Restrooms & stalled spaces

Sensing that keeps the lights on for people behind partitions

Design guide



A PIR sensor needs line of sight, and a restroom stall takes it away. In multi-stall rooms, dual technology adds ultrasonic sensing that fills the room and detects motion behind partitions. Single-user restrooms are simpler: the occupant is always in view.

PIR + US
dual technology for stalls

Auto-on
allowed in restrooms

3
solutions in this guide

Design goals

- Lights on automatically at entry (full auto-on is permitted in restrooms)
- No false offs while someone is in a stall
- Off within 20 minutes after the room empties
- One device at the entry where possible

Solutions in this guide

A Multi-stall: dual-technology wall sensor
Line voltage · PIR + ultrasonic

B Single-user restroom: wall sensor
Line voltage · PIR

C Single-user retrofit: battery-free
No new wire

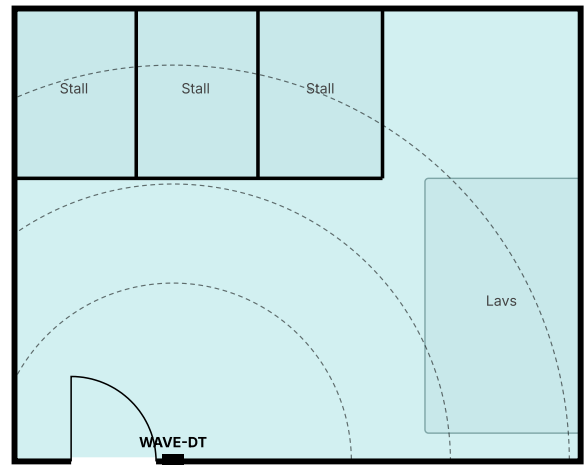
Code checklist

Requirement	Typical code target	How the solutions meet it
Automatic shutoff	Off within 20 minutes of vacancy	Time-out 20 min or less
Auto-on	Full automatic-on is permitted in restrooms	Occupancy (auto-on) mode
Local manual control	A manual control in the space	WAVE push-button or battery-free rocker
Egress / emergency	Emergency lighting stays on as required	Keep emergency circuits off the sensor, or use a listed transfer device

Typical requirements of ASHRAE 90.1-2019 and the 2021 IECC. Local amendments and other code editions differ; the adopted code for the project governs.

A Solution A: Multi-stall: dual-technology wall sensor

Line voltage · PIR + ultrasonic



Wall switch sensor and pattern
Ultrasonic coverage (dual technology)
Door

The WAVE-DT replaces the entry switch. PIR catches people walking in; ultrasonic fills the room and keeps the lights on for people inside stalls.

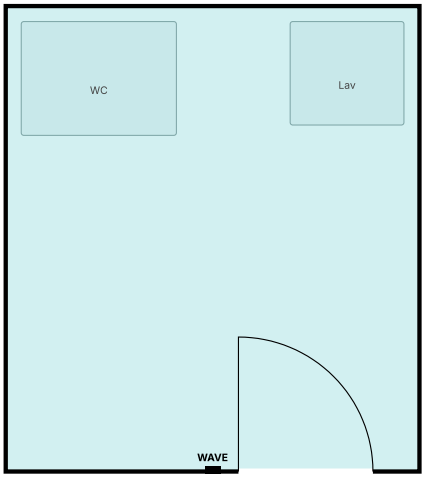
- Mount at the entry with a clear view toward the stalls
- Adjust ultrasonic sensitivity so the door swing alone doesn't hold the lights
- Large or L-shaped rooms: send the plan to Energio for a layout

Qty	Model	Description
1	**WAVE-DT-120/277-N**	Dual-technology wall switch sensor
1	**Wall plate**	Decorator plate

Tech sheet: ES-TS-103

B Solution B: Single-user restroom: wall sensor

Line voltage · PIR



Wall switch sensor and pattern
Door

In a single-user room the occupant is always in view, so a PIR WAVE in occupancy mode turns the lights on at entry and off after the room empties.

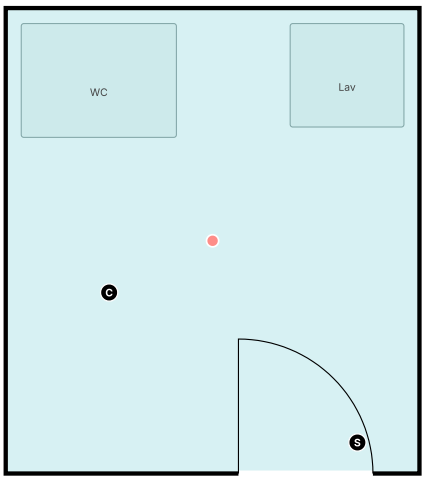
- Mount at the latch side of the door, inside the room
- Set occupancy (auto-on) mode and a short time-out
- Pair the exhaust fan on the second relay with the DR model

Qty	Model	Description
1	**WAVE-PIR-120/277**	PIR wall switch sensor
1	**Wall plate**	Decorator plate

Tech sheet: ES-TS-103

C Solution C: Single-user retrofit: battery-free

No new wire



Ceiling sensor and pattern · S Battery-free rocker · C Area controller

Where there's no neutral or the switch box can't take a sensor, a self-powered ceiling sensor links to a controller at the fixture; a stick-on rocker gives manual off.

- Center the E9T-OSC on the ceiling (34 ft Ø at 7–10 ft)
- Set the controller to occupancy (auto-on)
- In low light, fit the sensor's backup battery

Qty	Model	Description
1	**E9T-OSC**	Self-powered ceiling occupancy sensor
1	**E9X-RUV-4IBTP**	20 A on/off area controller
1	**E9T-S1A**	Battery-free rocker

Tech sheet: ES-TS-105 / 106 / 107

Design tips

- Do not put a wall sensor behind the door swing.
- Locker rooms with showers: keep sensors away from steam and use a longer time-out.
- Multi-stall rooms beyond one wall sensor's reach need a project-specific layout from Energio.

Related tech sheets

ES-TS-103 WAVE wall switch sensors · **ES-TS-105** Self-powered wireless sensors · **ES-TS-106** Wireless switches & keypads · **ES-TS-107** Wireless load controllers

Starting points only: check every project against its adopted energy code, the reflected ceiling plan and current manufacturer data. Diagrams are illustrative. Send plans to info@energiocontrols.com for a project layout. Products by B.E.G., DANLERS and ILLUMRA. Photo: Unsplash License.