
WxS 870-000

Temp+Humidity+AirPressure+MPI

Overview

The WxS 8700 is a wireless gas sensing platform based on LoRa technology operating at license free spectrum (ISM), enabling both public and private IoT network deployments by service providers, municipality governments, enterprises. It's deployed in star topology with very high density, particularly suited for industrial and enterprise IoT applications such as

- 1) Industrial campus safety
- 2) Smart and Safety
- 3) Environmental Monitoring
- 4) Subway security and safety
- 5) Hospitality safety
- 6) Residential complex, shopping center, CBD safety

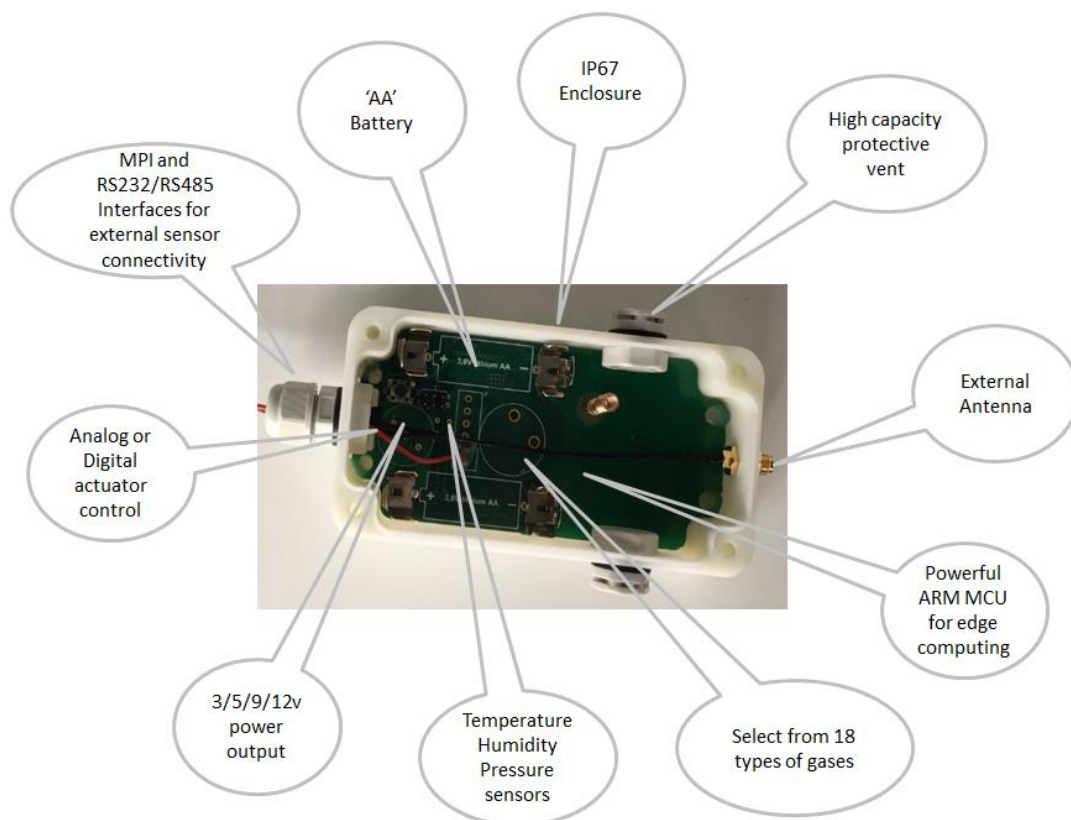
Polysense iView is a cloud IoT network management and sensing data analytic platform, supporting Polysense sensor end nodes, such as WxS 8800 and WxS 8700, and 3rd party sensor nodes and definition of new sensor data types. It provides flexible sensor data format conversion, data import and export; charting, data analytic, integrated map, zone and priority based alert management, SMS text and email notification, and open API for 3rd party integration.

Product Highlights

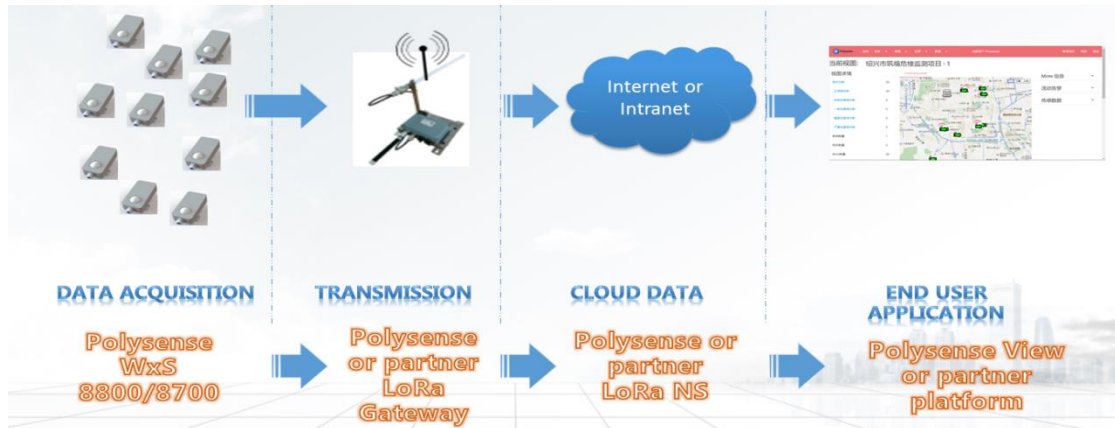
- ✓ 18 types of gases supported (flammable, explosive, poisonous, pollutant or with bad odor)
- ✓ PM 1/2. 5/10, VOC, CO2 also supported
- ✓ Integrated temperature, humidity, and atmospheric pressure sensor
- ✓ Temperature:-40-125°C
- ✓ Humidity: Range: 0 – 100%; +/- 2% typical accuracy
- ✓ Air pressure:260 to 1260 hPa absolute pressure range;High-resolution mode: 0.01 hPa RMS



- ✓ 4 MPI interfaces: each MPI can operate as 0-10v analog voltage input, 4-20mA current input, open/close, pulse counting
- ✓ Selectable RS232/RS485, Modbus interface for external sensor connectivity
- ✓ Analog and 16 level PWM digital output for actuator control
- ✓ 3v/5v/9v/12v power output to external devices
- ✓ IP 67+ enclosure rating
- ✓ Integrated internal antenna
- ✓ 1 or 2 'AA' Li-Ion Battery; 5 – 10 years of battery operational life
- ✓ Optional DC 5V power source
- ✓ Optional external SMA/IPEX antenna
- ✓ LoRaWAN 1.02 compliant
- ✓ Up to 5km reach in NLOS and up to 18km LOS environments
- ✓ Edge computing and cloud sensor data processing and analytic








Application Architecture

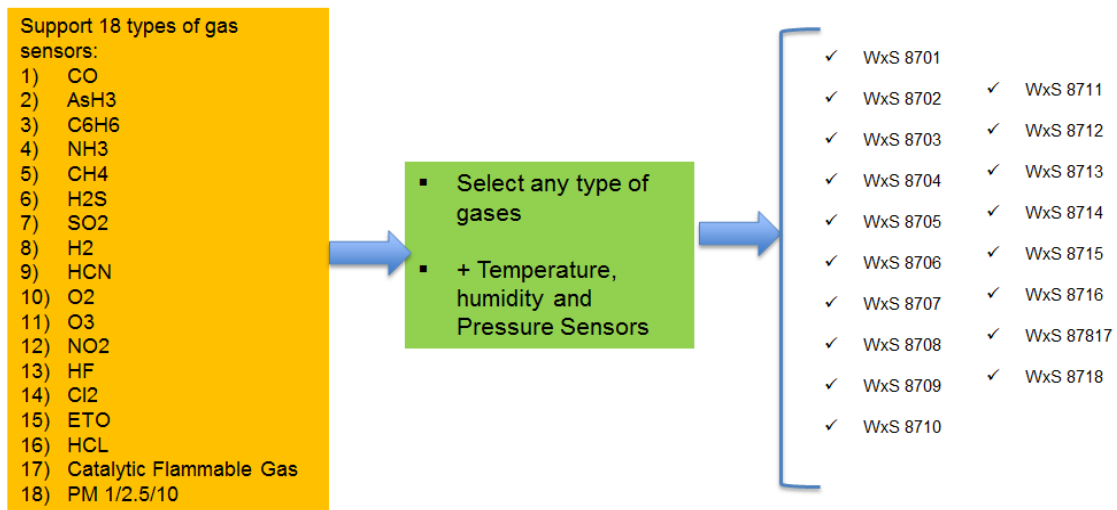


Sensor Specification

Internal sensors: the following sensors are fully integrated.

Parameter	value
Temperature	±0.3 °C accuracy; ±0.1 °C resolution; -40C to +125C range
Humidity	±2% typical accuracy; 0.1%rh resolution; 0-100% range
Atmospheric pressure	260-1260 hPa range; 0.01 hPa RMS
MPI	All the external sensors in the series can be configured
 LoRa Alliance	LoRaWAN 1.0.2
   	FCC(America): 2A07W-WXS8000, IC(Canada): 23701-WXS8000 CE(European Union): B1810246 ROHS(European Union): R2BJ180927F0664E

Name	Chemical Formula	Combustable/flammable /explosive	Poisonous	Air pollution	Odorous
Carbon monoxide	CO	Yes (high)	Yes	Yes	
Arsine	AsH3	Yes	Yes		
Benzene	C6H6	Yes	Yes		
Ammonia	NH3		Yes	Yes	Yes (high)
Methane	CH4	Yes (highest)	Yes	Yes	
Sulfur dioxide	SO2	Yes (high)	Yes	Yes	Yes
Hydrogen	H2	Yes			
Hydrogen sulfide	H2S	Yes (high)	Yes	Yes	Yes
Ozone or trioxygen	O3				Yes (high)
Nitrogen dioxide	NO2	Yes (medium)	Yes	Yes	Yes
Hydrogen cyanide	HCN	Yes	Yes	Yes	Yes
Hydrogen fluoride	HF		Yes	Yes	Yes (High)
Chlorine gas	Cl2		Yes	Yes	Yes
Ethylene oxide (ETO)	C2H4O	Yes (medium)	Yes	Yes	Yes
hydrogen chloride	HCl				Yes
Phosphine	PH3	Yes	Yes	Yes	Yes
Catalytic Flammable Gas	CH4, LPG, C3H8, Alkanes	Yes			
Atmospheric particulate matter	PM 1/2.5/10um		Yes	Yes	Yes



External sensors (outside the enclosure): in addition to internal sensors, listed in the table above, an array of sensors can be externally connected to WxS 8800 via analog or digital input interfaces (collectively called MPI – Multi-Purpose Interface), including:

- ✓ Digital temperature probes (analog PT100 or digital DS18B20) with selection of probe heads (shapes, dimension, and cable length) for most effective attachment (to machine surface, pipe, cold chain)
- ✓ Ultrasonic sensor for level measurement
- ✓ Distance sensor
- ✓ Fill level switch
- ✓ Smart seating sensor (pressure)



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- ✓ Displacement sensor for structure health monitoring, such as crack growth monitoring
- ✓ Optical proximity sensor
- ✓ Soil sensor for smart agriculture
- ✓ Magnetic contact switch/mechanical switch sensor for open/close monitoring of manhole, utility cabinet or vault
- ✓ PM 1, PM 2.5, PM 10

This external sensor list continues to grow as customers identify and request additional requirement for specific external sensors for their target applications.

Wireless Specification

Parameter	value
Antenna	Internal or external (SMA)
Channels	8/16/64 full duplex
Channel plan	NA (902MHz), EU (868MHz) and CN (470MHz)
Compliance	LoRaWAN 1.0.2
Maximum Link Budget	168dB
Distance	2-5km NLOS; 15km LOS

Mechanical Specification

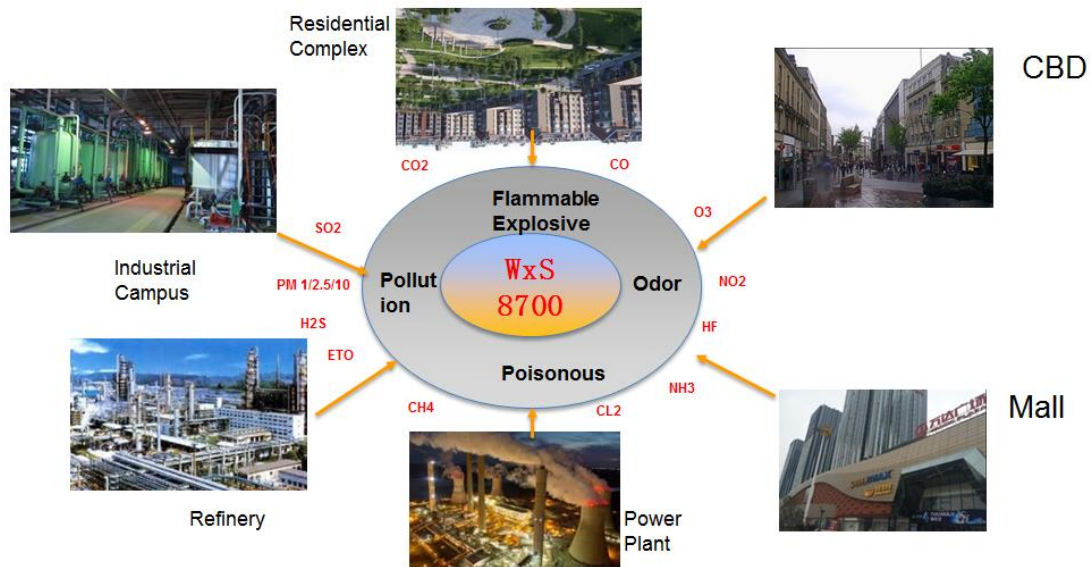
Parameter	value
Enclosure dimension	60mm x 100mm x 30mm
Enclosure IP rating	IP65 or IP67
Power	1 or 2 AA Battery; DC 5v optional
Operating Temperature	-40C to +85C
High airflow protective vent	8,000ml/min (dp = 70mbar)
Total Weight	120 g

Sample Applications

Gas, dust, and particulate matters are today present everywhere in our daily lives – in our breathing atmosphere, in our homes, in our working environment, in our vehicles; there is no escape of such seemingly invisible stuff.

Some of them are unarmful, even necessary, such as O₂. However, many are dangerous – flammable to cause fire, explosive to cause major accidents, poisonous to cause cancers, major elements of environmental pollutions, or bad living environment with bad odor. They can be generated in many industrial processes, from vehicles, or just gas leaks.

Therefore, it is becoming increasingly critical to be able to detect and monitor the presence and density of such type of gases, dust and particulate matters, for the safety of the society and the health of human beings, making sure the density level does not rise or cross the dangerous threshold level or report timely to avoid major accidents by advanced warnings.



Applications	Description
Industrial campus safety	Many industrial operations, as part of the chemical process, generate certain types of gases which may be harmful to workers, pollute the air, or even causing fire or explosion under certain conditions (temperature and pressure). WxS 8700 can be installed to detect and monitor virtually all dangerous gases while assessing the environmental condition (temperature and pressure)
Residential Complex, hospitality hotels, shopping center, CBD Safety	Keeping the shopping center, CBD and complex safe and pleasant is one of the key factors to attract customers. WxS 8800 can be installed at strategic locations, such as public square, hallway, restroom to detect and monitor fire and smoke (Temperature and CO), bad odor (NH3, O3), and dangerous gases (such as CH4).
Subway security and safety	Crowded spaces such as subway are always potentially dangerous for accidental gas leaks, fire, or terrorism attacks. WxS 8700 can be installed at strategic locations to monitor the presence and arise of such dangerous gas elements in combination with temperature monitoring
Environment Monitoring	Air quality (AQI) is now a major measurement of quality of life in any city. A holistic view of the air quality consists of a number of measurements, including CO, CO2, O3, NO2, and PM 1/2.5/10, street noise level. WxS



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	8700 enables the sampling, collection, edge processing, transmission of all these critical parameters
Smart Home	You often go back home multiple times to double check that the appliances in kitchen is turned off when you leave home to work or go on a vacation. You are concerned about gas leaks and fire. WxS 8700 can monitor temperature, CO, CH ₄ , nature gas – while you are away and alert you if anything abnormal is detected



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About Polysense

Polysense develops products and solutions for Industrial IoT and smart homes, including distributed fiber sensing, LPWAN LoRa and NB-IoT based wireless IoT sensors, Passive Optical Network (PONs) and cloud based data management and analytic platform.

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