HopeRF Sensor Products Introduction

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Manufacturer of IoT Key Components

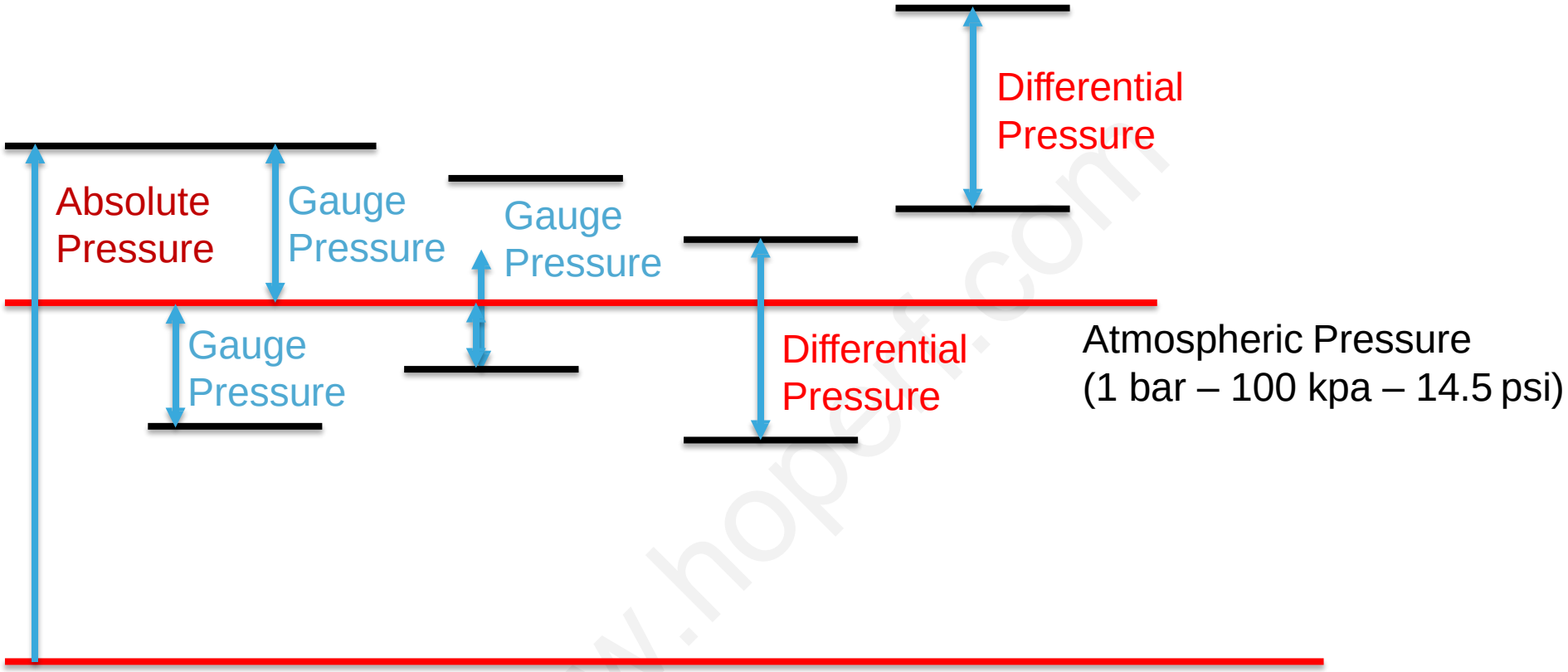
RF IC
射频芯片

IoT Module
无线

Signal Chain
信号链产品

Customized Solutions -
RF Modules & Wireless Networking
& More IoT Products

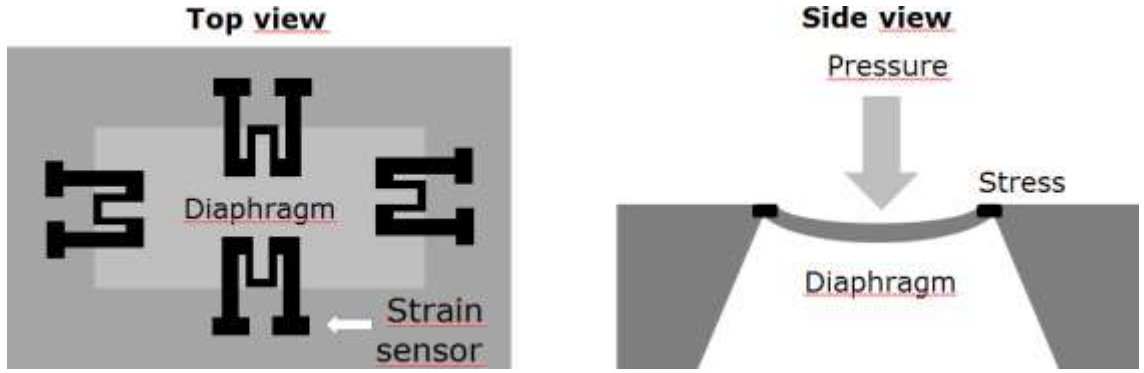
Classification of Pressure Sensor

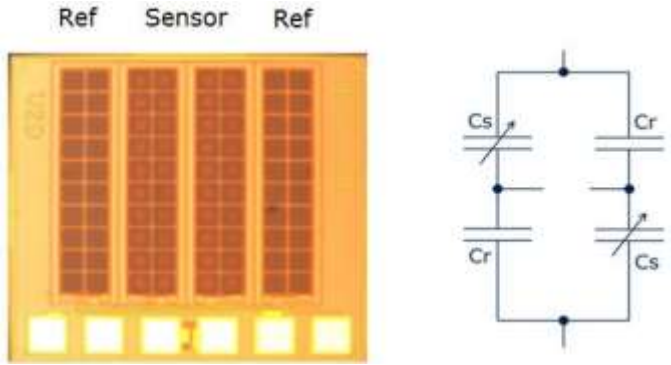


Absolute Pressure Sensor

- Pressure is referred to 0 psi (absolutely empty)
- Only positive pressure values
- The international standard atmospheric pressure value is 1013.25 hpa

Piezoresistive & Capacitive Pressure Sensor





Piezoresistive

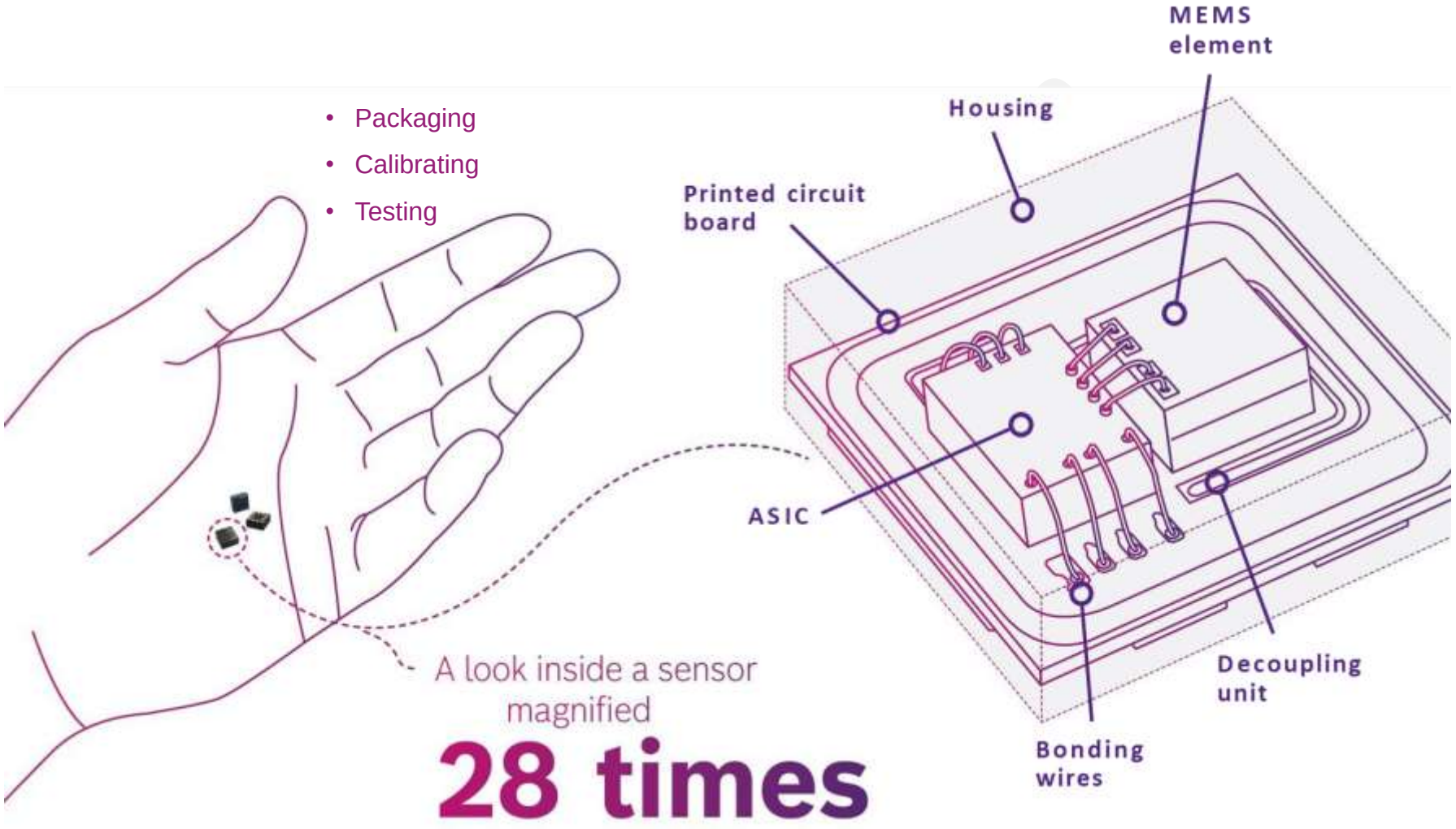
- Widely used in weather station products, measured in mBar.
- Air pressure is monitored based on the piezoresistive effect, where air pressure relative to reference pressure creates a corresponding mechanical stress on the diaphragm.
- The nonlinear temperature response of piezoresistive pressure sensors requires more complex calibration.
- Higher pressure noise levels do not cover applications with low pressure noise, fast transient response, high temperature stability and low power consumption.

Capacitive

- Provides better performance in motion tracking applications, such as walking or climbing.
- The pressure measurement is a differential calculation between sensing unit and reference unit, providing better temperature stability and lower pressure noise.
- Capacitive pressure sensors offer lower pressure noise, higher pressure accuracy and lower power consumption.
- Capacitive sensing units consume more than 50% less power than resistive sensing units.

Internal Structure of Pressure Sensor

- Packaging
- Calibrating
- Testing

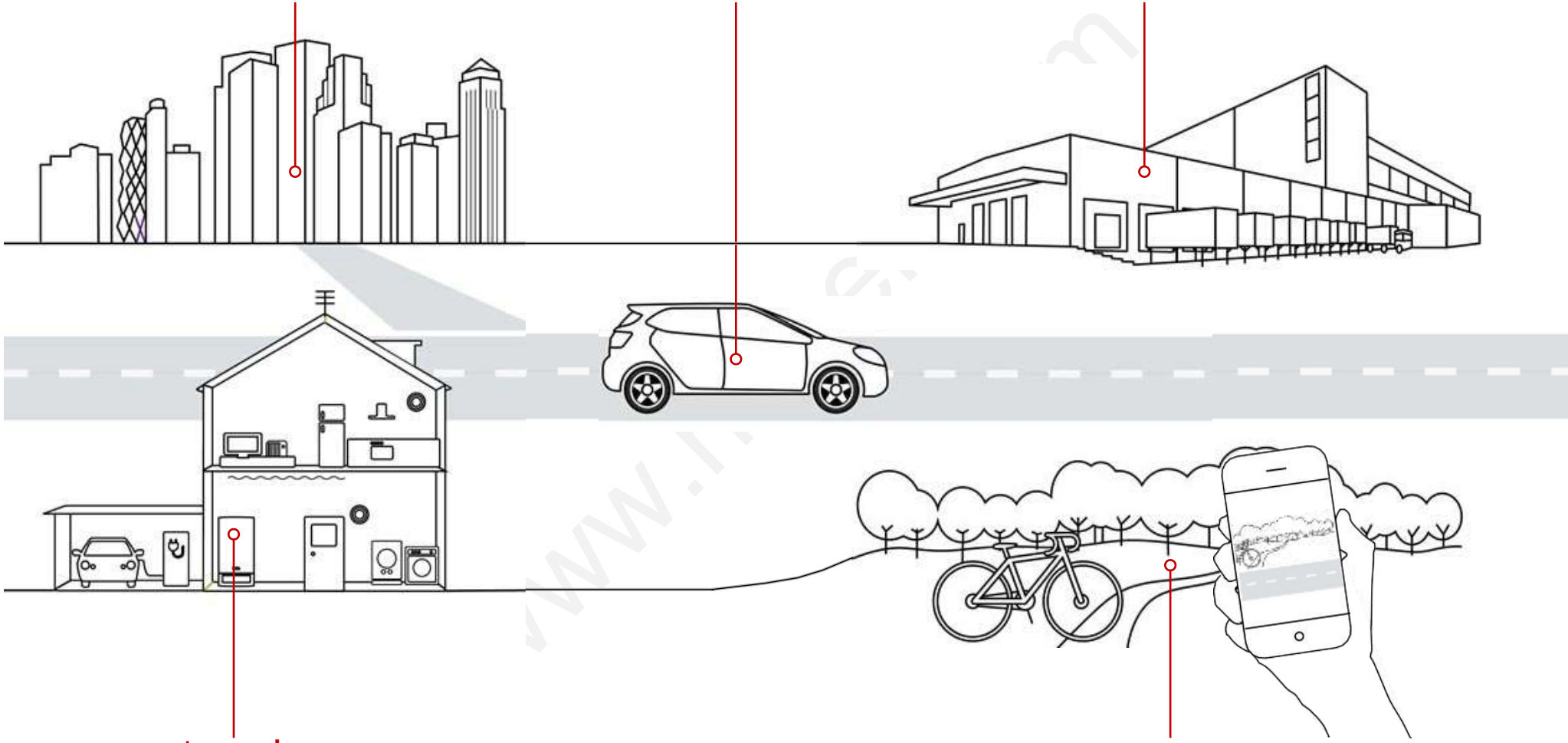


Applications for Pressure Sensor

... in your city
Indoor/outdoor navigation

... at your vehicle
TPMS, Seat air cushions

... at your workplace
Asset/personnel tracking



... at your home
Environmental quality monitoring

... during your free time
Activity tracking

Sample Applications

Smart Thermostat

By comparing indoor temperature with setting temperature, the fan coiler, motorized valve or air valve, heating or cooling equipment at the end of the air-conditioning system will be turned on or off for control, so as to achieve comfort and energy-saving effect.

Sample Applications

Portable Weather Station

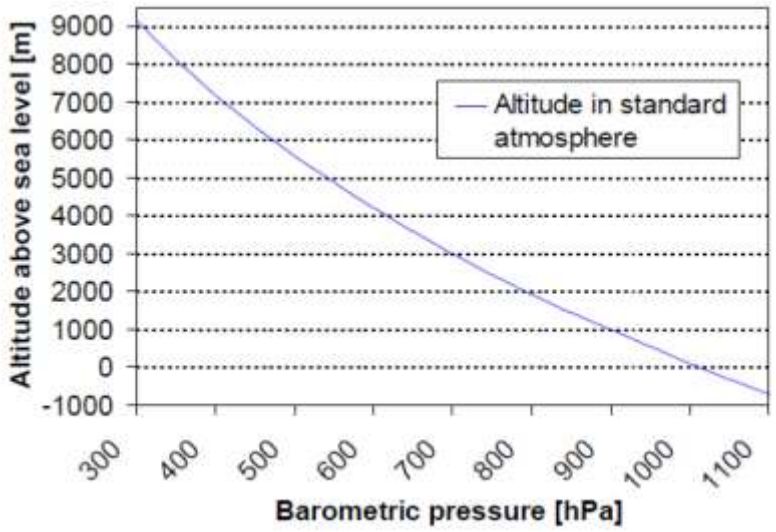
A monitoring device integrating a variety of meteorological sensors, capable of measuring and recording a variety of meteorological elements in real time, such as temperature, humidity, barometric pressure, wind speed, wind direction, rainfall, etc. Its working principle is mainly based on the physical effects of various sensors and signal conversion technology.

Sample Applications

Altimeter or Barometer

The pressure sensor continuously measures the atmospheric pressure and, based on the measured and reference values, calculates the altitude or sea level air pressure.

$$Altitude = 44330 \times \left[1 - \left(\frac{P}{P_0}\right)^{\frac{1}{5.255}}\right]$$



Sample Applications

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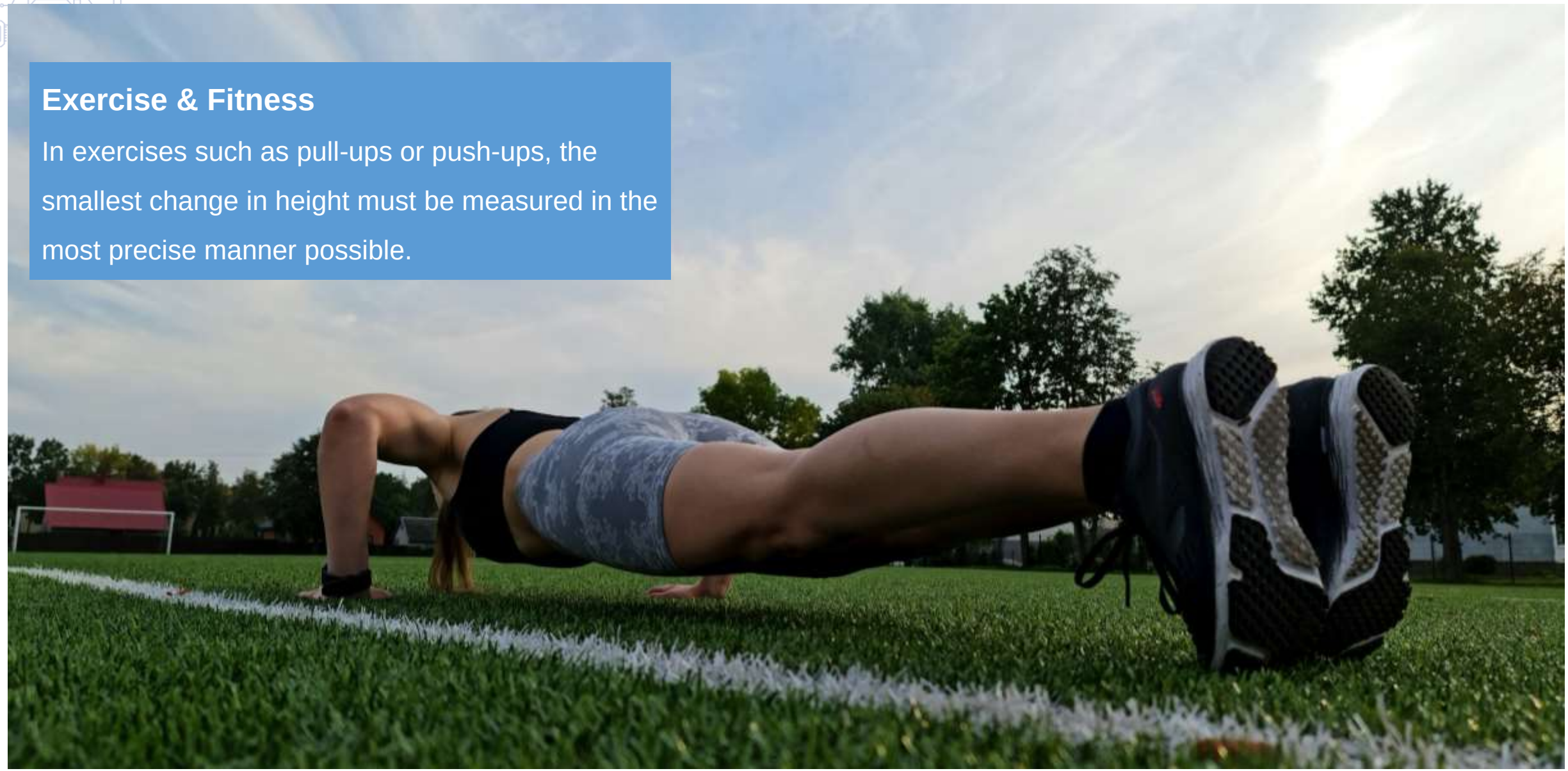


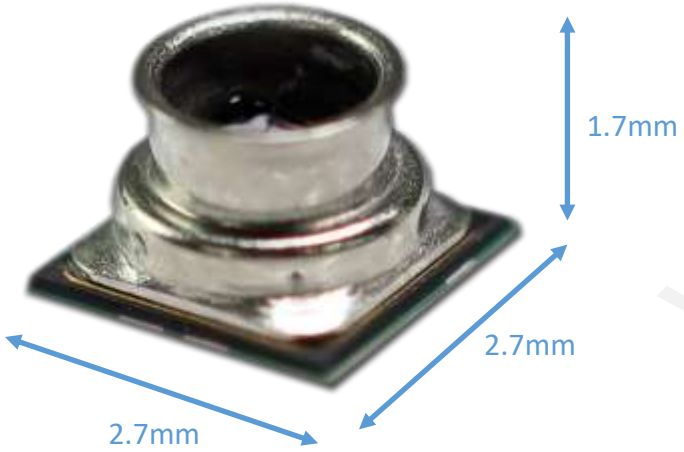
Exercise & Fitness

In exercises such as pull-ups or push-ups, the smallest change in height must be measured in the most precise manner possible.

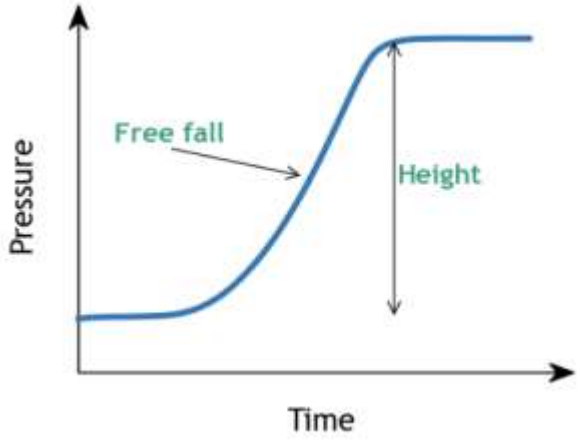
Sample Applications

Outdoor Sports

Hiking, running, cycling, swimming, surfing, diving, mountaineering, etc., the most important thing is to pay attention to altitude change, weather change, navigation direction, diving depth, etc., so wearable products must be equipped with ABC sensors as standard: altimeter, barometer, compass.



Sample Applications



Drop Detection

- During free fall, the air pressure increases significantly as it is proportional to the altitude.
- The altitude change can be approximated by dividing the pressure change by 12 Pa/m, which corresponds to an altitude change of approximately 1 m at standard temperature (20 °C) and standard pressure (1000 hpa).
- Air pressure sensors need to support high resolution and high-speed measurement so that the moment of free fall can be recognized.
- Comparing the heights after and before the fall gives the height of the fall.

Sample Applications

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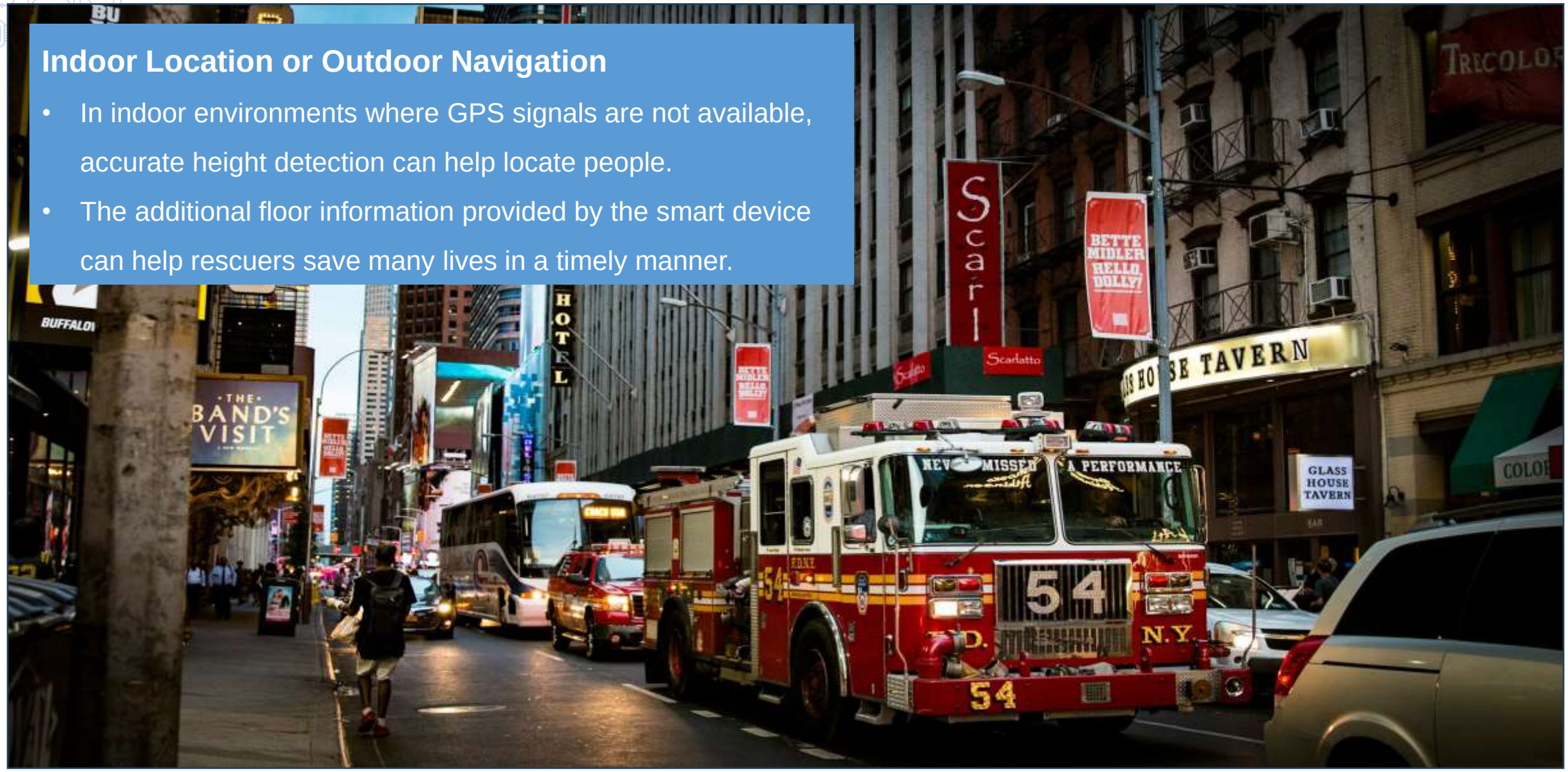
Indoor Location or Outdoor Navigation

- In indoor environments where GPS signals are not available, accurate height detection can help locate people.
- The additional floor information provided by the smart device can help rescuers save many lives in a timely manner.



Sample Applications

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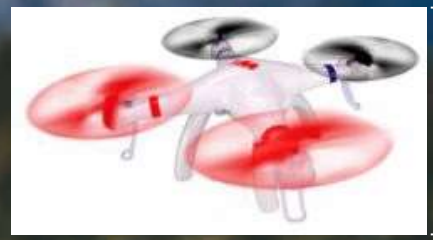
Altitude Hold

The barometric pressure sensor is needed in drone application in order to give an accurate position of the UAV height.



* Considering an ascend/descend speed of 5m/s with sampling rate of 100Hz
ascent/descent @10ms*5m/s=5cm

Sample Applications

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Dust Box Inspection for Sweeping Robot

- By monitoring the air flow through the dust box by means of an air pressure sensor, it is possible to estimate the accumulation of waste in the dust box.
- When the air pressure sensor detects a drop in the air pressure inside the dust box, it indicates that the dust box is full, reminding the user to clean the dust box or replace the filter in time, which can trigger the sweeping robot to stop working and return to the charging seat.
- Some of the higher-end charging cradles also feature an automatic dust box cleaning function, which allows the sweeper to return to the position where it last stopped working and continue sweeping once the dust box has been cleaned.

Sample Applications

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Temperature & Pressure Compensation of Ultrasonic Gas Meter

- Ultrasonic gas meter uses the difference of ultrasonic wave's upstream and downstream flight time in the medium for measurement, which has the advantages of high precision, high reliability, high safety, wide range ratio, good durability, compact size, etc. It can be widely used in gas measurement for residential users and commercial users.
- Through air pressure sensor, the ultrasonic gas meter can provide temperature and pressure compensation function, effectively solving the measurement loss caused by temperature and pressure changes of the traditional mechanical gas meter, and helping the gas company to reduce the difference between supply and sales.

Absolute Pressure Sensors

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Product Appearance	Product Model	Product Type	Product Description	Package Size	Pressure Range	Typical Accuracy	Temperature Range	Operating Voltage	Output Type	Static Consumption
	**HP203N**	Absolute	Piezoresistive	8-pin LGA 3.8 x 3.6 x 1.15mm	30~120kpa	±200pa	-40~85℃	1.8~3.6V	I2C	0.1uA
	**HPS700A**	Absolute	Piezoresistive	8-pin LGA 3.8 x 3.6 x 1.15mm	0~1600kpa	±2.0kpa	-40~85℃	1.8~3.6V	I2C	0.1uA
	**HPS700A-M**	Absolute	Piezoresistive	8-pin LGA 3.8 x 3.6 x 1.15mm	0~1600kpa	±2.0kpa	-40~85℃	1.8~3.6V	I2C	0.1uA
	**HP303B**	Absolute	Capacitive high precision	8-pin LGA 3.8 x 3.6 x 1.15mm	30~120kpa	±100pa	-40~85℃	1.7~3.6V	I2C/SPI	1uA
	**HP303S**	Absolute	Capacitive high precision compact size	8-pin LGA 2.5 x 2.0 x 0.95mm	30~120kpa	±100pa	-40~85℃	1.7~3.6V	I2C/SPI	1uA

Waterproof Absolute Pressure Sensors

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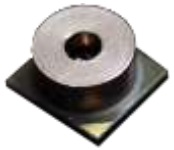
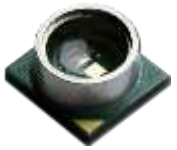
Product Appearance	Product Model	Product Type	Product Description	Package Size	Pressure Range	Typical Accuracy	Temperature Range	Operating Voltage	Output Type	Static Consumption
	**HP206N**	Absolute	Piezoresistive	6-pin LGA 6.8 x 6.2 x 3.1mm	30~200kpa	±200pa	-40~85℃	1.8~3.6V	I2C	0.1uA
	**HP206W**	Absolute	Piezoresistive	6-pin LGA 6.8 x 6.2 x 3.1mm	30~200kpa	±200pa	-40~85℃	1.8~3.6V	I2C	0.1uA
	**HP5834**	Absolute	Piezoresistive compact size customizable range	6-pin LGA 4.5 x 4.5 x 3.0mm	0~1200kpa	±200pa	-40~85℃	1.8~3.6V	I2C	0.1uA
	**6862I**	Absolute	Capacitive high precision	6-pin LGA 6.8 x 6.2 x 3.1mm	30~120kpa	±100pa	-40~85℃	1.7~3.6V	I2C	1uA
	**HPS27W**	Absolute	Capacitive high precision compact size	10-pin LGA 2.7 x 2.7 x 1.7mm	30~120hpa	±100pa	-40~85℃	1.7~3.6V	I2C/SPI	1uA

Gauge Pressure Sensors

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Product Appearance	Product Model	Product Type	Product Description	Package Size	Pressure Range	Typical Accuracy	Temperature Range	Operating Voltage	Output Type	Static Consumption
	**HP209**	Gauge	Piezoresistive metal nozzle optional waterproof	6-pin LGA 9.0 x 9.0 x 11.3mm	0~200kPa	1.0% @ FS	-40~85℃	1.8~3.6V	I2C	0.1uA
	**HPS09**	Gauge	Piezoresistive metal nozzle optional waterproof	6-pin LGA 9.0 x 9.0 x 11.3mm	-200~200kPa	1.0% @ FS	-40~85℃	2.7~5.5V	I2C	0.5uA
	**HPSxxxGS**	Gauge	Piezoresistive plastic nozzle	6-pin SOP 10.3 x 7.0 x 10.26mm	-200~200kPa	1.0% @ FS	-40~85℃	3.0~5.5V	I2C	0.2uA

Temperature & Humidity Sensors

Product Appearance	Product Model	Product Type	Package Size	Humidity Accuracy	Humidity Range	Temperature Accuracy	Temperature Range	Operating Voltage	Output Type	Static Consumption
	**T09**	Temperature	WLCSP 1.495 x 1.025 x 0.6mm	--	--	±0.2℃ @-10~+65℃	-40~+125℃	2.0~3.6V	I2C	0.1uA
	**TH09C**	Temperature & Humidity	QFN4 2.0 x 2.0 x 0.75mm	±2% @0~+85%	0~100%	±0.15℃ @0~+70℃	-40~+100℃	1.71~3.60V	I2C	0.04uA

Why Choose Ours

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HOPERF sensors are all-in-one, energy-efficient products that are easy-to-use and are supported by advanced software and expert technical support staff.

Decades of sensor design experience

Excellent evaluation and support tools

Unmatched technical support

Continued product development

Reduced time to market

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