

P1A

Pressure Sensor

Description

P1A family features a highly modular compact geometry. This modularity and extensive range of options offered by the P1A family make the advantages of Ceramic Capacitive technology in low-pressure sensing now available to the broadest spectrum of industrial applications. Besides the multiple standard configurations available, customized adaptations can also be considered.

Kavlico's P1A Ceramic Capacitive Pressure Sensor incorporates the latest generation sensing elements with state-of-the-art ASICs. Designed to withstand harsh environments, it features superior EMI protection, outstanding shock and vibration performance, impressive longevity and lifetime performance and high quality. It is tested to parameters that match or exceed those of competing products on the market.



Features

- Small Compact Size
- Highly Modular Product Configurations
- Kavlico Ceramic Capacitive Technology
- Outstanding Long Term Stability and Performance
- Vacuum to 16 Bar Gage and Absolute
- Media Resistant CCAP Technology

Applications

- Vacuum Machinery / Plant
- Medical and Laboratory Sterilizers / Autoclaves
- HVAC Systems
- Water Pump Booster Sets
- Pneumatic Systems
- Waste and Water Management
- Industrial OEM Applications

MAIN FEATURES

Pressure Ranges	0 to 0.25 up to 0 to 16 bar (gage) 0 to 1.6 up to 0 to 16 bar (absolute) -1 to 0 up to -1 to 0 bar (gage) *
Electrical Connection	Packard Electric Metri-Pack 150 Series *
Pressure Connection	G1/4A DIN 3852-E, 1/4 - 1/8 NPTF *
Housing Material	304 Stainless Steel (1.4301)
Connector Material	PBT (30% Glass Fibre)
Output Signal	4 - 20 mA, 0.5 - 4.5 VDC, 0 - 5 VDC, 0 - 10 VDC



Pressure Ranges

from 0 to...	bar (gage)	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16
from 0 to...	bar (absolute)					1.6	2.5	4	6	10	16
Proof Pressure Factor		4x	4x	4x	4x	4x	4x	3x	3x	3x	2x
Burst Pressure Factor		6x	6x	6x	6x	6x	6x	5x	5x	4x	3x

from -1 to...	bar (gage)	0	1								
Proof Pressure	bar (gage)	-1 / +4	-1 / +4								
Burst Pressure	bar (gage)	6	6								

from 0 to...	PSI (gage)	5	10	15	20	30	50	75	100	150	200
from 0 to...	PSI (absolute)				20	30	50	75	100	150	200
Proof Pressure Factor		4x	4x	4x	4x	4x	4x	3x	3x	3x	2x
Proof Pressure Factor		6x	6x	6x	6x	6x	6x	5x	5x	4x	3x

Physical

Operating Life Cycle	min. 10 million full pressure cycles over the full range
Vibration Resistance	IEC 60068-2-64 (RANDOM) 20 PSD
Shock Resistance	100 g minimum according to DIN EN 60068-2-27
Drop Test	1 meter drop on concrete as per SAE J1455 / DIN EN 60068-2-3-1
Weight	≤ 50 grams
Ingress Protection	IP 65 or IP67 - depending on electrical connector
Medium Temperature	-30°C to + 120°C (others on request)
Environmental Temperature	-30°C to + 100°C (depending on internal and external seal ring capability) ¹
Storage Temperature	-30°C to + 100°C (depending on internal and external seal ring capability) ¹
Media	All class II fluids and gases compatible with stainless steel 304 (1.4301) and the internal and external (optional) seal ring material

Performance

Accuracy²	≤ 1 % of span ⁴
Non-linearity³	0.2 % of span ⁴
Non-repeatability	0.1 % of span ⁴
1-year stability	0.2 % of span ⁴
Temp. Coefficients - Zero	0.2 % of span / 10 K within temperature range 0°C to + 80°C.2 %
Temp. Coefficients - Span	0.2 % of span / 10 K within temperature range 0°C to + 80°C.2 %

Electrical

Output Signal	4...20 mA	0.5...4.5 VDC ratiometric	0...5 VDC	0...10 VDC
Operating Supply Signal	9-30 VDC ⁴	5 VDC $\pm$ 5% ⁴	8-30 VDC ⁴	14-30 VDC ⁴
Power Consumption	$\leq$ 600 mW	$\leq$ 25 mW	$\leq$ 600 mW	$\leq$ 600 mW
Overvoltage Protection	min. 33 VDC	min. 33 VDC	min. 33 VDC	min. 33 VDC
Short-circuit Proofness	not applicable	Yes ⁵	Yes ⁵	Yes ⁵
Insulation Voltage	500 VDC	500 VDC	500 VDC	500 VDC
Reverse Polarity Protection	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶
Load	$\leq (V_{sup}-8 \text{ VDC})/(0.02 \text{ A}) [\Omega]$	$\geq 4.7 \text{ k}\Omega$	$\geq 4.7 \text{ k}\Omega$	$\geq 4.7 \text{ k}\Omega$
Response Time	$\leq 5 \text{ ms max. to 63\% of full scale pressure with step change on input}$			

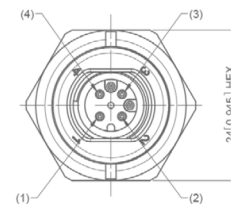
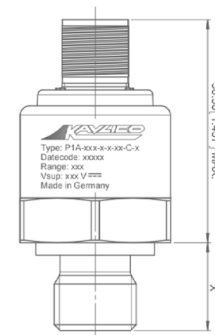


DIMENSIONS

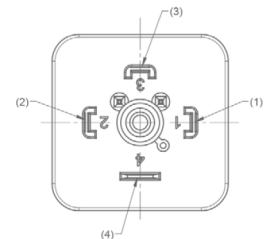
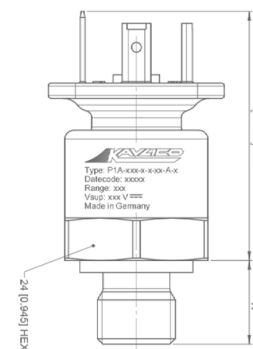
Dimensions in mm [Inch]

Pressure Sensor with Electrical Connection

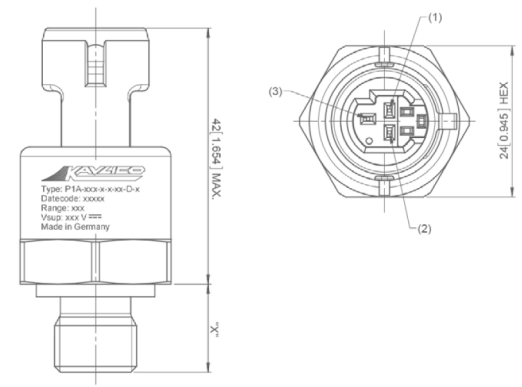
M12 Pin Call Outs				
Output	Pin 1	Pin 2	Pin 3	Pin 4
4-20 mA	Vsup	...	Iout	...
0.5-4.5 VDC ratiometric	Vsup	...	Vout	GND
0-5 VDC	Vsup	...	Vout	GND
0-10 VDC				



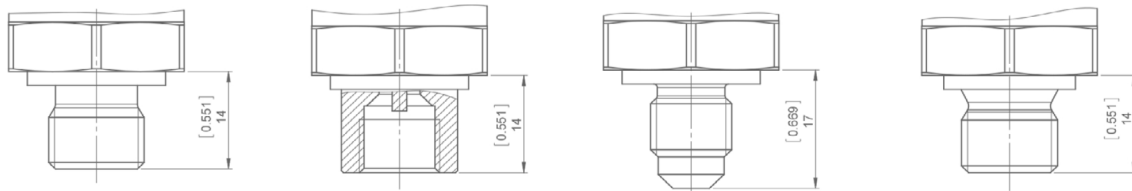
18 mm Pin Call Outs				
Output	Pin 1	Pin 2	Pin 3	Pin 4
4-20 mA	Vsup	Iout	...	...
0.5-4.5 VDC ratiometric	Vsup	Vout	GND	...
0-5 VDC	Vsup	Vout	GND	...
0-10 VDC				



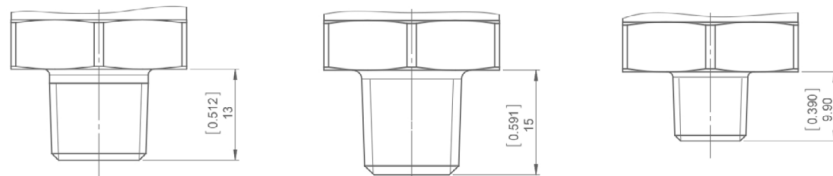
Packard (metri-pack 150) Pin Call Outs			
Output	Pin 1	Pin 2	Pin 3
4-20 mA	Iout	Vsup	...
0.5-4.5 VDC ratiometric	GND	Vsup	Vout
0-5 VDC	GND	Vsup	Vout
0-10 VDC			



Pressure Connections and Recommended Installation Torque



Name	G1/4A DIN 3852-E	7/16-20 UNF-2B SAE J1926-1	7/16-20 UNF-2A SAE J1926-2	G1/4A DIN 3852-A
Thread	External	Internal	External	External
Torque	20 Nm	20 Nm	20 Nm	20 Nm



Name	1/4-19 BSPT R1/4 PER DIN EN 10226	1/4-18 NPTF	1/8-27 NPTF
Thread	External	External	Internal
Torque	20 Nm	20 Nm	20 Nm

Note: Recommended torque may vary according to material and specific application



GENERAL NOTES

* for more options see How to Order

² Including non-linearity, hysteresis, non-repeatability, zero point and full scale error (corresponds to error of measurement per IEC 61298-2). Adjusted in vertical mounting position with pressure port down.

³ BFSL according to IEC 61298-2 reference conditions to EN 61298-1

⁴ Others on request

⁴ Unit shall be supplied by a power supply with double/reinforced insulation (SELV) and limited energy in accordance to UL/EN/IEC 61010-1 or LPS in accordance to UL/EN/IEC 60950-1 or class 2 per UL1310/UL1585 (NEC or CEC). The power supply shall be approved for usage above 2000m if the pressure sensor is used in this environment.

For indoor and outdoor use, not exposed to direct sunlight.

⁵ for min. 3 intervals at 5 minutes each

⁶ for min. 10 seconds on assigned pins



ORDERING OPTIONS

Example : P1A-06G-1-A-01-A-D

P1A Sensor, 0 - 2.5 bar Gage, 4 - 20 mA Output, No External Seal Ring, G1/4
DIN 3852-E Pressure Connection, with 18mm, EN 175301-803-A003MS, 4 pole
Electrical Connector and Fluorocarbon FKM Internal Seal Ring

Family	P1A	06	G	1	A	01	A	D
P1A								
Pressure Ranges								
01 0 - 0.25 Bar		50 0 - 5 PSI						
02 0 - 0.4 Bar		51 0 - 10 PSI						
03 0 - 0.6 Bar		52 0 - 15 PSI						
04 0 - 1 Bar		53 0 - 20 PSI						
05 0 - 1.6 Bar		54 0 - 30 PSI						
06 0 - 2.5 Bar		55 0 - 50 PSI						
07 0 - 4 Bar		56 0 - 75 PSI						
08 0 - 6 Bar		57 0 - 100 PSI						
09 0 - 10 Bar		58 0 - 150 PSI						
10 0 - 16 Bar		59 0 - 200 PSI						
30 -1 - 0 Bar								
31 -1 - 1 Bar								
Reference								
A: Absolute								
G: Gage								
Output								
1: 4-20 mA								
2: 0.5-4.5 VDC radiometric								
3: 0-5 VDC								
4: 0-10 VDC								
External Seal Ring								
A: None								
B: Fluorocarbon FKM (Viton)								
Only for pressure connection port option 1 lower temperature limited to -20°C								
C: Aluminium Washer G1/4								
Only for pressure connection port option 4								
D: Copper Washer G1/4								
Only for pressure connection port option 4								
F: Ethylene Propylene - EPDM								
Only for pressure connection port option 1								
Pressure Connection (Port)								
01: G 1/4A DIN 3852-E								
02: 7/16-20UNF-2B (female) SAE J1926-1 (modified)								
With 45° cone and schrader								
03: 7/16-20UNF-2A (male) SAE J1926-2 (modified)								
With 45° cone								
04: G1/4A DIN 3852-A								
05: 1/4-19 BSPT								
Is equivalent to 1/4-19PT and R1/4 per DIN EN 10226 5								
06: 1/4-18 NPTF								
11: 1/8-27 NPTF								
Built-In Electrical Connection								
A: 18mm, EN 175301-803-A003MS, 4 pole								
Sensor delivered without mating connector								
C: M12, 4 pole according to IEC 61076-2-101								
Sensor delivered without mating connector								
D: Packard Metri-Pack 150, 3 pole								
Sensor delivered without mating connector								
Internal Seal Ring								
C: Neoprene - CR								
Operating Temp: - 30 to 120°C								
D: Fluorocarbon - FKM (VITON)								
Operating Temp: - 20 to 120°C								
E: Fluorosilicone - FVMQ								
Operating Temp: - 30 to 120°C								
F: Ethylene Propylene - EPDM								
Operating Temp: - 30 to 120°C								



Before installation and operation, ensure that the appropriate pressure sensor has been selected in terms of pressure range, design and specific measuring conditions. Non-compliance can result in serious injury and/or damage to the equipment.

Warning: The product information contained in this catalogue is given purely as information and does not constitute a representation, warranty or any form of contractual commitment. Kavlico reserve the right to modify their products without notice. It is imperative that we should be consulted over any particular use or application of our products and it is the responsibility of the buyer to establish, particularly through all the appropriate tests, that the product is suitable for the use or application. Under no circumstances will our warranty apply, nor shall we be held responsible for any application (such as any modification, addition, deletion, use in conjunction with other electrical or electronic components, circuits or assemblies, or any other unsuitable material or substance) which has not been expressly agreed by us prior to the sale of our products.



AGENCY APPROVALS & CERTIFICATIONS



Pressure equipment directive 97/23/EC
EMC directive 2004/108/EG,
IEC 61326 Emission (Group 1, Class B) and Immunity (industrial locations)



2011/65/EU ROHS Directive



In Process

Sensata Technologies, Inc. ("Sensata") data sheets are solely intended to assist designers ("Buyers") who are developing systems that incorporate Sensata products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products. Sensata data sheets have been created using standard laboratory conditions and engineering practices. Sensata has not conducted any testing other than that specifically described in the published documentation for a particular data sheet. Sensata may make corrections, enhancements, improvements and other changes to its data sheets or components without notice.

Buyers are authorized to use Sensata data sheets with the Sensata component(s) identified in each particular data sheet. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER SENSATA INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN. SENSATA DATA SHEETS ARE PROVIDED "AS IS". SENSATA MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE DATA SHEETS OR USE OF THE DATA SHEETS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. SENSATA DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO SENSATA DATA SHEETS OR USE THEREOF.

All products are sold subject to Sensata's terms and conditions of sale supplied at www.sensata.com SENSATA ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR THE DESIGN OF BUYERS' PRODUCTS. BUYER ACKNOWLEDGES AND AGREES THAT IT IS SOLELY RESPONSIBLE FOR COMPLIANCE WITH ALL LEGAL, REGULATORY AND SAFETY-RELATED REQUIREMENTS CONCERNING ITS PRODUCTS, AND ANY USE OF SENSATA COMPONENTS IN ITS APPLICATIONS, NOTWITHSTANDING ANY APPLICATIONS-RELATED INFORMATION OR SUPPORT THAT MAY BE PROVIDED BY SENSATA.

Mailing Address: Sensata Technologies, Inc., 529 Pleasant Street, Attleboro, MA 02703, USA.

CONTACT US

Americas

+1 (800) 350 2727

sensors@sensata.com

Europe, Middle East & Africa

+33 (3) 88 20 8080

position-info.eu@sensata.com

Asia Pacific

sales.isasia@list.sensata.com

China +86 (21) 2306 1500

Japan +81 (45) 277 7117

Korea +82 (31) 601 2004

India +91 (80) 67920890

Rest of Asia +886 (2) 27602006
ext 2808