Smart Spot

Smart Spots are configurable IoT devices that allow monitor different environmental factors, such as air quality (gases and suspended particles), temperature, humidity and noise, as well as integrating weather stations.
The inclusion of all these sensors and capacities in a single device provides savings in the installation, maintenance and management as well as in communications.
As for the connection possibilities of this device, it is offered in multiple versions, including Wi-Fi, LoRa, GSM/GPRS and NB-IoT

CONNECTIVITY

This device offers different communication options: 4G/Ethernet, Wi-Fi, GSM-GPRS, LoRa and NB-IoT.
On the other hand, they allow the use of communication protocols such as LwM2M, MQTT and Modbus TCP (industrial environments). Furthermore, these devices are FIWARE-Ready.

SUPPLY

To be scalable in different types of territories, Smart Spots allow different types of power sources, high-capacity batteries and solar panel recharging*.
Thanks to this versatility, these devices are capable of working in remote natural environments, without the need for an electrical installation, as well as operating in city environments where it is not possible to receive a continuous electrical connection.

CORE SYSTEM

CHARACTERISTICS	Operating system	Watchdogs anti-blocking system
		Industrial operating system in real time (FreeRTOS)
		Valid for industrial environments
	CPU	Dual Core a 240 MHz. 16MB RAM / 32MB Flash - expandable with SD card
	Antennas	Multi-antenna IP68 anti-vandalism (GPS/M2M/WiFi)
	Device health monitoring	Temperature
		Humidity
	Vandalism detection	Accelerometer
		Gyroscope
COMMUNICATIONS	Network	WiFi
		LoRa
		GPRS
		NB-IoT
	Protocols	MQTT
		OMA LwM2M
		ETSI NGSI (FIWARE)
		HTTP
		Sentilo
	Remote management	Own platform (Homard)
		Third party platform
	Data sending	Configurable between 1 seg - 24 hr.
POWER SUPPLY	Energy consumption	180-300 mA Active
	Voltage (nominal)	5V
	Battery (optional)	20.000 mA
	Solar panel (optional)	6.5V

*Smart Spot devices allow different power configurations, being able to adapt the capacity of the battery and the solar panel to the specific use case

ENCLOSURE	Protection	Protection IP65
	operating temperature range	-30°C to 60°C
	Size	300x220x36,7 cm
	Material	Aluminium
	Anchorage system	Anti-vandalism security
	weight	1,8 kg

Environment

Air quality · Weather · Ambient

People

Interaction · Experience · Flow

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Extensions

1. Weather parameters	Temperature, humidity and Pressure
2. Harmful & greenhouses gases*	NO2, H2S, CO, NO, SO2, O3, NH3 & CO2
3. Particles Matters (PM)	PM1, PM2.5 y PM10
4. Sound level meter**	Class II - 40 dB - 115 dB
5. People Flow	WiFi y BLE

Up-to 6 gases
***Possibility of incorporating a sound level meter CESVA Class I*

Extensions enclosures

Protection	Aluminium IP65
Weight	2,2 kg
Anchorage system	Anti-vandalism system
Size	100x220x280 mm

*Adaptation to the use case

1. Weather parameters

TEMPERATURE	**Resolution**	0.01°C
	Accuracy	±0.1°C
	Range	-40°C a +125°C
HUMIDITY	**Resolution**	0.01 %HR
	Accuracy	±1.5 %HR
	Range	0 %HR a 100 %HR
PRESSURE	**measuring range**	300 a 1.000 hPa
	Accuracy	±0.25 % hPa
	External protection	Solar radiation protection RS3 - B

2. Harmful & greenhouses gases

CORE SYSTEM	1. Optimal air flow pump	
	2. Connector with coarse filter	
	3. Air quality plate Control system	
	4. Dual-gas plate (2, 4 or 6 gases)	
SENSORS TECHNOLOGY	**Type of sensor**	Electrochemical
	Rango de humedad	[15, 85] % hr
	Temperature range	[-20, 45] °C
	Lifetime	24 Months
CALIBRATION AND DATA QUALITY SERVICE	**Calibration equipments**	1. Calibration with reference gas with external composition and stability certification (LINDE) 2. External certification of Composition and stability 3. UNE-EN ISO/IEC 17025, Agency EPA
	Artificial Intelligence models	1. Drift compensation 2. Removal of outliers 3. Model for the improvement of data accuracy for each sensor

3. Particles Matter (PM)

Core system	Air quality control system Anti-humidity filter Forced air flow pump
Measurement range	0,35 a 40µm
Particles/second	10,000
Size of measured particles	PM1, PM2.5 y PM10
Max. Mass flow rate	PM1 y PM2.5: 2,000 µm/m3 PM10: 5,000 µm/m3
Resolution	0,1 µm/m3
Accuracy	>90% (Ref. Spectometer Grimm 11D)

4. Sound level meter (Class 2)

CHARACTERISTICS	Working range SPL	40 - 115 dB		
	Weighting frequency	Filter IEC 61672-1 A		
	Weighting time	IEC 61672-1 Slow (S) & Fast (F)		
	Certification	ROHS2/CE		
	Additional features	Continuous exposure monitor, Threshold detection		
FUNCTIONS	Available functions	LASFast	LASlow min	LA1
		LAFast max	LAeq	LA10
		LAFast min	LA	LA50
		LASlow	LAmax	LA90
		LASlow max	LAmin	LA99

5. Crowd monitoring

Configuration	Independent for each technology (WiFi & BLE)
Time range	Simultaneous aggregation in 3 time ranges Aggregation time configurable from 1 m 1 h. (3 ranges)
Hash algorithms	Obfuscated WiFi/BLE identifiers SHA1 and MDS since detection Configurable Hash algorithm for obfuscation (MDS and SHA1) Key for configurable Hash obfuscation algorithm Individual report of detected devices in Hash format (SHA1 and MDS)

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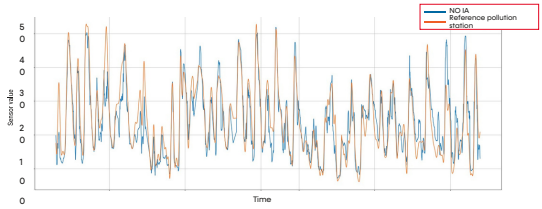
1. More information Weather parameters

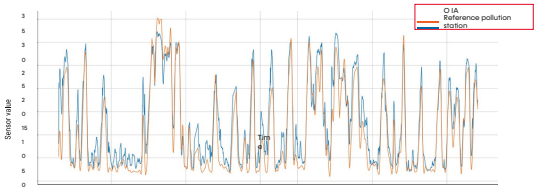
Solar radiation
protection probe
RS3-B

2. More information Harmful & greenhouses gases

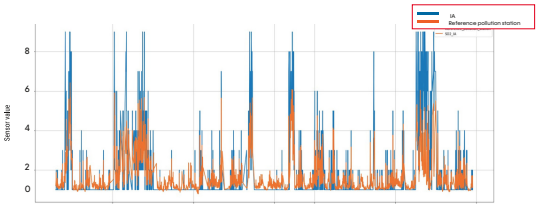
NO2	Range	0-5 ppm
	Accuracy	±2 ppb
	Resolution	1 ppb
	Maximum stable value	50 ppm
	Cross sensivity	CL> HS> NO> SO, CO



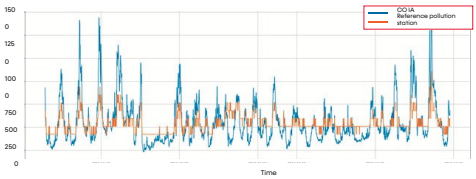
O3	RRange	0-5 ppm
	Accuracy	±3 ppb
	Resolution	1 ppb
	Maximum stable value	50 ppm
	Cross sensivity	CL> HS> NO> SO, CO



SO2	Range	0-5 ppm
	Accuracy	±3 ppb
	Resolution	1 ppb
	Maximum stable value	100 ppm
	Cross sensivity	O, NO> Cl> HS, NO, CO



CO	Range	0-10 ppm ±5
	Accuracy	ppb
	Resolution	1 ppb
	Maximum stable value	2.000 ppb
	Cross sensivity	HS> NO



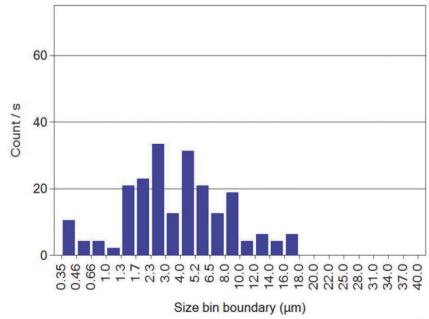
NO	Range	0-5 ppm
	Accuracy	±10 ppb
	Resolution	1 ppb
	Maximum stable value	50 ppm
	Cross sensivity	HS>NO>SO, Cl

NH3	Range	0-20 ppm
	Accuracy	±20 ppb
	Resolution	1 ppb
	Maximum stable value	200 ppm
	Cross sensivity	CL, NO, SO> HS; NO> CO> H

H2S	Range	0-1 ppm
	Accuracy	±2 ppb
	Resolution	1 ppb
	Maximum stable value	50 ppm
	Cross sensivity	NO>SO> CL> NO

CO2	Tecnology	Óptical
		Specific plate & hood
	RRange	específico 0-5.000 ppm
	Accuracy	±1 ppm
	Resolution	1 ppm
	Lifetime	24 months

3. More information Particles Matter (PM)



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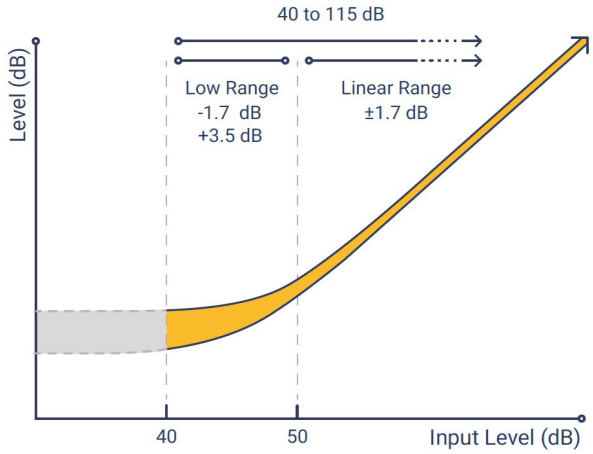
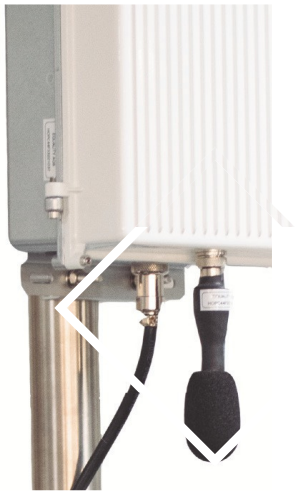
4. More information Sound level meter (Class 2)

Range of action (40-115 dB)

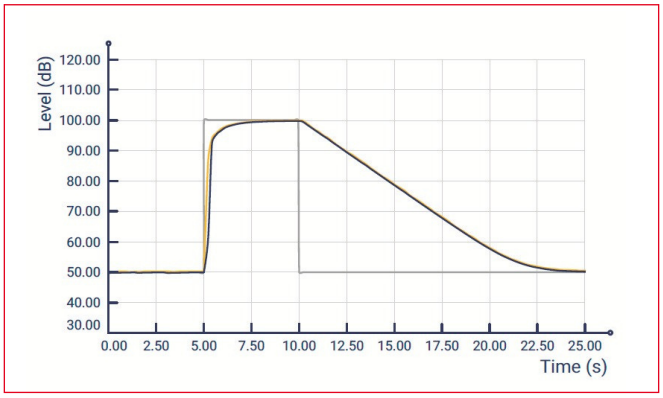




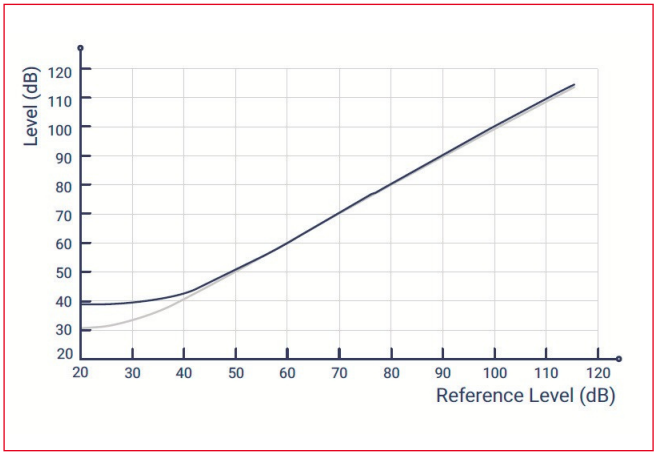
Sound level sensor with wind protection probe

Weighting time - FAST (F)

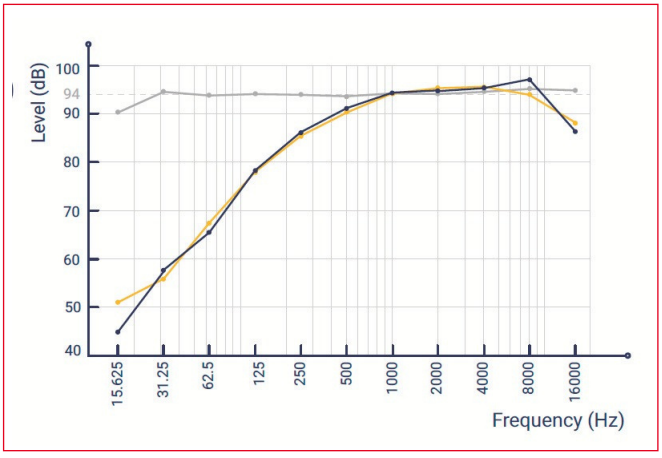
Weighting time - SLOW (S)



Extensive response (1kHz)



Response frequency weighting A



SPL Meter
Reference*
Entry level

*The device used as reference is a class 2 sound level meter according to IEC 61672 and ANSI S1.4

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