# Pressure Sensor/PS(ADP4), PF(ADP1)

# Pressure Sensor PS/PF





PF Pressure Sensor

Jul 2015

High precision pressure sensor (without amp.)

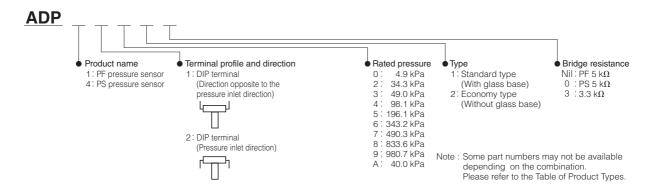
# **Features**

- Compact size (PS type)
- High accuracy and liner characteristic
- Broad line-up
- RoHS compliant

# **Typical Applications**

- Industrial use: pressure switches and pneumatic components, compressed air pressure measuring devices and airbeds
- Medical use: blood pressure meters, oxygen generator and airbeds
- Others: pressure sensing devices for air pressure mediums

# **Ordering Information**



### **Types** Part No Brige resistance PS pressure sensor PF pressure sensor $5 \, \mathrm{k}\Omega$ $5 \text{ k}\Omega$ $3.3~\mathrm{k}\Omega$ $3.3~\mathrm{k}\Omega$ Terminal DIP terminal: DIP terminal: SMD terminal DIP terminal: DIP terminal: DIP terminal: DIP terminal: DIP terminal: DIP terminal: Direction opposite | Pressure inlet Pressure inlet Direction opposite Pressure inlet Direction opposite Direction opposite Pressure inlet Pressure to the pressure direction to the pressure direction to the pressure direction to the pressure direction inlet direction inlet direction inlet direction inlet direction 4.9kPa ADP1201 ADP41010 ADP42010 ADP1101 34.3kPa ADP41210 ADP42210 ADP1121 ADP1221 49.0kPa ADP41310 ADP42310 ADP1131 ADP1231 98.1kPa ADP41410 ADP42410 ADP4932 ADP41413 | ADP42413 ADP1241 ADP1141 Standard type 196.1kPa ADP41510 ADP42510 ADP1251 (with glass ADP1151 base) 343.2kPa ADP1261 ADP41610 ADP42610 ADP1161 490.3kPa ADP41710 ADP42710 ADP1171 ADP1271 833.6kPa ADP41810 ADP42810 ADP1181 ADP1281 980.7kPa ADP41910 ADP42910 ADP41913 | ADP42913 ADP1191 ADP1291 ADP4933 Economy type ADP11A23 ADP12A23 (without glass 40.0kPa ADP41A23 ADP42A23 base)

Standard packing: Carton: 100 pcs.; Case: 1,000 pcs.

Rating							
Туре	Standard type (With glass base)				Economy type (Without glass base)		
Type of pressure	Gauge pressure						
Pressure medium	Air *2						
Rated pressure (Unit: kPa)	4.9	34.3 to 343.2 490.3	833.6	980.7	98.1 <b>*</b> <sup>3</sup>	980.7 <b>*</b> <sup>3</sup>	40.0
Max. applied pressure	Twice of	f the rated pressure		es of the oressure	Twice of the rated pressure	1.5 times of the rated pressure	Twice of the rated pressure
Bridge resistance	$5{,}000~\Omega~\pm1{,}000~\Omega$			3,300 Ω	±700 Ω	3,300 Ω ±600 Ω	
Ambient temperature	-20 °C to +100 °C -4 °F to +212 °F (no freezing or condensation)			−5 °C to +50 °C 23 °F to +122 °F			
Storage temperature	-40 °C to +120 °C -40 °F to +248 °F (no freezing or condensation)			-20 °C to +70 °C -4 °F to +158 °F			
Standard temperature	25 °C 77 °F 30 °C 86			86 °F	25 °C 77 °F		
Temperature compensation range	0 °C to 50 °C 32 °F to +122 °F				60 °C +140 °F	5 °C to 45 °C 41 °F to +113 °F	
Drive current (constant current)	1.5 mA.DC			1.0 mA.DC		1.5 mA.DC	
Output span voltage	40±20 mV 100±40 mV		65±25 mV		43.5±22.5 mV		
Offset voltage	±20 mV				±15 mV		
Linearity	±0.7 %FS	±0.3 %FS ±0.5 %FS	±0.6	%FS	±1.0	%FS	±0.3 %FS
Pressure hysteresis	±0.6 %FS ±0.2 %FS ±0.4 %FS ±1.0 %		%FS	±0.7 %FS			
Offset voltage-temperature characteristics *4	±15 %FS	%FS ±5.0 %FS		±3.5 %FS		±10 %FS	
Sensitivity-temperature characteristics *4	±10 %FS	10 %FS ±2.5 %FS			±1.3 %FS		

Notes: \*1 Unless otherwise specified, measurements were taken with a drive current of ±0.01 mA.DC and humidity ranging from 25% to 85%.

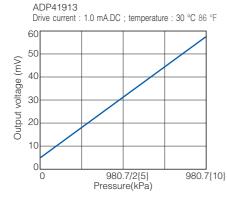
- \*2 Please consult us if a pressure medium other than air is to be used.
- \*3 For PS pressure sensor only
- \*4 This is the regulation which applies within the compensation temperature range
- \*5 Please consult us if the intended use involves a negative pressure.

# **Reference Data**

# [PS pressure sensor]

# Characteristics data

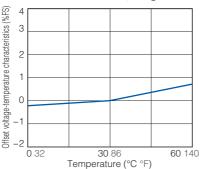
1.-(1) Output characteristics



1.-(2) Offset voltage - temperature characteristics

ADP41913

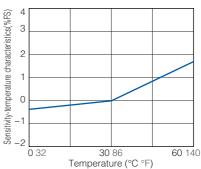
Drive current: 1.0 mA.DC; rating ±3.5 %FS



1.-(3) Sensitivity -temperature characteristics

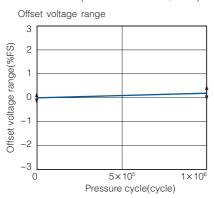
ADP41913

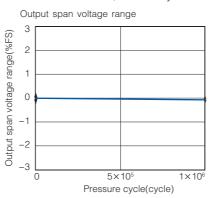
Drive current: 1.0 mA.DC; rating ±2.5 %FS



Pressure cycle range (0 to rated pressure)

Tested sample: ADP41913, temperature: 100 °C 212 °F, No. of cycle: 1×106





Even after testing for 1 million times, the variations in the offset voltage and output span voltage are minimal.

# Pressure Sensor/PS(ADP4), PF(ADP1)

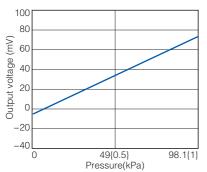
# [PF pressure sensor]

# Characteristics data

### 1.-(1) Output characteristics

ADP1141

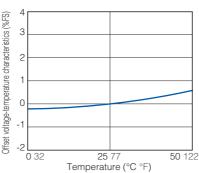
Drive current : 1.5 mA.DC; temperature : 30 °C 86 °F



1.-(2) Offset voltage - temperature characteristics

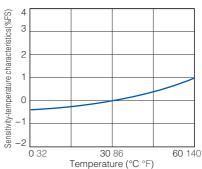
ADP1141

Drive current: 1.5 mA.DC; rating ±5 %FS



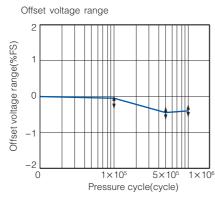
1.-(2) Sensitivity - temperature characteristics
ADP1141

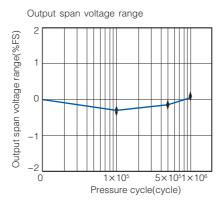
Drive current : 1.5 mA.DC; rating ±2.5 %FS



# • Pressure cycle range (0 to rated pressure)

Tested sample: ADP1131, temperature: 25 °C 77 °F





Even after testing for 1 million times, the variations in the offset voltage and output span voltage are minimal.

Jul. 2015

# **Evaluation Test**

Classification	Tested item	Tested condition		
Environmental characteristics	Storage at high temperature	Temperature: Left in a 120 °C 248 °F constant temperature bath Time: 1,000 hrs.	Passed	
	Storage at low temperature	Temperature: Left in a -40 °C -40 °F constant temperature bath Time: 1,000 hrs.	Passed	
	Humidity	Temperature/humidity: Left at 40 °C 104 °F, 90 % RH Time: 1,000 hrs.	Passed	
	Temperature cycle	Temperature: -40 °C to 120 °C -40 °F to 248 °F 1 cycle: 30 Min. Times of cycle: 100	Passed	
Endurance characteristics	High temperature/ high humidity operation	Temperature/humidity : 40°C 104°F, 90% RH Operation times : 10 <sup>6</sup> , rated voltage applied.	Passed	
Mechanical characteristics	Vibration resistance	Double amplitude: 1.5 mm 0.059 inch Vibration: 10 to 55 Hz Applied vibration direction: X, Y, Z 3 directions Times: 2 hrs each	Passed	
	Dropping resistance	Dropping height: 75 cm 29.528 inch Times: 2 times	Passed	
	Terminal strength	Pulling strength: 9.8 N {1 kgf}, 10 sec. Bending strength: 4.9 N {0.5 kgf}, left and right 90 ° 1 time	Passed	
Soldering resistance	Soldered in DIP soldering bath	Temperature : 230 °C 446 °F Time : 5 sec.	Passed	
	Temperature	Temperature: 260°C 500 °F Time: 10 sec.	Passed	

Note: For details other than listed above, please consult us.

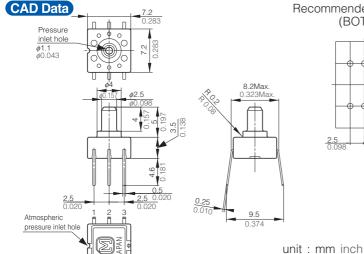
Items	Criteria
Offset valtage Output span voltage	Variation amount within ±5.0%FS of value

# **Dimensions**

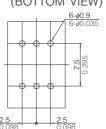
The CAD data of the products with a CAD Data mark can be downloaded from: http://industrial.panasonic.com/

# [PS pressure sensor]

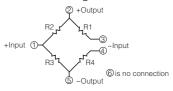
● Terminal direction : DIP terminal Direction opposite to the pressure inlet direction ADP41□□□



Recommended PC board pattern (BOTTOM VIEW)







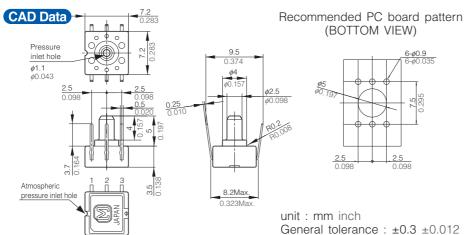
Terminal No.	Name
1	Power supply (+)
2	Output (+)
3	Power supply (-)
4	Power supply (-)
5	Output (–)
6	No connection

Note: Leave terminal 6 unconnected.

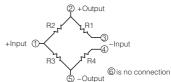
Terminal connection

diagram

■ Terminal direction : DIP terminal Pressure inlet direction ADP42□□□



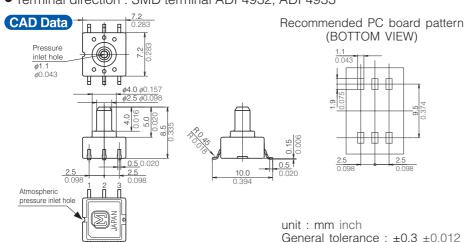
General tolerance: ±0.3 ±0.012



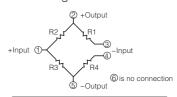
Terminal No.	Name
1	Power supply (+)
2	Output (+)
3	Power supply (-)
4	Power supply (–)
5	Output (–)
6	No connection

Note: Leave terminal 6 unconnected.

• Terminal direction: SMD terminal ADP4932, ADP4933



Terminal connection diagram



Terminal No.	Name	
1	Power supply (+)	
2	Output (+)	
3	Power supply (-)	
4	Power supply (-)	
5	Output (–)	
6	No connection	

Note: Leave terminal 6 unconnected:

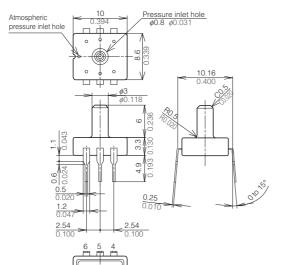
# **Dimensions**

The CAD data of the products with a CAD Data mark can be downloaded from: http://industrial.panasonic.com/

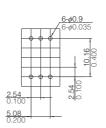
# [PF pressure sensor]

● Terminal direction : DIP terminal Direction opposite to the pressure inlet direction ADP11□□(□)

# **CAD Data**

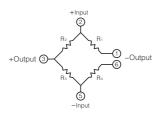


Recommended PC board pattern (BOTTOM VIEW)



Tolerance: ±0.1

Terminal connection diagram



Terminal No.	Name
1	Output (–)
2	Power supply (+)
3	Output (+)
4	No connection
5	Power supply (-)
6	Output (–)

Note: Leave terminal 4 unconnected.

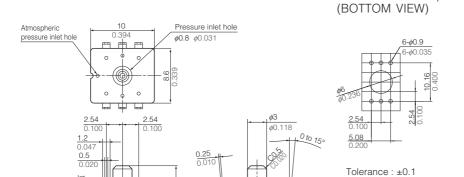
unit : mm inch

General tolerance: ±0.3 ±0.012

Recommended PC board pattern

● Terminal direction : DIP terminal Pressure inlet direction ADP12□□(□)

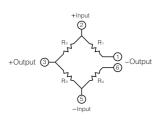
# **CAD Data**



JAPAN

unit: mm inch General tolerance: ±0.3 ±0.012

# Terminal connection diagram



Terminal No.	Name		
1	Power supply (+)		
2	Output (+)		
3	Power supply (-)		
4	Power supply (-)		
5	Output (–)		
6	No connection		

Note: Leave terminal 4 unconnected.

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# Pressure Sensor/PS(ADP4), PF(ADP1)

# **NOTES**

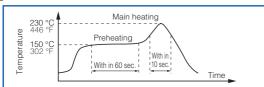
### Mounting

Use the land of the printed-circuit board on which the sensor is securely fixed

### Soldering

Avoid the external thermal influence as the product has a limited thermal capacity due to its compact structure. Heat deformation may damage the sensor or deteriorate its performance. Use the non-corrosive rosin flux. Prevent the flux from entering into the inside of the product as the sensor is exposed to the atmosphere.

- 1) Manual soldering
  - Raise the temperature of the soldering tip between 260 and 300 °C 500 and 572 °F (30 W) and solder within 5 seconds.
     The sensor output may vary if the load is applied on the
  - terminal during soldering.
  - Keep the soldering tip clean.
- 2) DIP soldering (DIP Terminal)
   Keep the temperature of the DIP solder tank below 260 °C 500 °F and solder within 5 seconds.
  - To avoid heat deformation, do not perform DIP soldering when mounting on the circuit board which has a small thermal capacity.
- 3) Reflow soldering (SMD Terminal)
  - · The recommended reflow temperature profile conditions are given below.



- We recommend the screen solder printing method as the method of cream.
- Please refer to the recommended PC board specification diagram for the PC board foot pattern.
- · Self alignment may not always work as expected, therefore, please carefully the position of the terminals and pattern.
- The temperature of the profile is assumed to be a value measured with the printed wiring board of the terminal
- Please evaluate solderbility under the actual mounting conditions since welding and deformation of the pressure inlet port may occur due to heat stress depending on equipments or conditions.
- 4) Rework soldering
  - Complete rework at a time.
  - · Use a flattened soldering tip when performing rework on the solder bridge. Do not add the flux.
  - Keep the soldering tip below the temperature described in the specifications
- 5) Avoid drop and rough handling as excessive force may deform the terminal and damage soldering characteristics
- 6) Keep the circuit board warpage within 0.05 mm of the full width of the sensor.
- After soldering, do not apply stress on the soldered part when cutting or bending the circuit board.
- Prevent human hands or metal pieces from contacting with the sensor terminal.
  - Such contact may cause anomalous outlets as the terminal is exposed to the atmosphere.

- 9) After soldering, prevent chemical agents from adhering to the sensor when applying coating to avoid insulation deterioration of the circuit board
- 10) Please consult us concerning leadfree soldering.

### Cleaning

- · Prevent cleaning liquid from enteringthe inside of the product as the sensor is exposed to the atmosphere.
- Do not perform ultrasonic cleaning in order to prevent damages to the product.

### Environment

- 1) Avoid use and storage in the corrosive gas (organic solvent, sulfurous acid and hydrogen sulfide gases) which negatively affects the product.
- Avoid use in a place where these products come in contact with water as the sensor does not have a splash-proof construction.
- Avoid use in an environment where these products cause dew condensation.
  - When water attached to the sensor chip freezes, the sensor output may be fluctuated or damaged.
- 4) Due to the structure of the pressure sensor chip, the output varies under light.
  - Do not expose the sensor chip to light when applying a voltage by using a transparent tube.
- 5) Do not apply high-frequency oscillation, such as ultrasonic waves, to the product

# Quality check under actual use conditions

These specifications are for individual components. Before use, carefully check the performance and quality under actual use conditions to enhance stability.

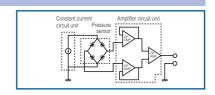
# Other precautions

- 1) The wrong mounting method and the pressure range may invite the risk of accidents
- 2) Only applicable pressure medium is dry air. Avoid use in the corrosive gas (organic solvent, sulfurous acid and hydrogen sulfide gases) or other mediums containing moisture or foreign substances. Such mediums may damage or break the product.
- The pressure sensor chip is located inside the pressure introduction port. Do not insert foreign substances, such as wires, into the port as those substances may damage the chip and close the port. Do not block the atmosphere introduction
- 4) Use electric power within the rated power range. Use beyond the range may damage the product.
- Follow below instructions as static electricity may damage the product:
  - (1) For Storage, short the circuit between terminals by using conductive substances or wrap the whole chip with aluminum foil. For storage and transportation, avoid plastic containers which are easily electrified.
  - Before use, connect electrified materials on desk and operators to the ground in order to safely discharge static electricity.
- 6) Carefully select and fix tubes, introduction pipes and products based on the working voltage. Please contact us for any inquires.

# **APPLICATION CIRCUIT DIAGRAM (EXAMPLE)**

The pressure sensor converts a voltage by constant current drive and if necessary, amplifies the voltage.

The circuit on the right is a typical use example.



# **MOUNTING METHOD**

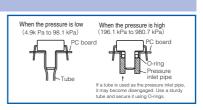
The general method of air pressure transmission varies depending on the low/high pressure condition.

- (1) Select a study pressure introduction pipe to avoid pressure leak.
- (2) Securely fix the pressure introduction pipe to avoid pressure leak.

Should a safety concern arise regarding this product, please be sure to contact us immediately

(3) Do not block the pressure introduction pipe.

Methods of transmitting air pressures



# **ПОСТАВКА** ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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# Офис по работе с юридическими лицами:

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