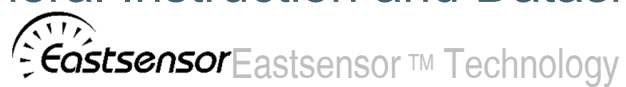


# ESS3 OEM PRESSURE SENSOR **【2023】**

General Instruction and Datasheet



# General Instruction and Datasheet

ESS3 GID-3-EV03.2

Measuring your business



■ Range: 0~100MPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.2%/FS ■ Φ11mm~19mm Standard OEM Pressure Sensor

## Description

ESS3 Series OEM Pressure Sensor uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

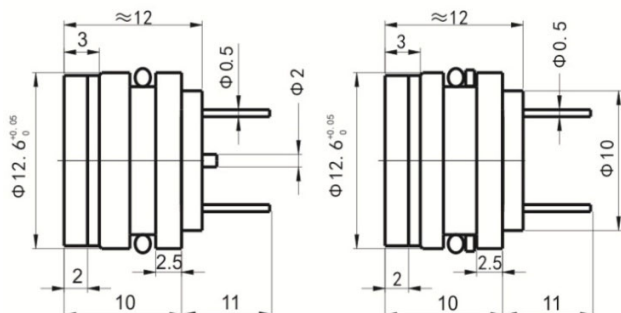
ESS3 Series OEM Pressure Sensor is available all pressure ranges from -100KPa to 100MPa. Also the different dimension can be chosen: diameter from 11 mm to 19 mm, height from 5 mm to 15 mm. Pressure type including Gauge, Differential, Absolute and Sealed Gauge are all available.

## ES3 Series Key Features

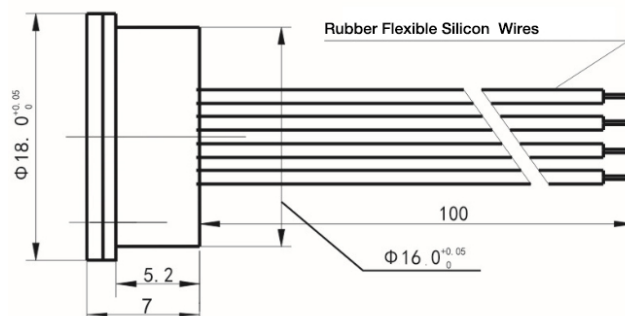
Model		Range	Diameter	Type	Accuracy/FS	Input	Output
ESS312	Compact Size Pressure Sensor	0-10bar-1000bar	12.6mm	G/A/S	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS319	Universal OEM Pressure Sensor	-1bar-0.1bar-1000bar	19mm	G/A/S	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS319-I2C	Digital Output Pressure Sensor	-1bar-0.1bar-1000bar	19mm	G/A	0.3%-0.5%	3.3V/5V	150mV
ESS319T	Pressure & Temperature Sensor	0.1bar-30bar -104°F-185°F	19mm	G/A/S	0.25% 0.50%	1.5mA/5V/10V	150mV
ESS319I	Analog Output Pressure Sensor	-1bar-0.1bar-1000bar	19mm	G/A/S	0.20%	10-30V	6V
ESS320	Differential Pressure Sensor	0-0.35bar-35bar	19mm	D	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS322	All Welded Pressure Sensor	-1bar-0.1bar-1000bar	28mm	G/A/S	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS323	Welded Joint Type Pressure Sensor	-1bar-100bar	19mm	G/A/S	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS331	High Temperature Pressure Sensor	0-5bar-100bar	29.5mm	G/A/S	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS332	Flat Base Pressure Sensor	-1bar-0.1bar-35bar	19mm	G/A/S	0.1%-0.2%	1.5mA/5V/10V	150mV
ESS350	Flat Diaphragm Pressure Sensor	0-0.35bar-60bar	50mm	G/A/S	0.20%	1.5mA/5V/10V	150mV

## ES3 Series Portfolio

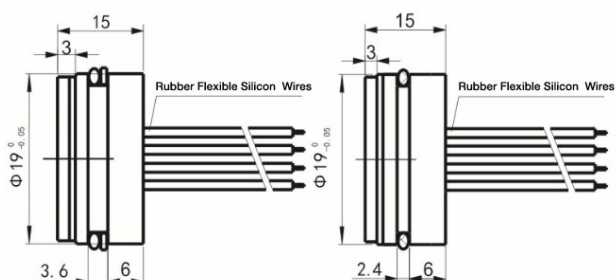
**ESS312 Compact Size  $\Phi 12$  Piezoresistive OEM Sensor**  
Range: 1Mpa~100Mpa



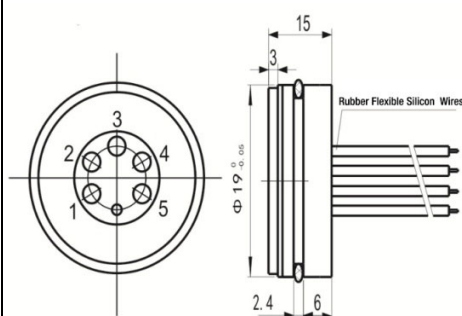
**ESS318 Low Range Piezoresistive OEM Sensor**  
Range: 1Kpa~ $\pm 10$ Kpa



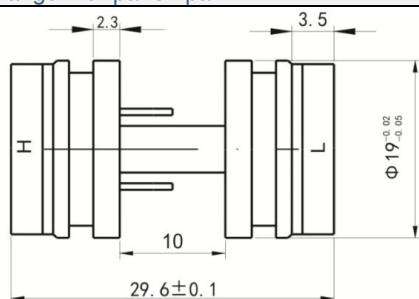
**ESS319 High Stable Universal Piezoresistive OEM Sensor**  
Range: -100Kpa~10Kpa~100Mpa



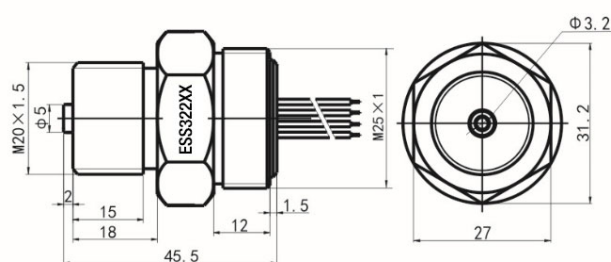
**ESS319P Flush Diaphragm Piezoresistive Pressure Sensor**  
Range: -100Kpa~10Kpa~3.5Mpa



**ESS320 Piezoresistive OEM Differential Pressure Sensor**  
Range: 10Kpa~3Mpa

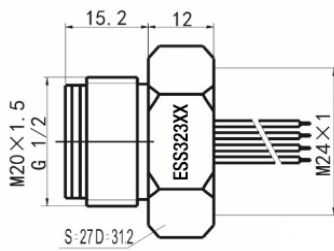


**ESS322 Welded Piezoresistive Pressure Sensor**  
Range: -100Kpa~10Kpa~100Mpa

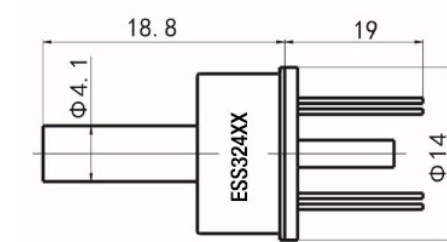
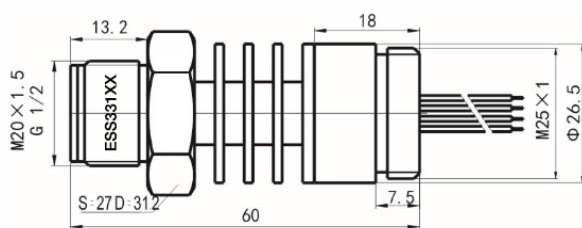


**ESS323 Welded Flush Diaphragm Piezoresistive Sensor**  
Range: -100Kpa~10Kpa~10Mpa

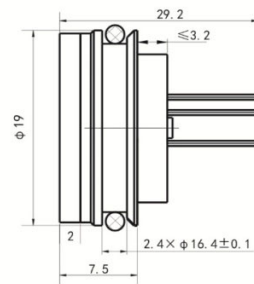
**ESS324 TO-8 Housing Piezoresistive Pressure Sensor**  
Range: 5Kpa~600Kpa



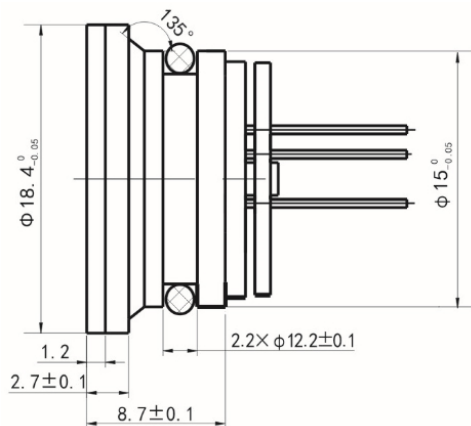
**ESS331 High Temperature Piezoresistive Pressure Sensor**  
Range: 35Kpa~10Mpa



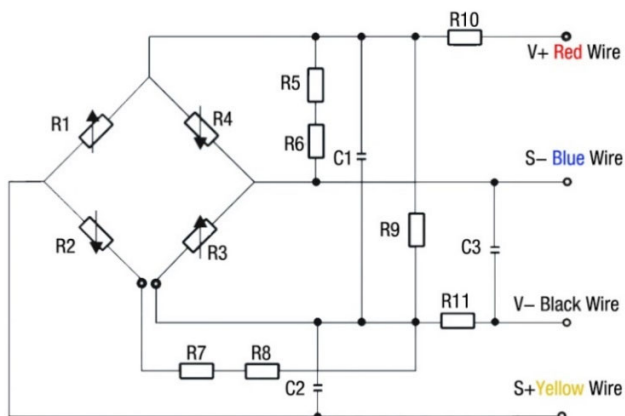
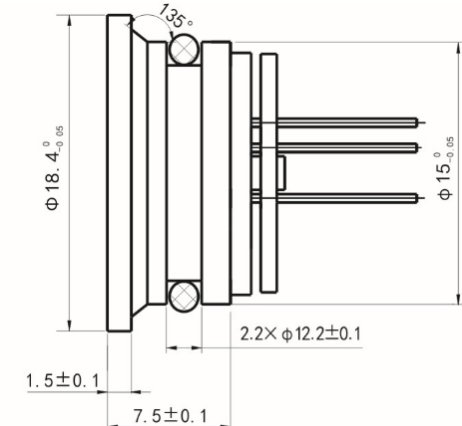
**ESS332 Welded Flat Base Piezoresistive Pressure Sensor**  
Range: -100Kpa~10Kpa~3.5Mpa



**ESS333 Flush Diaphragm Flat Base Piezoresistive Sensor**  
Range: -100Kpa~10Kpa~10Mpa



**ESS333P Flush Diaphragm Flat Base Piezoresistive Sensor**  
Range: -100Kpa~10Kpa~10Mpa



ESS		High Stable OEM Pressure Sensor							
		Code		Model					
		312	Compact Size Φ12 Piezoresistive OEM Sensor						
		319	High Stable Universal Piezoresistive OEM Sensor						
		319-IIC	Digital Output Pressure Sensor						
		319-7	Low Range (0-7kpa) Piezoresistive OEM Sensor						
		319I	Analog Output Pressure Sensor Module (4-20mA; 0.5-4.5V)						
		319T	Pressure & Temperature Pressure Sensor						
		320	Piezoresistive OEM Differential Pressure Sensor						
		322	Welded Piezoresistive Pressure Sensor						
		323	Welded Flush Diaphragm Piezoresistive Sensor						
		331	High Temperature Piezoresistive Pressure Sensor						
		332	Welded Flat Base Piezoresistive Pressure Sensor						
		333	Flush Diaphragm Flat Base Piezoresistive Sensor						
		350	Flat Diaphragm Pressure Sensor						
		501	Ceramic Piezo-Resistive Pressure Sensor						
		501I	Ceramic Piezo-Resistive Pressure Sensor Module (4-20mA; 0.5-4.5V)						
		601	Encapsulated Ultra-Low Pressure Sensor						
		01	MCS Pressure Sensor						
				Code	Span	Code	Span	Code	Span
				R01	0~10KPa	R07	0~400KPa	R13	0~7.0 MPa
				R02	0~20KPa	R08	0~600KPa	R14	0~10 MPa
				R03	0~35KPa	R09	0~1.0 MPa	R15	0~25 MPa
				R04	0~70KPa	R10	0~1.6 MPa	R16	0~40 MPa
				R05	0~100KPa	R11	0~2.0 MPa	R17	0~60 MPa
				R06	0~200KPa	R12	0~3.5 MPa	R18	0~100 MPa
				Code	Pressure Type				
				G	Gauge				
				D	Differential				
		A	Absolute						
		S	Sealed Gauge						
		Code	Power Supply						
		M	1.5mA						
		V5	5V						
		V10	10V						
		Code	Pressure connection						
		0	O-ring -NBR						
		1	O-ring -Viton						
		Code	Electric connection						
		1	Kovar pin						
		2	Rubber flexible silicon wires (10cm)						
ESS	319	R10	G	M	0	2			

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20℃

## ESS312 Compact Size Piezoresistive Pressure Sensor



■ Range: 0KPa-1MPa~100MPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.2%/FS ■ Diameter:  $\Phi$ 12.6mm

### Description

ESS312 Compact Size Pressure Sensor is a new range of sensor that benefit from smaller capsule dimensions ( $\Phi$ 12.6mm) and crevice free diaphragms. It uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS312 is available the ranges from 1Mpa to 100Mpa.

### Key Features & Benefits

- Pressure range 0-1MPa-100MPa
- Gauge, Absolute, Sealed gauge
- Constant Current: 1.5mA
- Voltage power supply: For 19mm only
- Isolated construction, measure various media
- Full Stainless Steel 316
- Wide temperature compensation  $-10^{\circ}\text{C} \sim 80^{\circ}\text{C}$
- Long-term stability  $\pm 0.1\%$ FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	$\pm 1$	$\pm 2$	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.6	3.8	k $\Omega$



0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D
0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Zero Temp. Drift*	±0.15	±0.8	%FS, @25°C
Sensitivity Temp. Drift*	±0.2	±0.7	%FS, @25°C
Long-term Stability	0.1		%FS/year

Range -100KPa~100MPa

\*The typical value of 0~10KPa and 0~20KPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:** Φ12\*1.8mm (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 25g

## Electric & Environment Performance

**Power supply:** 1.5mA/5V(optional) (Max input voltage is 10VDC)

**Insulation Resistance:** 500MΩ@500VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Useful Time (25°C):** >1\*100 Million Times

@Pressure Circulation(80%FS)

**Response Time:** ≤1ms

**Storage Temp.:** -40~+125°C

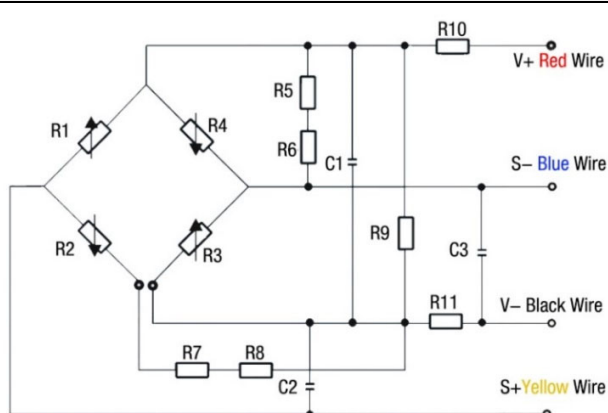
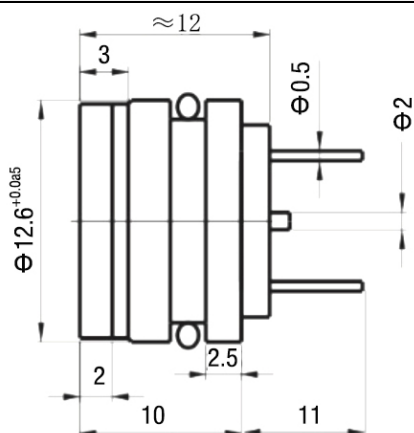
**Operating Temp.:** -40~+85°C

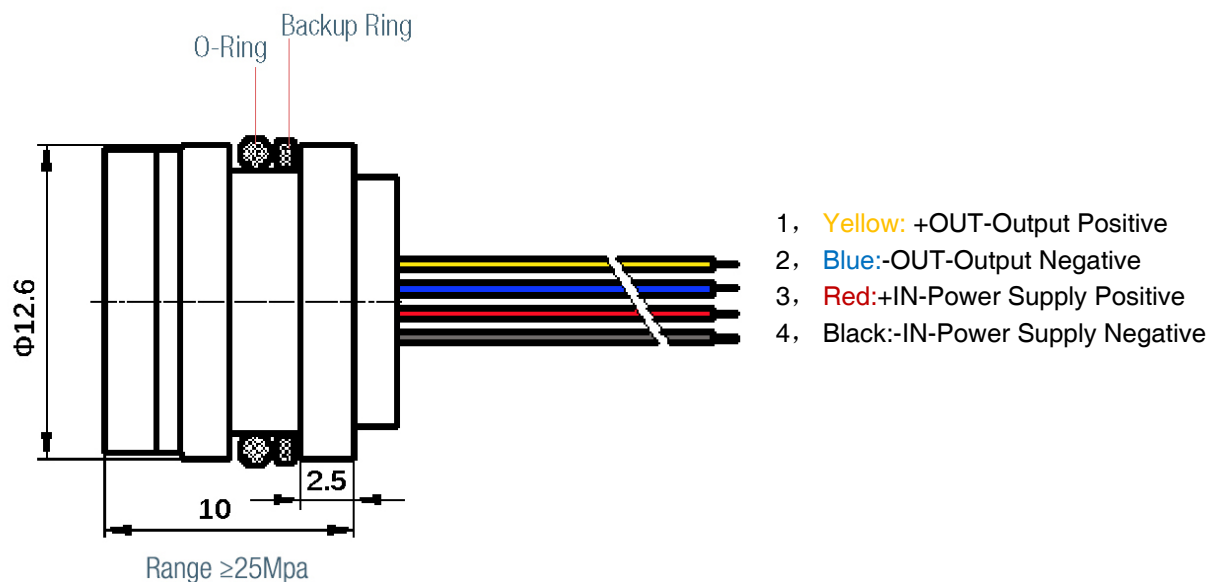
**Compensation Temp.:** 0~50°C; -10~80°C

@ 0~70 (7KPa,20 KPa,35 KPa)

## Drawing & Electrical Connection

ESS312 Compact Size Piezoresistive Pressure Sensor Range: 0-1MPa~100MPa



**ESS312 Compact Size Piezoresistive Pressure Sensor Range: 0-1MPa~100MPa**


## Ordering Procedure

ESS3 High Stable OEM Piezoresistive Sensor						
Code		Model				
12		Welded Flat Base Piezoresistive Pressure Sensor				
Cod	Span	Code	Span	Code	Span	
R01	0~1.0 MPa	R05	0~10 MPa	R09	0~100.0 MPa	
R02	0~2.0 MPa	R06	0~25 MPa			
R03	0~3.5 MPa	R07	0~40 MPa			
R04	0~7.0 MPa	R08	0~60 MPa			
Code		Pressure Type				
G		Gauge				
A		Absolute				
S		Sealed Gauge				
Code		Power Supply				
M		1.5mA				
V5		5V (for 19mm only, not available for ESS312)				
V10		10V (for 19mm only, not available for ESS312)				
Code		Pressure connection				
0		O-ring -NBR				
1		O-ring -Viton				
Code		Electric connection				
1		Kovar pin				
2		Rubber flexible silicon wires (10cm)				
ESS3	12	R03	G	M	0	2

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance.  
 ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than  $-20^{\circ}\text{C}$



## ESS319 High Stable OEM Piezoresistive Pressure Sensor



■ Range: 0~100MPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.2%/FS ■ Φ19mm Standard OEM Pressure Sensor

### Description

ESS319 Series OEM Pressure Sensor uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS319 Series OEM Pressure Sensor is available all pressure ranges from 0 to 100MPa.

### Key Features & Benefits

- Pressure range 0~100MPa
- Gauge, Absolute, Sealed gauge
- Constant current/Voltage power supply
- Isolated construction, measure various media
- Φ19mm OEM Pressure Sensor
- Full Stainless Steel 316
- Wide temperature compensation -10°C~80°C
- Long-term stability ±0.2%FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D
0~1.0 MPa	200%	125~185	150	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	±1	±2	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.6	3.8	kΩ
Zero Temp. Drift*	±0.15	±0.8	%FS, @25°C
Sensitivity Temp. Drift*	±0.2	±0.7	%FS, @25°C
Long-term Stability	0.1		%FS/year

0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:**  $\Phi 16 \times 1.8\text{mm}$  (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 20~30g

## Electric & Environment Performance

**Power supply:** 1.5mA/5V (Max input voltage is 10VDC)

**Insulation Resistance:** 500M $\Omega$ @500VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Useful Time (25°C):** >1\*100 Million Times

@Pressure Circulation(80%FS)

**Response Time:**  $\leq 1\text{ms}$

**Storage Temp.:** -40~+125°C

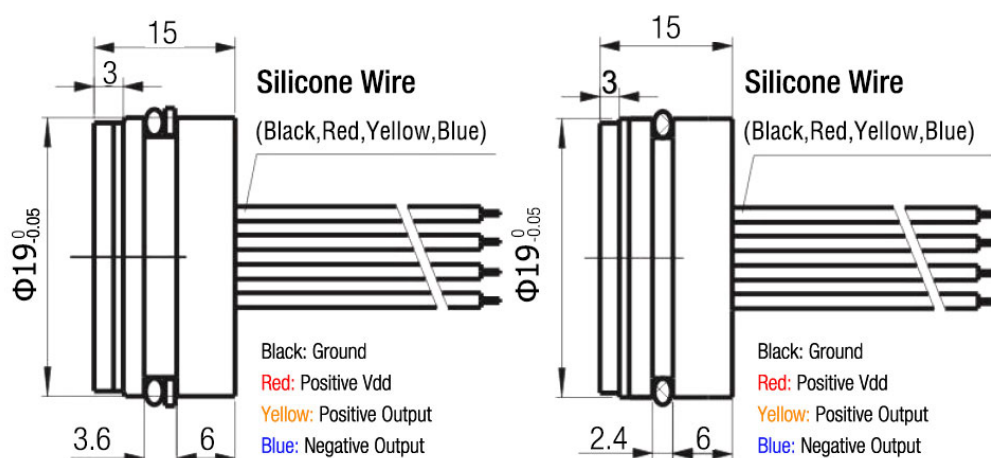
**Operating Temp.:** -40~+85°C

**Compensation Temp.:** 0~50°C; -10~80°C

@ 0 ~ 70 (7kPa, 20 kPa, 35 kPa)

## Drawing

ESS319 High Stable Universal Piezoresistive OEM Sensor Range: 0Kpa~100Mpa



## Ordering Procedure

ESS3	High Stable OEM Piezoresistive Sensor					
	Code	Model				
	19	High Stable Universal Piezoresistive OEM Sensor				
	19P	Flush Diaphragm Piezoresistive Pressure Sensor				
	19T	Pressure & Temperature Sensor				
	19-I2C	Digital Pressure Sensor				
	19I	Pressure Sensor with Analog Output				
		Cod	Span	Code	Span	Code Span
		R01	0~10KPa	R07	0~400KPa	R13 0~7.0 MPa
		R02	0~20KPa	R08	0~600KPa	R14 0~10 MPa
		R03	0~35KPa	R09	0~1.0 MPa	R15 0~25 MPa
		R04	0~70KPa	R10	0~1.6 MPa	R16 0~40 MPa
		R05	0~100KPa	R11	0~2.0 MPa	R17 0~60 MPa
		R06	0~200KPa	R12	0~3.5 MPa	R18 0~100 MPa
		Code	Pressure Type			
		G	Gauge			
		A	Absolute			
		S	Sealed Gauge			
		Code	Power Supply			
		M	1.5mA			
		V5	5V			
		V10	10V			
		Code	Pressure connection			
		0	O-ring -NBR			
		1	O-ring -Viton			
		Code	Electric connection			
		1	Kovar pin			
		2	Rubber flexible silicon wires (10cm)			
ESS3	19	R10	G	M	0	2

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20°C

## ESS319-I2C Digital Pressure Sensor



Range: -100kPa...0kPa~10kPa...100MPa Output: I2C Accuracy:  $\pm 0.5\%$ /FS(pressure);  $\pm 0.5^\circ\text{C}$  (temperature) Pressure Type: Gauge/Absolute Power Supply: 3.3V/5V

### Description

ESS319-I2C Digital Pressure Sensor can transfer the measurement signals of pressure and liquid level to I2C digital output. With the fast and accurate interface, the ESS319-I2C is used to build an Internet of Things using a microcontroller. It can read data and control power on and off to reduce power consumption through microprocessor operation.

ESS319-I2C Digital Pressure Sensor is available ranges from -100KPa to 100MPa.

### Key Features & Benefits

- Digital compensation for sensor offset, sensitivity, temperature drift and nonlinearity
- 32-bit customer ID field for module traceability
- Digital output of temperature and pressure in I2C bus mode
- Fast power-on to data output response: 3ms
- Low power consumption, sleep mode operation, as low as 5  $\mu\text{A}$ , current consumption depends on the programmed sampling rate
- Operating temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$
- Wide supply voltage capability: 3.3V/5V

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	$\pm 1$	$\pm 2$	mV DC
FS Output	100		mV DC
Input/ Output	2.6	3.8	k $\Omega$
Zero Temp. Drift*	$\pm 0.15$	$\pm 0.8$	%FS, @25°C
Sensitivity Temp. Drift*	$\pm 0.2$	$\pm 0.7$	%FS, @25°C

0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Long-term Stability	0.1	%FS/year
---------------------	-----	----------

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:**  $\Phi 16 \times 1.8\text{mm}$  (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 20~30g

## Electric & Environment Performance

**Power supply:**  $5 \pm 0.1\text{Vdc}$ ;  $3.3 \pm 0.1\text{Vdc}$ ;

**Insulation Resistance:**  $500\text{M}\Omega @ 500\text{VDC}$

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Storage Temp.:**  $-40 \sim +125^\circ\text{C}$

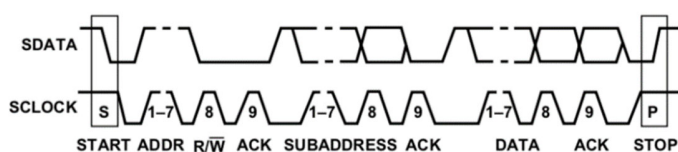
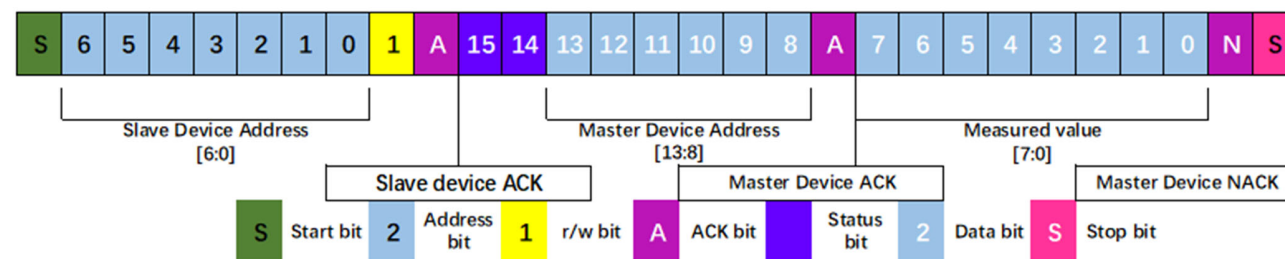
**Operating Temp.:**  $-40 \sim +85^\circ\text{C}$

**Compensation Temp.:**  $0 \sim 50^\circ\text{C}$ ;  $-10 \sim 80^\circ\text{C}$

@  $0 \sim 70$  (7kPa, 20 kPa, 35 kPa)

## Data Measurement & Communication Sequence

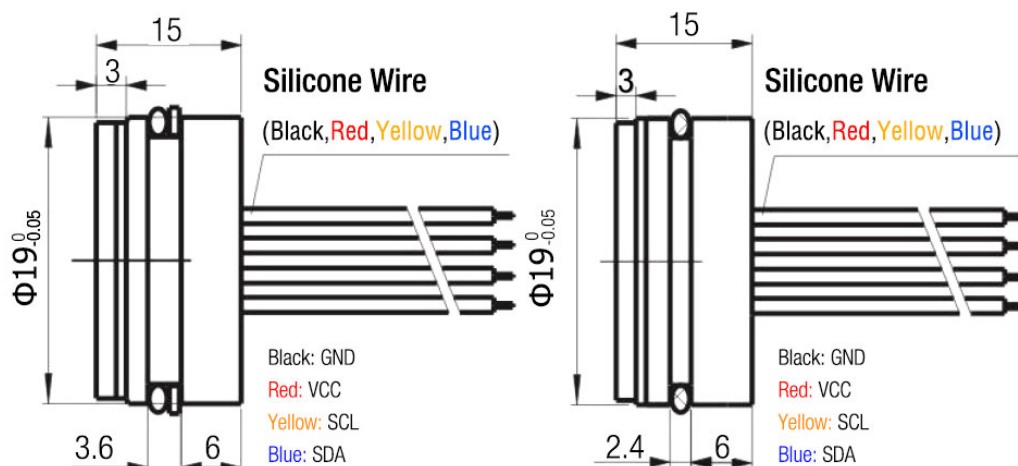
For read and write operations, the master device commands to start, and sends an ACK (acknowledgement) as a slave device to indicate success. The factory address of the slave device is 0x28, and the communication sequence is shown as below



Parameters	Typ	Unit
Zero pressure output(5%)	333	Hex
Zero pressure output(10%)	666	Hex
Full-scale pressure output (90%)	399A	Hex
Full-scale pressure output (95%)	3CCB	hex

## Drawing

ESS319-I2C Digital Pressure Sensor Range: -100kPa...0kPa~10kPa...100MPa



## Ordering Procedure

ESS3	High Stable OEM Piezoresistive Sensor					
Code	Model					
19-I2C	Digital Pressure Sensor					
Cod	Span	Code	Span	Code	Span	
R01	0~10KPa	R07	0~400KPa	R13	0~7.0 MPa	
R02	0~20KPa	R08	0~600KPa	R14	0~10 MPa	
R03	0~35KPa	R09	0~1.0 MPa	R15	0~25 MPa	
R04	0~70KPa	R10	0~1.6 MPa	R16	0~40 MPa	
R05	0~100KPa	R11	0~2.0 MPa	R17	0~60 MPa	
R06	0~200KPa	R12	0~3.5 MPa	R18	0~100 MPa	
Code	Pressure Type					
G	Gauge					
A	Absolute					
S	Sealed Gauge					
Code	Power Supply					
C	3.3V					
E	5V					
Code	Pressure connection					
0	O-ring -NBR					
1	O-ring -Viton					
Code	Electric connection					
1	Kovar pin					
2	Rubber flexible silicon wires (10cm)					
ESS3	19-I2C	R10	G	E	0	2

**Note:** ① Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ② please protect the diaphragm and the compensated board carefully to prevent any damage. ③ Please contact us if your requested working temperature lower than -20℃

## 0-7Kpa Range Pressure Sensor



■ Range: 0~7KPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.2%/FS ■ Φ19mm Standard OEM Pressure Sensor

### Description

ESS319-7 is the minimal range pressure sensor that can measure the range of 0-7kpa, it's been designed and manufactured by principle of silicone piezo-resistance and uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS319-7 Pressure Sensor is available pressure ranges from 0 to 7Kpa.

### Key Features & Benefits

- Pressure range 0~7KPa
- Gauge type pressure only
- Constant current/Voltage power supply
- Isolated construction, measure various media
- Φ19mm OEM Pressure Sensor
- Full Stainless Steel 316
- Wide temperature compensation 0°C~50°C
- Long-term stability ±0.2%FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Parameters	Typ.	Max.	Unit	Pressure
Zero Output	±1	±2	mV	G
FS Output	65	80	mV	G
Nonlinearity	0.2	0.5	%FS	G
Hysteresis	0.05	0.08	%FS	G
Repeatability	0.05	0.08	%FS	G
Input/Output impedance	2.6	6.0	kΩ	G
Zero Temperature Drift	±0.5	±1.0	%FS, @25°C	G
Sensitivity Drift	±0.5	±1.0	%FS, @25°C	G

### Technical Parameters

Parameters	Data	Unit
Excitation	1.5mA   5V  10V	mA/V
Insulation Impedance	500	MΩ @100VDC
Working Temp.	-40~+125	°C
Storage Temp.	-40~+125	°C
Compensation Temp.	0~50	°C
Response Time	≤1	Ms
Humidity	50%±10%	RH
Environment Pressure	86~106	Kpa



Long-term Stability	0.1	0.2	%FS/year	G
Constant Acceleration	100		g@11ms	G
MOC of housing	SS316			G
MOC of Diaphragm	SS316			G
MOC of Leading Tube	Gold-plated kovar			G
O-Ring Material	nitrile rubber or viton			G
O-Ring Size	Φ16*1.8mm			G
Media	Compatible with SS316L			G
Fluid Filled	Silicone Oil			G
Life time	1*100 million			G

Shock& Vibration	10	gRMS
<ul style="list-style-type: none"> <li>Suspended the O-Ring of sensor with inner case.</li> <li>Keep sensor vertically when install into case</li> <li>The recommended tolerance should be +0.02~+0.05 for inner case build.</li> <li>0.01uF ceramic type capacitance has been embedded to improve the ability of anti-interference, if customer need sensor more fast response ability, please contact when order.</li> <li>Ensure to keep senso away from shock&amp; vibration</li> </ul>		

## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:** Φ16\*1.8mm (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

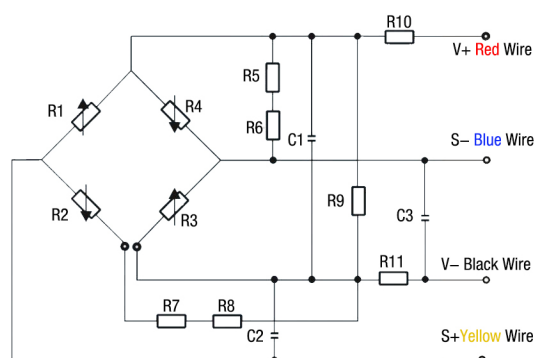
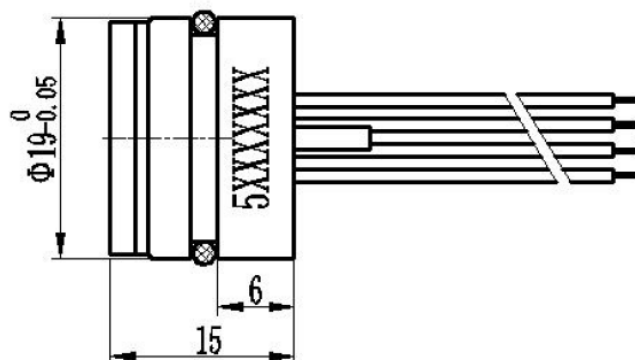
**Packing Medium:** Silicon Oil

**Net weight:** 23g



## Drawing

ESS319-7 Pressure Sensor Range: 0Kpa~7Kpa



C1, C2, C3 are 0.01uF ceramic type capacitance (103), user looking for sensor quick response performance or with battery excitation can make declaration to remove C1, C2, C3

## Ordering Procedure

ESS3	High Stable OEM Piezoresistive Sensor					
	Code	Model				
	19	High Stable Universal Piezoresistive OEM Sensor				
	19P	Flush Diaphragm Piezoresistive Pressure Sensor				
	19T	Pressure & Temperature Sensor				
	19-I2C	Digital Pressure Sensor				
	19I	Pressure Sensor with Analog Output				
	19-7	7Kpa Pressure Sensor				
	Cod	Span	Code	Span	Code	Span
	R00	0-7Kpa				
	R01	0~10KPa	R07	0~400KPa	R13	0~7.0 MPa
	R02	0~20KPa	R08	0~600KPa	R14	0~10 MPa
	R03	0~35KPa	R09	0~1.0 MPa	R15	0~25 MPa
	R04	0~70KPa	R10	0~1.6 MPa	R16	0~40 MPa
	R05	0~100KPa	R11	0~2.0 MPa	R17	0~60 MPa
	R06	0~200KPa	R12	0~3.5 MPa	R18	0~100 MPa
	Code	Pressure Type				
	G	Gauge				
	A	Absolute				
	S	Sealed Gauge				
	Code	Power Supply				
	M	1.5mA				
	V5	5V				
	V10	10V				
	Code	Pressure connection				
	0	O-ring -NBR				
	1	O-ring -Viton				
	Code	Electric connection				
	1	Kovar pin				
	2	Rubber flexible silicon wires (10cm)				
ESS3	19-7	R00	G	M	0	2

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20℃

## ESS319I Analog Output Pressure Sensor



■ Range: 0~1000bar(G) ■ Overload Pressure: 150%~300% ■ Accuracy: 0.25%/FS ■ Power Supply: 10-30Vdc (24Vdc default)

### Description

ESS319I Analog output pressure sensor can produce 4-20mA or 0-5V analog output signal, based on Series ESS319 OEM Pressure Sensor, ESS319I also uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS319I Analog output pressure sensor is available all pressure ranges from 0 to 1000barg.

### Key Features & Benefits

- Pressure range 0~100MPa
- Pressure Type: Gauge
- Constant current/Voltage power supply
- Isolated construction, measure various media
- Φ19mm OEM Pressure Sensor
- Full Stainless Steel 316
- Wide temperature compensation -10°C~80°C
- Long-term stability ±0.25%FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	±1	±2	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.6	3.8	kΩ
Zero Temp. Drift*	±0.15	±0.8	%FS, @25°C
Sensitivity Temp. Drift*	±0.2	±0.7	%FS, @25°C

0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Long-term Stability	0.1	%FS/year
---------------------	-----	----------

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance



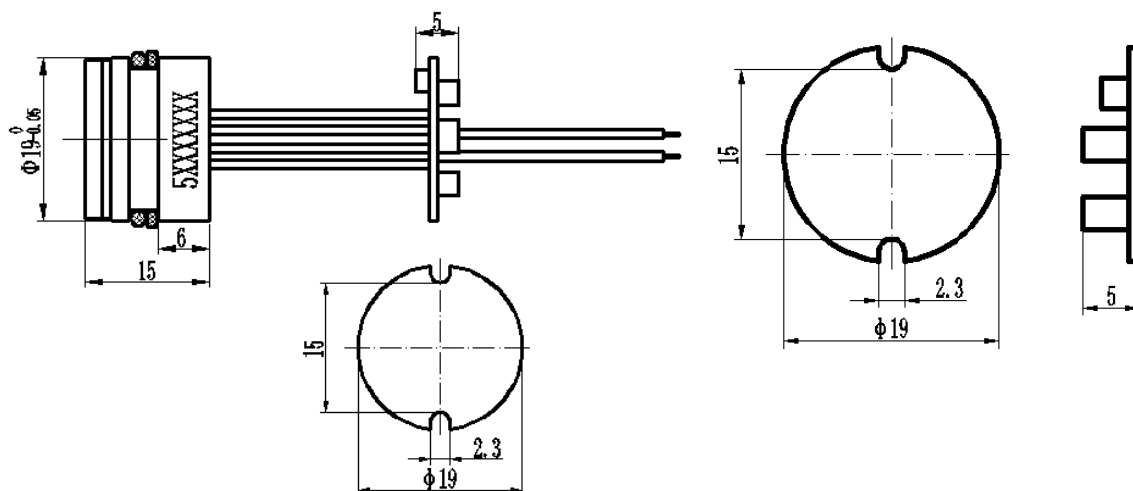
**Diaphragm:** Stainless Steel 316L  
**Housing:** Stainless Steel 316L  
**Pressure leading tube:** Stainless Steel 316L  
**O Ring:**  $\Phi 16 \times 1.8\text{mm}$  (nitrile rubber or viton)  
**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber  
**Packing Medium:** Silicon Oil  
**Net weight:** 50g

## Electric & Environment Performance

**Power supply:** 10-30Vdc (24Vdc default)  
**Output:** 4-20mA or 0-5V or 0.5-4.5V (ratio)  
**Load Resistance:**  $\leq (U-12)/0.02 \Omega$   
**Overpressure:** 1.5~3 times FS  
**Vibration (20~500Hz):** 20G  
**Useful Time (25°C):** >1\*100 Million Times  
 @Pressure Circulation(80%FS)  
**Response Time:**  $\leq 1\text{ms}$   
**Storage Temp.:** -40~+125°C  
**Operating Temp.:** -40~+85°C  
**Compensation Temp.:** 0~50°C; -10~80°C  
 @ 0~70 (7kPa,20 kPa,35 kPa)

## Drawing

ESS319I Analog Output Pressure Sensor Range: 0Kpa~25Mpa



## Ordering Procedure

ESS3	High Stable OEM Piezoresistive Sensor										
	Code	Model									
	19	High Stable Universal Piezoresistive OEM Sensor									
	19P	Flush Diaphragm Piezoresistive Pressure Sensor									
	19T	Pressure & Temperature Sensor									
	19-I2C	Digital Pressure Sensor									
	19I	Pressure Sensor with Analog Output									
		Code	Span		Cod	Span		Cod	Span		
		R01	0~10KPa		R07	0~400KPa		R13	0~7.0 MPa		
		R02	0~20KPa		R08	0~600KPa		R14	0~10 MPa		
		R03	0~35KPa		R09	0~1.0 MPa		R15	0~25 MPa		
		R04	0~70KPa		R10	0~1.6 MPa		R16	0~40 MPa		
		R05	0~100KPa		R11	0~2.0 MPa		R17	0~60 MPa		
		R06	0~200KPa		R12	0~3.5 MPa		R18	0~100 MPa		
		Code	Pressure Type								
		G	Gauge								
		A	Absolute								
		S	Sealed Gauge								
		Code	Power Supply								
		V5	5V								
		V13	10-30V								
		V24	24V								
		Cod	Output								
		O1	0.5-4.5V								
		O2	0-5V								
		O3	0-10V								
		O4	4-20mA								
		Code	PCB Shape								
		RD	Roundness								
		RT	Rectangular								
		Code	Pressure connection								
		0	O-ring -NBR								
		1	O-ring -Viton								
		Code	Electric connection								
		1	Kovar pin								
		2	Rubber flexible silicon wires								
ESS3	19I	R10	G	V5	O1	RD	0	2			

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20℃

## ESS319T Pressure & Temperature Sensor



- Range: 10KPa~3MPa(Pressure); -40°C~85°C(Temperature)
- Temperature Compensation: 0-50 °C(<400kpa)
- Temperature Compensation: -100-80 °C(>400kpa)
- Overload Pressure: 150%~300%
- Accuracy: 0.25%/FS(Pressure); 0.5%/FS(Temperature)
- Pressure Type: Gauge/Seal Gauge/Absolute
- Power Supply: 1.5mA/5V

- Range: -100KPa~70MPa(Pressure); -40°C~85°C(Temperature)
- Temperature Compensation: 0-50 °C(<400kpa)
- Temperature Compensation: -100-80 °C(>400kpa)
- Overload Pressure: 150%~300%
- Accuracy: 0.25%/FS(Pressure); 0.5%/FS(Temperature)
- Pressure Type: Gauge/Seal Gauge/Absolute
- Power Supply: 1.5mA/5V

### Description

ESS319T Pressure & Temperature sensor is made from high-sensitivity piezoresistive silicon chip. Both the pressure sensor and temperature sensor have been packed in fluid-filled cylindrical cavity and isolated from measured media by SS diaphragm seal. ESS319T can measure pressure and temperature at the same time.

ESS319T Pressure & Temperature Sensor is available all pressure ranges from -100kpa to 70MPa for pressure and -40°C to 85°C for temperature.

### Key Features & Benefits

- Pressure range 10Kpa-3Mpa;-100kpa-70Mpa
- Temperature range: -40°C to 85°C
- Gauge, Absolute, Sealed gauge
- Constant Current: 1.5mA
- Voltage power supply: 5V/10V
- Isolated construction, measure various media
- Full Stainless Steel 316
- Long-term stability  $\pm 0.2\%$ FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS



0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D
0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Zero Output	±1	±2	mV DC
FS Output	100 (typ)	150	mV DC
1.5mA, 10Kpa	30 (min)	150	mV DC
1.5mA, other range	60(min)	150	mV DC
10V, 10Kpa	60(min)	150	mV DC
10V, other range	98(min)	102	mV DC
Input/ Output Impedance	2.6	3.8	KΩ (1.5mA)
	3	18	KΩ(10V)
Zero Temp. Drift*	±0.15	±0.8	%FS, @25°C
Sensitivity Temp. Drift*	±0.2	±0.7	%FS, @25°C
Long-term Stability	0.1		%FS/year

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C

## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:** Φ16\*1.8mm (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 120g



## Electric & Environment Performance

**Power supply:** 1.5mA/5V(optional) (Max input voltage is 10VDC)

**Insulation Resistance:** ≥200MΩ@250VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20g(20-5000HZ)

**Useful Time (25°C):** >1\*100 Million Times

@Pressure Circulation(80%FS)

**Response Time:** ≤1ms

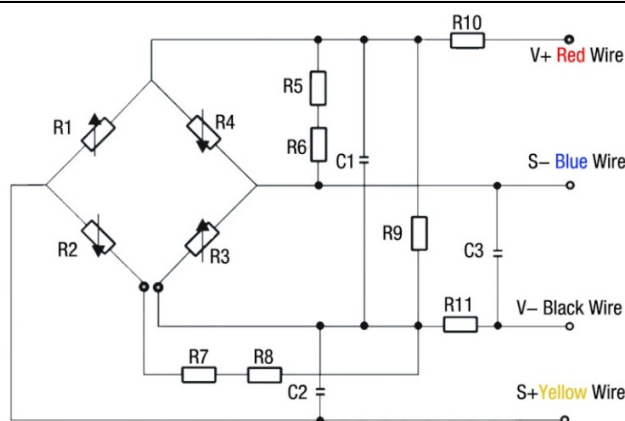
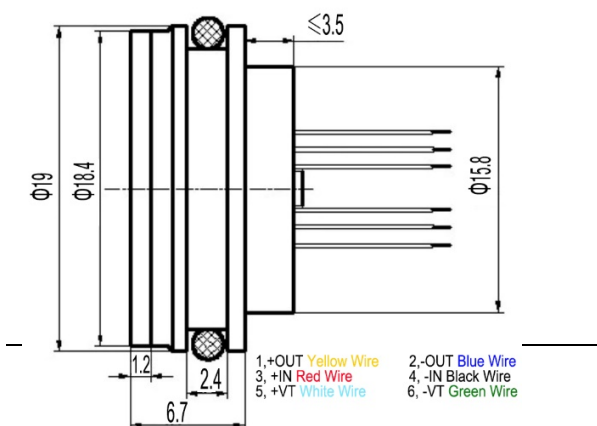
**Storage Temp.:** -40~+125°C

**Operating Temp.:** -40~+85°C

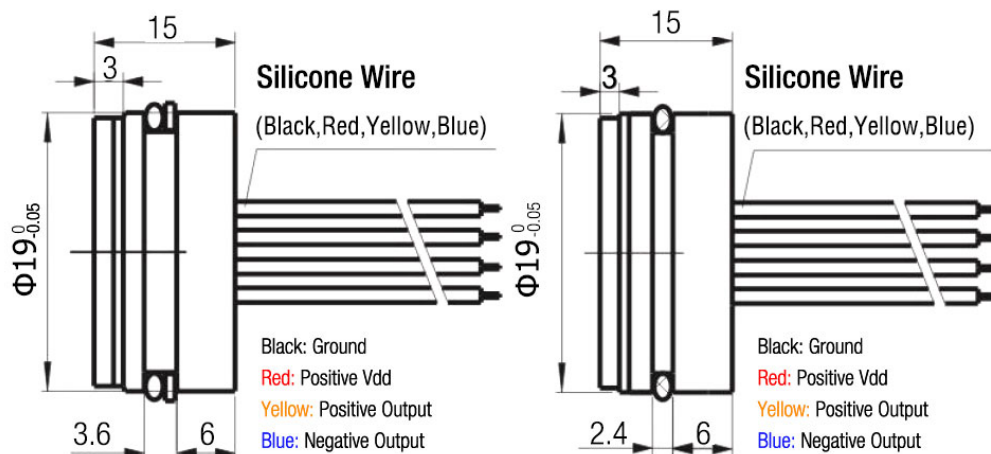
**Compensation Temp.:** 0~60°C (1.5Ma, ≤70Kpa);  
-10~70°C (1.5Ma, >70Kpa); -20~85°C (5V/10V)

## Drawing & Electrical Connection

ESS319T Pressure & Temperature Sensor Range: 10KPa~3MPa





**ESS319T Pressure & Temperature Sensor** Range: -100KPa~70MPa


## Ordering Procedure

ESS319T		Pressure & Temperature OEM Piezoresistive Sensor						
		Code	Size					
		H	19mm*6.7mm					
		S	19mm*15mm					
			Cod	Span	Code	Span	Code	Span
		R01	0~10KPa	R07	0~400KPa	R13	0~7.0 MPa	
		R02	0~20KPa	R08	0~600KPa	R14	0~10 MPa	
		R03	0~35KPa	R09	0~1.0 MPa	R15	0~25 MPa	
		R04	0~70KPa	R10	0~1.6 MPa	R16	0~40 MPa	
		R05	0~100KPa	R11	0~2.0 MPa	R17	0~60 MPa	
		R06	0~200KPa	R12	0~3.5 MPa			
		Code	Pressure Type					
		G	Gauge					
		A	Absolute					
		S	Sealed Gauge					
			Code	Power Supply				
			M	1.5mA				
		V5	5V					
		V10	10V					
			Code	Pressure connection				
			0	O-ring -NBR				
			1	O-ring -Viton				
				Code	Electric connection			
				1	Kovar pin			
				2	Rubber flexible silicon wires (10cm)			
ESS319T	S	R10	G	M	0	2		

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20 °C

## ESS320 Piezoresistive OEM Differential Pressure Sensor



■ Piezoresistive Silicon Chip Employed ■ Perfect Long Term Stability ■ MEMS Technology ■ Diameter:  $\Phi 19\text{mm}$

### Description

#### Brief Introduction

ESS320 OEM Differential Pressure Sensor is a standard and most popular sensor applied in air and liquid pressure measuring. A high sensitivity silicon pressure chip is employed in the sensor. The housing is filled with oil for pressure transmission. The most important specification for industry application is long term stability. ESS320 sensor is designed for industry application with perfect long-term stability

#### Diaphragm and pressure range

The diaphragm diameter has tight relation with pressure measured. Low pressure requires large diameter and high pressure needs small diameter. This is caused by oil expansion during temperature changing. It creates internal pressure due to the resistance of the diaphragm. The smaller diaphragm will create large internal pressure, and it is difficult to make zero compensation.

#### Caution:

- The metal diaphragm is very thin (approx. 20  $\mu\text{m}$ ), so do not touch it with hard or sharp objects under any circumstances. Even slight deformations can affect the pressure signal!
- In the event of pressure overloads, please note that even pressure pulses  $< 0,1 \text{ us}$  are "detected" by the pressure sensor chip. Short, high pressure peaks can cause the sensor chip to break.

### Standard Range

Code	Range	Overload	Break	Pressure
0~10KPa	0~0.01MPa	300%FS	600%FS	Differential
0~20KPa	0~0.02MPa	300%FS	600%FS	Differential
0~35KPa	0~0.035MPa	300%FS	600%FS	Differential
0~70KPa	0~0.07MPa	200%FS	600%FS	Differential
0~100KPa	0~0.1MPa	200%FS	500%FS	Differential
0~250KPa	0~0.25MPa	200%FS	500%FS	Differential
0~400KPa	0~0.4MPa	200%FS	500%FS	Differential
0~600KPa	0~0.6MPa	200%FS	500%FS	Differential
0~1.0 MPa	0~1.0MPa	200%FS	300%FS	Differential
0~1.6 MPa	0~1.6MPa	200%FS	300%FS	Differential
0~2.5 MPa	0~2.5MPa	150%FS	300%FS	Differential

**Notes:** 10kPa, 35kPa, 70kPa, 100kPa, 250kPa, 400kPa, 600kPa, 1MPa, 1.6MPa, 2.5MPa (bar and psi unit available)

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	$\pm 0.2$	$\pm 0.3$	%FS, BFS
Hysteresis	$\pm 0.03$	0.05	%FS
Repeatability	$\pm 0.03$	0.05	%FS
Zero Output	$\pm 1$	2	mV DC
FS Output	85	100	mV DC
Excitation	1.5		mA
Heat Hysteresis	$\pm 0.05$	0.075	%FS
Zero Temp. Drift*(1.5mA@-10~70°C C)		1.5	%FS, @25°C
Sensitivity Temp. Drift**(1.5mA@-10~70°C C)		1.5	%FS, @25°C
Long-term Stability	$\pm 0.2$	$\pm 0.3$	%FS/year

*Nonlinearity calculated based on least square method*

*\*The typical value of 0~10kPa and 0~20kPa's zero temperature*



## Construction Performance

**Diaphragm:** Stainless Steel 316L  
**Housing:** Stainless Steel 316L  
**Pressure leading tube:** Stainless Steel 316L  
**O Ring:**  $\Phi 16 \times 1.8\text{mm}$  (Ding cyanide or fluororubber)  
**Measuring Medium:** Which is compatible with SS316L, Ding cyanide & fluororubber  
**Packing Medium:** Silicon Oil  
**Net weight:** 0.1kg

## Specification

Parameters	Min	Typ	Max	Units	Notes
Sensitivity	13.2	20	26.5	mV/V@FS	
Zero Pressure Output	-6.0		8.0	mV/V	①
Pressure Non-Linearity	-0.10		0.10	%Span	②
Pressure Hysteresis	-0.05		0.05	%Span	
Input/Output Resistance	3800	4400	5800	$\Omega$	
Temp. Coefficient -Span	-1450	-1250	-1000	ppm/ $^{\circ}\text{C}$	③
Temp. Coefficient -Offset		1		$\mu\text{V/V}/^{\circ}\text{C}$	③
Temp. Coefficient -Resistance	1300	1510	1750	ppm/ $^{\circ}\text{C}$	③
Thermal Hysteresis-Span	-0.025		0.25	%Span	③
Thermal Hysteresis-Offset	-0.025		0.25	%Span	③
Line (Common Mode) Pressure			1000	psi	
Line Pressure Effect on Zero			0.5	%Span/1Kpsi	
Pressure Overload			3X	Rated	④
Pressure Burst			4X	Rated	⑤
Operating Temperature	-40		+125	$^{\circ}\text{C}$	⑥
Storage Temperature	-40		+125	$^{\circ}\text{C}$	⑥
Vibration (10~2000Hz)			20	g	
Insulation Resistance (50Vdc)	50			M $\Omega$	⑦
Output Load Resistance	5			M $\Omega$	⑧
Supply Voltage		5	9.5	V	
Supply Current			1.5	mA	
Voltage Breakdown			500	Vrms	⑨
Endurance (FS@25 $^{\circ}\text{C}$ )		1,000,000		Cycles	
Media Compatibility	All fluid and gasses compatible with SS316 & Nitrile				

**Notes:** Above data is based on the following parameter:

range: 0-15psid, power supply: 5V, material of O-Ring: Viton

## Electric & Environment Performance

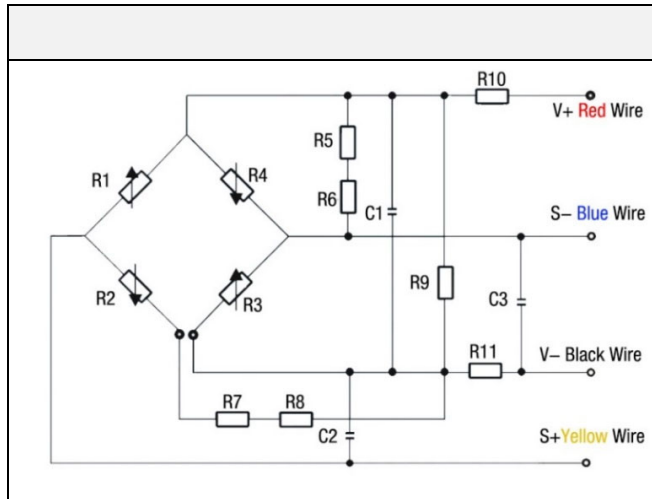
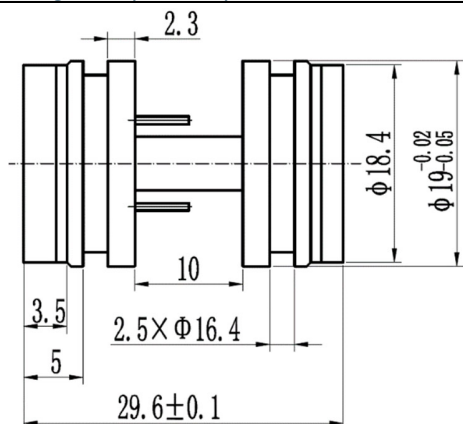
**Power supply:**  $\leq 2\text{mA}$  (constant current)  
**Insulation Resistance:**  $\leq 250\text{M}\Omega$  @250VDC  
**Bridge Resistance:**  $3\text{k}\Omega \sim 6\text{k}\Omega$   
**Electrical Connection:** Silicone shielded  
**Vibration (20~5000Hz):** 20G  
**Useful Time (25 $^{\circ}\text{C}$ ):**  $> 1 \times 100$  Million Times  
 @Pressure Circulation(80%FS)  
**Response Time:**  $\leq 1\text{ms}$  (90%FS)  
**Storage Temp.:** -40~+125 $^{\circ}\text{C}$   
**Operating Temp.:** -40~+125 $^{\circ}\text{C}$   
**Compensation Temp.:** 0~60 $^{\circ}\text{C}$   
**Wire Connection:** 4 wire (typical) | 5 wire (available)  
 39x  $\Phi 0.015$ , Silicon shield

### Note

- ① Measured at ambient.
  - ② Best fit straight line
  - ③ Over the temperature range -20 $^{\circ}\text{C}$  to +85 $^{\circ}\text{C}$  (0 $^{\circ}\text{C}$  to 50 $^{\circ}\text{C}$  for 1psi, 0 $^{\circ}\text{C}$  to 70 $^{\circ}\text{C}$  for 5psi) with Respect to 25 $^{\circ}\text{C}$
  - ④ For high-end port, rated or 1000psi whichever is less; for low-end point, rated or 150psi whichever is less. The Maximum pressure that can be applied without changing the transducer performance accuracy.
  - ⑤ The maximum pressure that can be applied to a transducer without rupture of either the sensing element or transducer.
  - ⑥ Temperature range for cable and connector is -20 $^{\circ}\text{C}$  to +105 $^{\circ}\text{C}$
  - ⑦ Between case and sensing element.
  - ⑧ Load resistance to reduce measurement errors due to output loading.
  - ⑨ At dry air
- Direct mechanical contact with diaphragm is prohibited. Diaphragm surface must remain free of defects (scratches, punctures, fingerprints. Etc) for device to operate properly.
- Caution is advised when handling parts with exposed diaphragms. Use protective cap whenever devices are not in used.**

## Drawing & Electrical Connection

**ESS320 OEM Piezoresistive Differential Pressure Sensor**  
Range: 10Kpa~2.5Mpa

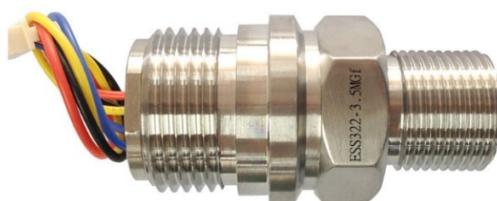


## Ordering Procedure

ESS3		High Stable OEM Piezoresistive Sensor						
		Code	Model					
		20	OEM Piezoresistive Differential Pressure Sensor					
			Cod	Span	Code	Span	Code	Span
			R01	0~10KPa	R05	0~100KPa	R09	0~1.0 MPa
			R02	0~20KPa	R06	0~250KPa	R10	0~1.6 MPa
			R03	0~35KPa	R07	0~400KPa	R11	0~2.5 MPa
			R04	0~70KPa	R08	0~600KPa		
			Code	Pressure Type				
			D	Differential				
			Code	Power Supply				
			M	1.5mA				
			V5	5V				
			V10	10V				
			Code	Pressure connection				
			0	O-ring -NBR				
			1	O-ring -Viton				
			Code	Electric connection				
			1	Ding cyanide				
			2	Fluororubber				
ESS3	20	R03	D	M	0	2		

**Note:** ① Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance.  
② please protect the diaphragm and the compensated board carefully to prevent any damage. ③ Please contact us if your requested working temperature lower than -20°C

## ESS322 All Welded OEM Piezoresistive Pressure Sensor



Range: 0~100MPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.1%/FS ■ All Welded OEM Pressure Sensor

### Description

ESS322 Series OEM Pressure Sensor uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS322 All Welded Series OEM Pressure Sensor is available all pressure ranges from -100kpa to 100MPa.

### Key Features & Benefits

- Pressure range -100kpa~100MPa
- Gauge, Differential, Absolute, Sealed gauge
- Constant Current/Voltage power supply
- Isolated construction, measure various media
- Welded OEM Pressure Sensor
- Full Stainless Steel 316
- Wide temperature compensation -10°C~80°C
- Long-term stability  $\pm 0.1\%$ FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D
0~1.0 MPa	200%	125~185	150	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	$\pm 1$	$\pm 2$	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.6	3.8	k $\Omega$
Zero Temp. Drift*	$\pm 0.15$	$\pm 0.8$	%FS, @25°C
Sensitivity Temp. Drift*	$\pm 0.2$	$\pm 0.7$	%FS, @25°C
Long-term Stability	0.1		%FS/year

0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:**  $\Phi 16 \times 1.8\text{mm}$  (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 180g

## Electric & Environment Performance

**Power supply:** 1.5mA/5V(optional) (Max input voltage is 10VDC)

**Insulation Resistance:** 500M $\Omega$ @500VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Useful Time (25°C):** >1\*100 Million Times

@Pressure Circulation(80%FS)

**Response Time:**  $\leq 1\text{ms}$

**Storage Temp.:** -40~+125°C

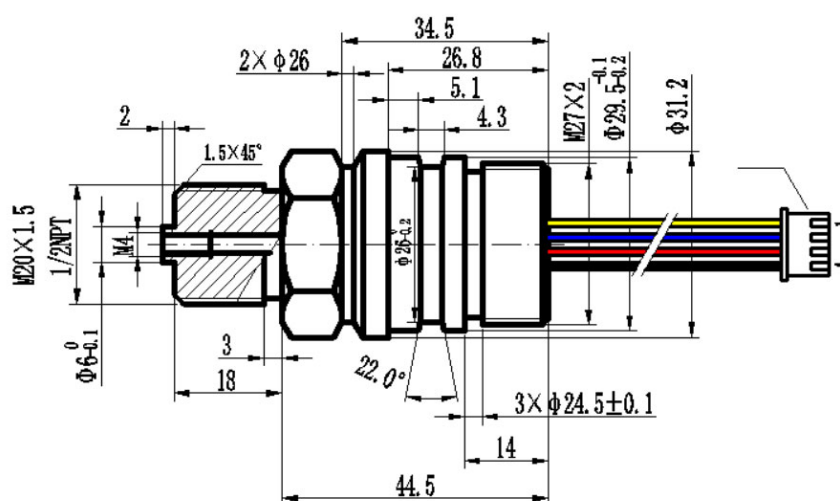
**Operating Temp.:** -40~+85°C

**Compensation Temp.:** 0~50°C; -10~80°C

@ 0 ~ 70 (7kPa,20 kPa,35 kPa)

## Drawing

ESS322 All Welded Piezoresistive OEM Sensor Range: -100kpa~100Mpa



## Ordering Procedure

ESS3		High Stable OEM Piezoresistive Sensor									
		Code	Model								
		22	Welded Piezoresistive Pressure Sensor								
		23	Welded Flush Diaphragm Piezoresistive Sensor								
			Cod	Span		Code	Span		Code	Span	
			R01	0~10KPa		R07	0~400KPa		R13	0~7.0 MPa	
			R02	0~20KPa		R08	0~600KPa		R14	0~10 MPa	
			R03	0~35KPa		R09	0~1.0 MPa		R15	0~25 MPa	
			R04	0~70KPa		R10	0~1.6 MPa		R16	0~40 MPa	
			R05	0~100KPa		R11	0~2.0 MPa		R17	0~60 MPa	
			R06	0~200KPa		R12	0~3.5 MPa		R18	0~100 MPa	
				Code	Pressure Type						
				G	Gauge						
				D	Differential						
				A	Absolute						
				S	Sealed Gauge						
					Code	Power Supply					
					M	1.5mA					
					V	5V					
						Code	Pressure connection				
						0	O-ring -NBR				
						1	O-ring -Viton				
							Code	Electric connection			
							1	Kovar pin			
							2	Rubber flexible silicon wires (10cm)			
ESS3	22	R10	G	M	0	2					

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20°C



## ESS323 Welded Flush Diaphragm (Joint Type) Pressure Sensor



■ Range: -100Kpa~10MPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.2%/FS ■  $\Phi$ 19mm Welded Flush Diaphragm

### Description

ESS323 Welded Diaphragm Pressure Sensor, with narrow range and joint type connection, is the simplified version of ESS322, it uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS323 is available pressure ranges from -100Kpa to 10MPa.

### Key Features & Benefits

- Pressure range -100Kpa~10MPa
- Gauge, Absolute, Sealed gauge
- Constant current/Voltage power supply
- Isolated construction, measure various media
- $\Phi$ 19mm OEM Pressure Sensor
- Full Stainless Steel 316
- Wide temperature compensation -10°C~80°C
- Long-term stability  $\pm 0.2\%$ FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	$\pm 1$	$\pm 2$	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.6	3.8	k $\Omega$
Zero Temp. Drift*	$\pm 0.15$	$\pm 0.8$	%FS, @25°C

## ESS323 GID-3-EV03.0



0~600KPa	200%	90~120	100	G/A/D
0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Sensitivity Temp. Drift*	±0.2	±0.7	%FS, @25°C
Long-term Stability	0.1		%FS/year

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS @25°C, max value is 1.6%FS @25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:** Φ16\*1.8mm (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 50~80g

## Electric & Environment Performance

**Power supply:** 1.5mA/5V (Max input voltage is 10VDC)

**Insulation Resistance:** 500MΩ@500VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Useful Time (25°C):** >1\*100 Million Times  
@Pressure Circulation(80%FS)

**Response Time:** ≤1ms

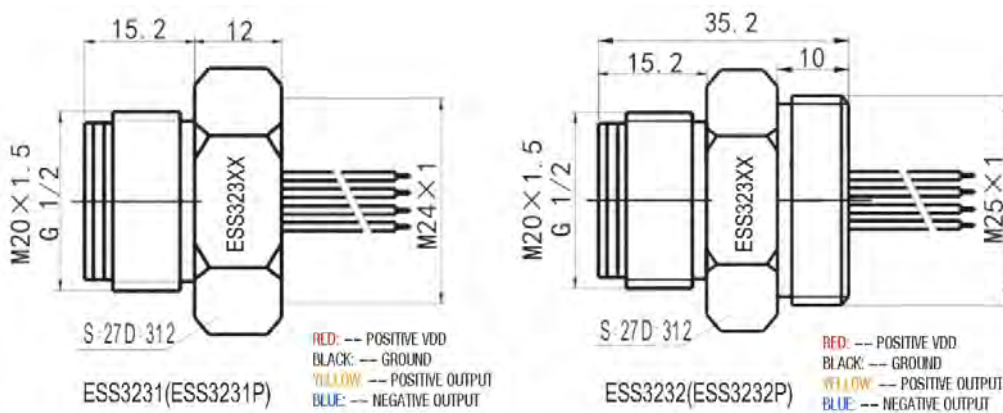
**Storage Temp.:** -40~+125°C

**Operating Temp.:** -40~+85°C

**Compensation Temp.:** 0~50°C; -10~80°C  
@ 0~70 (7kPa,20 kPa,35 kPa)

## Drawing

ESS323 Welded Diaphragm Pressure Sensor Range:-100Kpa~10Mpa



## Ordering Procedure

ESS3	Welded Diaphragm Pressure Sensor					
	Code	Model				
	23	Welded Joint Type Pressure Sensor				
	23P	Welded Flush Diaphragm Pressure Sensor				
		Cod	Span	Code	Span	Code Span
		R01	0~10KPa	R07	0~400KPa	R13 0~7.0 MPa
		R02	0~20KPa	R08	0~600KPa	R14 0~10 MPa
		R03	0~35KPa	R09	0~1.0 MPa	
		R04	0~70KPa	R10	0~1.6 MPa	
		R05	0~100KPa	R11	0~2.0 MPa	
		R06	0~200KPa	R12	0~3.5 MPa	
		Code	Pressure Type			
		G	Gauge			
		A	Absolute			
		S	Sealed Gauge			
		Code	Power Supply			
		M	1.5mA			
		V5	5V			
		V10	10V			
		Code	Process Connection			
		P1	M20*1.5			
		P4	G1/2			
		P5	G1			
		Code	Pressure connection			
		0	O-ring -NBR			
		1	O-ring -Viton			
		Code	Electric connection			
		1	Kovar pin			
		2	Rubber flexible silicon wires (10cm)			
ESS3	23	R10	G	M	P1	1 1

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20℃

## ESS331 High Temperature Pressure Sensor



Range: 0.035~10MPa ■ Overload Pressure: 150%~300% ■ Stability: 0.2 ■ Excitation: 1.5mA ■ Working Temperature:-40-150℃

### Description

ESS331 High Temperature Pressure Sensor uses radiator to resist 150℃ temperature, the element use high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS331 High Temperature Pressure Sensor is available pressure ranges from 35Kpa to 10MPa.

### Key Features & Benefits

- Pressure range 0.035Mpa~10MPa
- Gauge, Absolute, Sealed gauge
- Constant Current/Voltage power supply
- Isolated construction, measure various media
- High working Temperature: -40-150℃
- Full Stainless Steel 316
- Wide temperature compensation -10℃~80℃
- Long-term stability  $\pm 0.2\%$ FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	$\pm 1$	$\pm 2$	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.8	5.0	kΩ
Zero Temp. Drift*	$\pm 0.4$	$\pm 0.8$	%FS, @25℃
Sensitivity Temp. Drift*	$\pm 0.4$	$\pm 0.8$	%FS, @25℃

0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Long-term Stability	0.2	%FS/year
---------------------	-----	----------

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

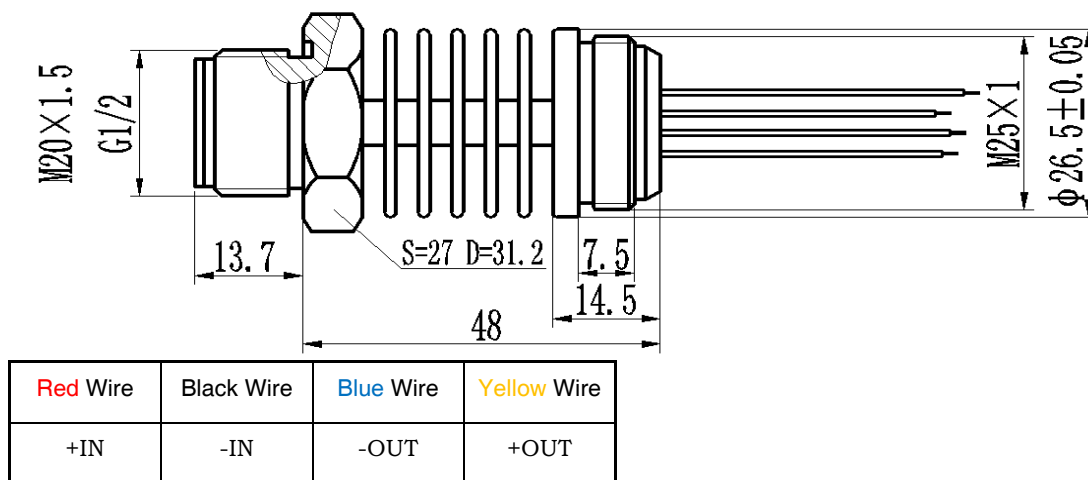
**Diaphragm:** Stainless Steel 316L  
**Housing:** Stainless Steel 316L  
**Pressure leading tube:** Stainless Steel 316L  
**O Ring:** 18.5\*23.9\*1.5-90° (nitrile rubber or viton)  
**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber  
**Packing Medium:** Silicon Oil  
**Net weight:** 80g

## Electric & Environment Performance

**Power supply:** 1.5Ma/5V  
**Insulation Resistance:** 500MΩ@500VDC  
**Overpressure:** 1.5~3 times FS  
**Vibration (20~500Hz):** 20G  
**Useful Time (25°C):** >1\*100 Million Times  
 @Pressure Circulation(80%FS)  
**Response Time:** ≤1ms  
**Storage Temp.:** -40~+125°C  
**Operating Temp.:** -40~+150°C  
**Compensation Temp.:** 0~50°C @ Current, ≤ 250Kpa,; -10~80°C@ Current, >250Kpa

## Drawing

ESS331 High Temperature Pressure Sensor Range: 35Kpa~10Mpa



## Ordering Procedure

ESS3		High Temperature Pressure Sensor					
		Code	Model				
		31	High Temperature Pressure Sensor				
		Cod	Span	Code	Span	Code	Span
		R03	0~35KPa	R09	0~1.0 MPa		
		R04	0~70KPa	R10	0~1.6 MPa		
		R05	0~100KPa	R11	0~2.0 MPa		
		R06	0~200KPa	R12	0~3.5 MPa		
		R07	0~400KPa	R13	0~7.0 MPa		
		R08	0~600KPa	R14	0~10 MPa		
		Code	Pressure Type				
		G	Gauge				
		A	Absolute				
		S	Sealed Gauge				
		Code	Power Supply				
		M	1.5mA				
		V5	5V				
		V10	10V				
		Code	Pressure connection				
		0	O-ring -NBR				
		1	O-ring -Viton				
		Code	Electric connection				
		1	Kovar pin				
		2	Rubber flexible silicon wires (10cm)				
ESS3	31	R10	G	M	0	2	

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20℃

## ESS332 Welded Flat Base Piezoresistive Pressure Sensor



Range: -100KPa-10Kpa~3.5MPa ■ Overload Pressure: 150%~300% ■ Accuracy: 0.1-0.2%/FS ■ Welded Flat Base

### Description

ESS332 Series OEM Welded Flat Base Pressure Sensor uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS332 Welded Flat Base Piezoresistive OEM Pressure Sensor is available all pressure ranges from -100kpa to 10KPa to 3.5MPa.

### Key Features & Benefits

- Pressure range -100kpa-10Kpa-3.5Mpa
- Gauge, Absolute, Sealed gauge
- Constant Current: 1.5mA
- Voltage power supply: 5V/10V
- Isolated construction, measure various media
- Full Stainless Steel 316
- Wide temperature compensation -10°C~80°C
- Long-term stability  $\pm 0.1\%$ FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	$\pm 1$	$\pm 2$	mV DC
FS Output	100		mV DC
Input/ Output Impedance	2.6	3.8	k $\Omega$
Zero Temp. Drift*	$\pm 0.15$	$\pm 0.8$	%FS, @25°C
Sensitivity Temp. Drift*	$\pm 0.2$	$\pm 0.7$	%FS, @25°C



0~1.0 MPa	200%	125~185	150	G/A/D
0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Long-term Stability	0.1	%FS/year
---------------------	-----	----------

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:**  $\Phi 16 \times 1.8\text{mm}$  (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 20-30g

## Electric & Environment Performance

**Power supply:** 1.5mA/5V(optional) (Max input voltage is 10VDC)

**Insulation Resistance:** 500M $\Omega$ @500VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Useful Time (25°C):** >1\*100 Million Times

@ Pressure Circulation(80%FS)

**Response Time:**  $\leq 1\text{ms}$

**Storage Temp.:** -40~+125°C

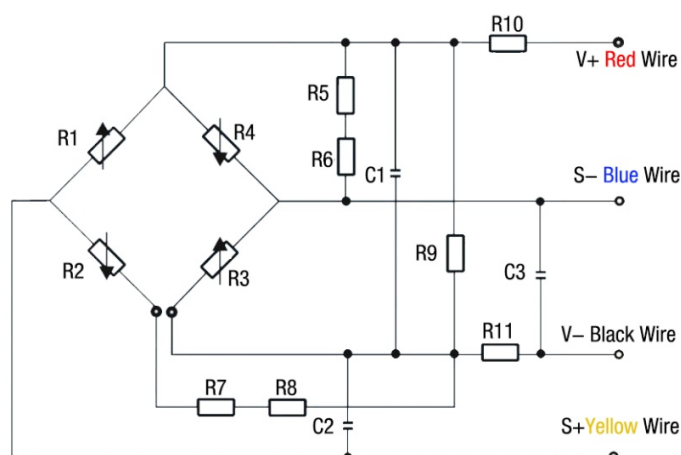
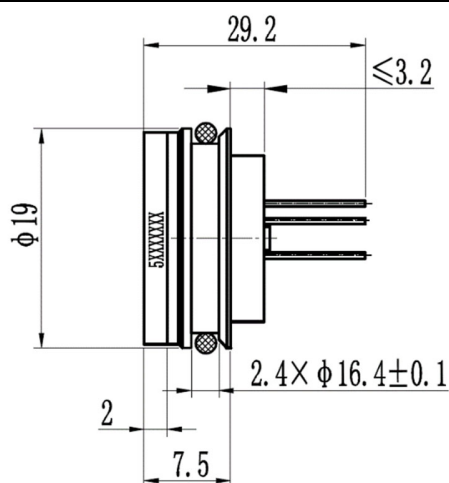
**Operating Temp.:** -40~+85°C

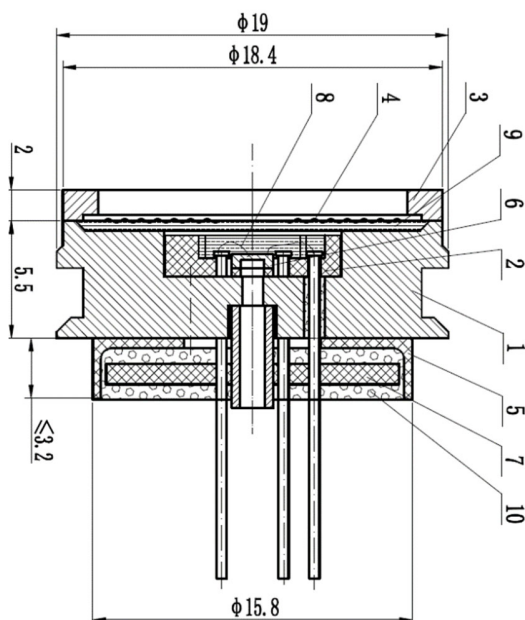
**Compensation Temp.:** 0~50°C; -10~80°C

@ 0 ~ 70 (7kPa, 20 kPa, 35 kPa)

## Drawing & Electrical Connection

ESS332 Welded Flat Base Piezoresistive Pressure Sensor Range: -100KPa-10Kpa~3.5MPa



**ESS332 Welded Flat Base Piezoresistive Pressure Sensor** Range: -100KPa-10Kpa~3.5MPa


Sectional View of ESS332

- 1, ESS332 Base of Welding/Sintering
- 2, Ceramic Backing Ring
- 3, Welding Ring
- 4, Ripple Diaphragm (SS326L)
- 5, Ceramic Guard Ring
- 6, Sensing Element
- 7, Compensation Board
- 8, Spun Gold Wire
- 9, Silicon Oil
- 10, RTV (Black)

## Ordering Procedure

ESS3		High Stable OEM Piezoresistive Sensor					
		Code	Model				
		32	Welded Flat Base Piezoresistive Pressure Sensor				
			Cod	Span	Code	Span	Code
			R01	0~10KPa	R05	0~100KPa	R09
			R02	0~20KPa	R06	0~200KPa	R10
			R03	0~35KPa	R07	0~400KPa	R11
			R04	0~70KPa	R08	0~600KPa	R12
			Code	Pressure Type			
			G	Gauge			
			A	Absolute			
			S	Sealed Gauge			
			Code	Power Supply			
			M	1.5mA			
			V5	5V			
			V10	10V			
			Code	Pressure connection			
			0	O-ring -NBR			
			1	O-ring -Viton			
			Code	Electric connection			
			1	Kovar pin			
			2	Rubber flexible silicon wires (10cm)			
ESS3	32	R10	A	M	0	2	

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20°C

## ESS350 Flat Diaphragm Pressure Sensor



■ Range: 0.035~6MPa ■ Overload Pressure: 150%~300% ■ Stability: 0.2 ■ Diameter: Φ50mm ■ O-Ring: DN1.5

### Description

ESS350 Flat Diaphragm Pressure Sensor design with Φ50mm diaphragm and uses a high-sensitivity piezoresistive silicon die as sensing component, which is protected against ambient influences by SS316 housing sealed with a concentrically corrugated diaphragm. Inside the housing, the filled silicone oil assures the measured pressure can be transmitted onto silicon die and then transform the pressure to electric signal.

ESS350 Series OEM Pressure Sensor is available all pressure ranges from 35Kpa to 6MPa.

### Key Features & Benefits

- Pressure range 0.035~6MPa
- Gauge, Absolute, Sealed gauge
- Constant current/Voltage power supply
- Isolated construction, measure various media
- Φ50mm diameter pressure sensor
- Full Stainless Steel 316
- Wide temperature compensation -10°C~80°C
- Long-term stability ±0.2%FS/year

### Application

- Industrial process control
- Level measurement
- Gas, liquid pressure measurement
- Pressure checking meter
- Pressure calibrator
- Liquid pressure system and switch
- Cooling equipment & A/C system
- Aviation and navigation inspection
- Pneumatics and hydraulics systems

### Standard Range

Range	Overload	Output/F.S (mV)	Typical Value(mV)	Pressure Type
0~10KPa	300%	35~60	45	G
0~20KPa	300%	70~110	90	G/A
0~35KPa	300%	55~80	70	G/A/D
0~70KPa	300%	55~80	60	G/A/D
0~100KPa	300%	60~85	75	G/A/D
0~200KPa	300%	60~85	75	G/A/D
0~400KPa	300%	60~80	70	G/A/D
0~600KPa	200%	90~120	100	G/A/D
0~1.0 MPa	200%	125~185	150	G/A/D

### Technical Parameters

Parameters	Typ.	Max.	Unit
Nonlinearity	0.2	0.5	%FS
Hysteresis	0.05	0.1	%FS
Repeatability	0.05	0.1	%FS
Zero Output	±1	±2	mV DC
FS Output	100		mV DC
Input/ Output Impedance	3.0	4.0	kΩ
Zero Temp. Drift*	±0.4	±0.8	%FS, @25°C
Sensitivity Temp. Drift*	±0.4	±0.8	%FS, @25°C
Long-term Stability	0.2		%FS/year

0~1.6 MPa	200%	80~120	100	G/A/D
0~2.0 MPa	200%	50~70	60	G/A/D
0~3.5 MPa	200%	100~120	110	G/A/D
0~7.0 MPa	200%	120~150	135	G/A
0~10 MPa	200%	180~230	200	G/A
0~25 MPa	150%	140~170	150	S
0~40 MPa	150%	230~280	250	S
0~60 MPa	150%	100~160	130	S
0~100 MPa	150%	100~150	120	S

**Notes:** G for Gauge pressure; A for Absolute pressure; D for Differential pressure; S for Sealed gauge.

Range -100kPa~100MPa

\*The typical value of 0~10kPa and 0~20kPa's zero temperature drift and sensitivity temperature drift is 0.4%FS@25°C, max value is 1.6%FS@25°C



## Construction Performance

**Diaphragm:** Stainless Steel 316L

**Housing:** Stainless Steel 316L

**Pressure leading tube:** Stainless Steel 316L

**O Ring:** DN1.5 (nitrile rubber or viton)

**Measuring Medium:** Which is compatible with SS316L, viton, nitrile rubber

**Packing Medium:** Silicon Oil

**Net weight:** 50-90g

## Electric & Environment Performance

**Power supply:** 1.5mA/5V (Max input voltage is 10VDC)

**Insulation Resistance:** 500MΩ@500VDC

**Overpressure:** 1.5~3 times FS

**Vibration (20~500Hz):** 20G

**Useful Time (25°C):** >1\*100 Million Times

@Pressure Circulation(80%FS)

**Response Time:** ≤1ms

**Storage Temp.:** -40~+125°C

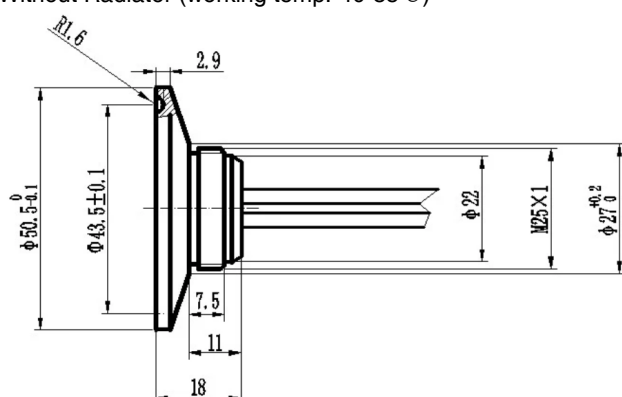
**Operating Temp.:** -40~+85°C; -40~+150°C

**Compensation Temp.:** 0~50°C @Current, ≤250Kpa;  
-10~80°C @Current, >250Kpa

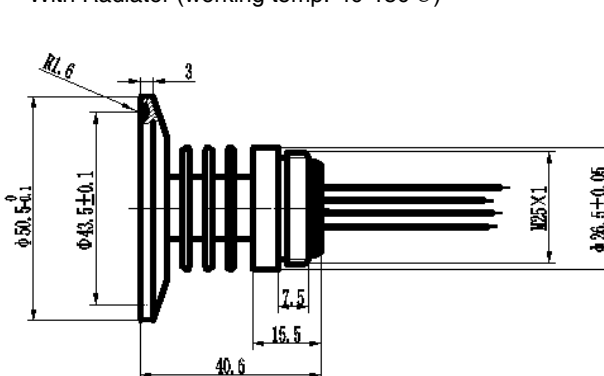
## Drawing

### ESS350 Flat Diaphragm Pressure Sensor Range: 35Kpa~6Mpa

Without Radiator (working temp.-40-85°C)



With Radiator (working temp.-40-150°C)



Red Wire	Black Wire	Blue Wire	Yellow Wire
+IN	-IN	-OUT	+OUT

## Ordering Procedure

ESS3		Flat Diaphragm Pressure Sensor						
		Code	Model					
		50	Flat DiaphragmPressure Sensor					
		50R	Flat DiaphragmPressure Sensor with Radiator					
			Cod	Span	Code	Span	Code	Span
			R03	0~35KPa	R09	0~1.0 MPa		
			R04	0~70KPa	R10	0~1.6 MPa		
			R05	0~100KPa	R11	0~2.0 MPa		
			R06	0~200KPa	R12	0~3.5 MPa		
			R07	0~400KPa	R13	0~7.0 MPa		
			R08	0~600KPa				
			Code	Pressure Type				
			G	Gauge				
			A	Absolute				
			S	Sealed Gauge				
			Code	Power Supply				
			M	1.5mA				
			V5	5V				
			V10	10V				
			Code	Pressure connection				
			0	O-ring -NBR				
			1	O-ring -Viton				
			Code	Electric connection				
			1	Kovar pin				
			2	Rubber flexible silicon wires (10cm)				
ESS3	50	R03	G	M	0	2		

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20°C

## ESS501 Ceramic Piezo-Resistive Pressure Sensor



■ Range: 0~800bar ■ Diaphragm Material: Ceramic Al<sub>2</sub>O<sub>3</sub> 96% ■ Flush diaphragm ■ Temperature: -40...+135 (-40 °F...+275 °F)

### Description

ESS501 pressure sensors are made with a ceramic base plate and a flush diaphragm and work following the piezoresistive principle. The Wheatstone bridge is screen printed on one side of the flush ceramic diaphragm which is, in turn, glued to the sensor's body. The bridge faces the inside where a cavity is made and the diaphragm's opposite side can therefore be exposed directly to the medium to be measured.

Because of the Al<sub>2</sub>O<sub>3</sub> ceramic excellent chemical resistance (aggressive gases, most of solvents and acids, etc.), no additional protection is normally required.

ESS501 sensors are thermally compensated by laser-adjustable PTC resistors and the use of ceramic ensures a high linearity across the entire range of measurement, reducing effects of hysteresis to a minimum.

### Key Features & Benefits

- Pressure range 0.5bar-800bar
- Excellent resistance to corrosion and abrasion
- Absolute measurement available
- Thermally compensated
- Extended customization
- Extended choice of measuring ranges

### Application

- Cooling equipment & A/C system
- Automotive and vehicle
- Industrial process control
- HVAC system
- Refrigeration equipment
- Air conditioning unit

### Technical Characteristics

Parameter	Units	Description
Sensor type	-	Flush diaphragm, absolute (A), gauge (R) or sealed gauge (S)
Technology	-	Piezoresistive
Diaphragm material	-	Ceramic Al <sub>2</sub> O <sub>3</sub> 96% (standard), 99.6% or sapphire (on request)
Weight	g	≤ 8 (ceramic cell only)
Response time	ms	≤ 1
Supply voltage	VDC	2...30
Offset	mv/v	- 0.1 ± 0.1 (Other nominal values available on request)

Current cons.	mA	$\leq 1.3 @ 10V$											
Operating	°C	-40...+135 (-40 °F...+275 °F)											
Storage temperature	°C	-40...+150 (-40 °F...+302 °F)											
Impedance	kΩ	$11 \pm 30\%$											
Nominal pressure FSO	bar	0.5	1	2	5	10	20	50	100	200	400	600	800
	psi	7	14	29	73	145	290	725	1450	2900	5800	8700	11600
Overload pressure	bar	1	2	4	10	15	35	100	150	350	500	750	1000
	psi	14	29	58	145	217	507	1450	2175	5075	7250	10875	14500
Burst pressure	bar	2	3	6	15	25	65	120	200	500	650	950	1250
	psi	29	43	87	217	362	942	1740	2900	7250	9425	13775	18125
Vacuum capability	bar	-0.1	-0.5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	psi	-1.4	-7	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14
Type	-	R	A/R/S	A/R/S	A/R/S	A/R/S	A/R/S	A/R/S	S	S	S	S	S
Total thickness	mm	6.15	6.17	6.23	6.30	6.35	6.55	6.70	6.70	7.05	7.32	7.55	8.05
	in	0.242	0.2432	0.245	0.248	0.250	0.258	0.263	0.263	0.278	0.288	0.297	0.317
Sensitivity 2	mv/v	1.4-2.4	2.0-3.6	2.3-3.5	2.3-4.0	3.1-5.5	2.4-4.0	4.0-6.0	3.0-4.8	2.5-3.9	3.1-4.8	3.1-4.8	2.0-3.5
Accuracy 3	%/fs	0.4/0.9	0.3/0.9	0.3/0.6	0.2/0.4	0.2/0.5	0.2/0.5	0.2/0.5	0.2/0.5	0.4/0.9	0.5/1.0	0.5/1.0	0.5/1.0
Thermal offset shift(typ./max.)	%/fs/k	$\pm 0.005 / \pm 0.040$ 25 °C...85 °C (77 °F...185 °F)											
Thermal span shift	%/fs/k	$\leq \pm 0.010$ 0 °C...70 °C (32 °F...158 °F) $\leq \pm 0.012$ -25 °C...0 °C / 70 °C...85 °C (-13 °F...32 °F / 158 °F...185 °F) $\leq \pm 0.014$ -40 °C...-25 °C / 85 °C...135 °C (-40 °F...-13 °F / 185 °F...275 °F)											
Reliability tests 4	-	1000 hours @85 °C (185 °F) & 85 %RH 500 thermal shocks -40°C...+150 °C (-40 °F... +302 °F) 1000 hours burn-in @150 °C (302 °F) 10 million 0 bar to Pnom pressure cycles											

Tests performed at 25°C in Metallux housings, unless otherwise specified. Different housings may affect performances.

1. Psi values for reference only.

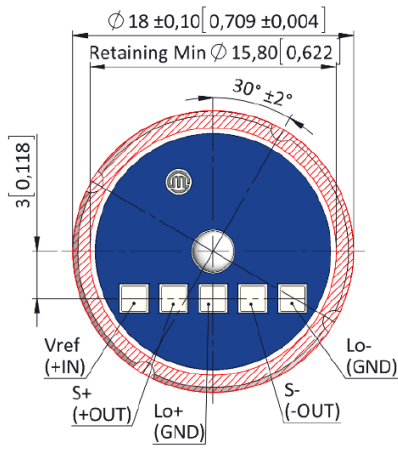
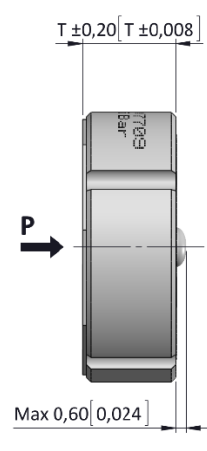
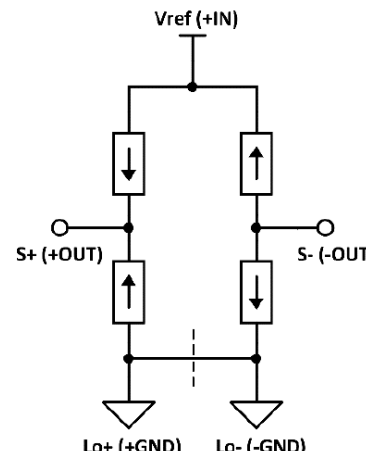
2. The sensitivity of each production batch is constant, within the indicated range and with minimal dispersion.

3. Accuracy =  $\sqrt{\text{NonLinearity}^2 + \text{Hysteresis}^2 + \text{NonRepeatability}^2}$ , terminal based.

4. All technical characteristics will remain within indicated ranges performing the above-mentioned reliability tests.

## Drawing

### ESS501 Ceramic Piezo-resistive Pressure Sensor Range: 0bar~800bar

Top View	Side View	Schematics
 <p>Top view drawing of the ESS501 sensor. The circular housing has an outer diameter of <math>\phi 18 \pm 0.10</math> [0,709 ± 0,004] and a retaining diameter of <math>\phi 15,80</math> [0,622]. The thickness is <math>3</math> [0,118]. The sensor is mounted on a PCB with four pins: Vref (+IN), S+ (+OUT), Lo+ (GND), and S- (-OUT). The pins are spaced at <math>30^\circ \pm 2^\circ</math>.</p>	 <p>Side view drawing of the ESS501 sensor. The total height is <math>T \pm 0,20</math> [T ± 0,008]. The maximum width is <math>\text{Max } 0,60</math> [0,024]. The pressure input P is indicated.</p>	 <p>Schematic diagram of the ESS501 sensor. The circuit shows a Wheatstone bridge with four resistors. The input is Vref (+IN). The output is S+ (+OUT) and S- (-OUT). The bridge is connected to ground (Lo+ (+GND) and Lo- (-GND)).</p>



## Ordering Procedure

ESS5		Ceramic Piezoresistive Pressure Sensor									
		Code		Model							
		01		Pressure Sensor							
		01I		Pressure Sensor Module (with pcb)							
				Code		Span		Code		Span	
				R01		0...0.5 bar [0...7psi]		R07		0...50 bar [0...720psi]	
				R02		0...1 bar [0...14psi]		R08		0...100 bar [0...1450psi]	
				R03		0...2 bar [0...29psi]		R09		0...200 bar [0...2900psi]	
				R04		0...5 bar [0...72psi]		R10		0...400 bar [0...5800psi]	
				R05		0...10 bar [0...145psi]		R11		0...600 bar [0...8700psi]	
				R06		0...20 bar [0...290psi]		R12		0...800 bar [0...11600psi]	
				Code		Pressure Type					
				R		Gauge					
				A		Absolute					
				S		Sealed Gauge					
				Code		Sensitivity adjustment					
				0		Without					
				9		On request					
				Code		Thermal offset					
				0		≤ ± 0.06 % FS/K (not thermally compensated)					
				1		≤ ± 0.04 % FS/K					
				2		≤ ± 0.02 % FS/K					
				9		Others on request (please specify)					
				Code		Termination type					
				01		5 pins 13 mm ± 0.5 mm, pitch 2.54 mm					
				31		5 pins 9 mm ± 0.5 mm, pitch 2.54 mm					
				02		4 pins 13 mm (without LO (-)) ± 0.5 mm, pitch 2.54 mm					
				32		4 pins 9 mm (without LO (-)) ± 0.5 mm, pitch 2.54 mm					
				03		5 pre-tinned soldering pads, pitch 2.54 mm					
				04		NOMEX™ cable 50.8 mm – 5 wires, pitch 2.54 ± 0.5 mm					
				05		PVC flat cable 50.8 mm – 5 wires, pitch 1.27 mm					
				09		Polyester cable 50.8 mm – 5 wires, pitch 2.54 mm					
				06		4 pins 13 mm ± 0.5 mm (without LO (+)) pitch 2.54 mm					
				36		4 pins 9 mm ± 0.5 mm (without LO (+)) pitch 2.54 mm					
				07		5 pins 13 mm ± 0.5 mm – open bridge, pitch 2.54 mm					
				37		5 pins 9 mm ± 0.5 mm – open bridge, pitch 2.54 mm					
				99		Others on request (please specify)					
				Code		Additional coating					
				1		Without					
				2		Parylene coating					
				9		Others on request (please specify)					
ESS5	01	R10	R	0	2	31	1				

**Note:** ① Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ② please protect the diaphragm and the compensated board carefully to prevent any damage. ③ Please contact us if your requested working temperature lower than -20°C

## ESS501I Ceramic Pressure Sensor Module (with PCB)



■ Range: 0~2bar~50bar ■ Diaphragm Material: Ceramic Al<sub>2</sub>O<sub>3</sub> 96% ■ Integrated accuracy: 0.5% ■ Output: 0.5-4.5Vdc | 4-20mA

### Description

Based on ESS501, ESS501I pressure sensors module is integrated with pcb which amplify the output from mv to analogy signal such as 0.5-4.5Vdc or 4-20mA.

Because of the Al<sub>2</sub>O<sub>3</sub> ceramic excellent chemical resistance (aggressive gases, most of solvents and acids, etc.), no additional protection is normally required.

### Key Features & Benefits

- Pressure range 0bar-50bar
- Excellent resistance to corrosion and abrasion
- Absolute measurement available
- Thermally compensated
- Extended customization
- Extended choice of measuring ranges

### Application

- Cooling equipment & A/C system
- Automotive and vehicle
- Industrial process control
- HVAC system
- Refrigeration equipment
- Air conditioning unit

### Technical Characteristics [for sensor element]

Parameter	Units	Description
Sensor type	-	Flush diaphragm, absolute (A), gauge (R) or sealed gauge (S)
Technology	-	Piezoresistive
Diaphragm material	-	Ceramic Al <sub>2</sub> O <sub>3</sub> 96% (standard), 99.6% or sapphire (on request)
Weight	g	≤ 8 (ceramic cell only)
Response time	ms	≤ 1
Supply voltage	VDC	2...30
Offset	mv/v	- 0.1 ± 0.1 (Other nominal values available on request)
Current cons.	mA	≤ 1.3 @ 10V
Operating	°C	-40...+135 (-40 °F...+275 °F)
Storage temperature	°C	-40...+150 (-40 °F...+302 °F)
Impedance	kΩ	11 ± 30%

Nominal pressure FSO	bar	0.5	1	2	5	10	20	50	100	200	400	600	800
	psi	7	14	29	73	145	290	725	1450	2900	5800	8700	11600
Overload pressure	bar	1	2	4	10	15	35	100	150	350	500	750	1000
	psi	14	29	58	145	217	507	1450	2175	5075	7250	10875	14500
Burst pressure	bar	2	3	6	15	25	65	120	200	500	650	950	1250
	psi	29	43	87	217	362	942	1740	2900	7250	9425	13775	18125
Vacuum capability	bar	-0.1	-0.5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	psi	-1.4	-7	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14
Type	-	R	A/R/S	A/R/S	A/R/S	A/R/S	A/R/S	A/R/S	S	S	S	S	S
Total thickness	mm	6.15	6.17	6.23	6.30	6.35	6.55	6.70	6.70	7.05	7.32	7.55	8.05
	in	0.242	0.2432	0.245	0.248	0.250	0.258	0.263	0.263	0.278	0.288	0.297	0.317
Sensitivity 2	mv/v	1.4-2.4	2.0-3.6	2.3-3.5	2.3-4.0	3.1-5.5	2.4-4.0	4.0-6.0	3.0-4.8	2.5-3.9	3.1-4.8	3.1-4.8	2.0-3.5
Accuracy 3	%/fs	0.4/0.9	0.3/0.9	0.3/0.6	0.2/0.4	0.2/0.5	0.2/0.5	0.2/0.5	0.2/0.5	0.4/0.9	0.5/1.0	0.5/1.0	0.5/1.0
Thermal offset shift (typ./max.)	%/fs/k	$\pm 0.005 / \pm 0.040$ 25 °C...85 °C      (77 °F...185 °F)											
Thermal span shift	%/fs/k	$\leq \pm 0.010$ 0 °C...70 °C      (32 °F...158 °F) $\leq \pm 0.012$ -25 °C...0 °C / 70 °C...85 °C      (-13 °F...32 °F / 158 °F...185 °F) $\leq \pm 0.014$ -40 °C...25 °C / 85 °C...135 °C      (-40 °F...13 °F / 185 °F...275 °F)											
Reliability tests 4	-	1000 hours @85 °C (185 °F) & 85 %RH      500 thermal shocks -40°C...+150 °C (-40 °F... +302 °F) 1000 hours burn-in @150 °C (302 °F)      10 million 0 bar to Pnom pressure cycles											

Tests performed at 25°C in Metallux housings, unless otherwise specified. Different housings may affect performances.

1. Psi values for reference only.

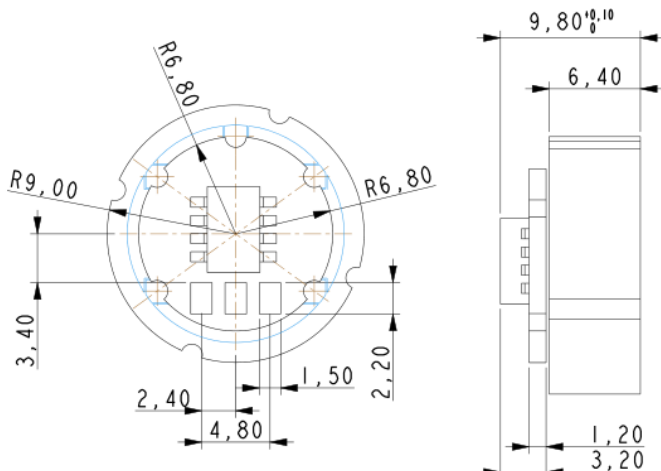
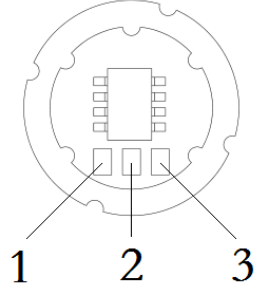
2. The sensitivity of each production batch is constant, within the indicated range and with minimal dispersion.

3. Accuracy =  $\sqrt{\text{NonLinearity}^2 + \text{Hysteresis}^2 + \text{NonRepeatability}^2}$ , terminal based.

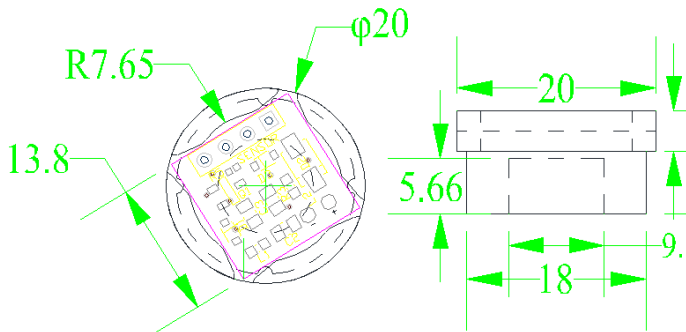
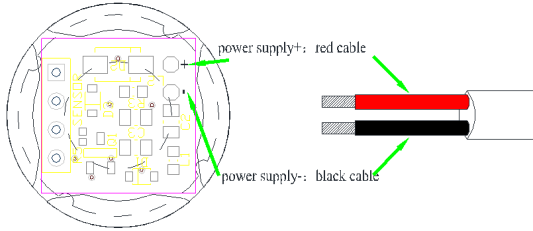
4. All technical characteristics will remain within indicated ranges performing the above-mentioned reliability tests.

## Drawing

### ESS501I Ceramic Piezo-resistive Pressure Sensor module Range: 0bar~50bar, 0.5~4. 5V output

Top View	Schematics						
 <p>Top view drawing of the ESS501I sensor module. Dimensions include: overall diameter 9,80<sup>+0,10</sup>, mounting hole diameter 6,40, pin pitch 1,50, pin diameter 0,80, and various radii (R6,80, R9,00). Pin locations are marked with 1, 2, and 3.</p>	 <p>Schematic diagram of the ESS501I sensor module. It shows a circular module with three pins labeled 1, 2, and 3.</p> <table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>“+”</td><td>Signal output</td><td>“-”</td></tr></table>	1	2	3	“+”	Signal output	“-”
1	2	3					
“+”	Signal output	“-”					

**ESS501I Ceramic Piezo-resistive Pressure Sensor module Range: 0bar~50bar, 4-20mA output**

Top View	Schematics				
	 <table border="1"> <thead> <tr> <th>Red Cable</th><th>Black Cable</th></tr> </thead> <tbody> <tr> <td>Power Supply “+”</td><td>Power Supply “-”</td></tr> </tbody> </table>	Red Cable	Black Cable	Power Supply “+”	Power Supply “-”
Red Cable	Black Cable				
Power Supply “+”	Power Supply “-”				

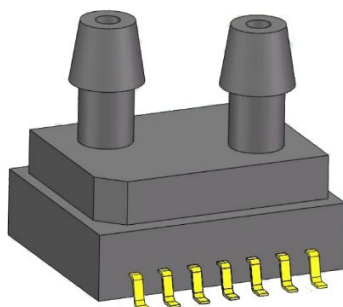
## Ordering Procedure

ESS5	Ceramic Piezoresistive Pressure Sensor			
	Code	Model		
	01	Pressure Sensor		
	01I	Pressure Sensor Module (with pcb)		
		Code	Span	Code Span
		R01	0...0.5 bar [0...7psi]	R07 0...50 bar [0...720psi]
		R02	0...1 bar [0...14psi]	R08 0...100 bar [0...1450psi]
		R03	0...2 bar [0...29psi]	R09 0...200 bar [0...2900psi]
		R04	0...5 bar [0...72psi]	R10 0...400 bar [0...5800psi]
		R05	0...10 bar [0...145psi]	R11 0...600 bar [0...8700psi]
		R06	0...20 bar [0...290psi]	R12 0...800 bar [0...11600psi]
		Code	Pressure Type	
		R	Gauge	
		A	Absolute	
		S	Sealed Gauge	
		Code	Sensitivity adjustment	
		0	Without	
		9	On request	
		Code	Output	
		0	0.5-4.5Vdc	
		1	0-5Vdc	
		2	0-10Vdc	
		9	4-20mA	
		Code	Termination type	
		01	5 pins 13 mm ± 0.5 mm, pitch 2.54 mm	
		31	5 pins 9 mm ± 0.5 mm, pitch 2.54 mm	
		02	4 pins 13 mm (without LO (-)) ± 0.5 mm, pitch 2.54 mm	
		32	4 pins 9 mm (without LO (-)) ± 0.5 mm, pitch 2.54 mm	
		03	5 pre-tinned soldering pads, pitch 2.54 mm	

								04	NOMEX™ cable 50.8 mm – 5 wires, pitch 2.54 ± 0.5 mm	
								05	PVC flat cable 50.8 mm – 5 wires, pitch 1.27 mm	
								09	Polyester cable 50.8 mm – 5 wires, pitch 2.54 mm	
								06	4 pins 13 mm ± 0.5 mm (without LO (+)) pitch 2.54 mm	
								36	4 pins 9 mm ± 0.5 mm (without LO (+)) pitch 2.54 mm	
								07	5 pins 13 mm ± 0.5 mm – open bridge, pitch 2.54 mm	
								37	5 pins 9 mm ± 0.5 mm – open bridge, pitch 2.54 mm	
								99	Others on request (please specify)	
									Code	Accuracy
									1	0.5%
									2	1.0%
									9	Others on request (please specify)
ESS5	01I	R06	R	0	2	31	1			

**Note:** ❶ Extremely attention must be paid to sensor installation process to avoid any miss conduction that affect the sensor performance, ❷ please protect the diaphragm and the compensated board carefully to prevent any damage. ❸ Please contact us if your requested working temperature lower than -20°C

## ESS601 Encapsulated Ultra-Low Pressure Sensor



■ Range: -500Pa ~ 500Pa, 0Pa ~ 500Pa ■ Pressure Type: G/D ■ Output: IIC/0.2-4.7Vdc ■ Temperature: -40...+85 °C (-40 °F...+185 °F)

### Description

ESS601 is kind of plastic encapsulated ultra-low pressure high-precision pressure sensor. It Encapsulates a high-performance MEMS pressure-sensitive chip and a special conditioning chip in a double-nozzle SOP14 case. The pressures in the two gas circuit structures refer to each other to reduce the impact of the environment on the output.

### Key Features & Benefits

- Range: -500Pa ~ 500Pa, 0Pa ~ 500Pa
- Pressure type: Gauge/Differential
- Output form: IIC, 0.2Vdc-4.7Vdc
- Accuracy:  $\pm 1.5\%$ /FS
- Compensation Temp.: -5-65°C

### Application

- Medical monitoring
- Respirator
- Fitness Equipment
- Industries Control
- Automotive Application
- Household Appliances

### Technical Characteristics

Parameter	Units	Description
Range	Pa	-500-500; 0-500
Supply Voltage	V	1.8, 3.3, 3.6
Working Current	mA	1
Sleep Current	nA	20
ADC	Bit	24
Accuracy	%/FS	1.5
Response Time	ms	5
Compensation Temp.	°C	-5-65
Operation Temp.	°C	-40-85
Temp. Output Range	°C	-40-85
Temp. Accuracy	°C	1

All values in this table are tested under the condition of voltage 3.3Vdc and temperature 25 °C if there is no special note.

(1) Divided into two forms of gauge pressure and differential pressure;

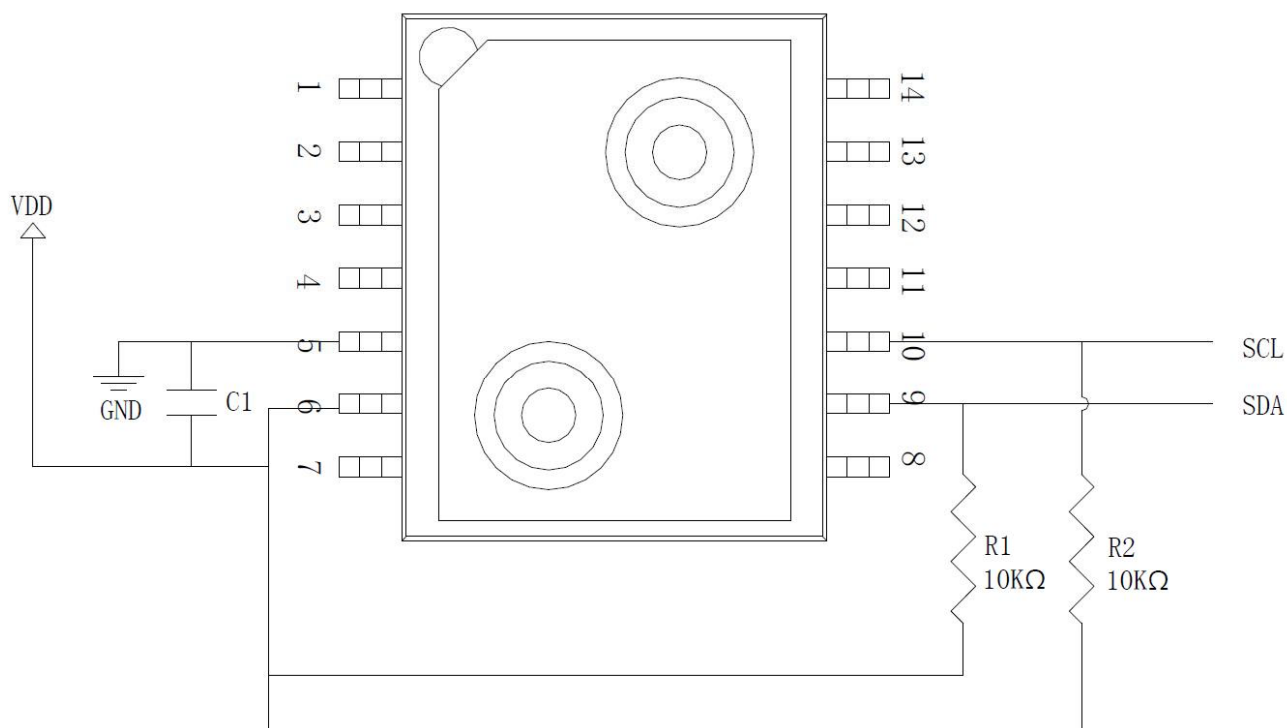
(2) Accuracy refers to the output accuracy of the product in a clean gas environment within the compensation temperature range; accuracy is determined by the linearity, repeatability and hysteresis of the product;

(3) The sensor is in a constant temperature field, and the detection accuracy of the ambient temperature;

## Drawing

**ESS601 Encapsulated Ultra-Low Pressure Sensor Range: -500-500pa; 0-500pa**

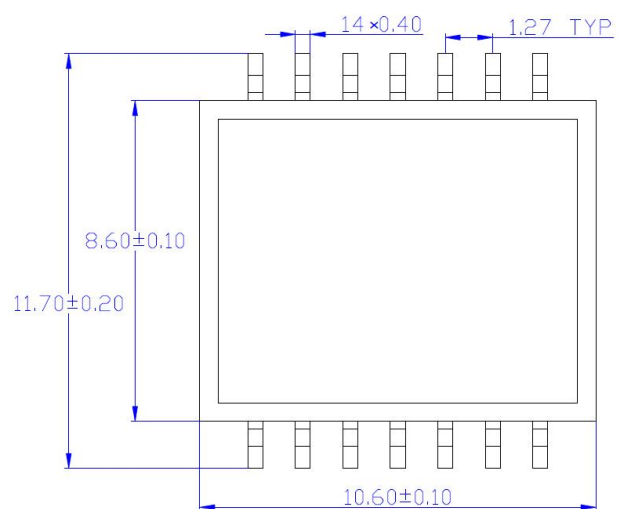
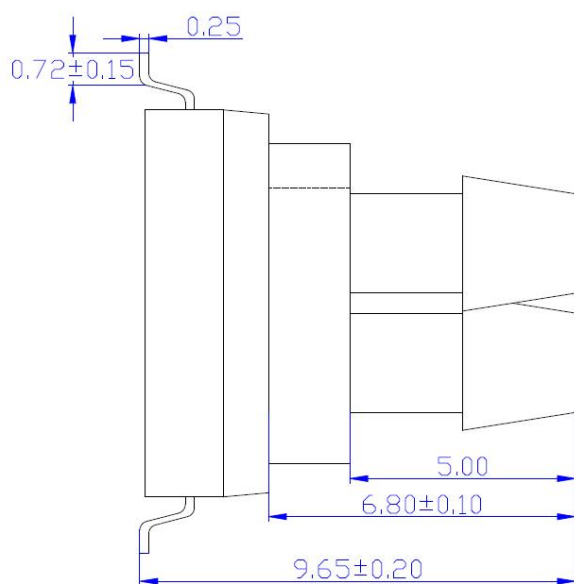
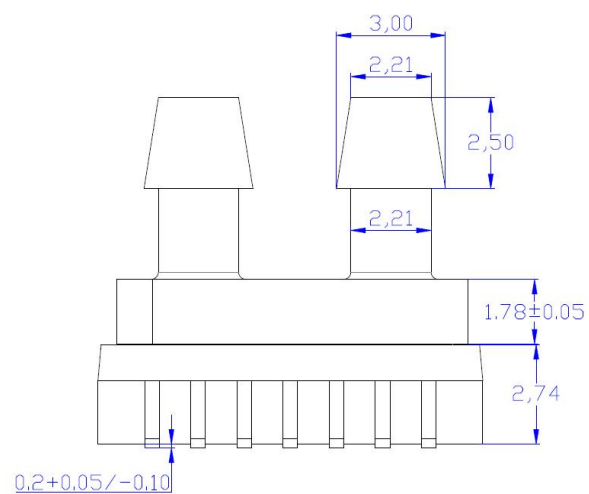
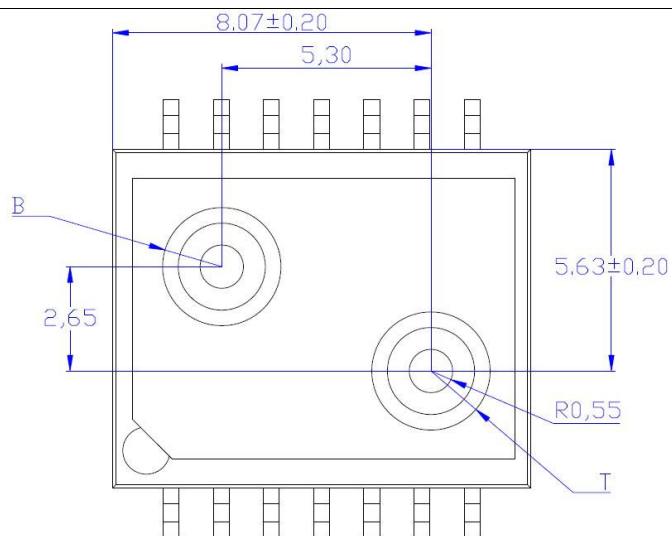
### Pin Definition



Pin Number	Pin Definition	
5	GND	Ground
6	VDD	Positive Power
9	SDA	Output
10	SCL	Clock
1,2,3,4,7,8,11,12,13,14	NC	-

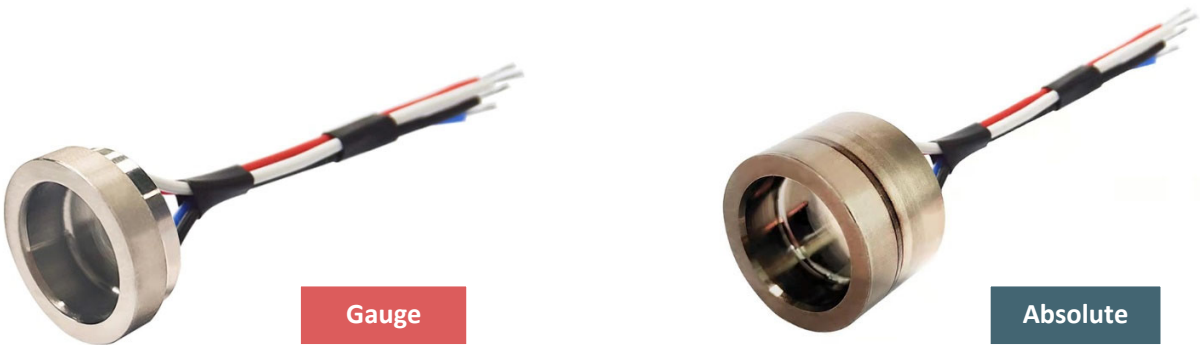
### Dimension (mm)





## ESS01 MCS Pressure Sensor

Measure High Pressure under High Temperature with High Accuracy



<ul style="list-style-type: none"><li>• <b>Range:</b> 0-0.2-2200bar (Standard type)</li><li>• <b>Range:</b> 0-1-4700bar (Customization)</li><li>• <b>Media Temperature:</b> -60℃ +175℃</li><li>• <b>Ambient Temperature:</b> -60℃ +175℃</li><li>• <b>Temperature Compensation:</b> -50 +150℃</li><li>• <b>Overload Pressure:</b> 150%~200%</li><li>• <b>Burst Pressure:</b> 2000%</li></ul>	<ul style="list-style-type: none"><li>• <b>Long-term Stability at Zero Point:</b> 0.05%FS/Y, 0.1%FS/Y</li><li>• <b>Long-term Stability Full-scale:</b> 0.05%FS/Y, 0.1%FS/Y</li><li>• <b>Output sensitivity:</b> 1.5mV/V</li><li>• <b>Zero Output:</b> ±0.4mV/V</li><li>• <b>Repeatability:</b> ±0.01%/FS, ±0.02%/FS, ±0.05%/FS,</li><li>• <b>Hysteresis:</b> ±0.02%/FS, ±0.05%/FS, ±0.1%/FS,</li><li>• <b>Non-linearity:</b> ±0.1%/FS, ±0.2%/FS, ±0.4%/FS,</li></ul>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### Description

ESS01 Pressure Sensor adopt the technology of Metals Coalesce System which combine kind of material together, choose the best characterizes of each material, adjust the thermal coefficient of expansion and stability in long terms, coalesce and melt the Elastomer steel plate and foil material for certain while under high temperature, high pressure, and true vacuum.

The thickness and diameter size, also the inner structure of sensing diaphragm can be highly customized as per different pressure range, especially when it comes to high pressure more than 1000bar to 4700bar.

By a serial of processes including photoetching, developing, and etching, welding, sealing, ESS01 pressure sensor can be well calibrated to achieve the perfect performance, even under harsh environment.

ESS01 can be ideally installed at many critical sites under extreme harsh condition, for example, aviation engine, aerospace, navigation, downhole, coal mine, petrochemical industry, and high-speed railway.



68000psi | 175℃ | 0.05%/F.S | TCZ(TCS)<5ppm

## Technical Parameters

Parameters	Typ.	Unit	Pressure
Pressure Range	0~0.2...220	MPa	G/A/S
Pressure Range	0-0.1...470	MPa	G/A/S
Operating voltage	2.5-10	vDC	G/A/S
Output sensitivity	1.5	mV/V	G/A/S
Zero output	±0.4	mV/V	G/A/S
Media temperature	-60~+175	°C	G/A/S
Ambient temperature	-60~+175	°C	G/A/S
Temperature	-50~+150	°C	G/A/S
Insulation impedance	≥20	MΩ@250VDC	G/A/S
Electrical strength	500	VAC	G/A/S
Response frequency	1	KHZ	G/A/S
Acceleration	50	g	G/A/S

Parameters	Typ.	Max.	Unit
Repeatability	0.01	0.05	%FS
Hysteresis	0.02	0.05	%FS
Nonlinearity	0.1	0.2	%FS
Zero Output	0.3	0.4	mV /V
Long term Stability (0	0.05	0.1	FS/Y
Long term Stability (F.S)	0.05	0.1	FS/Y
Therma Temperature. Coefficient (0 point)	25	50	ppm
Therma Temperature. Coefficient (F.S)	50	100	ppm
Input impedance	480	2500	Ω
Output impedance	480	2500	Ω

**Notes:** G for Gauge pressure; A for Absolute pressure; S for Sealed gauge

## Zero/Full Temperature Drift Test Data-

SN	T <sub>cm</sub>	0bar ↑ (mV/V)	12bar ↑ (mV/V)	24bar(mV/V)	12bar ↓ (mV/V)	0bar ↓ (mV/V)	Zero(mV/V)	F.S(mV/V)	Vout(mV/V)
ESS01-13(1)	25°C	-0.06044	0.62921	1.30517	0.63003	-0.06028	-0.06036	1.30517	1.36553
	-40°C	-0.06263	0.62754	1.30463	0.62869	-0.06251	-0.06257	1.30463	1.3672
	25°C	-0.06085	0.62876	1.30475	0.62965	-0.06067	-0.06076	1.30475	1.36551
	125°C	-0.04797	0.63705	1.30774	0.63798	-0.04726	-0.04762	1.30774	1.35536
	150°C	-0.04418	0.63926	1.30806	0.64008	-0.04384	-0.04401	1.30806	1.35207
	25°C	-0.06265	0.62715	1.30325	0.62810	-0.06228	-0.06247	1.30325	1.36572
ESS01-20(6)	25°C	-0.28681	0.47437	1.22278	0.47524	-0.28664	-0.28673	1.22278	1.50951
	-40°C	-0.29276	0.47061	1.22111	0.47162	-0.29258	-0.29267	1.22111	1.51378
	25°C	-0.28723	0.47407	1.22233	0.47460	-0.28745	-0.28734	1.22233	1.50967
	125°C	-0.26472	0.49010	1.23177	0.49132	-0.26349	-0.26411	1.23177	1.49588
	150°C	-0.25732	0.49556	1.23496	0.49653	-0.25655	-0.25694	1.23496	1.49190
	25°C	-0.28963	0.47166	1.21984	0.47218	-0.28981	-0.28972	1.21984	1.50956

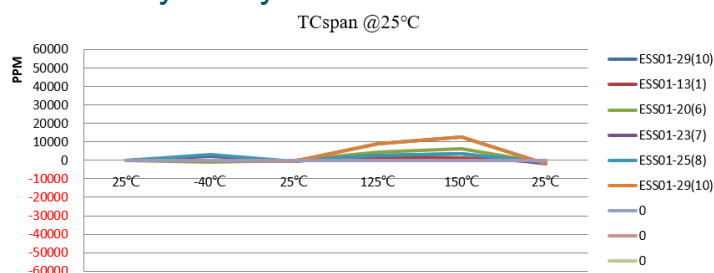
## Construction Performance

	Gauge type	Absolute type
Dimension	Ø19xH8	Ø19xH13
Weight	10g	15g



## Time Drift - Temperature Repeatability - Consistency Analysis

Tcspan for 25°C							
	25°C	-40°C	25°C	125°C	150°C	25°C	ppm/°C
ESS01-13(1)	0	-270	-210	1285	1445	-960	12.85
ESS01-20(6)	0	-835	-225	4495	6090	-1470	48.72
ESS01-23(7)	0	2140	-305	2630	3490	-1835	32.92
ESS01-25(8)	0	3165	-390	2620	3635	-845	48.69
ESS01-29(10)	0	-285	-310	8935	12420	-1950	99.36



## Drawing

