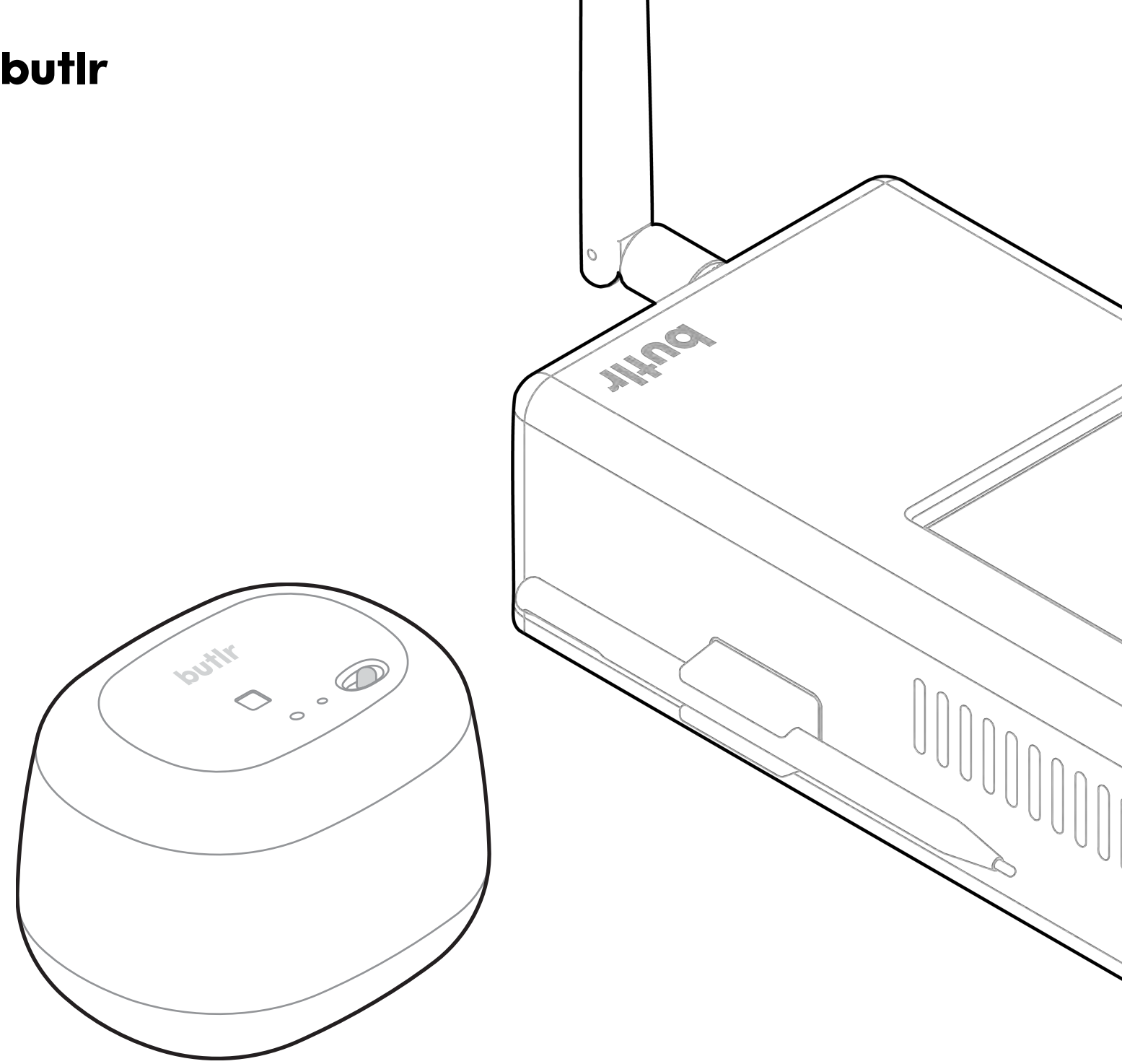
butlr



Heatic Sensor 1.0 & Hive Beta

Datasheet

Version 2022.07.15

Contents

00

Quick Facts

Product Models

- Butlr Heatic Sensor 1.0 (M/N: BSR01)
- Butlr Hive (beta) (M/N: BHV00)

Power

- Sensor: battery operated (1 x 3.6v D Cell 19000 mAh Li-SOCl2 battery)
- Hive: 5.1 V, 3.0 A DC power supply

Sensor Modes

- “Presence” (prev. “Activity”): Provides real-time data on people detections using API’s occupancy endpoint.
- “Traffic” (prev. “Headcount”): Provides real-time 'in' and 'out' traffic data using API’s headcount endpoint.

Thermal Sensor Specs

- Low resolution thermopile array
- 60 degree FOV
- Temperature sensing range: 32°F to 176°F (0°C to 80°C) with an accuracy of ± 4.5°F (2.5°C)

Radio

- Sensor RF band: 2405 MHz-2480 MHz
- Wireless network type: Self-healing Mesh
- Wireless network frequency: 2.4 GHz

Regulatory

- USA: FCC ID, FCC sDoc, California Prop65
- Canada: IC, IC VOC
- EU: RED, RoHs, WEEE, UKCA
- Other: TELEC (Japan), IMDA (Singapore), RCM (Australia), WPC (India), KC (South Korea)

System Accuracy

In common office/residential settings and Butlr’s specifications for optimal performance:

- Traffic (“in” and “out”): >95% accuracy
- Presence: 90-95% accuracy

Deployment

- Optimal installation height: 7-9.5.5 ft (2.1-2.9 m) for Traffic, 7-10.5 ft (2.2-3.2 m) for Presence
- Mount types: ceiling mount, wall mount, adjustable angle mount, magnetic mount, hanging rod

Device Dimensions

- Heatic Sensor 1.0: 3 x 2.3 x 2 in (75 x 60 x 53 mm)
- Hive (Beta): 5.8 x 2.8 x 1.7 in (147 x 73 x 43 mm)

Operating Environment

- Indoor only, avoid direct sunlight
- Hardware operating temp: 0 - 104 °F (0 - 40°C)
- Operating temp for best detection results: 65 - 85 °F
- Relative humidity: 5% to 90% noncondensing

Security and Privacy

- Data encrypted in transit (TLS 1.2) and at rest (AES256)
- SAML Authentication via Auth0
- TIER certified data centers
- Annual internal audit security assessments
- Annual external penetration tests
- No personally identifiable data collected

Software Compatibility

- Studio (app)
  - 2 cores 4 thread 1.3GHz (Intel i5)
  - 4GB RAM per desktop client
  - Using 500MB disk storage
  - Windows, iPadOS & MacOS
- Dashboard (web)
  - Chrome, Safari recommended

01

Platform Overview

Workplace planning and asset strategy

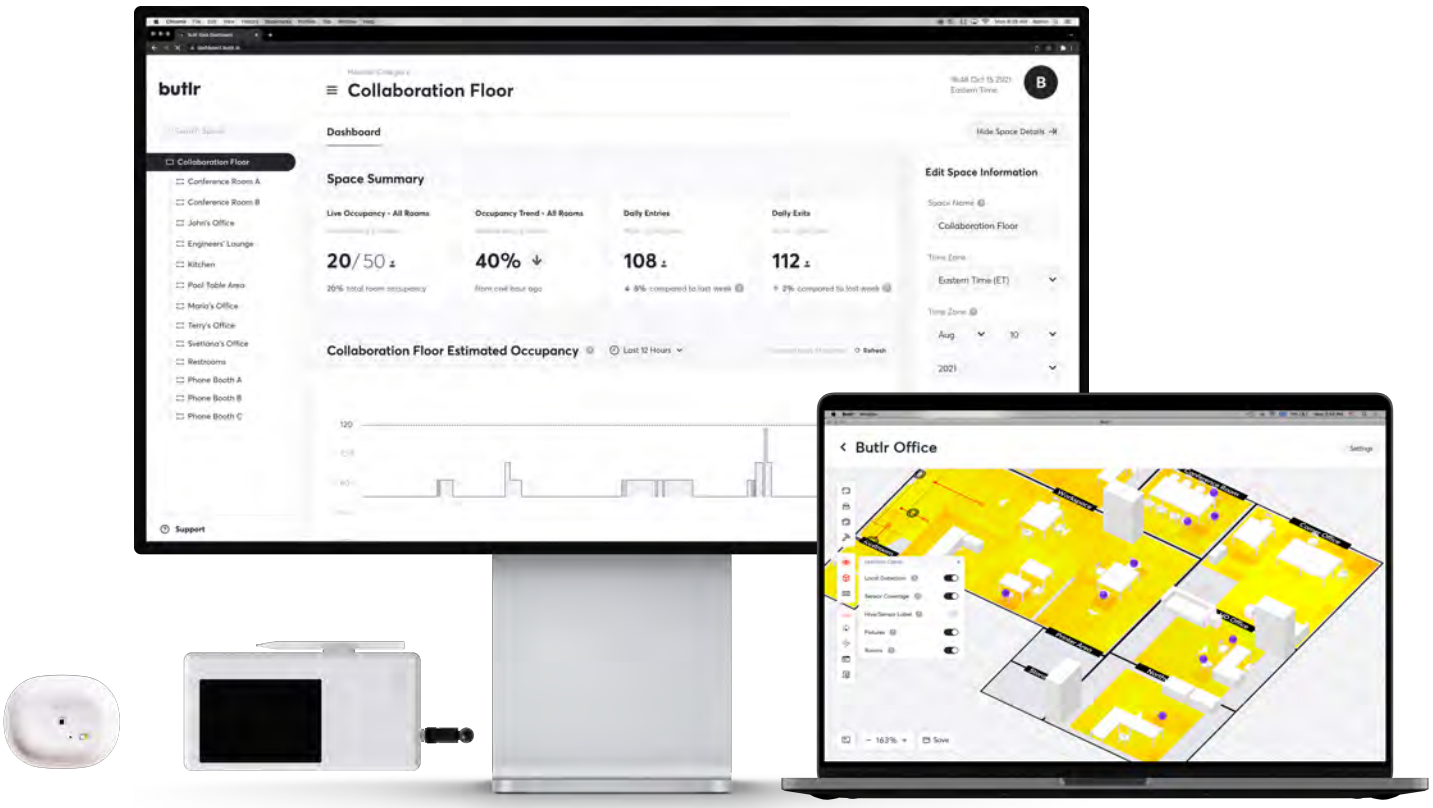
Leasing decisions
Space positioning
Tenant Improvement (TI) & Buildout
Pricing & renewals
Tenant analytics

Employee and tenant experience

Space booking & hoteling
Wayfinding
Amenity availability
Traffic management
Collaboration & collisions analytics

Facility management and building operations

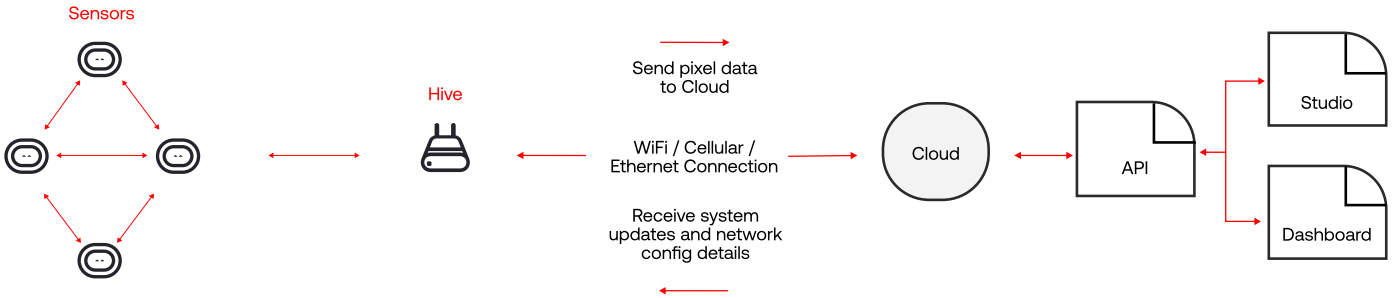
Traffic-based cleaning
Smart HVAC systems
Maintenance optimization
Proactive alerting on capacity
Notifications on unusual activities



Heatic Sensor 1.0 Hive Beta Dashboard Studio

02

System Overview

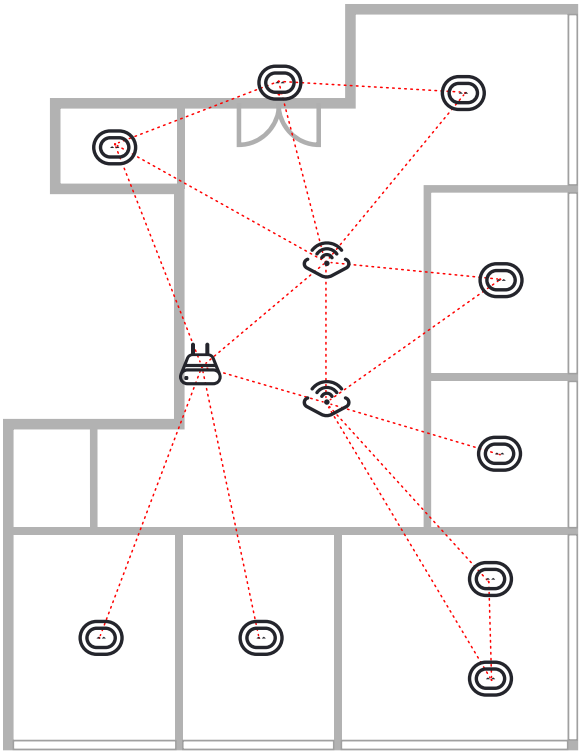


Mesh Network

Heatic Hive and Sensors will form a mesh network. The system works best when the distance between devices (from Hive to Sensors/Mesh Network Boosters or from one Sensor/Mesh Network Booster to another) is less than 30 feet (10 meters), this greatly depends on what other devices are working on the 2.4GHz WiFi band in the area.

Device Group

To achieve the best real-time performance, each Hive should not be connected to more than 12 sensors. Specifically, the frame rate limit per device group is 36 frames per second (FPS). Traffic sensors run at 8 FPS, while Presence sensors run at 3 FPS. We recommend grouping devices based on proximity.



Hive

Heatic Sensor

Mesh Network Booster

Network Specs

Network Interfaces	
Hive	Wifi, Ethernet, LTE (external device needed)
Sensor	Proprietary Wireless Network Protocol
Firmware Update	Over-the-Air (OTA)

Hive-Internet Connectivity

WiFi Frequency Bands	2.4 Ghz / 5 Ghz

Sensor-Hive Mesh Network

Wireless System Security	NIST Certified
Wireless Network Type	Self-healing Mesh
Wireless Network Protocol	6LoWPAN Internet Protocol (IP) and IEEE 802.15.4e Standards Compliant
Wireless Network Frequency	2.4GHz to 2.4835GHz
Wireless Network Formation	Automatic
Wireless Network Reliability	100%
Measurement type	Synchronized
Sensor Hardware Architecture	Programmable System-on-Chip

03

Hive

General Specs

Power Source	120-240 V AC Wall Power, PoE via adapter
Power Supply	5.1 V, 3.0 A DC power supply
Operating Temp. Range	0°F to 104°F (0°C to 40°C)
Operating R.H. Range	5% to 90% noncondensing
Designed in	USA
Warranty	Active Subscription Based Warranty
Maximum Number of Heatic Sensors per Hive	12 (without external gateway plug-in)
I/O Support	Touch Screen
Network Connection	WiFi, Ethernet, LTE (external device needed)
Operating System	Linux

Hive Beta

Materials	ABS
Weight	200g
Dimensions	147mm x 73mm x 40mm
Configuration Interface	3.5 inch touch screen

Antenna Specs

Mechanical		Electrical	
Material	TPEE	Frequency	2.4GHz
Material of Radiator	CU	Antenna Gain	2.5dBi
Connector Type	SMA-J	Radiation Type	Omnidirectional
Antenna Color	Black	Polarization	Linear
Overall Length	110 mm - OD 10mm	Power standing	10W
Weight	8 gr	Nominal Impedance	50Ω

04

Heatic sensor

General Specs

Sensing Technology	Low resolution thermopile array
Communication	Wireless mesh network
Usage	Indoor
Sensor Power Supply	3.6v D Cell Li-SOCl2 Battery (Lithium Metal Battery)
Battery Capacity	19 Ah
Operating Temp. Range	0°F to 104°F (0°C to 40°C)
Operating R.H. Range	5% to 90% noncondensing
Mounting Height Range	7-11 ft (2 - 3.2 m)
Height Tolerance	10 cm
Housing Material	ABS
Origin	Designed in the USA
Warranty	Active Subscription Based Warranty
Certifications	USA: FCC ID, FCC sDoc, California Prop65 Canada: IC, IC VOC EU: RED, RoHs, WEEE, UKCA TELEC (Japan), IMDA (Singapore), RCM (Australia), WPC (India), KC (South Korea)

Sensor Output

API Endpoints	docs.butlr.io
Data Latency from Sensor to API in optimal network conditions	Traffic Mode: ~11 s Presence Mode: ~2 s
Data Privacy	No cameras. PII (personally identifiable information) not able to be captured by virtue of low resolution thermal pixels

Spatial Level

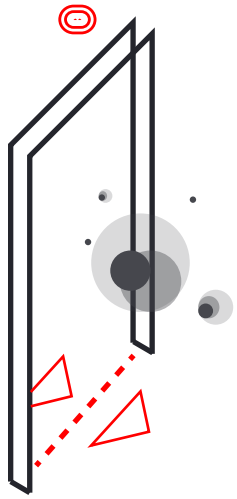
Space-level	Combines data from multiple rooms in one Space (e.g. floor, building)
Room-level	Combines data from multiple sensors in one room
Zone-level (Beta)	Combines data from a user defined region (e.g. desk, section, groups of rooms)
Sensor-level	Data collected under a single sensor coverage

Default Settings

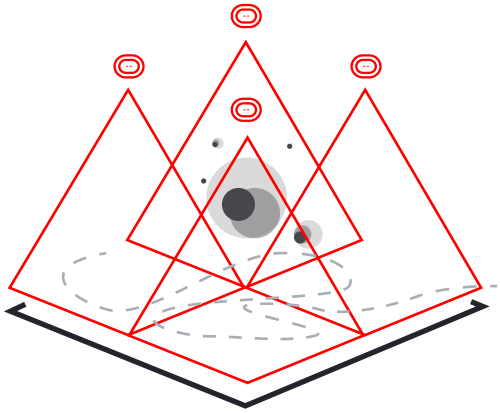
Active Sampling Rate	Traffic Mode: 8 fps Presence Mode: 3 fps
Power Saving Sampling Rate	0.5 fps
Power Saving Schedule	Weekdays: 10PM - 6AM local time Weekends: all day Please contact Butlr to change this schedule.
Active Current Draw	Traffic Mode: 4.5 mA Presence Mode: 2.35 mA

Sensor Modes

Traffic Mode (prev. “Headcount”)	Supplies aggregations of total 'in' and 'out' movements relative to a sensor's orientation, user-defined door line and direction of entry
API	Uses “headcount algorithm” and “headcount endpoint”
Primary Data	“In” and “Out”
Secondary Data	Estimated occupancy
Optimal Sampling Rate	6.5-8 frames per second
Data Latency from Sensor to API *in optimal network conditions*	~11 s Once person exits sensor coverage
Optimal Installation Height	7 ft (2.1 m) - 9.5 ft (2.9 m)



Presence Mode (prev. “Activity”)	Supplies the number and coordinates of persons within the sensor's coverage area
API	Uses “occupancy algorithm” and “occupancy endpoint”
Primary Data	Occupancy, Detection Coordinates
Secondary Data	Occupancy Trends Beta: Trajectory, Activity Heatmap, Fall Detection
Optimal Sampling Rate	2.5-3 frames per second
Data Latency from Sensor to API *in optimal network conditions*	2 s
Optimal Installation Height	7 ft (2.1 m) - 9.5 ft (2.9 m)



Sensor Detection Accuracy

Traffic Mode

Recommended Use Cases	Primarily for the following building, floor or large space-level data: 1. Entryway entries and exits 2. Occupancy estimated from main entryway entries and exits
Entry & Exit Count Accuracy	> 95% Conditions: • For common office and residential settings • Environmental temperature between 65-85°F or 18-29°C • Minimum distance between people is 4 in or 10 cm • Installed following Butlr's specifications for best performance
Estimated Occupancy Accuracy	90-95% Additional Conditions: • Daily expected occupancy of space must be ≥ 50 people • Maximum of 4 entryways enclosing the space
Factors that may affect accuracy *assuming sensors are correctly installed*	**False Positive Detections** Non-human heat objects Large animals People continuously standing on virtual door line People walking on virtual door-line without entering or exiting **False Negative Detections** Person wearing a helmet or thick clothing Person's external temperature is 35.6°F or 2°C below environmental temperature Distance between people is less than 4 in or 10 cm Object blocking over 1/3 of sensor view Weak internet or device mesh network connection Please contact Butlr for assistance with these scenarios.

Sensor Detection Accuracy

Presence Mode

Recommended Use Cases	Room, zone or desk-level (coming soon) occupancy Space-level occupancy, if fully covered by sensors
Occupancy Accuracy	90-95% Conditions: • For common office and residential settings • Environmental temperature between 65-85°F or 18-29°C • Minimum distance between people is 4 in or 10 cm • Installed following Butlr's specifications for best performance
Factors that may affect accuracy *assuming sensors are correctly installed*	**False Positive Detections** Strong sunlight Laptops and other appliances Soft furniture that retains body heat Large animals Note: butlr's algorithm automatically resolves most cases mentioned above, but outliers are possible. **False Negative Detections** Person wearing a helmet or thick clothing Person's external temperature is 35.6°F or 2°C below environmental temperature Distance between people is less than 4 in or 10 cm Object blocking over 1/3 of sensor view Weak internet or device mesh network connection Please contact Butlr for assistance with these scenarios.

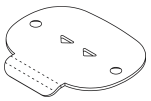
Heatic Sensor 1.0

Weight	5.6 oz (166 g)
Dimensions	72.5 mm x 57.5 mm x 51.5 mm
FOV	60 degrees
Theoretical Coverage	2*tan(30)*height
Battery Life (based on commonly used default settings)	Headcount Mode: 7 - 12 months Activity Mode: 15 - 20 months

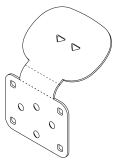
Mounting

Sensor-to-wall	Adhesive / Screws / Magnetic / Hanging Rod
Sensor-to-base/bracket	Magnetic
Mounting Guide	support.butlr.io/mounting-guide

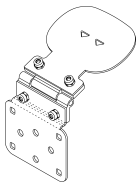
Mounts/Brackets



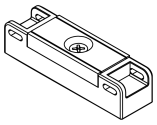
Ceiling Mount



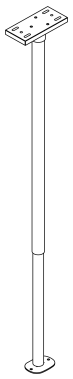
Wall Mount



Adjustable Mount

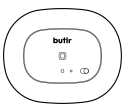


Magnetic Add-On

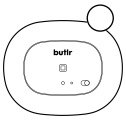


Hanging Rod

Hardware Variants



Internal antenna version

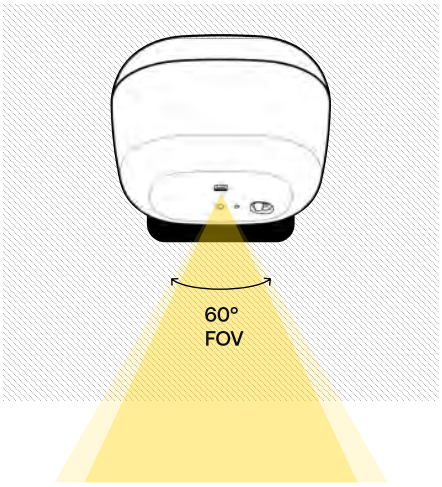


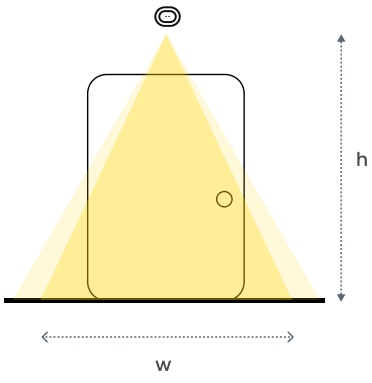
External antenna version

Height & Coverage

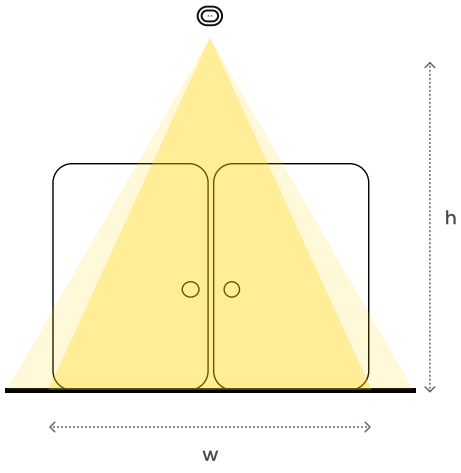
Traffic Mode	Using the default wall mount (105° tilt angle)
Sensor Height (h)	**Width of Single Sensor Coverage (w)**
6.9 ft (2.1 m) min*	57 in (1.45 m)
7.9 ft (2.4 m)	70 in (1.78 m)
8.9 ft (2.7 m)	83 in (2.1 m)
9.5 ft (2.9 m) max*	93 in (2.35 m)

*Installing sensors at heights beyond the recommended range may lead to less accurate results.



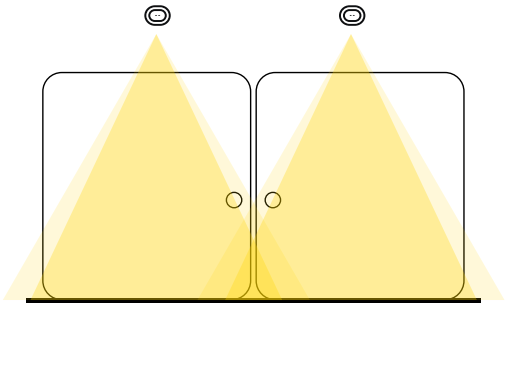


Single door



Double door

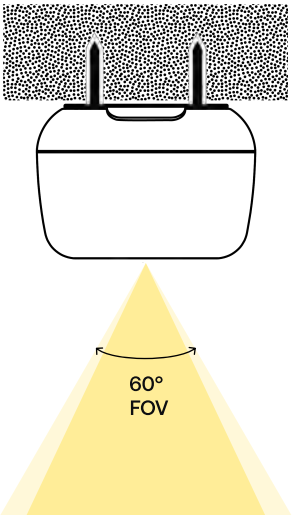
Install sensor higher to cover the full door width.



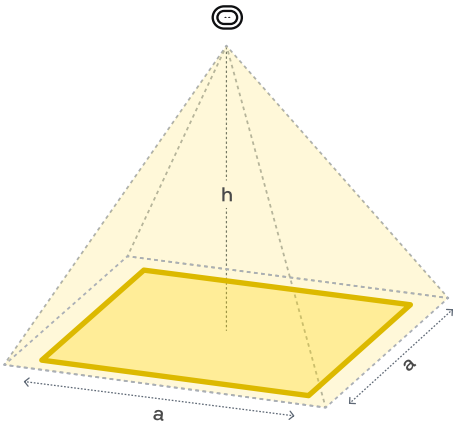
Wider entrances

Please contact Butlr for assistance with calibrating multiple sensors with coverage overlaps.

Presence Mode		Using the default ceiling mount
Sensor Height (h)	**Single Sensor Coverage Area (a^2)**	**Optimal Distance Between Sensors (d)**
7.2 ft (2.2 m) min*	67 x 67 in (1.7 x 1.7 m)	79 in (2 m)
7.9 ft (2.4 m)	75 x 75 in (1.9 x 1.9 m)	91 in (2.3 m)
8.5 ft (2.6 m)	87 x 87 in (2.2 x 2.2 m)	98 in (2.5 m)
9.2 ft (2.8 m)	95 x 95 in (2.4 x 2.4 m)	110 in (2.8 m)
9.8 ft (3.0 m)	102 x 103 in (2.6 x 2.6 m)	118 in (3 m)
10.5 ft (3.2 m) max*	114 x 114 in (2.9 x 2.9 m)	126 in (3.2 m)

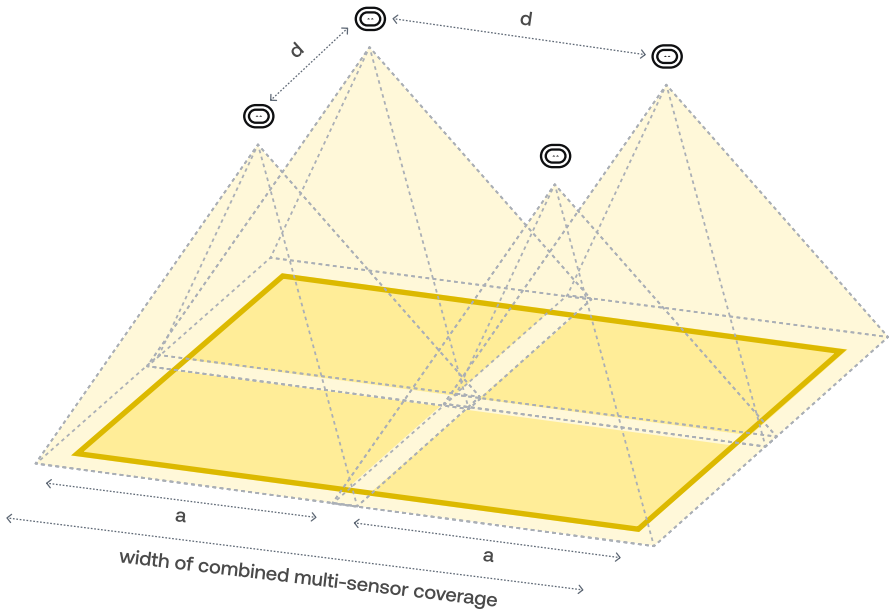


*Installing sensors at heights beyond the recommended range may lead to less accurate results.



Single sensor coverage

Effective coverage area of a sensor is the squared width of one side (a).



Multi-sensor coverage

Adhering to the optimal distance between sensors (d) will prevent any gaps or overlaps between the effective coverages of all sensors.

- If sensor-to-sensor distance > d, there will be gaps not covered by sensors;
- if sensor-to-sensor distance < d, there will be overlapping coverage that will have to be excluded via Studio app to avoid duplicate counts.

butlr

Thank you.

Contact us

Have questions about the Butlr People Sensing Platform?
Please contact us at support@butlr.io or
submit a form via our website www.butlr.io or
visit our Learning Center at https://support.butlr.io

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