

SMART SENSOR

COMPANY PROFILE
Ver.200302

Company

Address

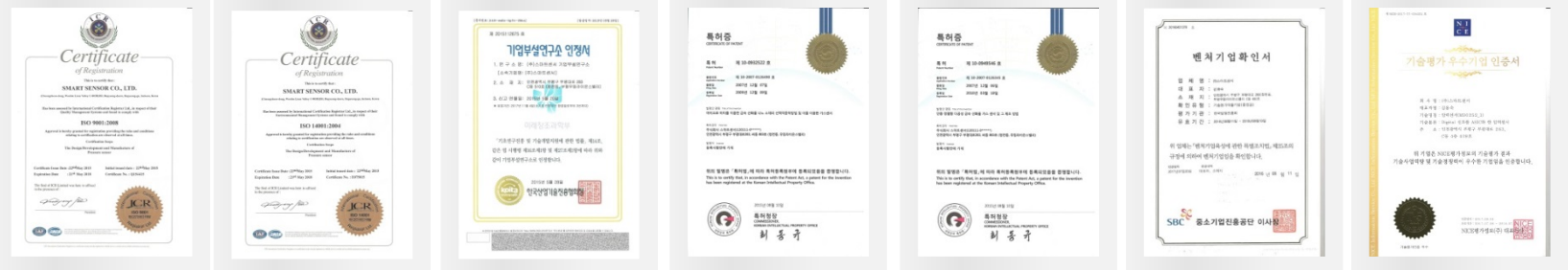
Main Products

- Home Appliance Pressure Sensor : Bedding Cleaning, Water Purifier, Air Purifier Differential, Washing Machine Water Level, Refrigerator Control, Air Conditioner
- Industrial pressure sensor : booster pump, hot water distributor, differential sensor for fire-fighting, sprinkler, cold air conditioning
- Digital instrument and automotive sensor : Truck air compressor, TPMS, trailer measurement control system, digital pressure gauge for semiconductor equipment
- IoT based IT sensor : NFC and RFID based sensor, APP application based altimeter and blood pressure sensor

Customer



Certification



- ▶ ISO 9001 ▶ ISO 14001 ▶ R&D center certification ▶ Patent10-0932522 ▶ Patent10-0949546 ▶ Venture certification ▶ Excellent technology evaluation company
 2007-0126490(932522):Selectively depositing a metal oxide gas sensor using the same method and a nano-material using a micro-heater
 2007-0126345(949546):Single-alignment type porous metal oxide gas sensor and a method of manufacturing the same

Web/E-mail

History

1986-2000

1986. 05. Samsung jonghap guegi established
 1988. 03. renamed to Tasco
 1995. 05. renamed to Green Sensor
 1996. 05. Explosion proof electrical equipment certifications
 1998. 10. KMIRG membership
 1999. 03. Chosen to receive government's export assistance
 1999. 05. CE certificate (Pressure Transmitter, Model TP-26S)
 2000. 05. ISO9001 certificate
 2000. 08. Korea Industry Association member

2001-2005

2001. 01. Venture business company certificate
 2001. 06. Selected as a promising small and medium enterprise to export
 2001. 10. R&D center established
 2002. 02. Ceramic diaphragm sensor manufacturing patent
 2002. 03. High temperature metal diaphragm strain gauge for pressure transmitter
 2002. 04. Ministry of Science and Technology (Science day)
 2002. 05. Award from Hanyang university for venture business company with potential
 2002. 10. Technician Cooperation with In-ha Tech University
 2002. 12. Cooperation with Yu-Han university electronics engineering
 2004. 06. Joint venture in China
 2004. 07. Electric facility safety mark certified (from KETI)
 2005. 03. Exported to 58 countries and 258 customers

2006-2010

2006. 12. Award from Information / Communication ministry for IT business
 2007. 12. Selected to be one of the companies to move in to the Songdo knowledge industry area
 2008. 10. Cooperation with Incheon university
 2008. 12. ISO 9001 additional certifications
 2009. 04. Venture company certifications
 2009. 02. Semiconductor 4" Wafer development and fabrication at FAB center
 2009. 08. Semiconductor 8" Wafer development and fabrication at FAB center.
 2010. 04. Moving into knowledge industry area
 2010.04. "smart system co.,ltd" established

2011-NOW

2014.02. Half Bridge MSG (Micro-fused Strain Gauge) Development
 2015.05. Research center established
 2015.05. ISO9001/14001 certificate
 2015.06. Patent10-0932522 : Selectively depositing a metal oxide gas sensor
 2015.06. Patent10-0949546 : Single-alignment type porous metal oxide gas sensor
 2016.08. Venture certification
 2017.08. Excellent technology evaluation company
 2019. Full Bridge MSG Development

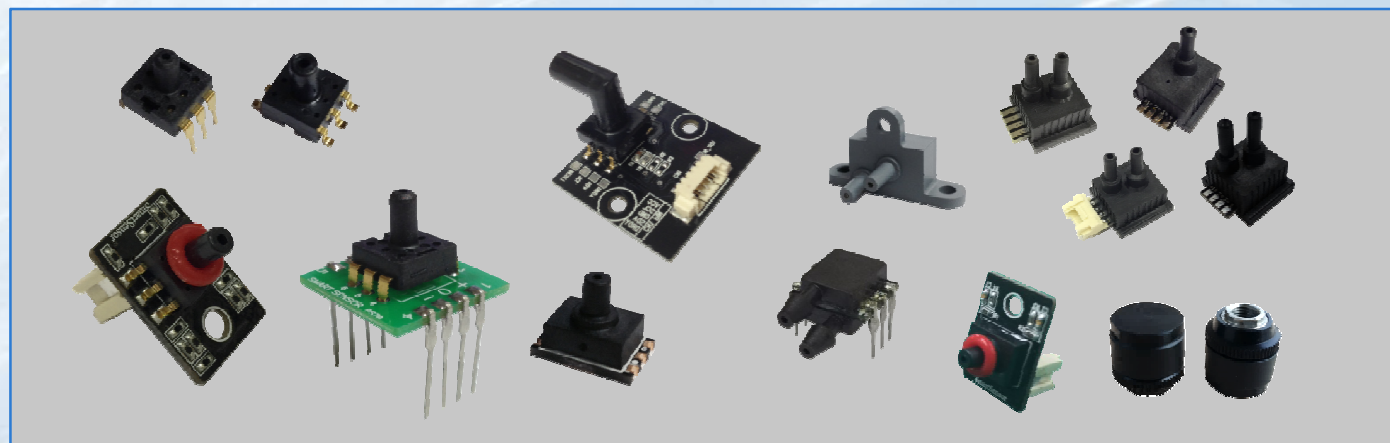
Core sensor technology

Semiconductor pressure sensor



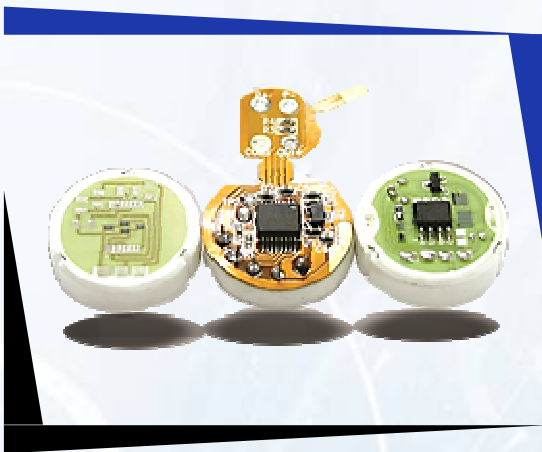
Pressure is measured using the piezo-resistive difference in the metal diaphragm. It can be used for absolute pressure, differential pressure, level, air conditioner, gas meter, and automobile tire pressure sensor.

| No | Model | Product Category | Type |
|----|------------------|---|--------------------|
| 1 | PS-10B | Vaccum cleaner | Semiconductor type |
| 2 | PS-100D,PS-200D | Air cleaner filter | Semiconductor type |
| 3 | SM-200D | Water purification | Semiconductor type |
| 4 | PS-33D/PS-35V | Fire smoke extraction system | Semiconductor type |
| 5 | PS-70 | Multi functional analog type | Semiconductor type |
| 6 | SM series | Pressure Sensor for Washing Machine / Dishwasher / Air Mat / Air Massager /Pressure Mixer for Vacuum Mixers / Coffee Machines / Vacuum Packaging Machines | Semiconductor type |
| 7 | PS-121F | ressure sensor for barometric altitude sensor | Semiconductor type |
| 8 | TPMS-100 | Tire Pressure measurement sensor | Semiconductor type |



Core sensor technology

Ceramic Pressure sensor



Pressure is measure using the piezo resistive change in the ceramic diaphragm. It can be used for absolute pressure, differential pressure, level, air conditioner, gas meter, and automobile tire pressure, gas pressure detection, etc.

| Model | Image | Range | Output | Supply | Size | Mat'l | TEMP |
|---------|-------|-------------------------|--------------------|-------------|----------|---|----------|
| PS-13 | | 5 to 50 bar (option) | 0.5 to 4.5V (G) | DC 3 to 30V | Ø 13 | Ceramic (AL ₂ O ₃) | 0~70°C |
| PS-18 | | 2 to 400 bar (option) | 0.5 to 4.5V (G) | DC 3 to 30V | Ø 18 | Ceramic (AL ₂ O ₃) | 0~70°C |
| PS-18F | | 0.5 to 400 bar (option) | 0.5 to 4.5V (G)(A) | DC 3 to 30V | Ø 18 | Ceramic (AL ₂ O ₃) | 40~125°C |
| PS-18FA | | 0.5 to 400 bar (option) | 0.5 to 4.5V (G)(A) | DC 3 to 30V | Ø 18 | Ceramic (AL ₂ O ₃) | 40~125°C |
| PS-21 | | 0.5 to 400 bar (option) | 0.5 to 4.5V (G)(A) | DC 3 to 30V | Ø 21 | Ceramic (AL ₂ O ₃) | 40~125°C |
| PS-21A | | 0.5 to 400 bar (option) | 0.5 to 4.5V (G)(A) | DC 5V | Ø 21 | Ceramic (AL ₂ O ₃) | 40~125°C |
| PS-30 | | 0 to 35 bar (option) | 0.5 to 4.5V (G)(A) | DC 3 to 30V | 12*15 mm | Ceramic (AL ₂ O ₃) | 40~125°C |



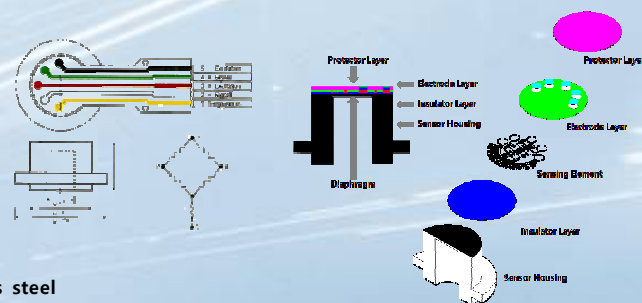
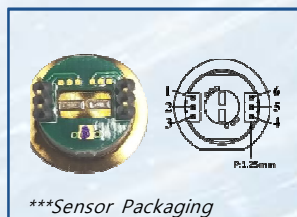
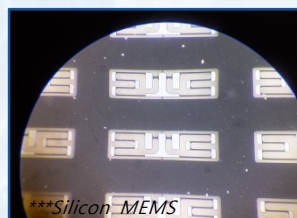
Core sensor technology

Metal pressure sensor



Micr-fused Strain Gauge (MSG) type pressure sensor which uses stainless steel diaphragm based on micro-fused glass frit technology as a sensing material it has a very compact structure. Semiconductor pressure sensor have a weakness in high pressure environment due to packing. The sensitivity of the metal sensor is slightly lower than the semiconductor sensor but it can be used in harsh environments. It produces High quality signals even in high pressure high temperature.

| 번호 | PART | SPEC | Sensor type |
|----|------------------------------|---------------------|-------------|
| 1 | Pressure range | 0~3000bar (MAX) | Metal type |
| 2 | Over pressure | X3 Rated pressure | Metal type |
| 3 | Burst pressure | X8 Rated pressure | Metal type |
| 4 | Functional temperature range | -40~150°C | Metal type |
| 5 | Typical zero offset | ±0.2mV/V | Metal type |
| 6 | Reliability | < ±3% of full scale | Metal type |
| 7 | Typical hysteresis | < ±3% of full scale | Metal type |



- Silicon MEMS strain gage elements glass bonded to on stainless steel diaphragm with sus630 Material
- ASIC Signal conditioner calibrated output
- Digital TEMP Compensation

Core sensor technology

Micro-fused Strain Gauge

MEMS 1st Generation Half Bridge

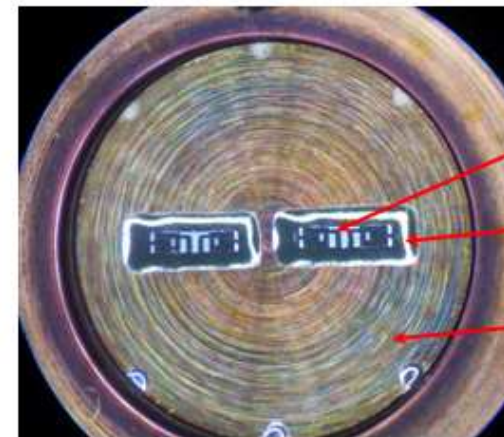
on stainless steel diaphragm with glass frit.



Pressure port top view



Pressure port side view



Sensor base component parts

- MEMS sensor
- Bonding glass
- Metal type Diaphragm

Half bridge – sensor base



Assembly Product



Assembly Wired

Core sensor technology

Micro-fused Strain Gauge

MEMS 2nd Generation Full bridge

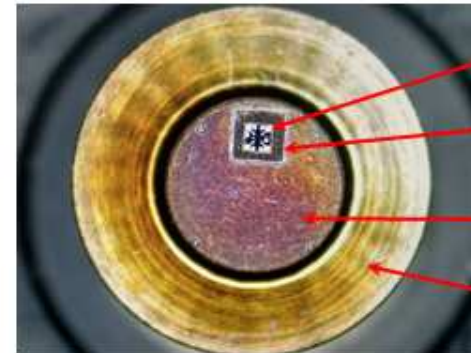
on stainless steel diaphragm with glass frit.



Pressure port top view



Pressure port side view



MEMS sensor

Bonding glass

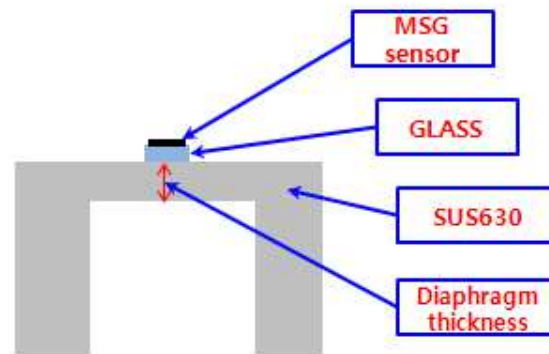
Metal type
Diaphragm

Sensor body
base

Sensor base component parts



Assembly Product



MSG
sensor

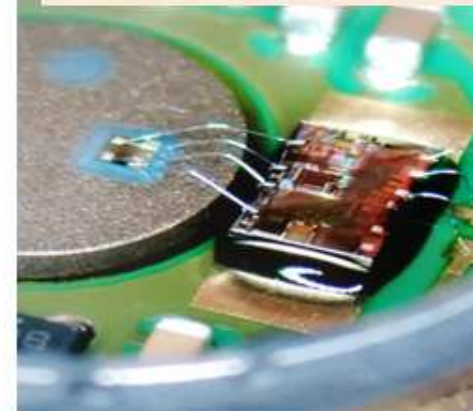
GLASS

SUS630

Diaphragm
thickness

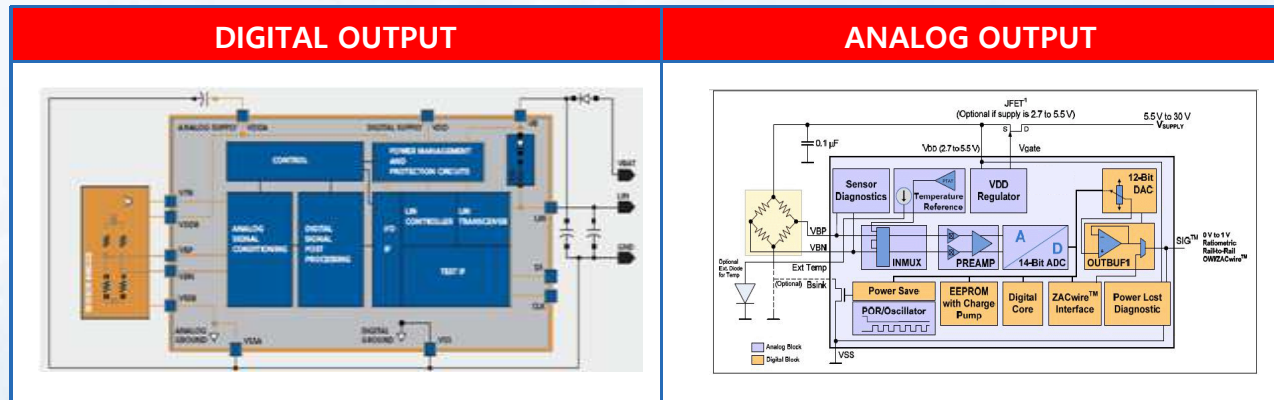
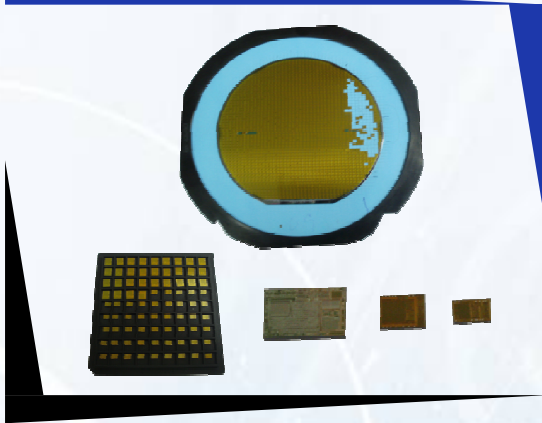
Diaphragm

4 wires instead of 6



Core sensor technology

MEMS and ASIC



Transducer and Transmitter



- Oil Field Type design and manufacturing
- Thick Diaphragm design and manufacturing
- Thick Diaphragm welding
- SSB(Small Size Ball) Bonding
- Lead Frame design and manufacturing



Production line

DIE bonding / Wire bonding / Packaging / CELL BASE / Diaphragm printing / Active trimming

MEMS



ASSY / Calibration

SENSOR



Pressure sensor & TMPS Reliability test / Module / Leak Tester

Reliability test



Sensor application

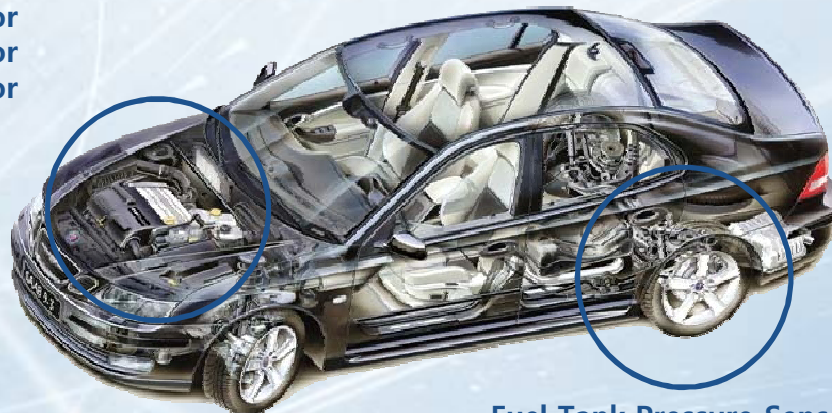
➔ Automotive pressure control field

P-55



MAP sensor
Intake Manifold Pressure Sensor
Air Conditioning Pressure Sensor
ESC Pressure Sensor
Atmospheric pressure sensor
Power Steering Pressure Sensor

MAP Sensor



Fuel Tank Pressure Sensor
Brake pressure sensor
TPMS

P-80



PS-650



TPMS-200



TPMS-200 With Bluetooth Smart SoC
and MEMS Sensor & ASIC

Sensor application

➔ Trailer Monitoring System

SU-1000
(Cargo sensor)



SW-1000
(Load sensor)



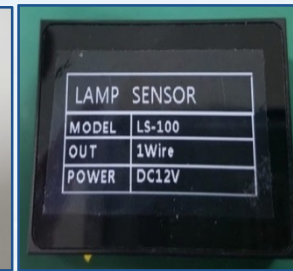
TPMS-200P
(TPMS)



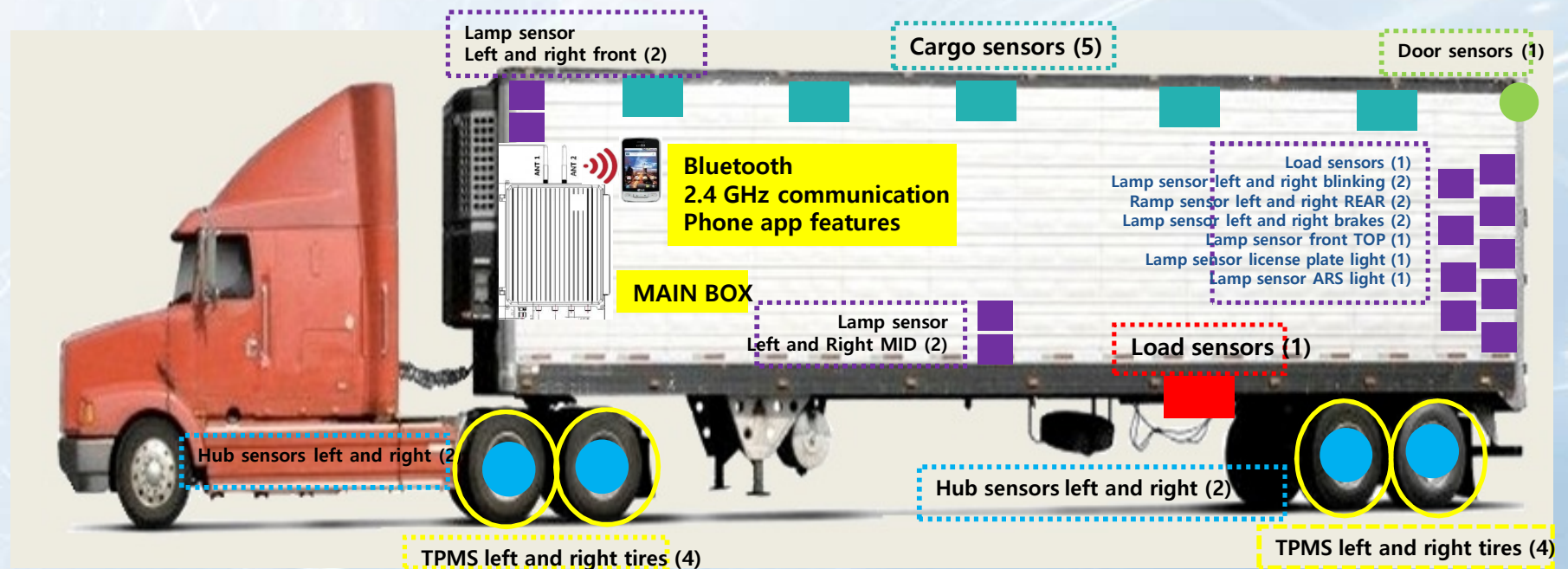
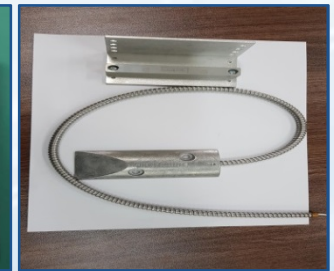
TPMS-200T
(Hub sensor)



LS-100
(LAMP SENSOR)



DS-100
(DOOR SENSOR)



Sensor application

➔ Special Automotive pressure control field

PS-900



PS-950



PS-100



P-50



Sensor application

➔ injection machine & CNC machine pressure control field

PS-900



PS-950



P-150



PS-100



Sensor application

➔ Semiconductor Equipment

SM-300series (with Metal sensor)



P-15S, P-18S



P-85



WMS-100 series



Digital Gauge for Semiconductor Equipment (SM-300series)
 Pressure switch for semiconductor screw equipment (P-15S, P-18S)
 Flowmeter for Semiconductor Equipment (WMS-100series / P-85)



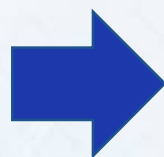
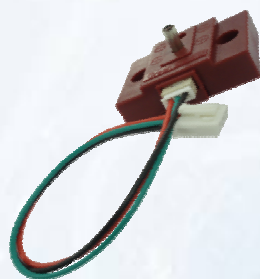
Introduced a high-precision digital gauge that can withstand up to 3000bar using a proprietary oilless metal sensor that can replace a digital gauge with an existing oil type metal sensor. (2018.11)

Sensor application

➔ Home appliance – Refrigerator

SM-200D series

LS-20



Pressure sensor

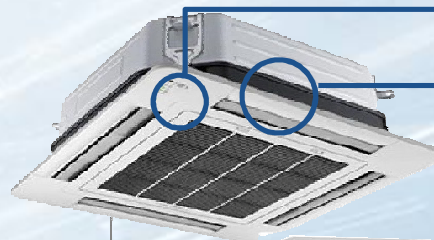
Humidity sensor

Pressure sensor
/ Ice making pressure sensor

➔ Home appliance – System air conditioner

P-100D

LS-50



Distributor sensor

Condensate water level sensor

Refrigerant pressure sensor

Sensor application

➡ Home appliance –water purifier

LS-100

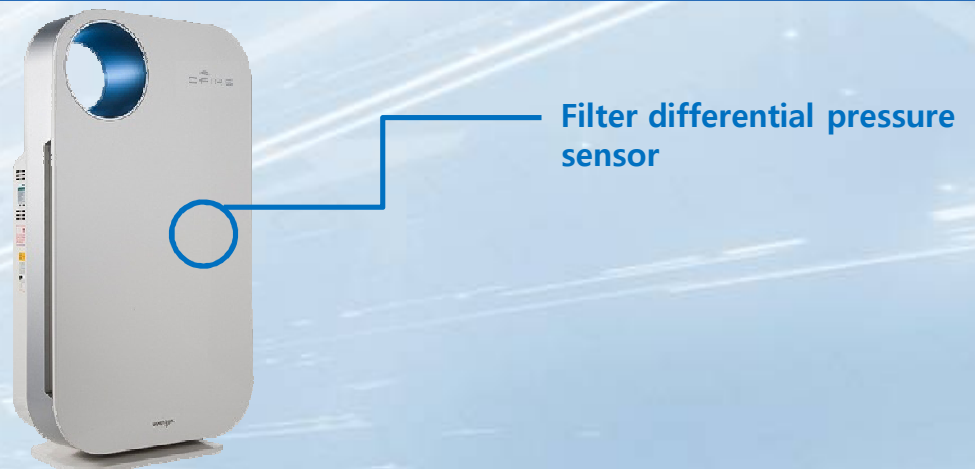
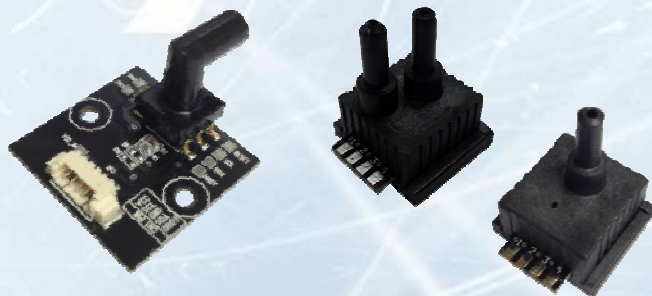
P-20V



➡ Home appliance – Air cleaner

PS-100D

SM-6300D



Sensor application

→ Home appliance

SP-200



Vacuum Control sensor



Control Pressure sensor



Vacuum Control sensor

SM-430F



Steam Control Pressure sensor



Steam Control Pressure sensor

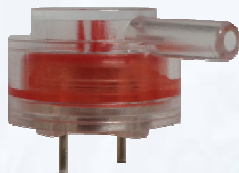
Sensor application

→ Home appliance

Q1/Q3 series



TS-150



Control Pressure sensor



Control Pressure sensor

SM-6300 series

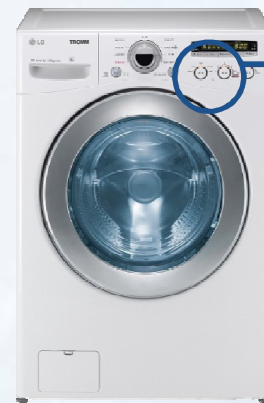
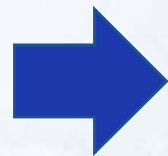
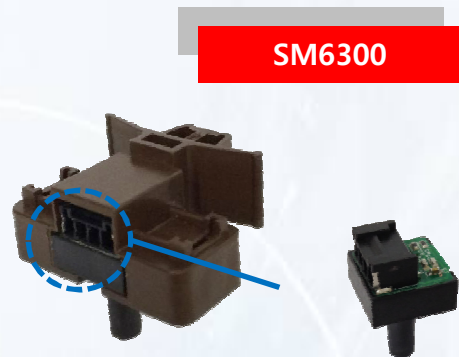


Control Pressure sensor



Sensor application

→ Home appliance



Digital
Water
Level sensor



→ Home appliance



Sensor application

➔ Pressure sensor for fire fighting / Pressure sensor for sprinkler



➔ Industrial pressure sensor



Sensor application

➡ Healthcare & Medical

Medical pressure sensor



➡ Pressure altimeter

SM121F

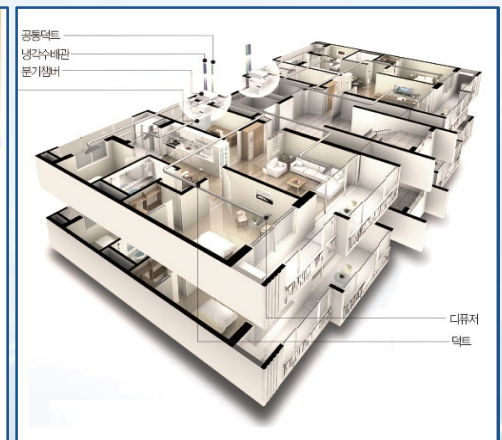
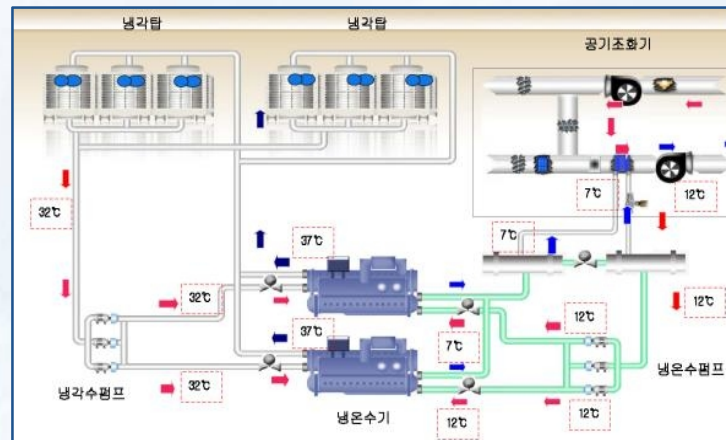
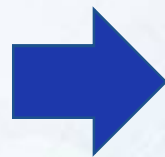
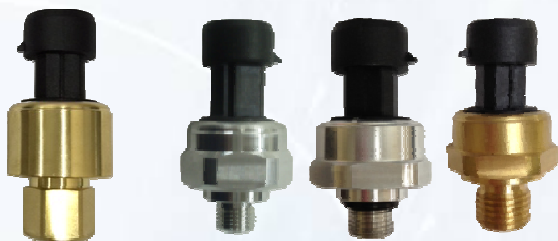


Sensor application

➔ Boost pump pressure control

P-51

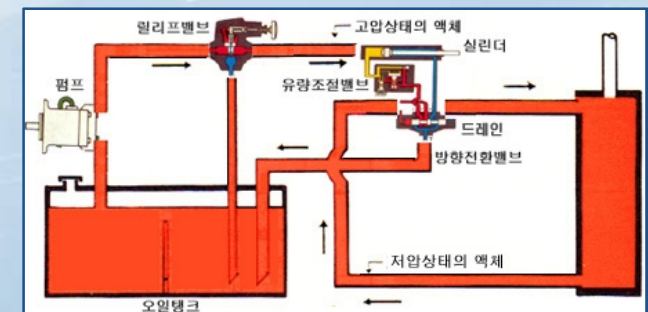
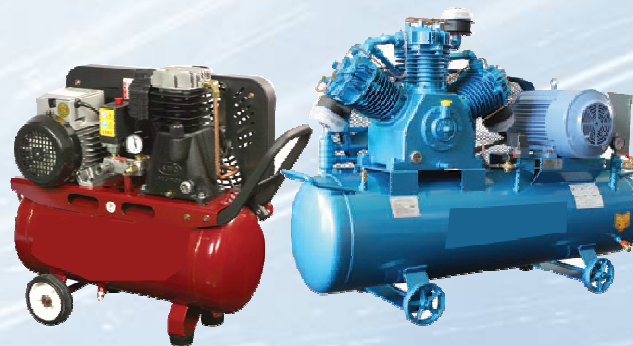
P-50 series



➔ Heating distributor pressure control

P-150 series

P-100



Sensor application

➔ Booster pump pressure control field



➔ Heating distributor pressure control field



IT Sensor (Smart sensor)

Sensor module for Communications(Rectangular type)

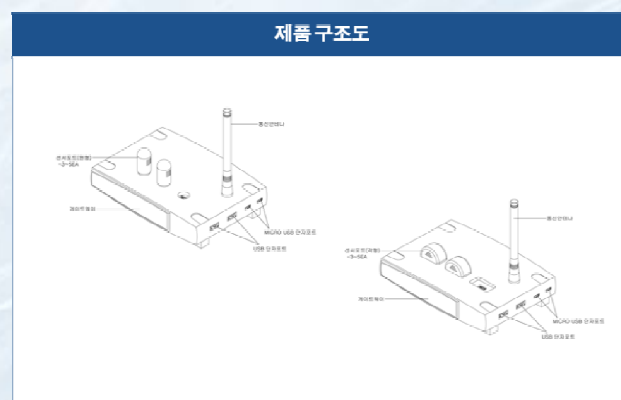
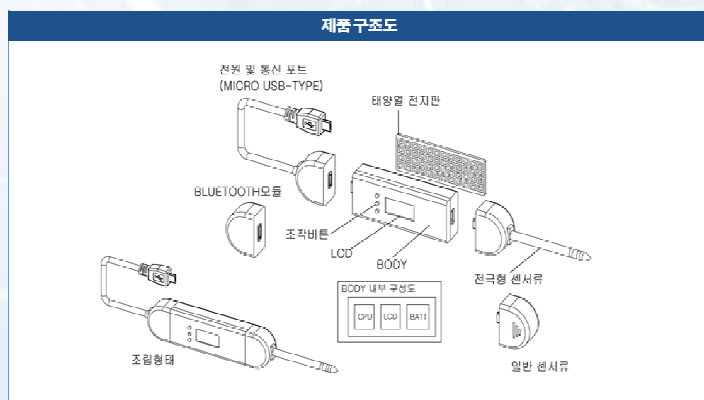
USB / Bluetooth / Wifi



응용센서



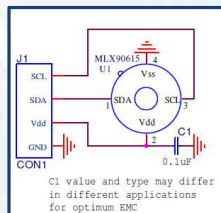
응용센서



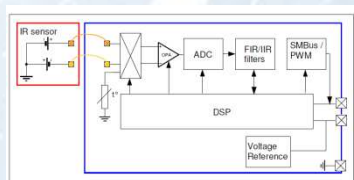
| Sensor | Rectangular | Circular type | Sensor | Rectangular | Circular type |
|-----------------------------------|-------------|---------------|-------------------------|-------------|---------------|
| level sensors | ● | | Infrared Sensor | | ● |
| pressure sensors | ● | | Light sensor | | ● |
| flow sensors | ● | | Noise sensor | ● | ● |
| humidity sensors | | ● | Sludge Sensors | | ● |
| Temperature sensor | ● | | Turbidity sensor | | ● |
| rotation sensor | ● | ● | Salinity Sensor | ● | ● |
| azimuth sensor | ● | ● | Ultrasonic Sensors | ● | |
| altimeter sensors | | ● | Sugar sensor | | ● |
| displacement sensors | | ● | Smoke sensor | | ● |
| Wind sensor | | ● | Oxygen Sensor | | ● |
| angle sensor | ● | | Dissolved Oxygen Sensor | | ● |
| voltage sensors | ● | | Ozone Sensors | | ● |
| Load sensors | ● | | CO2 sensor | | ● |
| integrated solar radiation sensor | ● | | CO sensor | | ● |
| body iris recognition sensor | | ● | LPG sensor | | ● |
| fingerprint sensor | ● | | VOC sensor | | ● |
| Current sensors | | ● | H2 sensor | | ● |

IR sensor

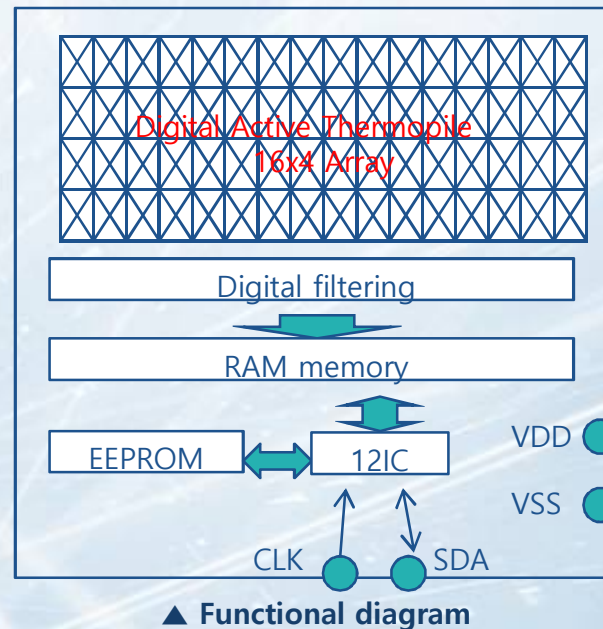
IR sensor IR sensor module spec and diagram



▲ Signal Diagram



▲ Block Diagram



● Difference between IR Thermometer and Thermo vision camera

Non contact type, When it comes to scan a big area or temperature of device, it is easy to check up over-heated motor
Thousands of IR thermometer effect at a time

● Advantage of IR Thermometer technology

- Available check up status of heating with eyes
- Real time detection and alarm for abnormality
- Non contact
- Inspection during processing
- Store information of thermal
- Reducing time and cost



▲ Smart device IR sensor and APP interface use

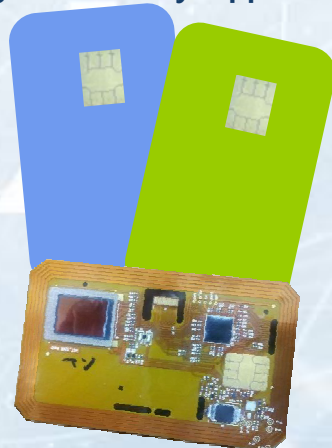
NFC

NFC type sensor

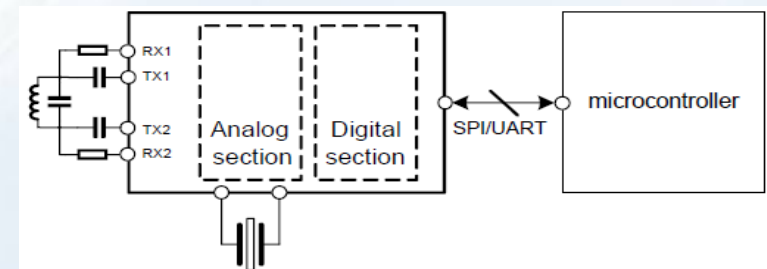
NFC type data logger & Application USN for NFC



▲ NFC card type
:Outdoor type, when data logging solar battery and rechargeable battery application



◀ Solar battery
: Card type, super low-cost and hand held type NFC sensor



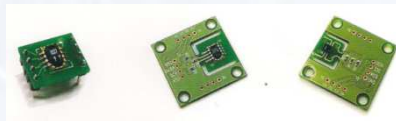
▲ NFC wireless RF transceiver charging type
: Adaptable installation space wireless RF transceiver charging type, easy of long data logging

USN

USN type sensor

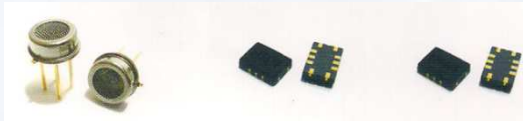
Using for USN sensor module for small scale monitoring system

<Temp-Humidity sensor module>

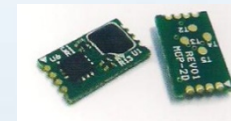


<Gas sensor module>

(O3, Co2, NO2, VOC, NH3, HC)



<Compass sensor module> <Pressure sensor module>



Wifi, Bluetooth

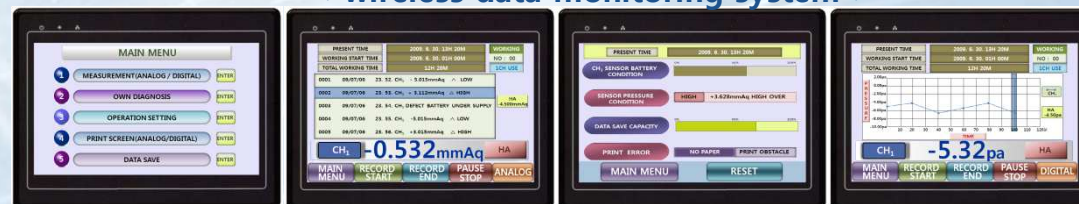


Wifi,
Bluetooth



Using of smart device for remote management

< wireless data monitoring system >



< display >

USN type Sensor Industrial Gauge Application > Smart gauge for composite sensor

Multi-functional smart gauge development



Using of smart device for setting



Merit of multi-functional smart gauge

- * Simplify big data information classification

- * No need to set up data

- * Alarm

- * Easy data editing

- * **Utilization of other logging system**

Digital Composite sensor Typical utilization case

- * Hydraulics system

- * Fire protection system

- * Water control system

- * Refrigeration application system

- * Boiler control system