

**Nidec**  
**NIDEC COPAL ELECTRONICS CORP.**  
**Pressure Transducer**  
**PA-97xS**  
 CE marking (EMC/RoHS directive)  
 Instruction Manual Ver.1.2

Thank you very much for choosing our product. Please be sure to read through the Operating Instructions before operating the product to ensure correct and optimal use. Keep the Operating Instructions handy for future reference.

**Operating precautions**

Be sure to read the Operating precautions before using the product. This caution mark indicates of physical damages to the user and/or the product if it is used improperly. The damage can be substantial.

The applicable media are gases/liquids compatible with SUS630. So please be careful about compatibility with applicable media. Use of corrosive fluid may cause injury and/or malfunction of products. In addition, the product is not explosive-proof. Never use flammable fluid as media.

Do not apply pressures that exceed the maximum rated pressure. Should this precaution be neglected, there is a possibility that the characteristics will vary or the output will become unstable.

Do not insert foreign materials, such as a wire, into the pressure port. Should this precaution be neglected, the characteristics may vary or the product may be damaged.

The sensor itself guarantees the operating temperature range from -40 to 125 °C. However sometimes the cable's temperature range (This option cable is up to 105°C) is less than the sensor's one. Please use after confirming well.

Do not insert foreign materials, such as a wire, into the pressure port. Should this precaution be neglected, the characteristics may vary or the product may be damaged.

Do not apply excessive force to the housing or the cables during the piping/wiring work. Should this precaution be neglected, the characteristics may vary or the product may be damaged.

Do not improperly connect the wires to the terminals. Should this precaution be neglected, the internal circuit may be damaged.

The mounting and dismounting must be carried out with the power switched off and at zero pressure.

The protective construction of the product is IP67. Do not use the product in an environment exceeding the IP67 rating. Should this precaution be neglected, there is a possibility of product failure.

Be sure to use a stable DC power supply source for the power supply unit. For protection of induction load of the relay or the solenoid, be sure to insert a surge-absorbing element (diode, varistor, etc.). For use of a power supply unit such as a switching power supply, be sure to provide an FG terminal.

Wires should be installed apart from the power line that handles high power as far as possible.

Please note that dew condensation due to sudden temperature transition, freezing within the pressure port (measurement of water pressure etc.) will cause malfunction.

Please handle the sealing surface and O-ring carefully so as not to scratch. The scratch may cause inferiority of sealing capability.

When using the optional connector cable, tighten fitting by hand after fully inserting the connector. If the tightening and inserting is inadequate, the product may fail to meet the specified IP.

In the insertion and removal of the connector, please check the direction with the product and connector grabbed tightly. Inadequate insertion and/or removal of the connector may cause product failure.

Please install it gently to the hexagon with a spanner (size: 22) matching the size and the maximum torque should be less than 35Nm. Be careful not to apply unnecessary force to the sensor body and cable at that time.

For use under the strong noise, consider shorting the sensor signal GND to the sensor body.

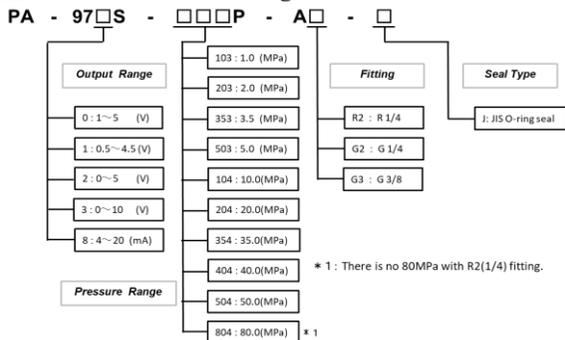
Standard O-ring material is NBR(-20~100°C). Please be aware of the medium and the temperature.

The atmosphere opening hole is not opened in the range above 353P. Please use the hole so as not to block it.

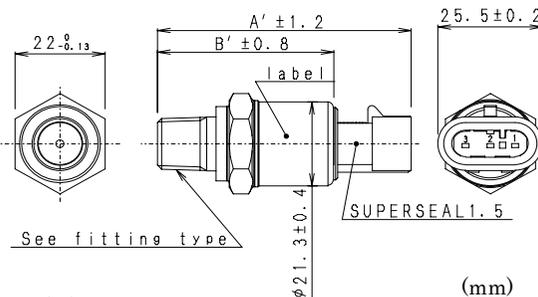
**Maintenance Precautions**

- Make sure the product operates normally before using. Unexpected event may cause product failure and affect its basic function.
- Do not disassemble or modify the product. Unauthorized disassembly or modification may result in a malfunction. The product warranty does not cover failures caused by disassembly and/or modification of the product.
- Stains on the product should be wiped off with a cloth immersed in a neutral detergent diluted water. Dry it with a soft cloth after they are wiped off. At this time, be careful not to allow the neutral detergent solution to enter the inside of the product. Infiltration of the neutral detergent solution may cause product failure.
- M12 connector of optional is compliant to IEC61076-2-101. If you would like to use cable other than the optional cable, please make sure the cable is indeed in compliance with the proper standard. Some cables don't meet IP standard, so please check it before using.

**Model Number Designation**



**Outline dimensions**

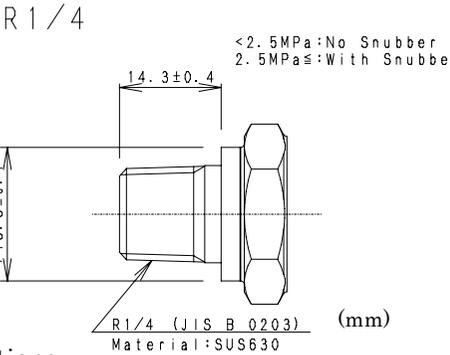
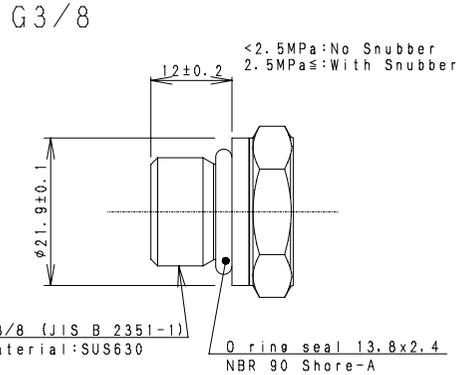
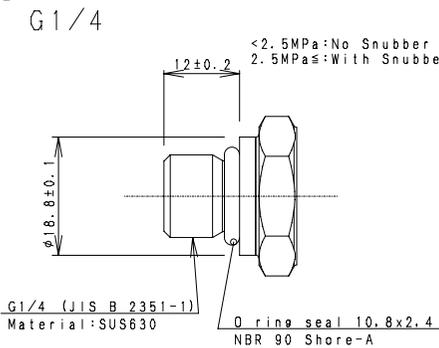


**Detail (mm)**

Type	A'	B'	971S A'	971S B'	Fitting
PA-97*S-***P-AG2-J	59.65	40.75	53.2	34.3	G 1/4
PA-97*S-***P-AG3-J	59.65	40.75	53.2	34.3	G 3/8
PA-97*S-***P-AR2	61.95	43.05	55.5	36.6	R 1/4

	Pin Assignment		
	Pin1	Pin2	Pin3
PA-970S	GND(Common)	SIG(Output)	Vcc(Power)
PA-971S	GND(Common)	SIG(Output)	Vcc(Power)
PA-972S	GND(Common)	SIG(Output)	Vcc(Power)
PA-973S	GND(Common)	SIG(Output)	Vcc(Power)
PA-978S	SIG(Output)	DNC(N.C.)	Vcc(Power)

**Fitting**

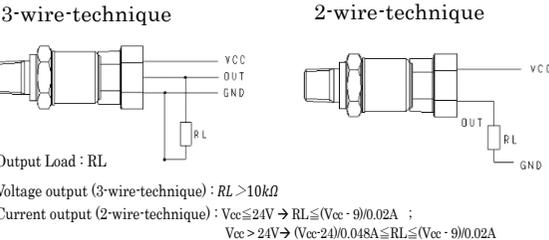


**Specifications**

Unless otherwise noted, all specifications are specified under the condition of ambient temperature of 25±5°C, supply voltage of 24VDC, 5VDC (ratiometric), and rated pressure range.

Item	Specification				
	Gauge pressure (MPa)				
Pressure type	103P	203P	353P	503P	104P
Pressure range	1.0	2.0	3.5	5.0	10
Rated pressure	4.0	4.0	10	10	20
Maximum pressure	7.0	7.0	50	50	100
Burst pressure	204P	354P	404P	504P	804P
Pressure range	20	35	40	50	80
Rated pressure	50	80	80	100	100
Maximum pressure	250	400	400	400	400
Burst pressure	-40 ~ 125 °C				
Operating temp.	-40 ~ 125 °C				
Storage temp.	95%RH maximum (No condensation)				
Operating humidity	Gas or liquid that can be used with SUS630				
Media	100MΩ minimum				
Insulation	G1/4, G3/8, R1/4				
Fitting	Approx. 50g				
Weight	IP67				
Protection grade	970S	9~36V DC			
Operating voltage	971S	5V DC ±10%			
	972S	9~36V DC			
	973S	14~36V DC			
	978S	9~36V DC			
Current Consumption	20 mA maximum				
Output Voltage/Current	970S	971S	972S	973S	978S
	1~5V	0.5~4.5V Ratiometric	0~5V	0~10V	4~20mA
Zero Voltage/Current	1 ± 0.06V	0.5 ± 0.06V	0+ 0.075V	0+ 0.15V	4 ± 0.24mA
Full Voltage/Current	5 ± 0.06V	4.5 ± 0.06V	5 ± 0.075V	10 ± 0.15V	20 ± 0.24mA
Linearity/Hysteresis/Repeatability	± 0.25 %FS				
Total Accuracy	± 0.5 %FS(0~105°C) / ± 1.5 %FS(-40~0°C/105~125°C) : (Include Linearity, Hysteresis and Repeatability.)				
Response	1 ms maximum				

**Wiring**

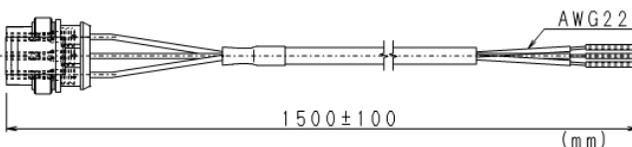


**Option Cable (Not subject to UL)**

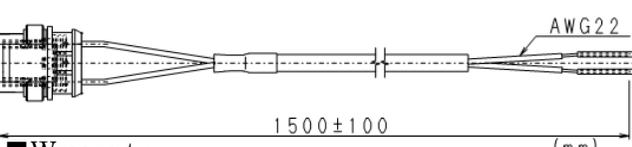
This is a color and function for an optional connector cable.

PA-970S/PA-971S PA-972S/PA-973S		PA-978S	
Color	Function	Color	Function
White	SIG(Output)	white	SIG(Output)
Blue	GND(Common)	—	—
Brown	Vcc(Power)	Brown	Vcc(Power)

\* PA-97S-V152C (For PA-970S/PA-971S/PA-972S/PA-973S)



\* PA-97S-A152C (For PA-978S)



**Warranty**

The warranty period for the product shall be one year. A failure due to causes attributed to design or manufacturing defects during the period one year from the date of delivery shall be repaired or replaced free of charge. However, the term "warranty" herein referred to shall imply the warranty for the product unit only, and damages from failure of the product shall be excluded. The following shall be excluded from the warranty:

- Failure or damage caused by improper use and careless operation in violation of the Operating Instructions.
- Failure or damage caused by inappropriate modification, adjustment, or repair.
- Failure or damage caused by acts of God, fire, or other unavoidable accidents.
- Replacement of accessories (O-ring, etc.) that come with the product.

This product is not intended to be used for equipment that may cause direct harm to life or body, or equipment that may cause significant physical damage. (Aerospace and space related equipment, railway vehicles, nuclear power equipment, military equipment, etc.)

The Company is not liable for any damages arising from the use of this product for purposes not intended by the Company.

[Warning]

Copying or reprinting the entire or part of the Operating Instructions shall be prohibited except where exceptions to copyright laws apply. Furthermore, descriptions stated in the Operating Instructions are subject to change without prior notice.

For inquiries regarding the product, please contact:  
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