

# Solid State Pressure Sensor

*PRELIMINARY*  
V2.0

## *Series – Model 85*

### FEATURES

- ✓ Robust SS housing
- ✓ IP 65 or Better
- ✓ MEMS Sensing Inside
- ✓ Custom Configurable
- ✓ As low as 125 Pa



### DESCRIPTION

The Series 85 is a miniature and robust pressure transducer with calibrated and temperature compensated output . It incorporates MEMS sensing chip which is specially designed for low pressure application where board-mount is not applicable.

Multi-order compensation for correction of offset, sensitivity, thermal errors and nonlinearity are accomplished in factory via an internal DSP running a correction algorithm with calibration coefficients stored in on-chip EEPROM.

A variety of output configuration, including resolution, sampling rate, output interface are available to provide simple and ready-to-use solution for a wide range of application. Multiple choices for pneumatic interface are suitable for system integration.

Multiple choices for media compatibility are available upon request.

Distributed in North America By:

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781-862-9572

# Specifications – Basic

V1.5

Parameters	Min	Typ	Max	Unit
Temp - Operating <sup>1</sup>	-20		85	°C
Temp - Compensated <sup>2</sup>	0		50	°C
Temp - Storage	-40		125	°C
Humidity <sup>3</sup>	0		95	%RH
Over-pressure <sup>4,7</sup>	3x			FS
Burst Pressure <sup>4,8</sup>	6x			FS
Long-term Stability <sup>5</sup>			1.0	%FS
Orientation Sensitivity <sup>6</sup>			0.04	%FS/g
ESD – HBM	-4		+4	kV
Vibration	20g, 10Hz to 2Hz			

## NOTES:

1. -40 to 85 °C is available upon request.
2. Custom temperature compensation is available upon request.
3. Gas only, no condensation.
4. Range dependent. Refer to individual data sheet.
5. Zero stability to be tested with 120 hour hot storage at 85 °C , which is roughly equivalent to accelerated aging of the part for over a year at Room Temperature.
6. Measured orientation effect on the zero output of 0.15 psi sensor with a standard deviation of 0.035% Full-Scale/g.
- 7.The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25°C [77°F]. Includes all errors.
- 8.The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, span, NOL, hysteresis, non-repeatability, TCO, TCS and thermal hysteresis
9. Over-pressure (OP): the maximum pressure that may be applied to the sensor without causing a change in performance with respect to the specifications.
10. Burst-pressure (BP): The maximum pressure that may be applied to the sensor without a catastrophic failure.

# Ordering Information

## Series 85

**85 A C - XXXX G - 1 2 10**

**Series**

**Type of Output**

A = Analog Output  
D = Digital Output

**Supply**

Blank = 5.0 V  
L = 3.3 V  
C = Custom

**Type of Pressure**

G: Gauge (+P at Port B)  
A: Absolute (+P at Port A)  
D: Differential (+P at Port B)  
I: Negative (-P at Port B, offset output when P=0)

\*Absolute is available only for pressure equal or greater than 1000 mbar/15 psi.

**Configuration**

10: Standard  
x1: Full gel coating  
x2: Thin-film conformal coating with Parylene  
x3: Gel on ASIC chip only  
x4: Selective gel on chips  
x0: No encapsulation  
xP: Refer to individual data sheet

**Output**

2 = 0.5 to 4.5 V  
4 = 4 to 20 mA  
S = Special  
A = 0.5 to 4.5V, clamped  
B = 0.2 to 4.7V, clamped

**Port Type**

1 = Flush  
2 = Barb  
3 = PTC, 4mm  
9 = Other

mbar	
2.5	L25
5	L50
10	100
20	200
40	400
60	600
100	101
200	201
500	501
1000	102
2000	202
4000	402
7000	702

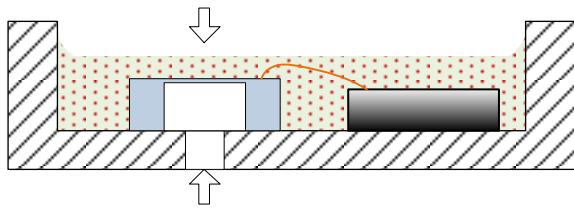
**Notes:**

Custom ranges and units are available upon request. Please contact factory.

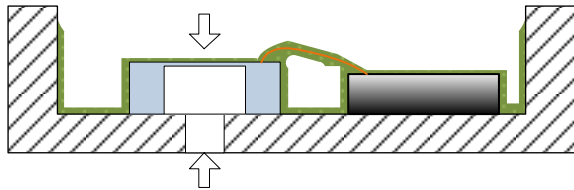
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# Smate® Type of Encapsulation

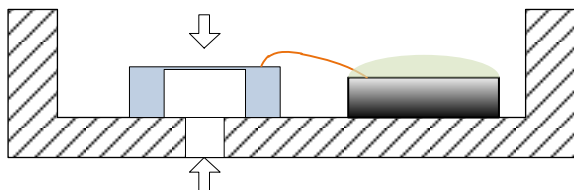
Series 85, 52, 19 & 17



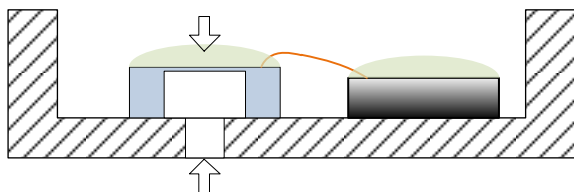
x1 Full gel coating



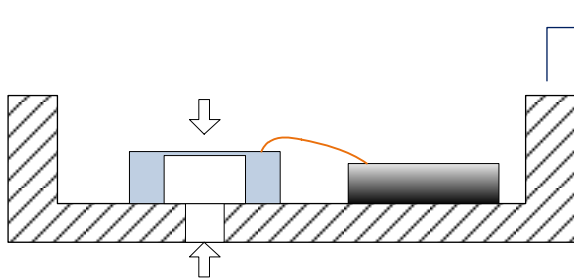
x2 Thin-film conformal coating with Parylene



x3 Gel on ASIC chip only



x4 Selective gel on chips



chips carrier inside of TXR  
x0 No encapsulation

Code of configuration

Note:

- The last right 2 digits in ordering information are coded for configuration.
- Type of encapsulation is determined per application and sensing chip used.
- Sensor price varies with the encapsulation chosen.
- Chips stack is taken in Series 17 and only available for absolute pressure.

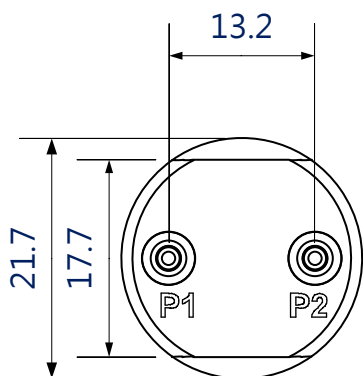
## Specifications – Analog Output

Parameters	Min	Typ	Max	Unit
Supply ( $V_{DD}$ ) – 3.3V <sup>1</sup>	2.75	3.3	3.6	V
Supply ( $V_{DD}$ ) – 5.0V <sup>1</sup>	4.75	5.0	5.25	V
Supply ( $V_{DD}$ ) – 12V <sup>1</sup>	8.0	12.0	16.0	V
Operating Current <sup>2</sup>		2.2	3.2	mA
Resolution - DAC <sup>3</sup>		13	16	bits
Output (-P) <sup>4</sup>		10%		$V_{DD}$
Output (Zero) <sup>4</sup>		50%		$V_{DD}$
Output (+P) <sup>4</sup>		90%		$V_{DD}$
Accuracy <sup>5</sup>		±0.5		%FS
Overall Error <sup>6</sup>		± 2.5		%FS
Update Rate <sup>7</sup>		1.2		kHz
Start-up Time <sup>8</sup>			2.3	ms

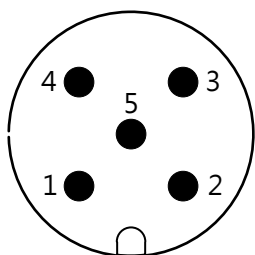
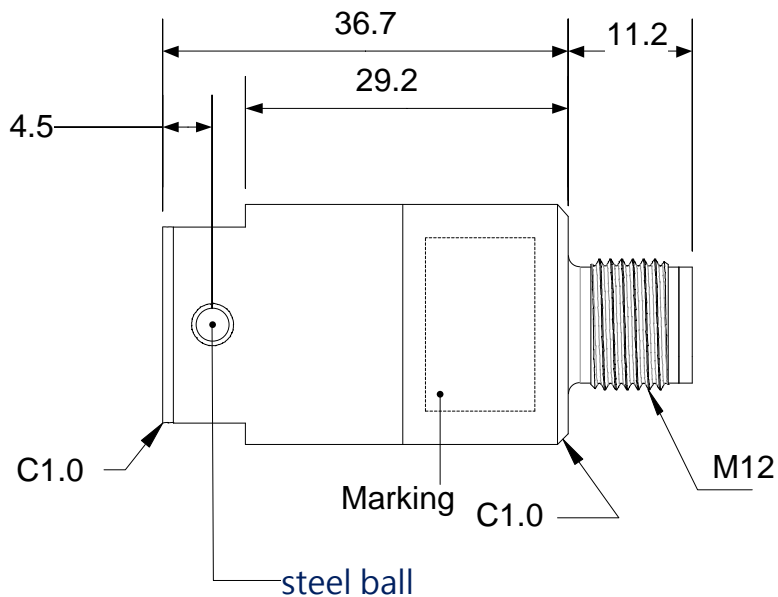
### NOTES:

1. 8 to 16V supply should be ordered separately. Other supply voltage from 2.75 to 5.5V is available upon request.
2. Continuously running measurement sequence is executed at 5V.
3. Higher resolution longer step response settling time. Dithering is available upon request and can be switched on or off.
4.  $V_{DD}$ -ratiometric voltage. For vented gauge pressure, zero is 10%. Absolute voltage output (0/1V, 0/5V) is also available upon request.
5. Combines errors at 25°C after reflow mounting and auto-zero. Pressure range dependent.
6. The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range and compensated temperature.. Combines errors of NOL, hysteresis, and repeatability. Pressure range dependent.
7. Single measurement duration in 16-bit with SSC on-chip temperature sensor. Resolution dependent.
8.  $V_{DD}$  ramps up to activate Digital data to ADC plus DAC settling time.
9. Recommended operating condition with external resistive load 1k $\Omega$  and capacitive load 10nF as low-pass filtering configuration at analog output for output bandwidth from 1kHz to 5kHz.

# Dimension - flush fitting

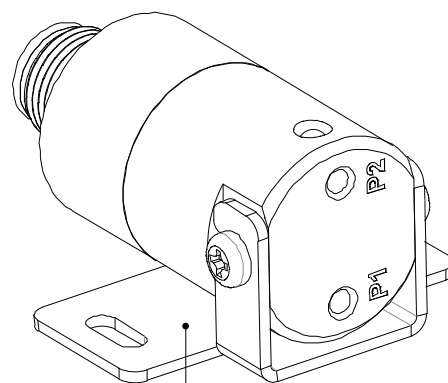
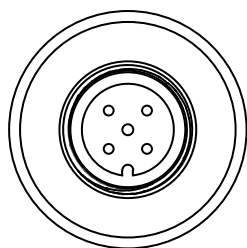


Unit: mm



M3P0.5

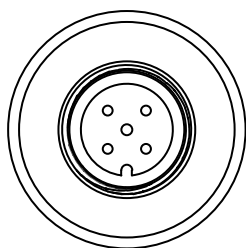
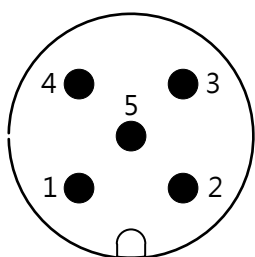
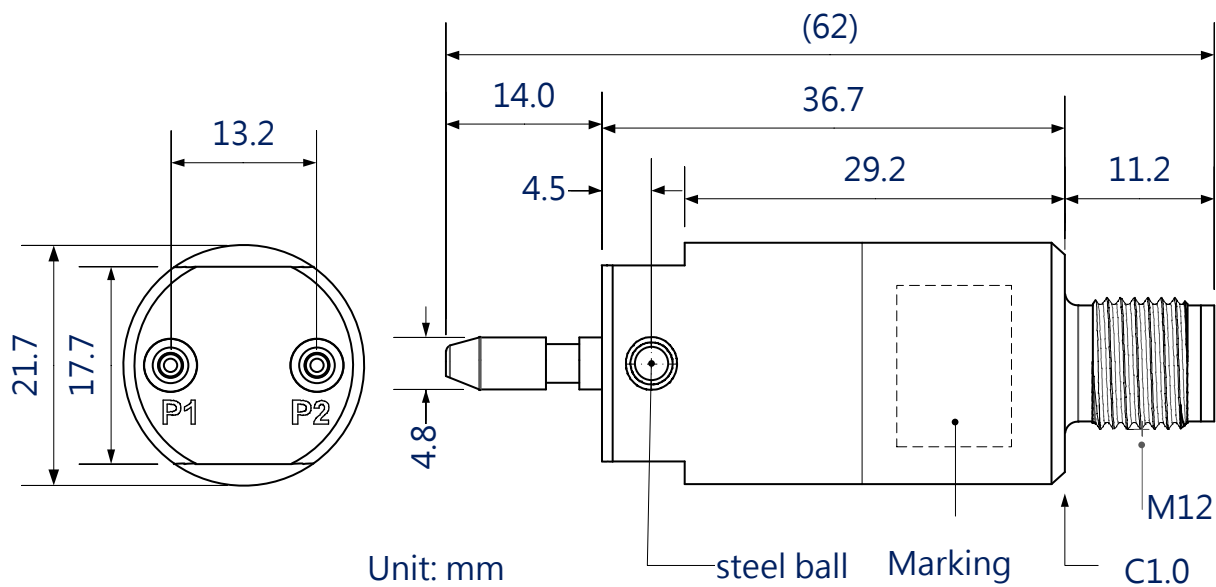
C1.0



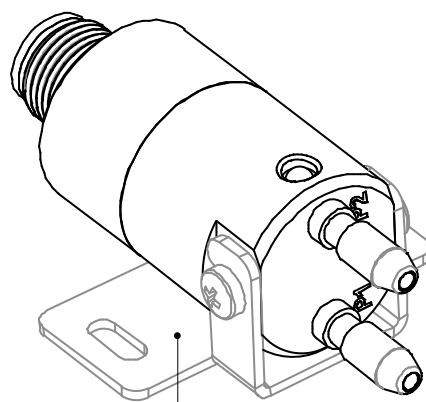
Mounting  
Bracket  
(excluded)

Standardized M12 Circular  
Connector, 5 circuits

# Dimension - barb fitting



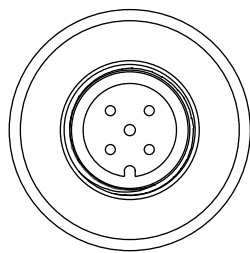
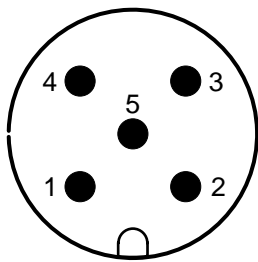
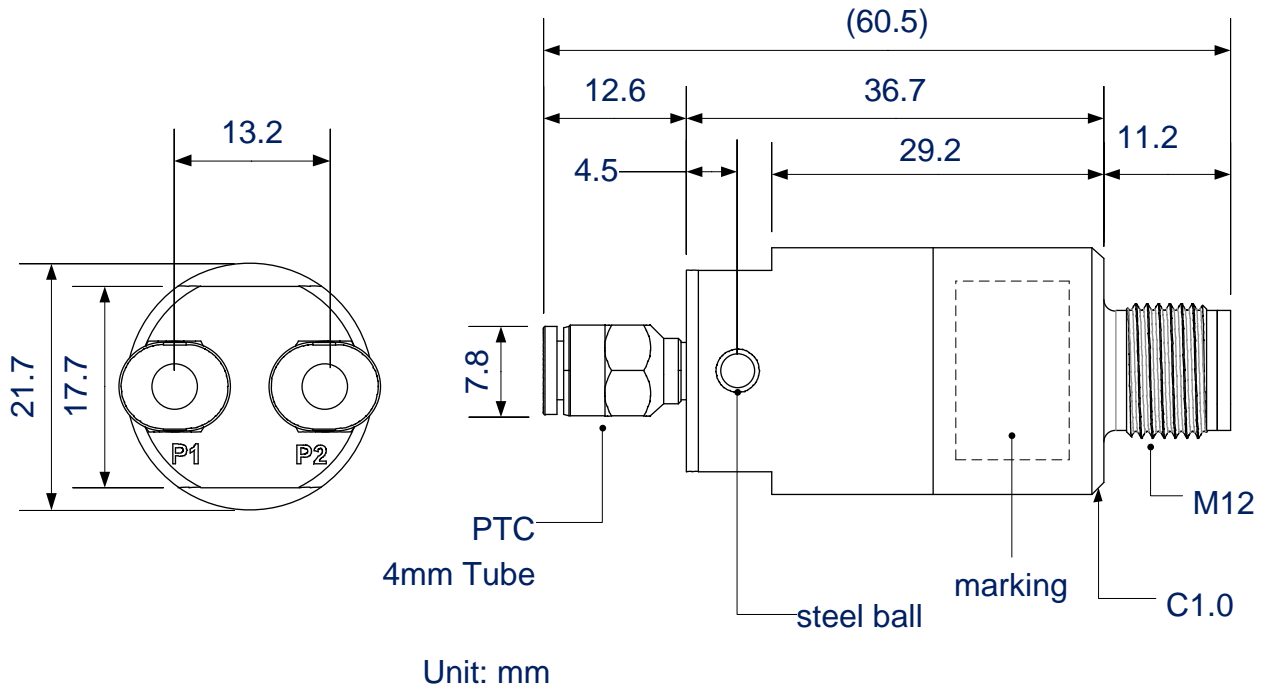
Standardized M12 Circular  
Connector, 5 circuits



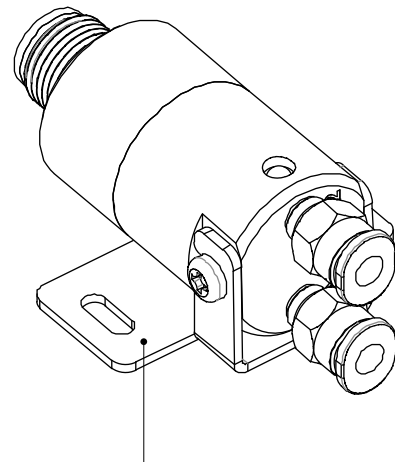
Mounting Bracket  
(excluded)

# Dimension

- PTC, 4 mm



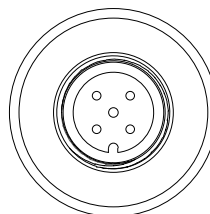
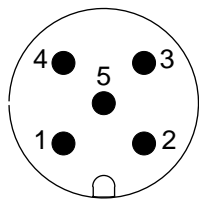
Standardized M12 Circular Connector, 5 circuits



Mounting Bracket (excluded)



# Electrical Connection



Standardized M12  
Circular Connector  
5-circuit

## Pinout Assignment

Analog Output

Pin #	Description
1	V <sub>DD</sub>
2	N.C.
3	GND
4	OUT
5	N.C.

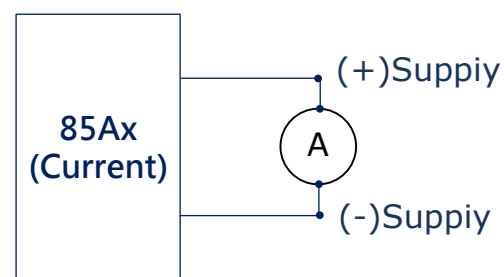
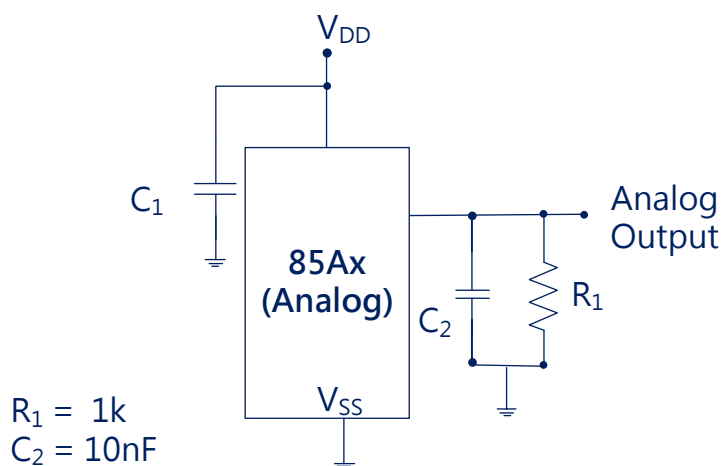
Current Output

Pin #	Description
1	(+)Supply
2	(-)Supply
3	N.C.
4	N.C.
5	N.C.

NOTE:

N.C. pins must be left floating

## Application Circuit



## Revision History

Rev	Description	Date	By
0.1	1st release	13-04-21	Eng
1.1	Clamped Analog added as "a"	21-05-21	Eng
1.2	Clamped output code change	22-06-21	Eng
1.3	Change dim_PTC, 4 mm Dimension	07-12-21	Eng
1.4	Pinout assignment added	23-02-22	Eng
1.5	Change dim_Flush Dimension	01-05-22	Eng
2.0	通用版	08-06-22	Eng

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