

General Instruction and Datasheet

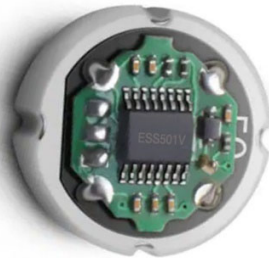
ESS501I/V GID-5-EV03.3.5

Measuring your business

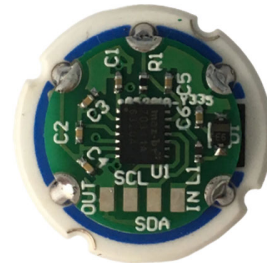
ESS501I/V/IIC Ceramic Pressure Sensor Module (with PCB)



ESS501-I
Output: 4-20mA



ESS501-V
Output: 0.5-4.5V



ESS501-IIC
Output: I2C

▪ Range: 0~2bar~50bar ▪ Diaphragm Material: Ceramic Al₂O₃ 96% ▪ Integrated accuracy: 0.5% ▪ Output: 0.5-4.5Vdc | 4-20mA | I2C

Description

Based on ESS501, ESS501I/V/IIC pressure sensors module is integrated with pcb which amplify the output from mv to analog signal such as 0.5-4.5Vdc or 4-20mA and I2C.

Because of the Al₂O₃ ceramic excellent chemical resistance (aggressive gases, most of solvents and acids, etc.), no additional protection is normally required.

Key Features & Benefits

- Pressure range 0~1bar...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 module]

Parameter	Unit	Description			
Sensor type	-	Absolute (A), Gauge (R) or Sealed gauge (S)			
Technology	-	Piezoresistive			
Diaphragm material	-	Ceramic Al ₂ O ₃ 96% (standard), 99.6% or sapphire (Sapphire is underway)			
Weight	g	≤ 8 (ceramic cell only) ; ≤ 30 (module)			
Response time	ms	≤ 1 (@90%/FS)			
Output signal			0-5V	0.5-4.5V	4-20mA
Supply voltage	VDC	2...36	6-36 3.0-5.5	3.0-5.5	11-36
Current cons.	mA	≤ 3 @ 10V	2.5(TYP)	2.5(TYP)	-
Impedance	Ω	11k ± 30%	>10k	>10k	≤50 (U-11)
Offset	mv/v	- 0.2 ± 0.1 (Other nominal values available on request)			
Operating temperature	°C	-40...+85°C (-40 °F...+185 °F)			

Storage temperature		°C	-40...+125 °C (-40 °F...+257 °F)											
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-	2.0-3.6	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.	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	± 0.005 / ± 0.040					25 °C...85 °C			(77 °F...185 °F)				
Thermal span shift	%/fs/k	≤ ± 0.010		0 °C...70 °C					(32 °F...158 °F)					
		≤ ± 0.012		-25 °C...0 °C / 70 °C...85 °C					(-13 °F...32 °F / 158 °F...185 °F)					
		≤ ± 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						

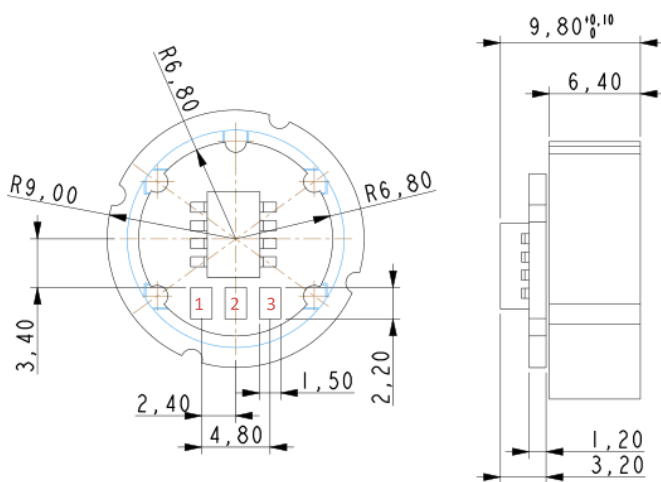
Tests performed at 25°C in Metallux housings, unless otherwise specified. Different housings may affect performances.

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 = √(NonLinearity²+Hysteresis² +NonRepeatability², terminal based.
4. All technical characteristics will remain within indicated ranges performing the above-mentioned reliability tests.

Drawing

ESS501V Ceramic Piezo-resistive Pressure Sensor module Range: 0bar~50bar, Output: 0.5-4.5V Power Supply: 5V

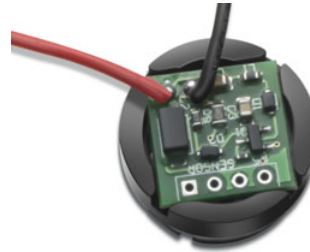
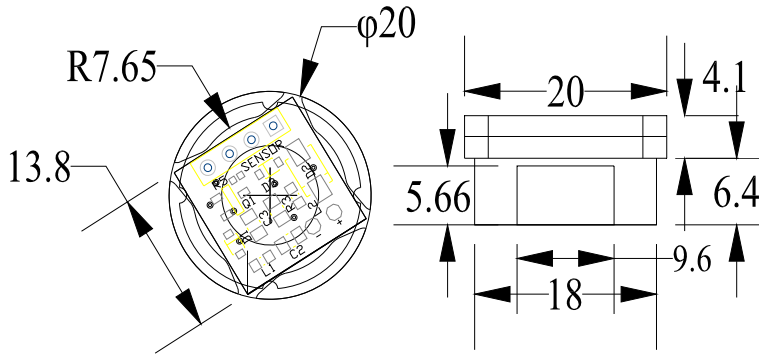
Top View (without supporter) | Schematics



1	2	3
Power supply “+”	Output Voltage	Power supply “-”

ESS501I Ceramic Piezo-resistive Pressure Sensor module Range: 0bar~50bar, Output: 4-20mA Power Supply: 10-36V

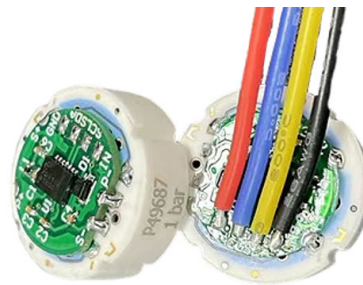
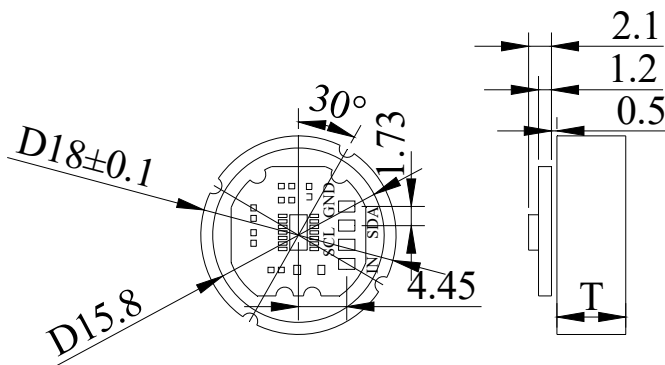
Top View (without supporter) | Schematics



Red Wire	Black Wire
Power Supply “+”	Power Supply “-”

ESS501-IIC Ceramic Piezo-resistive Pressure Sensor module Range: 0bar~50bar, Output: I2C, Power Supply: 2.7-5.5V

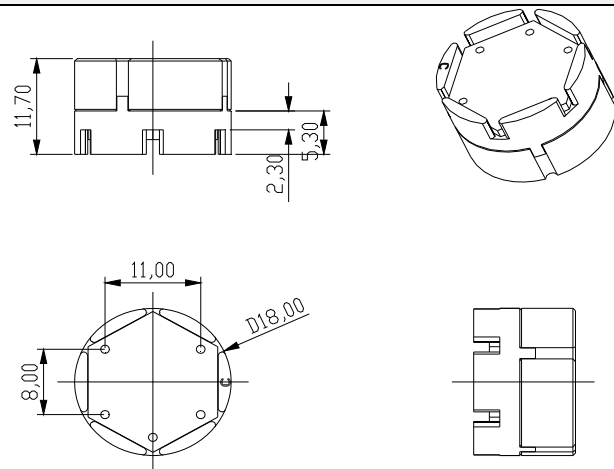
Top View (without supporter) | Schematics



Output Signal	IIC
IN+	VCC
GND	GND
SCL	SCL
SDA	SDA

Range(bar)	1	2	5	10	20	50	SCL	SCL
T(mm)	6.17	6.23	6.30	6.35	6.55	6.7	SDA	SDA

Module Dimension with Black Ring Supporter For voltage output type when **pressure range ≤5bar** & Current output type



ESS501V: 0.5-4.5V 0-5V	ESS501I: 4-20mA
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Wires connection for both current & voltage		
	Voltage	Current module
Red Wire	Positive	Power Supply “+”
Black Wire	Negative	Power Supply “-”
White Cable	Signal output SIG	NC

Ordering Procedure

ESS5	Ceramic Piezoresistive Pressure Sensor							
	Code	Model						
	01	Pressure Sensor						
	01I	Pressure Sensor Module (with pcb 4-2mA output)						
	01V	Pressure Sensor Module (with pcb 0.5-4.5V output)						
	01IIC	Pressure Sensor Module (with pcb I2C output)						
	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							
	M	Monolithic						
	F	Flush Diaphragm						
	Code	Sensitivity adjustment						
	0	Without						
	9	On request						
	Code	Output						
	mv	mv						
	0	0.5-4.5Vdc						
	9	4-20mA						
	10	IIC						
	Code	Termination type						
	02	Pre-tinned pads						
	03	Silicone single wires 80 mm-100 mm						
	Code	Accuracy						
	1	0.5%						
	2	1.0%						
	9	Others on request						
ESS5	01I	R06	R	M	0	9	03	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