

### FEATURES

- 0...1 to 0...150 psi and  $\pm 1$  psi to  $\pm 15$  psi
- Improved performance replacement
- High level voltage output
- Field interchangeable
- Calibrated and temperature compensated

### APPLICATIONS

- Medical equipment
- Barometry
- Computer peripherals
- HVAC

### GENERAL DESCRIPTION

The 142SC/143SC series transducers provide a 1 - 6 V output which is directly proportional to applied pressure. This series consists of twelve (12) devices for monitoring differential, gage or absolute pressures from 0 - 1 to 0 - 150 psi as well as  $\pm 1$  psi to  $\pm 15$  psi. These products feature a high level voltage output. Complete calibration and temperature compensation.

Based on Sensym's precision SX series sensors, the 142SC/143SC series is an improved performance, direct replacement second source part with equivalent pin-out and package mounting dimensions.

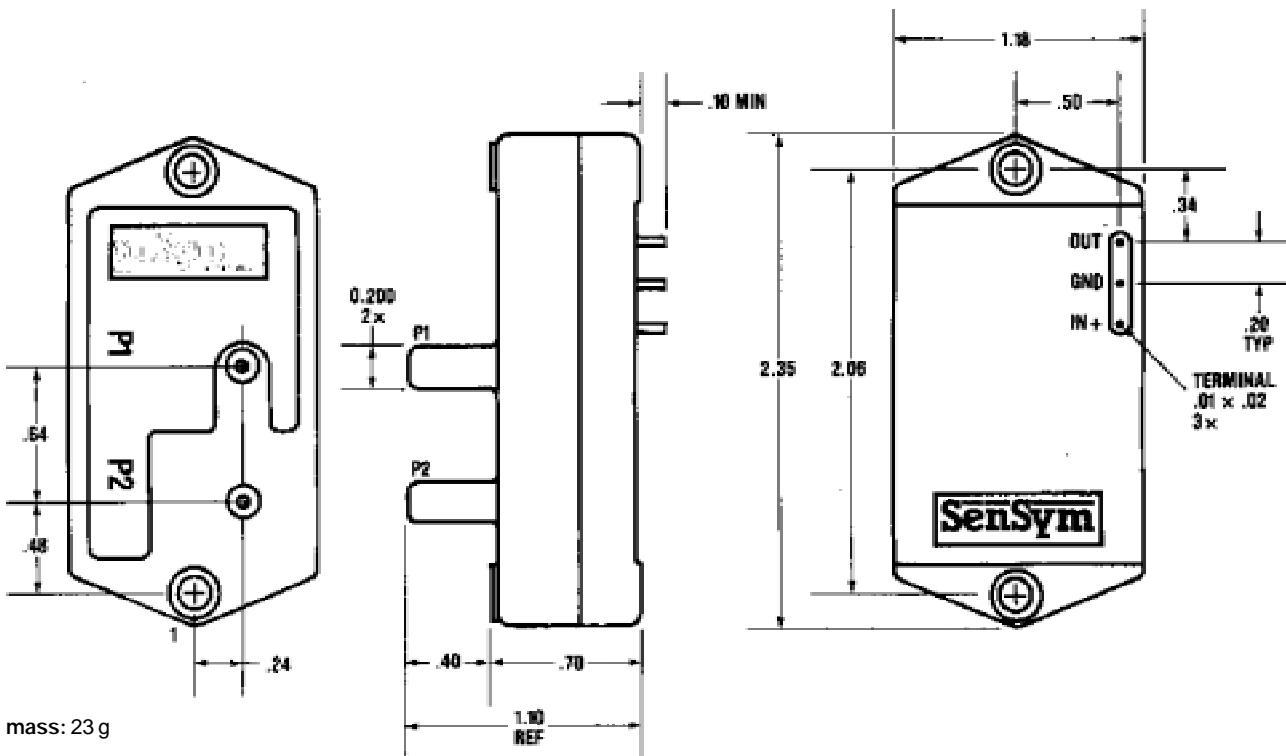
This allows for direct replacement in existing PC board layouts. Sensym's 142SC/143SC devices offer the



Scale: 1 cm  
1 inch

added advantage of tighter tolerances which give greater accuracy and improved interchangeability.

These products are designed to be used with non-corrosive, non-ionic and fluids such as air and dry gases.



mass: 23 g

### FUNCTIONAL SPECIFICATIONS

#### Maximum ratings

Supply voltage	+7 V <sub>DC</sub> to 16 V <sub>DC</sub>
Output current	
Source	10 mA
Sink	5 mA
Temperature range	
Compensated	-18°C to +63°C
Operating	-40°C to +85°C
Storage	-55°C to +125°C

#### Reference conditions

Supply voltage	8.0 ± 0.01V <sub>DC</sub>
Reference temperature	25 °C
Common-mode pressure	0 psig

### INDIVIDUAL OPERATING CHARACTERISTICS

SenSym part number	Operating pressure range	Proof pressure	Sensitivity
142SC01D	0 - 1 psid (g)	20 psig	5 V / psi
142SC05D	0 - 5 psid (g)	20 psig	1 V / psi
142SC15A	0 - 15 psia	45 psia	333 mV / psi
142SC15D	0 - 15 psid (g)	45 psig	333 mV / psi
142SC30A	0 - 30 psia	60 psia	167 mV / psi
142SC30D	0 - 30 psid (g)	60 psid	167 mV / psi
142SC100D	0 - 100 psid (g)	200 psid	50 mV / psi
142SC150D	0 - 150 psid (g)	200 psid	33 mV / psi
143SC01D	-1 to +1 psid (g)	20 psig	2,5 V / psi
143SC03D	-2.5 to +2.5 psid (g)	20 psig	1 V / psi
143SC05D	-5 to +5 psid (g)	35 psig	500 mV / psi
143SC15D	-15 to +15 psid (g)	45 psig	333 mV / psi

### PERFORMANCE SPECIFICATIONS<sup>1</sup> (all 142SC devices)

Parameter	Min.	Typ.	Max.	Unit
Offset calibration <sup>2</sup>	0.95	1.0	1.05	V
Output at full pressure	5.90	6.0	6.10	V
Full-scale span <sup>3</sup>	4.95	5.0	5.05	V
Linearity (P <sub>2</sub> > P <sub>1</sub> )	---	0.5	1.5	%FSO
(P <sub>2</sub> < P <sub>1</sub> ) <sup>4</sup>	---	0.2	0.75	%FSO
Temperature shift (-18°C to +63°C) <sup>5</sup>	---	0.5	1.0	%FSO
Repeatability and hysteresis	---	0.2	---	%FSO
Response time	---	0.1	1.0	ms

### PERFORMANCE SPECIFICATIONS<sup>1</sup> (all 143SC devices)

Parameter	Min.	Typ.	Max.	Unit
Offset calibration <sup>2</sup>	3.45	3.50	3.55	V
Output at full pressure	5.90	6.0	6.10	V
Full-scale span <sup>3</sup>	---	5.0	---	V
Linearity (P <sub>2</sub> > P <sub>1</sub> ) <sup>4</sup>	---	0.5	1.5	%FSO
(P <sub>2</sub> < P <sub>1</sub> )	---	0.2	0.75	%FSO
Temperature shift (-18°C to +63°C) <sup>5</sup>	---	0.5	1.0	%FSO
Repeatability and hysteresis	---	0.2	---	%FSO
Response time	---	0.1	1.0	ms

**Specification notes:**

1. Performance specifications shown are at reference conditions. Specifications apply for absolute pressure devices with pressure applied to port 1. For gage devices pressure is applied to port 2 and port 1 is left open to ambient. For differential pressures. Port 2 is the high pressure port. For operation at other than 8.0 V<sub>DC</sub> the typical ratiometricity error at 7 V to 8 V or 8 V to 9 V is  $\pm 0.50$  %FSO and at 9 V to 12 V it is  $\pm 2.00$  FSO. All SenSym differential devices feature dual pressure ports and can be used as gage or differential sensors. For absolute devices, port 2 is inactive.
2. Offset calibration is at 0 psi for each device.
3. Full-scale span is the algebraic difference between the output voltage at full-scale pressure and the output at the lowest specified operating pressure
4. Linearity refers to the best straight line fit as measured for offset, full-scale and 1/2 full-scale pressure.
5. Temperature shift refers to the combined effects of offset and sensitivity shifts. This is tested at -18°C to +63°C relative to 25°C. The maximum temperature shift specification applies to all devices except the 142SC01D and 143SC01D devices which have a maximum shift of 1.5 %FSO from 5°C to 45°C.

**GENERAL DISCUSSION**

Sensym's 142SC/143SC series utilizes Sensym's proven SX series sensor element in combination with a custom individually laser trimmed thick film ceramic. Each device is calibrated for offset and sensitivity as well as temperature effects providing an accurate, reliable sensor for a wide variety of sensor applications.

**OUTPUT CHARACTERISTICS**

The 142SC/143SC products give an output voltage which is directly proportional to applied pressure. For the 142SC/143SC gage and differential devices, an increasing or positive going output signal will result when increasing pressure is applied to port P2 (for absolute pressure, increases in pressure applied to port P1 produce an increasing output signal. Port P2 is inactive on absolute devices.) For standard 142SC/143SC devices the output is ratiometric to the supply voltage. Changes in the supply voltage will cause proportional changes in the offset voltage and full scale span.

**MECHANICAL AND MOUNTING CONSIDERATIONS**

The 142SC/143SC package is designed for convenient pressure connection and easy PC board mounting. The package has two mounting holes allowing firm PC board connection. Mounting screws or Sensym's plastic X-mas tree clips (part number SCXCLP) can be used for attachment (see application note SSAN-25).

For pressure attachment, tygon or silicon tubing is recommended.

**VACUUM REFERENCE (absolute devices)**

Absolute sensors have a hermetically sealed vacuum reference chamber within the sensor chip. The offset voltage on these units is therefore measured at vacuum, 0 psia. Since all pressure is measured relative to a vacuum reference, all changes in barometric pressure or changes in altitude will cause changes in the device output.

**MEDIA COMPATIBILITY**

142SC/143SC devices are compatible with most clean dry gases. Because the sensor chip circuitry is coated with a protective silicone gel, many otherwise corrosive environments can be compatible with the sensors. As shown in the physical construction diagram below, fluids must generally be compatible with nylon, aluminum, RTV, and silicon, for use with port 2.

For questions concerning media compatibility, contact the factory.

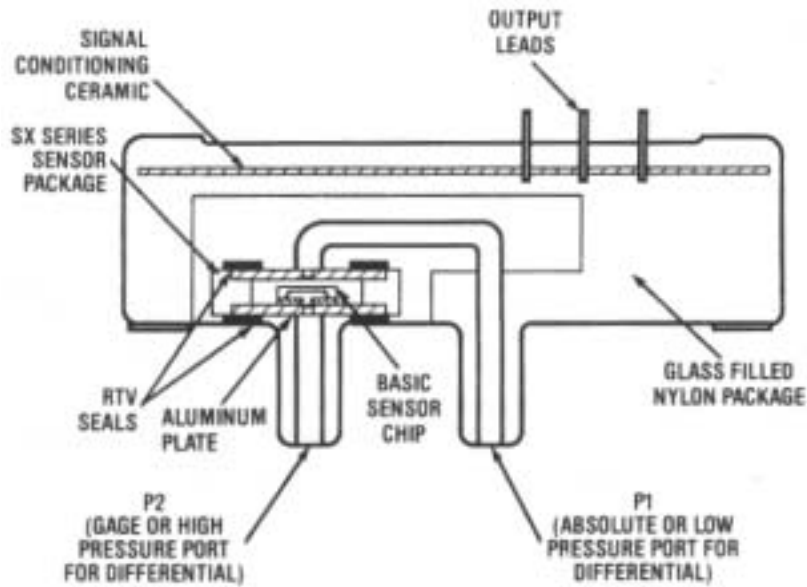
**USER CALIBRATION**

The 142SC/143SC devices are fully calibrated for offset and span and should therefore require little or no user adjustment in most applications.

All versions of the 142SC/143SC sensors have two (2) tubes available for pressure connection. For absolute devices, only port P1 is active. Applying pressure through the other port will result in pressure dead-ending into the backside of the silicon sensor and the device will not give an output signal with pressure.

For gage applications, pressure should be applied to port P2. Port P1 is then the vent port which is left open to the atmosphere. For differential pressure applications, to get proper output signal polarity, port P2 should be used as the high pressure port and P1 should be used as the low pressure port.

CUTAWAY VIEW 142SC/143SC PACKAGE



ORDERING INFORMATION

To order, use the following part numbers:

Standard device types

SenSym part number	Operating pressure range
142SC01D	0 - 1 psid (g)
142SC05D	0 - 5 psid (g)
142SC15A	0 - 15 psia
142SC15D	0 - 15 psid (g)
142SC30A	0 - 30 psia
142SC30D	0 - 30 psid (g)
142SC100D	0 - 100 psid (g)
142SC150D	0 - 150 psid (g)
143SC01D	-1 to +1 psid (g)
143SC03D	-2.5 to +2.5 psid (g)
143SC05D	-5 to +5 psid (g)
143SC15D	-15 to +15 psid (g)

**Note:** All Sensym differential devices feature dual pressure ports and can be used as gage or differential sensors. Sensym s differential (D) devices are therefore interchangeable with the other manufacturers (D) or gage (G) style devices and are also available for vacuum and pressure/vacuum applications.

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