

# Abacus: Product Information

The Abacus performs three functions: Counting people, measuring environmental conditions, and communication.

The Abacus counts people moving in and out through the entrance of a room or area, using a Time of Flight directional sensor. The Abacus is mounted above the entrance and the data that is collected tells you how many people are in the room at any given time. Measuring room occupancy in this way not only indicates whether it is occupied at any given moment, but also what the actual utilization is against the room's full capacity. This people counting function can also be applied to trigger event such as cleaning and sanitation activities, or notification of breach of people density in specific areas of a building.

The Abacus also measures environmental metrics such as ambient temperature, humidity, sound and light conditions, as well as air quality parameters including CO2 and TVOC levels.

The Abacus has a built-in communications module which enables it to relay data directly to the Ergosense cloud-based Solutions Hub. It can therefore operate completely independently and does not requiring any additional gateway functionality from other devices.



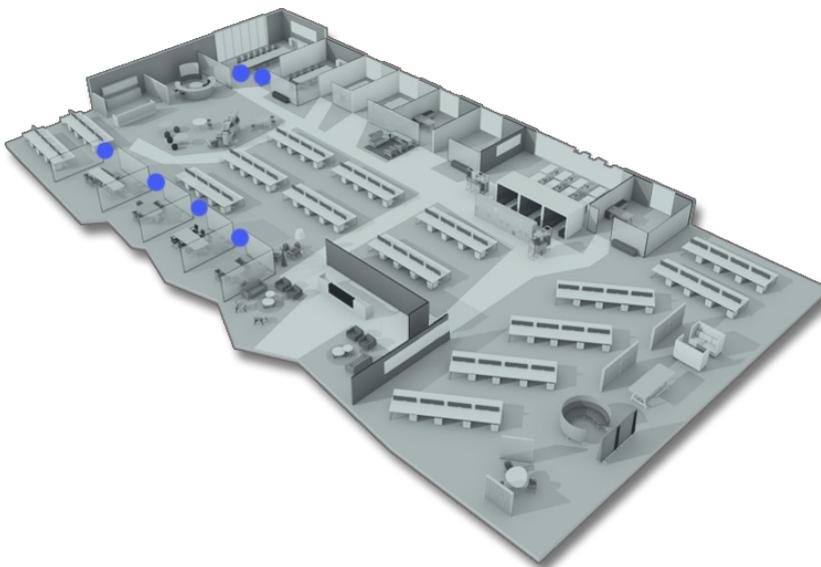
**Dimensions:**

103mm x 90mm x 30mm

**Weight:**

66,8g

**Placement Example:**



**Measures:**

-  CO2 levels
-  TVOC levels
-  Temperature
-  Occupancy
-  Humidity
-  Sound levels
-  Light lux level

**Power and Communication:**

 Information is streamed by the Abacus directly to the cloud-based Solutions Hub at pre-determined intervals. This transmission happens securely and seamlessly anywhere in the world via GSM using MQTT communications protocol. The secure independent connectivity means no other gateway function, or integration with client network is needed.

 No on-site configuration is required, the transmission will happen automatically when the device is powered. Abacus only needs to be plugged in using the supplied 5-volt power supply. Abacus will immediately start measuring and sending data to the cloud.

Ergosense (Pty) Ltd

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# Abacus: Specifications

Operating Voltage	4-5V
Operating current	100mA-2.1A
Power Supply	5V micro USB
Operating Temperature	-5C-50C
Storage Temperature	-20C-85C

## General Sensor Operation:

User input	Single push button
Microphone sensitivity	>40dBA
Temperature sensor range	-10C-85C
Humidity sensor range	0-80%
CO2 sensor range	400ppm up to 32768ppm
VOC sensor range	0ppb up to 32768ppb
Lux sensor range	0.01-64k lux
Battery power measurement	N/A
Occupancy/People counting	Time of Flight ranging sensor

## GSM Modem:

GSM operating frequencies RX	EGSM900: 925-960MHz DCS1800: 1805-1880MHz
LTE Bands	1,3,5,7,8,20,38,40
GSM operating frequencies TX	EGSM900: 880-915MHz DCS1800: 1710-1785MHz
LTE Bands	1,3,5,7,8,20,38,40
GSM antenna	Ceramic dual band monopole antenna
Sim card	Standard size Sim card or on board chip SIM

## Bluetooth low energy:

BLE version	ver 4.1
RF frequency	2.4GHz
TX power	+4dBm
RX sensitivity	-88dBm
BLE Module FCC Compliance	Part 15
BLE Module certification	CE qualified FCC, IC modular approval certified TELEC BQE qualified
BLE antenna	Onboard chip antenna
Range	5-10m individual node range in BLE mesh non line of sight

## Bluetooth low energy mesh:

Provisioning	Devices added to a network are provisioned using proven security algorithms using 256-bit elliptic curves Provisioning and network layer based on Mesh profile v1.0
Communication	All messages in the network are encrypted with AES-128 CCM mode
Privacy	Privacy through obfuscation
Data protection	Protected against security attacks like Brute-force, Bit-Flipping, Eaves Dropping, Replay, Trashcan, Man in the middle and physical insecure device attacks

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