrease or increase IR sensitivity, until the red LED only flashes when entering the room or making movements throughout the room.
   - To avoid false detections when the room is unoccupied, do not make the sensor too sensitive.
4. Enter the room and verify if the US detector is detecting movement (green LED flashes).
   - If the green LED flashes when entering the room, the default green ultrasonic range dial is set correctly.

This sensor is very sensitive.

- Verify the green LED flashes with movement throughout the room.
- Turn the green ultrasonic range dial to decrease or increase US sensitivity, until the green LED only flashes when entering the room or making movements throughout the room.
- To avoid false detections when the room is unoccupied, do not make the sensor too sensitive. 5. Leave the room and close the door. Wait until the Digital output state, relay or red and green LEDs stay OFF. Wait several minutes to ensure there are no false detections.
- If the door remains open, the US sensor may detect changes.
- If possible, wait longer, to confirm no IR or US change is registered.

5. Enter the room again to confirm the Digital output state, relay, red, or green LEDs turn ON.

NOTE: After going through these steps and verifying the OCS is set up to accommodate the room, do not adjust the DIP switches or dials.

Automatic Mode

Out of the box, the OCS 100W can be set up in Automatic Mode, where no manual sensitivity adjustments are needed and sensitivity learning and adjustments are made automatically. For simple setup, we recommend keeping the OCS in the default settings and flipping the B4 Dip switch to the OFF (Auto) position. The OCS is ready to mount (see Installation on page 5).

Sensor Placement and Installation Options

When placing the sensor in a room, be sure the sensor is not aimed out through a door. The sensor can detect hallway traffic, causing false triggers. PIR sensors trigger in response to changes in the amount of IR arriving from any of their segments of view within a direct line of sight from the sensor. US sensors trigger in response to changes in the frequency of reflected ultrasonic waves, caused by movement within the space.

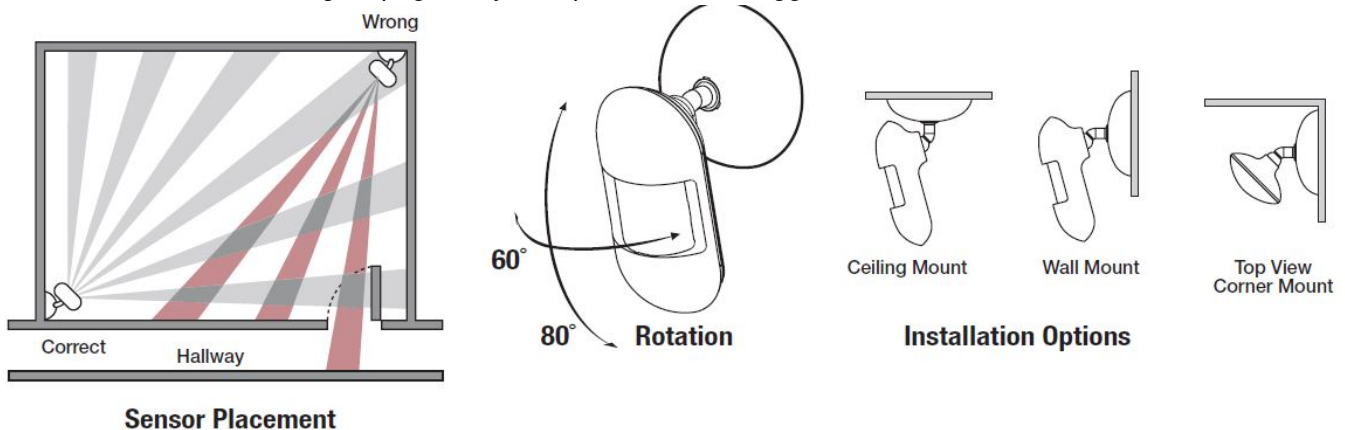**NOTE:** See Troubleshooting on page 7 if you experience false triggers

Figure 4. Sensor Placement and Installation Diagrams

NOTE: Mount the OCS 6 to 8 feet (1.8 to 2.4 m) away from HVAC vents and high air flow areas
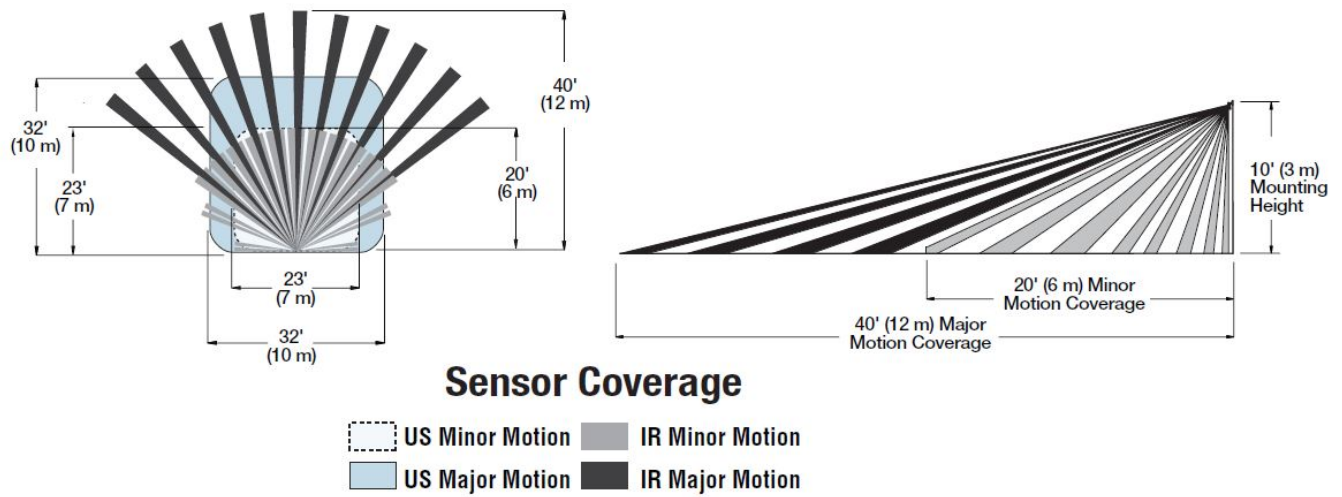
Sensor Coverage

Sensor Coverage

US Minor Motion   IR Minor Motion
US Major Motion   IR Major Motion

Figure 5.   Sensor Coverage Diagrams

OCS 100W Parts

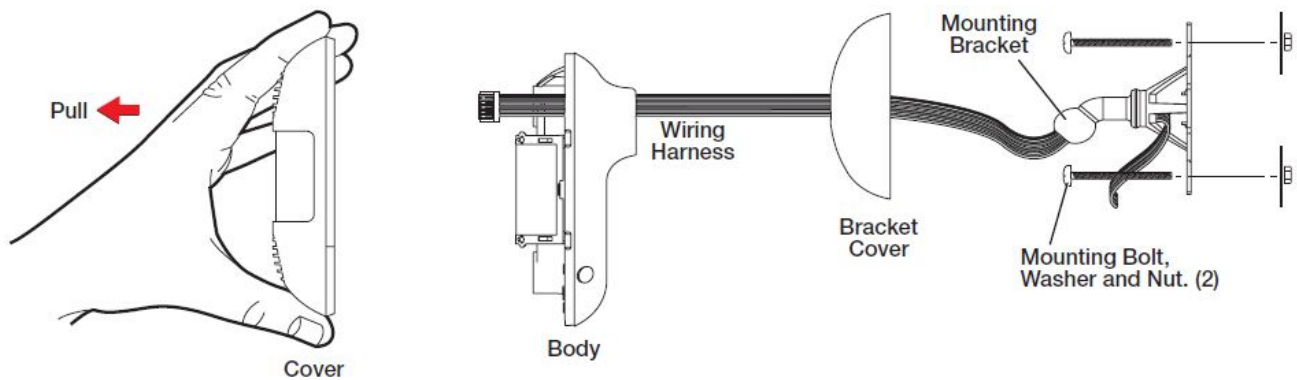**Figure 6.**   OCS 100W Parts

Installation

ATTENTION:

- All structural steps and electrical installation must be performed by qualified personnel in accordance with local and national building codes and electrical codes.
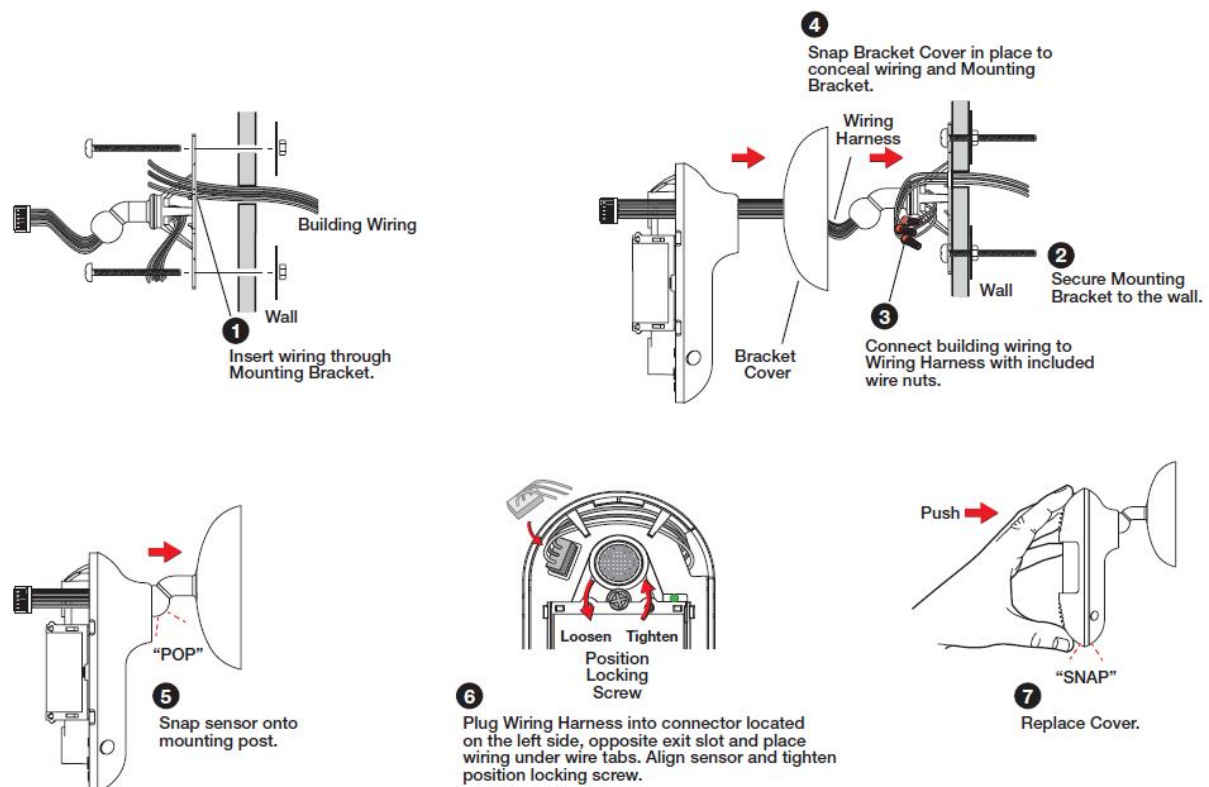- Only connect to Class III SELV systems.

Figure 7. OCS 100W Installation

PC 1224 Wiring

ATTENTION:

- Do not connect power to the device until you have read ATTENTION: on page 8.
- Remove power from the system before making any connections.
- The controller and the OCS 100W must share a common ground connection to avoid ground loops and a difference in grounding potential.

The OCS 100W requires 24 VDC. If the sensors are connected to a device that does not provide 24 VDC, use the included PC 1224 power module:

1. Connect a 12 VDC power source to the 12 VDC input on the supplied PC 1224 power converter (see figure 8), or power via the USB type-C 5 V input (see figure 9).
2. Wire the PC 1224 24 VDC, 75 mA max connector to the black and red wires on the OCS 100W.

NOTE: When the PC 1224 is powered via the USB 5 V input, the 24 V output is rated at 35 mA.
A 12 VDC, 1.25 A max pass-through is available to power additional 12 VDC devices, only if powered from the 12 V input.
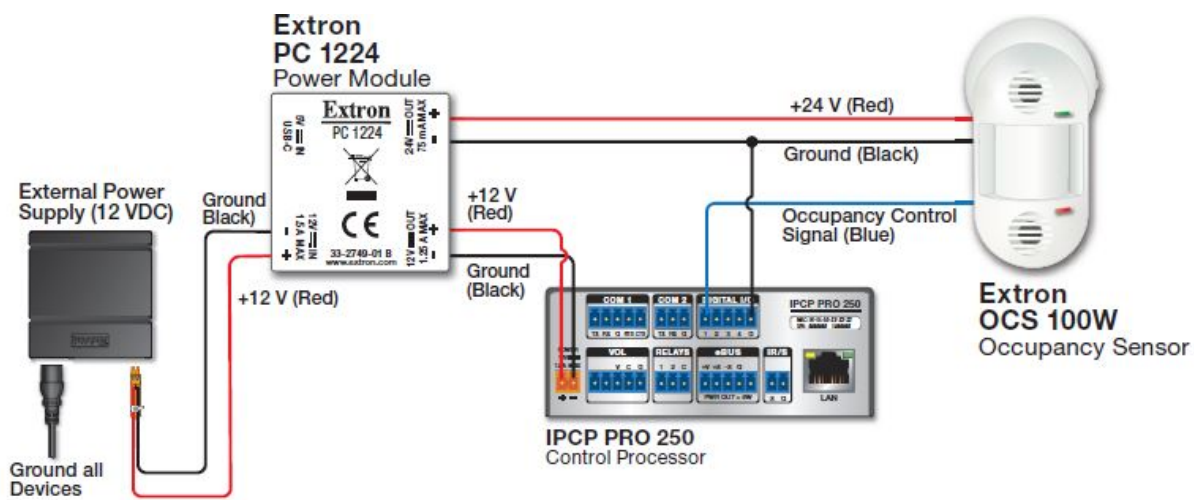
OCS 100W Wiring

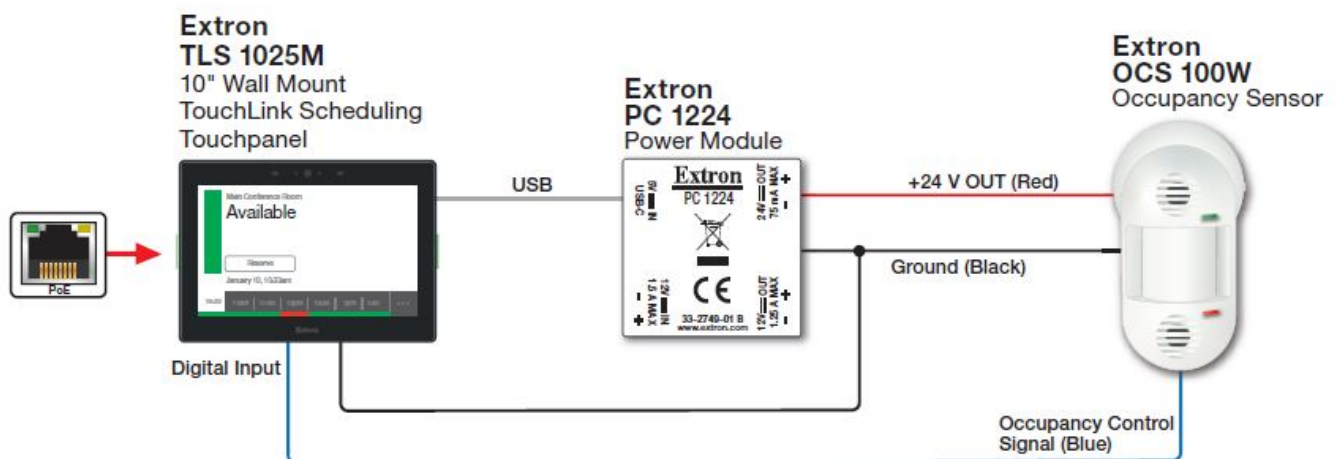**Figure 8.** OCS 100W External Power Supply Wiring Diagram

Figure 9. OCS 100W USB Power Wiring Diagram

Wire	Connections	Note
Power		
Black	Ground	Shared with all of the outputs.
Red	+24 VDC	Power input.
Occupancy Control Outputs		
Blue	Occupancy control output	When wiring the blue wire of the OCS to Extron products with Digital or FLEX Input ports, configure the ports as Input without pull up. The sensor provides approximately 21 VDC in the ON state and 0 VDC in the OFF state. Use the shared black ground wire.
Blue/White	Common	Relay contacts could be used to trigger third party devices, such as HVAC, based on occupancy.
Black/White	Normally closed when unoccupied	
Yellow/White	Normally open when unoccupied	
Occupancy and Lighting Output		
Gray	Occupancy and photocell control output	Typically used for lighting applications. When wiring the gray wires of the OCS to Extron products with Digital or FLEX Input ports, configure the ports as Input without pull up. The output state will remain OFF 0 VDC when occupancy is detected but there is high amount of ambient or natural light in the room. Only when there is low or no ambient or natural light in the room and occupancy is detected will the output state trigger ON 21 VDC. Use the shared black ground wire.

Troubleshooting

Problem	Possible Cause	Test	Solution
Sensor remains ON.	Constant noise.	Reduce both green and red knobs by 1/8 (15%) turn or remove noise source.	Move sensor to a less noisy area within the room.
Sensor remains OFF.	Sensitivity is set too low.	Increase both green and red knobs by 1/8 (15%) turn.	Move sensor. If the A2 DIP switch is set to OFF, set green and red US/IR sensitivity dials to normal levels.
Sensor remains on too long.	Timer setting too high.	Check DIP switch settings.	Reduce timer setting.
Hallway traffic turns sensor on.	Infrared sensor can see into the hallway.	Put sensor in timer test mode and walk the hallway.	Move sensor, so it cannot see into the hallway.

Safety Instructions

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide on the Extron website.

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. The Class A limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. This interference must be corrected at the expense of the user.
NOTE: For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide on the Extron website.
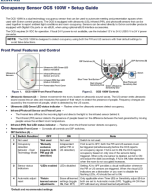
Power Attention

ATTENTION:

- These products are intended for use with a UL Listed LPS type power source.
- Use of a non-LPS or unlisted power supply will void all regulatory compliance certifications.
- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The power supply is to be located within the same vicinity as the Extron AV processing equipment in an ordinary location, Pollution Degree 2, secured to the equipment rack within the dedicated closet, podium, or desk.
- The installation must always be in accordance with the applicable provisions of the National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16.
- The power supply shall not be permanently fixed to the building structure or similar structure.

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide on the Extron website.

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Documents / Resources

Extron OCS 100W Occupancy Sensor [pdf] User Guide
OCS 100W Occupancy Sensor, OCS 100W, Occupancy Sensor, Sensor

References

- **Extron - The AV Technology Leader**