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# PIR motion detector

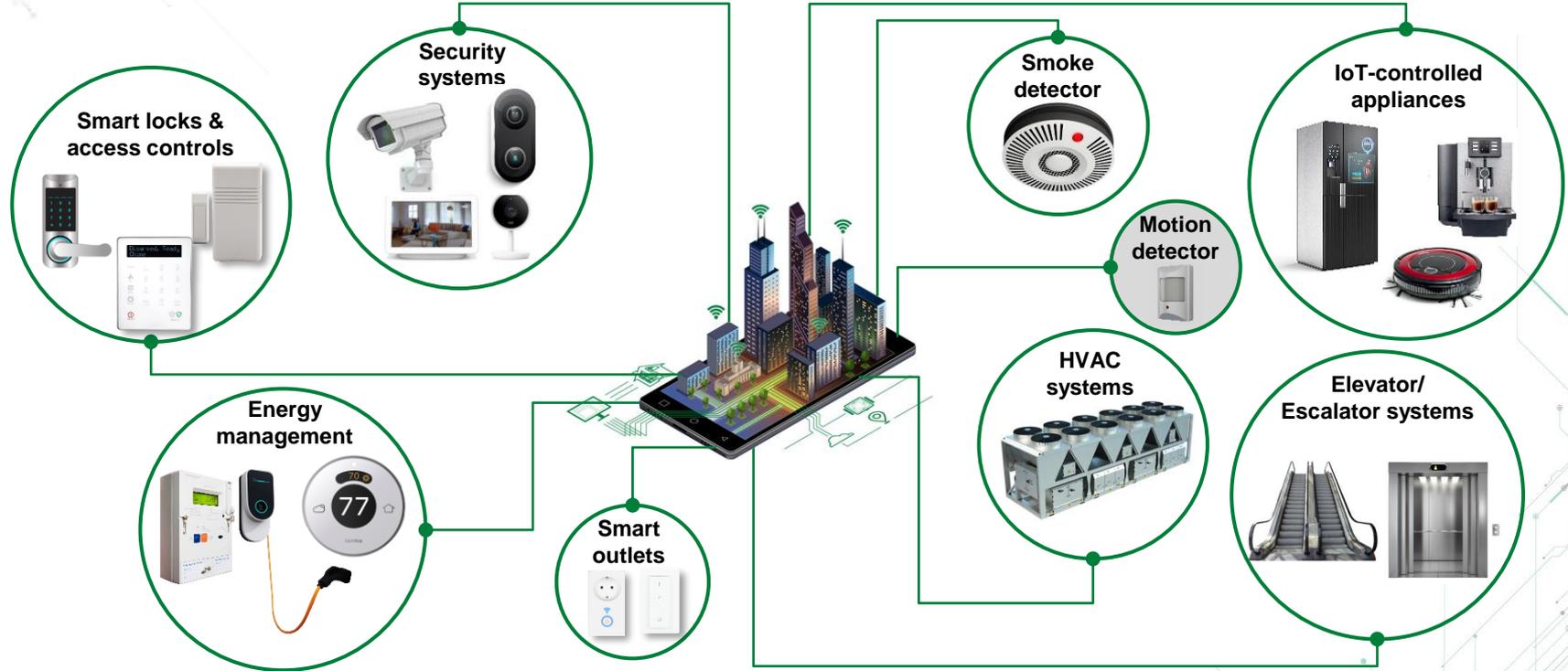
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Building automation

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# Smart buildings & homes are equipped with intelligent technologies that make lives more convenient and energy efficient



Littelfuse offers protect, control, and sense technologies to improve the safety, reliability, and energy efficiency of buildings.

# Market trends and drivers for PIR motion detectors

## Market trends and drivers

Passive Infrared is the leading technology of choice for motion sensing, as it combines performance and affordability.

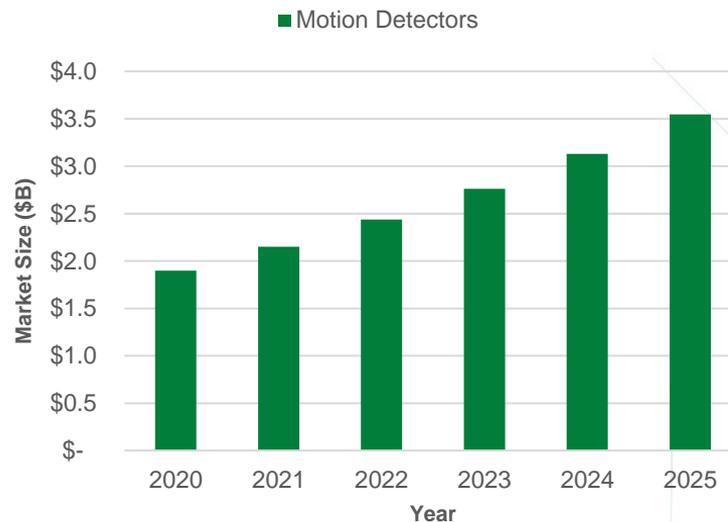
Government initiatives for energy savings are driving adoption in the public and commercial sectors.

Increased awareness of security and surveillance is driving the residential demand.

Wireless connectivity reduces installation costs and adds compatibility to smart home and IoT networks.

COVID-19 concerns require motion detectors for no-touch control, people counting, and distance measuring.

## Rapid growth at ~13.3% CAGR



Source: [Occupancy Sensor Market](#) (Markets and Markets, July 2020)

# Littelfuse components for PIR motion detectors

## AC/DC power stage

- MOV
- TVS diode



## Alarm

- Reed relay
- Solid state relay



## Microcontroller unit

- ZMOTION™

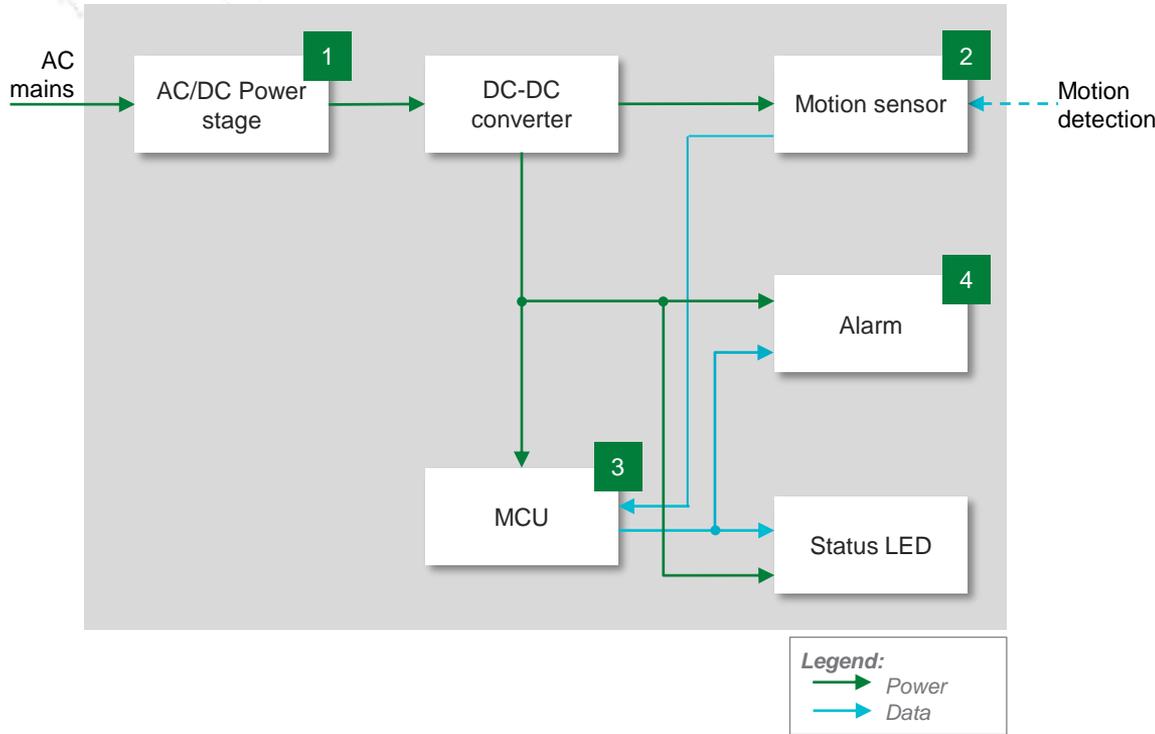


## Motion sensor

- PIR sensor



# PIR motion detector functional block diagram



	Technology	Series
1	MOV	<a href="#">LV UltraMOV</a>
	TVS diode	<a href="#">SMBJ</a>
2	PIR sensor	<a href="#">ZSFG469711</a> , <a href="#">ZRE200GE</a>
3	MCU	<a href="#">ZMOTION™</a>
4*	Reed relay	<a href="#">HE3600</a> , <a href="#">HE3300</a>
	Solid state relay	<a href="#">CPC1017N</a> , <a href="#">CPC1008N</a>

\* Reed relay is preferred when no leakage current is at the output load (for example, battery applications). Solid State Relay offers the smallest possible form factor.



# Benefits of recommended Littelfuse solutions

	Technology	Function in application	Product series	Benefits	Features
1	MOV	Protects the power supply unit from voltage transients and lightning	<a href="#">LV UltraMOV</a>	Reduces customer qualification time by complying with third-party safety standards such as UL/IEC	High peak surge current rating (up to 10 kA); high operating temperature (up to 125 °C); Wide operating voltage range $V_{M(AC)RMS}$ 11 V to 95 V
	TVS diode	Protects the power supply unit from voltage transients and lightning	<a href="#">SMBJ</a>	Compact design; improves system reliability by clamping the voltage at safe levels during transients	Excellent clamping voltage; 600 W peak pulse power capability at 10/100 $\mu$ s waveform; small form factor
2	PIR sensor	Motion detection	<a href="#">ZSFG469711</a> , <a href="#">ZRE200GE</a>	Low power consumption; high reliability	Dual element sensor; wide-angle detection; low voltage operation; pet immunity
3	MCU	Provides control signals per PIR sensing and other inputs	<a href="#">ZMOTION™</a>	Optimized for sensor application; reduces component count and saves space; allows for cheaper ceramic capacitors	Real-time control of motion sensitivity; ambient light sensing; serial or RF communication protocol
4	Reed relay	Control switch to activate alarm based on PIR sensor input	<a href="#">HE3600</a> , <a href="#">HE3300</a>	Low power consumption; high isolation; immune to environmental effects	Miniature single in-line package; external magnetic shield option
	Solid state relay	Control switch to activate alarm based on the PIR sensor input	<a href="#">CPC1017N</a> , <a href="#">CPC1008N</a>	Compact design saves space; robust operation	1500 $V_{rms}$ isolation; low drive reliability; no EMI/RFI generation

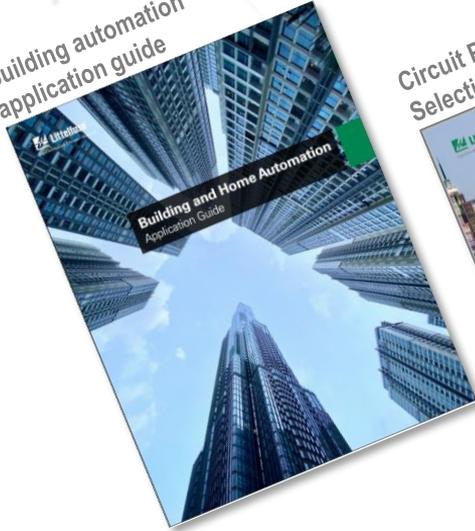
# Select safety standards for PIR motion detectors

Standard	Title	General scope	Region
IEC 63180:2020	Methods of measurement and declaration of the detection range of detectors—passive infrared detectors for major and minor motion detection	Provides a methodology and test procedures to determine and verify the detection area for motion detectors using passive infrared technology	Global
UL 639	Standard for intrusion—detection units	Requirements cover intrusion-detection units intended to be used in burglary-protection signaling systems. These units are intended to be used in indoor or outdoor locations to automatically indicate the presence of an intruder by actuating electrical control circuits.	North America
IEC 62368-1	Audio/video, information and communication technology equipment—Part 1: safety requirements	This part of IEC 62368 is a product safety standard that classifies energy sources; prescribes safeguards against those energy sources; and provides guidance on the application of, and requirements for, those safeguards	Global

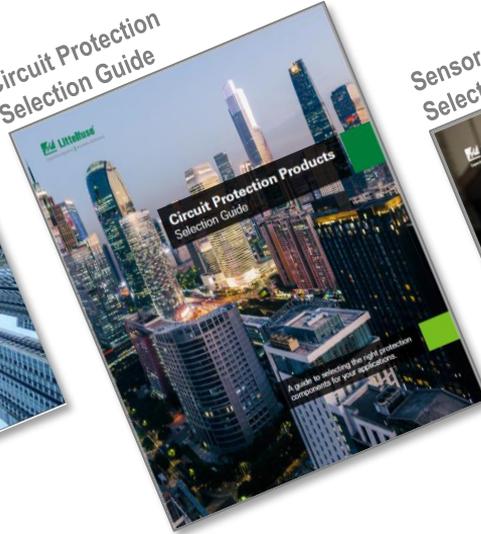
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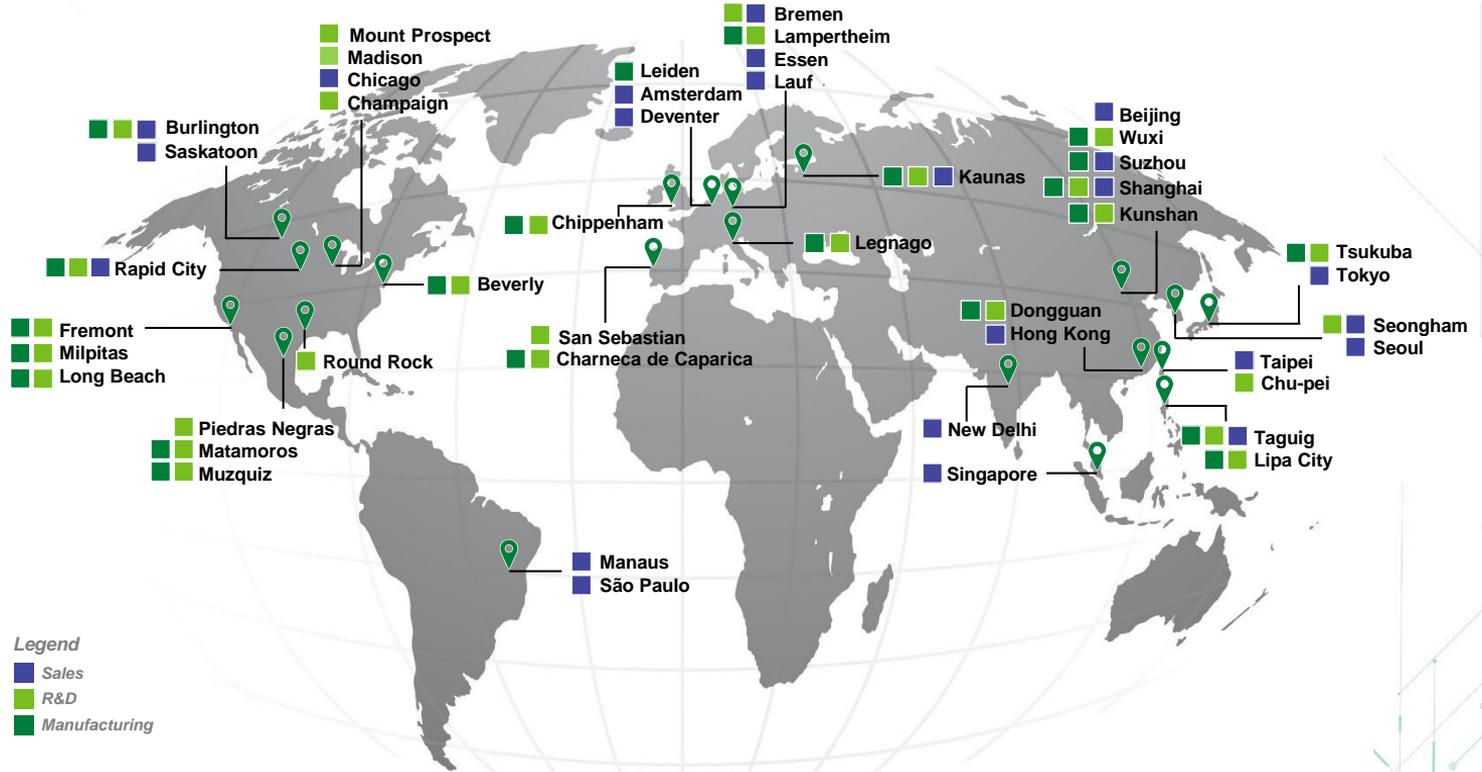
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